Barriers to accessing funding for women entrepreneurship technology start-ups in South Africa

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

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ABSTRACT

Orientation- High growth ventures (HGVs) which comprise young firms known as gazelles or super start firms have been known to be the biggest contributors towards economic growth. However, these types of firms are rare in developing economies, compared to developed economies. Even though Africa boasts some of the highest numbers of female entrepreneurs in the world at 27%, most of these ventures have little opportunity to grow, and numbers are even lower in high growth ventures as women entrepreneurs are in short supply.

Motivation for the study- There is an observation that the rates of women entrepreneurship is low compared to men in South Africa, the rates are even fewer in the high growth start-up space. It has also been argued that because women start-ups are underfunded or struggle to access adequate funding, this has contributed to the low rates.

Research purpose- The purpose of the study is to investigate the perceived barriers to accessing funding for women-led technology startups in South Africa. This is due to the fact that funding is a significant factor when it comes to the growth and success of a business.

Design/Methodology/Approach- The study was cross sectional and quantitative in nature. A self-administered survey was sent to founders and leaders of women-led tech startups in South Africa. An aggregate of 53 women technology start-up owners or partners of male technology start-ups working in different fields of the technology industry collectively took part in the survey. Validity, reliability, correlation and multiple regression were performed to test the relationship between the variables.

Main findings- Aspects that were investigated for the study included networks, bias (investor bias and stereotypes), confidence and access to funding. The results show that although women face these barriers when it comes to accessing funding for their businesses in terms of networks, investor bias and gender stereo types, their influence on access to funding is however not as strong, nor it is as significant.

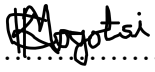
Contribution/Value add- This study contributes towards adding knowledge and a better understanding of the perceived barriers that women technology start-ups face when it comes to accessing funding in South Africa; this will allow for a better understanding on how to assist or come up with viable solutions and create a better environment for women entrepreneurs in South Africa.

Key words: women-led technology start-ups, funding, female entrepreneurship, barriers, perception, access to funding.

DECLARATION

I, Claire Kagiso Mmamodumedi Mogotsi, 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 the Field of Entrepreneurship and New Venture Creation at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Claire Kagiso Mmamodumedi Mogotsi



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Signed at Wits Business School

On the……7th……. day of……July…… 2023.

DEDICATION

I would like to dedicate this research report to my family. This is with a very special mention to my late grandfather, Mr Log Ditlhong Mogotsi. I know how you truly valued education and wanted us, your grandchildren, to succeed and excel in that, and I truly hope that by completing this programme, I have made you proud. I pray that you continue to watch over me.

I would also like to dedicate this project to all the women who continue to set trends and break barriers. To the women that continuously encourage young women like me to lead and to do well in whatever field that they are in. Thank you!

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I'd like to firstly, thank God for getting me this far. I have prayed to get an opportunity to complete my Masters, and God made it possible to not only get through the programme but also to complete such an important project that I am passionate about. One of my favourite scriptures from the bible Psalms 20:4 reads as follows "May he give you the desires of your heart and make all your plans succeed".

To my Supervisor, Professor Boris Urban, thank you for your continuous guidance and encouragement throughout the various stages of the research process. Thank you for supervising this work, and I really appreciate you lending me your expertise as it enabled me to pursue and complete this study. I appreciated how you also allowed room for autonomy.

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To all the women who participated in my study, and also those who connected me to their networks, I would like to express my gratitude. This study would not have been possible without your enormous contributions and for that I am eternally grateful.

To my mom, Ms Mmathari Mogotsi, thanks for being by my side, for believing in me, and also ensuring that I get the best education. Lastly to my aunts, uncles and cousins I couldn't have done this without your love and support. Thank you to my friends and colleagues for always giving me words of encouragement especially when the tough got going, especially Susan Maina, for walking this journey with me.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

High Growth Ventures (HGV's) are some of the largest contributors to economic growth in the world. These firms are also informally known as "gazelles" or "super start firms" (Gonzales-Uribe & Reyes, 2020). Gonzales-Uribe and Reyes (2020) further claim that these types of firms are rare in developing economies compared to developed economies. Additionally, these businesses or enterprises contribute significantly to economic growth (Gonzales-Uribe & Reyes, 2020). According to Toesland (2018) even though sub-Saharan Africa boasts the world highest rates of women entrepreneurs in the world at 27%, most of these ventures are small businesses with little opportunity for growth. One could argue that this could be due to market failures, especially in developing economies, mainly due to a lack of entrepreneurial capital which can prevent individuals from successfully growing their businesses (Gonzales-Uribe & Reyes, 2020). Moreover, when looking at the rates between men and women in high-growth technology start-ups, women seem to be under-represented or are in short supply (Jackson, 2020). For instance, women start-ups only account for single digit numbers in Africa as only 9% of startups have women leaders (Jackson, 2020).

Entrepreneurial capital is important for the growth of a new venture. For instance, having access to social capital, such as formal networks like venture capitalists, business angels, accountants or business personnel gives the entrepreneur an opportunity to mobilise access to other forms of resources, like financial capital, that are crucial for new businesses (Cooper, Hampton & McGowan, 2011). Financial capital is a huge part of entrepreneurial capital. Thus, having access to financial resources in the initial stages of the business contributes immensely to the growth of technology start-ups. Therefore, without funding, these businesses cannot grow to their full potential. For instance, sources of funding such as Venture Capitalists (VCs) are a critical source of finance, including seed money, development or start-up capital, and expansion capital (Venter & Urban, 2015). In exchange for some ownership and control, these VCs support companies with strong growth and profit potential (Venter & Urban, 2015). As a result, it is critical that women in technology businesses have access to this capital. The underrepresentation of women in the technology

space is not just prevalent in techno-entrepreneurship (Kushel, Labra & Diaz, 2018), but also in other types of entrepreneurship, and that should be concerning (Bryan, 2018). Women in entrepreneurship face many barriers when starting their businesses, particularly when it comes to accessing funding (Mijid, 2015, as cited in Bryan, 2018). There are various factors that have been justified as reasons for this lack of funding by various scholars, thus justifications stem from networking, gender bias, confidence, motivation, and education, as some of the barriers for women-led startups that prevent them from accessing funding (Losocco & Bird., 2012; With, Guiliani, Coleman, Ebrahim & Weis., 2021; Valla 2001; Bryan; 2018, Carranza, Dhakal & Love., 2018). In addition, Losocco and Bird (2012) argue that the explanations offered by scholars for this gender gap between male and female entrepreneurs are irreconcilable and inadequate.

Thus, taking this into consideration, the aim of this paper is to investigate the perceived barriers to accessing funding, particularly for women-led technology start-ups in the South African context. This is to get a better understanding and to provide effective solutions to ensure that women receive greater access to funding, in turn improving the rates of women-led technology start-ups in the entrepreneurship space. The paper is structured as follows. This paper firstly gives an explanation of the study's context, the theoretical underpinnings and literature review from which the hypothesis of the study is derived. This paper secondly, discusses the methodological approach, the data collection and data analysis techniques that are followed. Thirdly, presents the results of the tested hypothesis. This then is followed by a discussion of the findings in comparison to existing theories and literature, the study's limitations, implications and concludes with a list of potential future research topics.

1.2 Context of the study

South Africa has one of the highest rates when it comes to youth unemployment, inequality and poverty. For instance, the official national unemployment rate currently stands at 34,5% (Statistics South Africa, 2022). In addition, South Africa faces significantly greater employment challenges than other countries that form part of the BRICS group as these have unemployment rates lower than 12% (Bowmaker-Falconer & Herrington, 2020). Entrepreneurship has been hailed as a key driver towards economic development (Meyer & Meyer, 2022). For example, during his State of the Nation Address (SONA), President

Ramaphosa stated that it is not the job of the government to create jobs, however, it is the function of the private sector, specifically businesses driven by entrepreneurs, whilst at the same time, it is the government's job to create an enabling environment in order to achieve this (Meyer & Meyer, 2022). In fact, African technology start-ups are renowned for building solutions to some of the most complex challenges (Jackson, 2020). This illustrates how important not only entrepreneurship in general is in South Africa, but technology entrepreneurship specifically. Moreover, women are critical levers for economic growth and development not only in South Africa but on the continent, and research further indicates that economic participation by women has wide-reaching impact on and long term benefits for local communities, as well as overall economic growth (Bowmaker-Falconer & Herrington, 2020).

McClure (2019) claims that many women create informal businesses just as a way of trading for survival. However, there has been a change over time as more women have opted to enter industries that are thought to be "male-dominated" and are High Growth Ventures (HGVs), such as ventures based in technology, though the majority of these businesses are still in the infancy stages. For instance, companies in the female technology (femtech) sector are still finding their feet because of a lack of interest and funding (Smit, 2021). In spite of this, a considerable underrepresentation of women exists in this field due to a lack of funding, which is a serious problem. For instance, only 3% of the entire industry is represented by women-founded fintech companies (Smit, 2021). According to the GEM study, there has been an increase in the male to female ratio of entrepreneurial activity in South Africa overall, going from 1.52 in 2017 to 1.14 in 2019, showing a surge in female entrepreneurship (Bowmaker-Falconer & Herrington, 2020). Women make up more than 50% of the population; despite the fact that these numbers are rising, it is crucial that the ratio ideally reflects this fact (Bowmaker-Falconer & Herrington, 2020). However, women continue to be underrepresented in entrepreneurship, despite this rise.

Although funding is a universal problem for most entrepreneurs, the friction between what the entrepreneur can offer and what the funders require is what prevents most entrepreneurs from obtaining funding (Bowmaker-Falconer & Herrington, 2020). HGV's such as technology start-up ventures are funded a lot by Venture Capitalist investors thus, funding

is a very important aspect of growth for especially those High Growth Ventures (HGVs). It is vital that HGVs have their funding needs met as these startups need a variety of funding to support the launch, growth and scaling of the business (OC&C strategy consultants., 2018). According to a Business study, despite the pandemic, the South African venture capital business has grown, with 74 institutional investors investing R1.39 billion in 167 investment rounds in 2020 (Rajgopaul, 2022). However, South African women-led start-ups have only received 4.5% of all funding (Jackson, 2020). This demonstrates the inequalities in funding between male and female entrepreneurs.

1.3 Theoretical background of the study

This study is supported by the theories and concepts of signalling theory, social role theory, social capital theory, resource-based theory, and the concept of self-efficacy.

1.3.1 Signalling theory

The signalling theory is concerned with "reducing information symmetry between entrepreneurs and investors" (Alsos & Ljunggren, 2017, para. 6). This is partly because there is information that the entrepreneur would like to convey about his/her venture to an investor using signals (Alsos & Ljunggren, 2017). For instance, an entrepreneur might want an investor to know why he/she should invest in their business and possibly communicate returns in order to obtain funding. This theory is useful because it helps to understand how perceptions around investor bias and stereotypes play a role when it comes to women-led technology start-ups accessing funding and why female start-ups do not get funded as often as male-led start-ups.

1.3.2 Social role theory

The Social Role Theory (SRT) implies that social norms are to blame for demands to conform to gender roles (Eagly & Wood, 2012). According to Eagly and Wood (2012, p.1) "sex difference and similarities in behaviour reflect gender role beliefs and that in turn represent people's perceptions about men's and women's roles in the society in which they live". For instance, men are mostly likely to be employed in positions of authority whilst women are perceived to take on more home-maker roles at home and in employment settings (Eagly & Wood, 2012). This theory is used in the study to understand and explain how the

perceptions around gender bias plays a role when it comes to women-led technology start-ups accessing funding. These perceptions of gender influence how women see themselves and also how financial institutions see women in leadership positions.

1.3.3 Social capital

Entrepreneurs, according to Neumeyer, Santos, Caetano and Kalbfleisch (2019), are socially rooted actors who rely on key resources (e.g financial aid) to establish and expand their businesses. Thus, in order to obtain resources, social networks are crucial (Neumeyer et al., 2019). Neumeyer et al. (2019) describes a social network as a collection of nodes connected by a certain kind of social interaction that provides business owners the chance to build, use, and preserve social capital. For instance, a friend who finances a venture because they are convinced of the viability of the concept. This theory is adopted to understand and explain how perceptions around networking between women and men play a role when it comes to women-led technology start-ups accessing funding. These perceptions around networking influence how women network within the business sphere.

1.3.4 Self-efficacy

According to Bandura, self-efficacy refers to "beliefs in one's capabilities to organize and execute courses of action required to produce levels of attainment" (Bandura, 2000, p.16). Bandura (1997) claims that people need more than just a high sense of self-worth to achieve in their endeavours, thus they also need strong self-efficacy to mount and maintain the effort necessary for them to be successful. Self-efficacy is based on the principles of social cognitive theory of which perceived self-efficacy is embedded in the theory of human agency (Bandura, 2000). In addition, self-efficacy is a crucial motivating factor that affects decision-making, objectives, emotional responses, effort, coping, and persistence in individuals (Urban, 2015). This theory is adopted to understand and explain how women who lead technology start-ups perceive their own capabilities and abilities when it comes to obtaining funding. Perceptions around confidence (self-efficacy) play a big role in how women perceive whether they will obtain funding for their businesses or not.

1.3.5 Resource-based and Resource dependency theories

The resource-based approach or view claims that a business's resources are assessed "in terms of their mobility and imitability" (Henard & McFadyen, 2012, p.193), or how hard or easy it is for their competitors to duplicate these resources (Henard & McFadyen, 2012). In addition, businesses must manage their resources such that customers will appreciate the items they buy as they are considered value creators; thus ownership and use of these resources is strategically significant for a business so that it can gain a competitive edge (Henard & McFadyen, 2012, p.194). As a result, a company may more fully utilise its strengths the more financial resources it devotes to the creation of new products (Hernard & McFadyen, 2012). Additionally, financial resources are essential for a business and are among the resources that are most evidently required to be available for a company to fully implement its strategy (Stacey, 2011). In addition, the resource dependency theory states that an entrepreneur's endurance is "reliant on the accessibility of resources in the entrepreneurial eco-system" (Fuboh & Moss, 2021, p.1); as a result, women must have access to finance in order to thrive. This theory is adopted to understand and explain that essential access to adequate finance is important for the success and growth of women-led technology start-ups.

1.4 Problem statement

There has been a rise in women-owned businesses in South Africa; however, the majority of these companies are concentrated in service-oriented industries, such as those in retail, the arts, entertainment, and recreation, to name a few (Irene, 2019). According to Irene (2019), innovative entrepreneurship is essential for emerging economies. This therefore implies that businesses within the technology industry are essential for rapid economic expansion for an emerging economy like South Africa. However, despite that, female founders of technology businesses only receive a small portion of the total investment made in African technology start-up companies even in technology sectors that have a high level of investor interest (With et al, 2021). Additionally, female entrepreneurs are under-represented in sectors that require significant amounts of funding (With et al, 2021). For instance, when looking at the South African context, it is estimated that as little as 4,5% of VC funding went to female-led start-ups between January 2018 and August 2019 (Venture burn, 2021). Additionally, some argue that these figures reflect a shortage of female

entrepreneurs, as women account for 19,4% of business owners in South Africa and the numbers are even lower in the high growth start-up space (Venture burn, 2021). Therefore, due to this, there are few women in these sectors who have the potential to contribute significantly to the economy. There is a need to learn what barriers they face in accessing funding and the extent that these barriers affect them.

1.5 Motivation

This study is motivated by the observation that the rates of women in entrepreneurship is low, compared to men in South Africa, and the rates are even fewer in the high-growth start-up space (Venture burn, 2021). In addition to that, it has been argued that because women start-ups are underfunded or struggle to access funding, this has contributed to the low rates (Venture burn, 2021). This study contributes towards a better understanding of the perceived barriers that women technology start-ups face when it comes to accessing funding in South Africa; this will allow for a better understanding on how to assist or come up with viable solutions. This study is important because perceptions are important, and at the same time, there is limited research and information to derive policies and reforms to effectively increase the likelihood of women to gaining access to funds in the technology space in the South African context and in turn, increase the rates of women in this space.

1.6 Research Purpose, research question and aims of the study

Main research question: What influence do barriers have towards women-led start-ups in accessing funding in South Africa?

The aim is to investigate the perceived barriers towards women-led technology start-ups accessing funding in South Africa.

Research questions:

1)What degree of influence do networks have on access to funding?
2a) What degree of influence does investor bias have on access to funding?
2b) What degree of influence do gender stereotypes have on access to funding?
3) What degree of influence does confidence (self-efficacy) have on access to funding?

1.7 Conceptual definition of terms:

Tech start-ups or technology start-up

According to Blanks and Dorf (2020, p.16) a start-up can be defined as "a temporary organization in search of a scalable, repeatable, profitable business model." This scalability is enabled by technology (Evokari et al., 2019). Thus, technology start-ups are referred to as "teams building scalable businesses with a product, service by the use of technology either hardware or software." (Evokari et al., 2019, p.9).

Women-led start-ups or female-led start-ups

These are start-ups that are led or driven by women (Evokari et al., 2019). Key roles in this start-up such as Chief Executive Officer, Chief Technical Officer or Operating Officer are held by those of the female gender, not excluding teams in which both genders are represented (Evokari et al., 2019).

Funding

For the purposes of this research, we refer to the funding definition of equity finance, namely, Venture Capital. Venture capital can be defined as "financing that investors provide to businesses, in the startup and early growth phases, that they believe have high growth potential" (SME guides, 2022). VCs invest money, technical, or managerial expertise in exchange for minority equity ownership" (SME South Africa, 2022).

Perceptions

Perceptions are central cognitive constructs. Perceptions are mental representations of the external environment collected by our senses and mind (Krueger, 2003). Additionally, perceptions are subjective ideas of reality that may not always represent neutral environments or settings (Krueger, 2003).

1.8 Delimitations of the study

The delimitations of the study include the fact that the study is only confined to a niche group, that is, women entrepreneurs who are founders or leaders of technology start-ups in South Africa. Therefore, women entrepreneurs can therefore make sense of the study's findings despite the fact that it does not include all female entrepreneurs in all fields. In addition, despite the fact that there are alternative funding sources, this study focuses on women who mostly look for venture capital funding as technology start-ups require a lot funding. This study only focuses on a few aspects of the theories discussed. The study

focuses on the importance of networking as a resource for obtaining financial capital as a female entrepreneur. It also focuses on the signalling theory in relating to relationships between investors and women entrepreneurs, and the social role theory pertaining to the different roles men and women assume in society. It also links the concept of self-efficacy of female technology entrepreneurs as it relates to acquiring funding.

1.9 Contributions of the study

Various studies have been conducted to understand the relationship between the barriers faced by women entrepreneurs and access to funding. However, studies on female entrepreneurs only comprises of about less than 10% in the research field (Brush & Cooper, 2012). In addition, it has been argued that equal opportunity from the perspective of entrepreneurship is not a reality since the research that is currently available is more "men streamed" and ignores the needs of current and future female entrepreneurs (Delmar & Holmquist, 2004). Studies in developing countries around the industries that female entrepreneurs operate are also limited and only a few existing studies show results similar to developed countries (Carranza et al., 2018). Moreover, Uctu, Essop and Jafta (2020), as cited in Neneh and Welsh (2022), claim that little is known about technology companies in South Africa, particularly those founded by women. In addition to that, sectors in which women entrepreneurs operate are less profitable than those in which men operate (Carranza et al., 2018). Thus it is important to encourage women to operate in sectors that are more profitable. This study contributes knowledge towards women technology entrepreneurs, particularly ones in the technology space in South Africa, as it is fairly new thus not much has been written on the issues of funding. Furthermore, from a practical point of view, this study also contributes to increasing the number of women in highly profitable sectors of entrepreneurship. This is particularly to make actors, researchers, policy makers and the likes aware of the issue and possibly draw solutions on how women can gain access to funding, especially from VCs.

1.10 Conclusion

The context, theories and motivation for the study are all discussed in this chapter. This chapter also includes a discussion of the purpose, the research questions and how this study contributes to the broader academic community as a whole. It also includes definitions for

concepts that are study specific, the limitations and delimitations of the study. The next chapter provides a detailed review of the literature that has been written on the subject of the perceived barriers to accessing funding pertaining to women-led technology start-ups.

1.11 Structure of the Research Report

In chapter 1, the context and the background of the study is introduced. This is followed by the problem statement, aims and the research questions used to derive the findings, definitions of key concepts and the study's contribution.

In Chapter 2, a thorough literature review on the study's variables is provided. The study's theoretical underpinning the study is also examined. This chapter also presents the conceptual framework that serves as the basis of the research.

The methodology used is described in Chapter 3. It also details the paradigms and beliefs on which the study was based. This is followed by a discussion on the research design, the sampling techniques, sample size, the research instrument and the steps taken to acquire data. Lastly, it discusses the data analysis techniques that are used to test the validity and reliability of the study.

The findings of the hypothesis testing regarding the influence of financing access and perceived barriers (networks, bias, gender stereotypes, and confidence) are presented in Chapter 4. Additionally, the sample characteristics are also discussed. Results from the EFA, correlation, and multiple regression are also given and explained.

The study's results are compared to current hypotheses and the body of knowledge in Chapter 5. Additionally, it provides the limitations, the implications (research and policy), and the recommendations for further study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter reviews empirical studies undertaken, pertaining to the perceived barriers to accessing funding and women-led technology startups. This relationship is then expanded to create hypotheses on the influence between the variables listed below. The dependent variables are the access to funding and the independent variables are the perceived barriers, namely networks, investor bias, stereotypes and confidence. This theoretical review also influences the study's conceptual framework. The theories/concepts for this study are social capital, resource-based theories, signalling theory and self-efficacy. There is not a lot of literature written on this topic from a South African context, however even though limited, there is some western literature written on the subject.

2.2 Defining technology startups

High technology companies have been the subjects of extensive study and also under the microscope due to their influence and increasing importance over a number of years (Dimola, 2019). At the same time, these high-technology companies are seen as innovative since they create products or processes that are technologically unique, noticeably superior, a combination of the two, or both (Oslo Manual, 2005 as cited in Dimola). Start-ups are defined as "a temporary organization in search of a scalable, repeatable, profitable business model." (Blanks & Dorf, 2020, p.16). Thus, technology start-ups are referred to as "teams building scalable businesses with a product, service by the use of technology, either hardware or software" (Evokari et al., 2019, p.9). Additionally, these technology firms are also known as New High-Technology Ventures (NHTV) (Noriko, Taji, Emiko, & Tsuyuki, 2010). These businesses seek to create new technology or employ a business model based on technology to make money (Kuschel, 2019). Additionally, the success of high-technology companies is not guaranteed, and entrepreneurs in this sector face increased competition and high levels of uncertainty, which makes their problems more difficult (Kushel & Lepeley, 2016; Noriko et al., 2010).

2.3 Women entrepreneurs and technology start-ups

According to the GEM report, over half of women in developing nations regard entrepreneurship as a means to a better future, which is more than double the figure in high-income countries (Elam & Teleki, 2021). This means more women would like to be entrepreneurs. For instance, 17% of working women in emerging economies are already entrepreneurs, and an additional 35% of women on the continent aspire to become entrepreneurs (Elam & Teleki, 2021). However, it seems that most of these women seem to be lagging behind men (Elam & Teleki, 2021). Technology start-ups boast some of the lowest rates of women entrepreneurs compared to men. Participation in the fastest expanding industries is low, particularly in those where activity is strong and the ROI (Return on investment) is even higher (Elam & Teleki, 2021). For instance, there is low participation and representation of women in science, technology, engineering and mathematics (STEM) sectors (Elem & Teleki, 2021). This therefore suggests that the eco-system of entrepreneurship is attractive, but the fact that there is low rate of women in high-growth ventures such as those in the technology sector is concerning. This may be as a result of the difficulties faced by female entrepreneurs in launching or expanding their businesses, including regional normative, regulatory, and cognitive systems (Nziku & Struthers, 2017). Moreover, it is possible that statistics will tend to ignore women who are truly engaged in entrepreneurial activities unless data on the level of entrepreneurship among African women entrepreneurs is improved (Richardson et al., 2004 as cited in Nziku & Struthers, 2017). At the same time, most women do not see or think of themselves as business owners (Nziku & Struthers, 2017). Nziku and Struthers (2017) further state that the biggest obstacle facing women entrepreneurs is expanding the breadth and depth of women's entrepreneurship.

2.4 Perceived barriers

Several studies have been published on the perceived impediments to women-led technology entrepreneurs obtaining finance. Perception is a fundamental part of entrepreneurial cognition and in turn, illustrates the external environment around an individual recorded by senses (Shafi & Gulzar, 2021). As a result, these interpretations create a subjective paradigm that may not necessarily represent actual circumstances or events (Shafi & Gulza, 2021).

2.5 Networks

Networking and social connections are important for business success (Carranza et al, 2018). According to various studies, some of the reasons that are persistent on why women cannot access funding are that women have fewer networking opportunities and that therefore, affects their ability to raise funds for their businesses (FinDve 2020; Gem report, 2021). Nziku and Struthers (2017) define networking as a collection of interconnected relationships that benefit all parties through the exchange of data, resources, and personal recommendations. Thus, after an entrepreneur has raised initial cash, it is simpler to leverage additional resources (Nziku & Struthers, 2017). A person's perspective on a business start-up might also be influenced by the information and ideas that are shared within these networks (Nziku & Struthers, 2017). This is particularly important because networking is an integral part in the technology entrepreneur space. Strong ties are based on tight relations like family and friends whilst weak ties are based on loose relations such as individuals that are far removed from you like VC investors (Urban, 2011). According to Wheadon and Duval-Couetil (2018), men and women network differently, women develop strong ties while men form weak ties, and weak ties are seen to be advantageous due to rapid VC interest. In addition, Venter & Urban (2015); Urban (2011) note the significance of weak ties as they are more likely to offer resources (e.g funding).

2.5.1 Networks, funding and social capital

The ability to deploy goodwill created through the network of social relationships to support action is known as social capital (Venter & Urban, 2015). These are the relationships from which people can obtain institutional support, and they include the current and potential resources that are available via an actor's network of connections (Venter & Urban, 2015). This entails making connections with relevant people, building relationships with them to accomplish goals, and co-operating to attain a set of shared goals (Venter & Urban, 2015). In addition, Nziku and Struthers (2017) argue that trust is a particularly significant asset since social capital is founded on social networks with individuals who trust and support one another. Networking serves as an entrepreneur's social basis, making it a type of social capital (Venter & Urban, 2015). Thus, networking enables business owners who are just starting out to gain access to some of the most important tools available. A resource like financial resources, for example, could be considered essential. Nziku (2012, 2013), as cited

in Nziku and Struthers (2017), argues that for the majority of female entrepreneurs, social networks have a significant impact on how their enterprises are started.

It is important that entrepreneurs strike a balance between formal (weak ties) and informal networks (strong ties), at the same time entrepreneurs also need to pay attention to the quality of these networks (Hampton et al., 2011). Formal networks have their advantages. For instance, being a member of an association in a women's business network equals a greater chance of making a profit (Carranza et a.l, 2018). Thus, having this kind of networks can benefit women more than it does men (Carranza et al., 2018). However, Carranza et al. (2018) note that because women's networks contain relatives, friends and other women, their networks are limiting, thus resulting in limited information (Carranza et al., 2018). However informal networks also have their advantages because the majority of informal networks offer women entrepreneurs financial resources (e.g startup capital) to assist with launching their businesses (Carranza et al., 2018). Though, as much as women gain from these networks, they also lose out as these networks drain them of their resources stalling their businesses growing (Carranza et al., 2018). Some scholars argue that women's low rates from sectors (e.g. STEM) that are perceived to be masculine is caused by "masculine fraternal cultures" and not because they do not have ambition or the necessary qualifications (Marlow & McAdam, 2013). This means that women are excluded from networks that they could be utilizing to enter into industries that would enable them to gain financial resources, e.g. women entrepreneurs could be meeting potential investors through business networks (Carranza et al., 2018).

One of the sub-theories of the eco-systems theory is the resource dependency theory. According to the resource dependency theory, "an entrepreneur's endurance is reliant on the accessibility of resources in the entrepreneurial eco-system system" (Fuboh & Moss, 2021, p.1); as a result, women must have access to finance in order to thrive. The resource dependency hypothesis is crucial in understanding entrepreneurial ecosystems because ecosystem components need resources to survive, and the majority of these resources are transmitted or received through ecosystem component interactions (Fuboh & Moss, 2021, p.1). Additionally, the resource-based strategy or view claims that a business's resources are assessed "in terms of their mobility and imitability" (Henard & McFadyen, 2012, p.193),

or how hard or easy it is for their competitors to duplicate these resources (Henard & McFadyen, 2012). In addition, businesses must manage their resources such that customers will appreciate the items they buy as they are considered value creators; the ownership and use of these resources is strategically significant for a business so that it can gain a competitive edge (Henard & McFadyen, 2012). As a result, a company may more fully utilise its strengths the more financial resources it devotes to the creation of new products (Hernard & McFadyen, 2012). Additionally, financial resources are essential for a business and are among the resources that are most evidently required to be available for a company to implement its strategy (Stacey, 2011).

2.6 Gender Bias

Wheadon & Duval-Couetil (2018) note that a typical justification for why technology entrepreneurs struggle to raise funds is that there are both real and perceived hurdles to doing so. Thus, it is still extremely challenging for women to obtain venture capital, which is regarded as being the most important for growth in the technology and innovation industries (Ezzedeen & Zikic, 2012). However, when it comes to explaining the financing gap, investor bias has been mentioned as a contributing element. For instance, according to the GALI report, having a woman on the founding team is statistically linked to having received between $30,000 and $40,000 less in equity funding before enrolling in an accelerator programme (Davidson & Hume, 2020).

On one hand, the Gali report suggests that investor bias is partially to blame, despite the fact that it is difficult to assess investor bias (Davidson & Hume, 2020). For example, a 2019 study of more than 1.5 million enterprises in the United States found that 30% of the difference in women's investment performance was due to investor bias (Guzman & Kaxpercyk, 2019). According to the study's responder, some investors think that men-led enterprises fail more frequently and learn from these failures than women-led ones, whereas women fail more slowly and have steeper learning curves (Davidson & Hume, 2020). The GALI report further underlines the sustainability of the financing gap across venture profiles in addition to more overt signs of bias in similar assessments (Davidson & Hume, 2020).

Other research, on the other hand, however, argues that investors are biased against entrepreneurs that exhibit stereotypically feminine traits rather than against women, and that being a woman does not reduce interest from potential investors (during the pitching stage) (Balachandra, Briggs, Eddleston, & Brush, 2019). Instead of being motivated by sex, these prejudices are more often fuelled by gender-stereotypical behaviours that are connected to an entrepreneur's business acumen (Balachandra et al., 2019). Therefore, the fact that exhibiting feminine traits contributes to one not being able to access funding is a major issue as feminine traits are associated, ultimately, with being a woman.

2.6.1 Gender, funding and Information signalling

The signalling theory has become more and more popular, particularly in research on investment choices and investor-entrepreneur relationships (Alsos & Ljunggren, 2017). By leveraging information signals, the signalling theory seeks to reduce the information gap between entrepreneurs and investors (Alsos & Ljunggren, 2017). The signalling theory has four main concepts: signaller, receiver, signal, and feedback. Signallers are people who have knowledge that outsiders cannot access, such as business people (Alsos & Ljuggren, 2017). Receivers are people who are in need of information but do not currently have it, such as venture capitalists (Alsos & Ljunggren, 2017). Signals are information sent out to the receiver to communicate information that is unobservable to the recipient, such as information about the endeavour (Alsos & Ljuggren, 2017). Finally, feedback serves as the foundation for signallers to change or refine their signals and re-signal to investors (Alsos & Ljuggren, 2017).

Gender plays a role in this environment in a variety of ways. Gender can be seen as “a social dynamic rather than just a position, and studying gender entails studying how gender figures in social interaction” (Alsos & Ljunggren, 2017, para. 13). For instance, competence is a social construction impacted by people’s perceptions rather than being a trait shared by both genders meaning males and females (Alsos & Ljunggren, 2017). Men dominate venture capitalists and investors space (Elam & Teleki, 2021), and this has significant effects on how male and female entrepreneurs seeking investment are treated (Alsos & Ljunggren, 2017). In addition, studies show that investors tend to have a negative bias against women (Guzman & Kacperczyk, 2019). This is likely to apply within the entrepreneurial setting

because entrepreneurship is associated less with those are not considered males, investors compare male and female entrepreneurs based on traits commonly held by men, and ignore signals more frequently provided by women (Alsos & Ljuggren., 2017; Guzman & Kacperczyk, 2019). This due to the fact that investors in venture capital tend to have more experience with enterprises run by males, this also includes hobbies, educational background, and behavioural characteristics that may affect how investors interpret signals sent by male and female entrepreneurs (Alsos & Ljunggren, 2017).

Investors also have gendered perceptions about the institutional model of a prosperous entrepreneur (Alsos & Ljunggren, 2017). Thus, because female ventures are considered rare, women thus appear as not fit for the job or unusual for founder positions by investors and this results in reducing the probability of them getting funded (Guzman & Kacperczyk, 2019). Additionally, investors view women as riskier investments than men because they are stereotypically believed to have different objectives, behaviours, and resources than men (Alsos & Ljunggren, 2017). Guzman and Kacperczyk (2019) argue that because male investors and male entrepreneurs are similar this leads to a liking and attraction between them which increases the likelihood of investment, and in turn leading investors to favour backing male businesses.

2.7 Confidence

Self-confidence or self-efficacy is one of the most important attributes to have as an entrepreneur. It is also one of the main attributes that characterize proactive people with innovative work behaviour (Li, Liu & Liu, 2017). Confidence is associated with self-efficacy, that is the belief that one can successfully execute a specific activity (Albornoz-Aria & Santafe-Rojas, 2022). Thus, confidence is the assurance that someone has in their competence, and when combined with resources that are available, moreover, it also helps people spot opportunities and build successful firms (Albornoz-Arias & Santafe-Rojas., 2022). Therefore, it can be concluded that success correlates closely with confidence (Kay & Shipman, 2014).

2.7.1 Confidence, funding, and self-efficacy

According to a report by Briter Bridges and the World Bank Africa Innovation Lab, a "confidence gap" has been cited to be one of the reasons women-led start-ups struggle to access funding (With et al., 2021). Thus, despite female entrepreneurs possessing more education, an equal amount of experience and averaging similar profits as their male counterparts, they exhibit low confidence when pitching to investors, according to a study in the report (With et al., 2021) This also includes low confidence in expecting their companies to be profitable long term (With et al., 2021). Other studies state that women's social conditioning around self-confidence, particularly overt confidence, has a distinct role when it comes to "investment expectations, investment requests, and investment outcomes" (Davidson & Hume, 2020, p.9). For instance, woman entrepreneurs are less inclined to apply for external financing (e.g loans), and statistics reveal that women represent only a quarter (25%) of those who do apply for it despite having a similar acceptance rate (Davidson & Hume, 2020).

Duffy (2016) argues that women are also less likely to consider themselves as entrepreneurs as they lack confidence, and it's because they are responding to messages from the outside world about who should take the lead and risks. This means that the environment is what affects their confidence. Additionally, this self-perceived confidence also highlights a double standard in society where males are rewarded for confidence whilst women, on the other hand are penalized for it (Davidson & Hume, 2020). For instance, "a 2018 study tested three possible theories that could potentially explain the gender confidence gap, and it was found that the perceived confidence gap is consistent with a backlash avoidance mechanism where women feel uncomfortable self-promoting, due to perceived consequences" (Davidson & Hume, 2020, p.9).

The self-efficacy concept states that the higher the level of self-efficacy one has for a task, the more likely that one will pursue and accomplish it (Bandura, 1997). Hackett and Betz (1981) state that men enter traditional and non-traditional roles with the same levels of self-efficacy, however women report lower levels of self-efficacy for non-traditional roles than for traditional roles. This means that men are more comfortable entering industries that are

considered non-traditional for men than women are with entering roles considered non-traditional for women. Thus, confidence plays a large role in the entrepreneurial momentum. For instance, "launching a successful business is not a matter of only being innovative, it also requires one to be bold, courageous and have a tremendous faith in one's abilities" (Duffy, 2016).

Therefore, taking all these into account, these form the hypotheses from the literature:

1. Perceived networks strongly influences access to funding for women-led technology start-ups in South Africa.

2. (a) Perceived investor bias strongly influences access to funding for women-led technology start-ups in South Africa.

(b) Perceived gender stereotypes strongly influences access to funding for women-led technology start-ups in South Africa.

3. Perceived confidence (self-efficacy) strongly influences access to funding for women-led technology start-ups in South Africa.

Table 2.1: Literature review summary table

Authors	**Focal entrepreneurial phenomenon**	**Locus of relationship**	**Relationship between barriers and access to funding.**
Venter and Urban (2015) Lerner, Brush and Hisrich (1995) Carranza, Dhakal and Love (2018) Nziku and Struthers (2017) Wheadon and Duval-Couetil (2018) Ezzedeen and Zikic (2012)	Networks, funding, and social capital	Women entrepreneurs	How women network is very important, therefore obtaining social capital when it comes to accessing funding is vital. It is also important to strike a balance between the types of networks (formal and informal networks) an entrepreneur acquires, and the quality of these networks also matters, especially when an entrepreneur is trying to grow their business.

Authors	Focal entrepreneurial phenomenon	Locus of relationship	Relationship between barriers and access to funding.
Henard and McFadyen (2012)			
Alsos and Ljunggren (2017) Balachandra, Briggs, Eddleston, and Brush (2019) Guzman and Kaxpercyk (2019)	Gender, funding, and information signalling	Women entrepreneurs	Gender plays a critical role in understanding why female-led businesses do not get as much funding as male-led businesses. There are a wide range of reasons pertaining to gender. Investor bias is one of the reasons why women entrepreneurs struggle to access funding. Thus, because the VC and investor sector is dominated by males, it has been argued that investors are negatively biased against women entrepreneurs. Other studies argue that investors are not biased against entrepreneurs but rather against entrepreneurs that entrepreneurs that exhibit feminine traits/behaviours.
Bandura (1997) Hackett and Betz (1981) Duffy (2016) With et al. (2021) Albornoz-Aria and Santafe-Rojas (2022) (Davidson & Hume, 2020)	Confidence, funding, and self-efficacy	Women entrepreneurs	Confidence is an important trait when it comes to entrepreneurship, in turn, access to funding, particularly for women entrepreneurs. Therefore, it is important that the concept of self- efficacy comes through for women entrepreneurs when conducting business. However, a confidence gap has been cited to be one of the reasons women entrepreneurs struggle to access funding. Women are not confident in pitching to investors despite their education, experience and averaging similar profits as their male counterparts.

2.8 Conceptual framework

The conceptual model in figure 1 represents the relationship between networks, investor bias, gender-stereotypes and confidence and their influence on access to funding. The framework was created to show the direct relationships between each independent variable and the dependent variable.

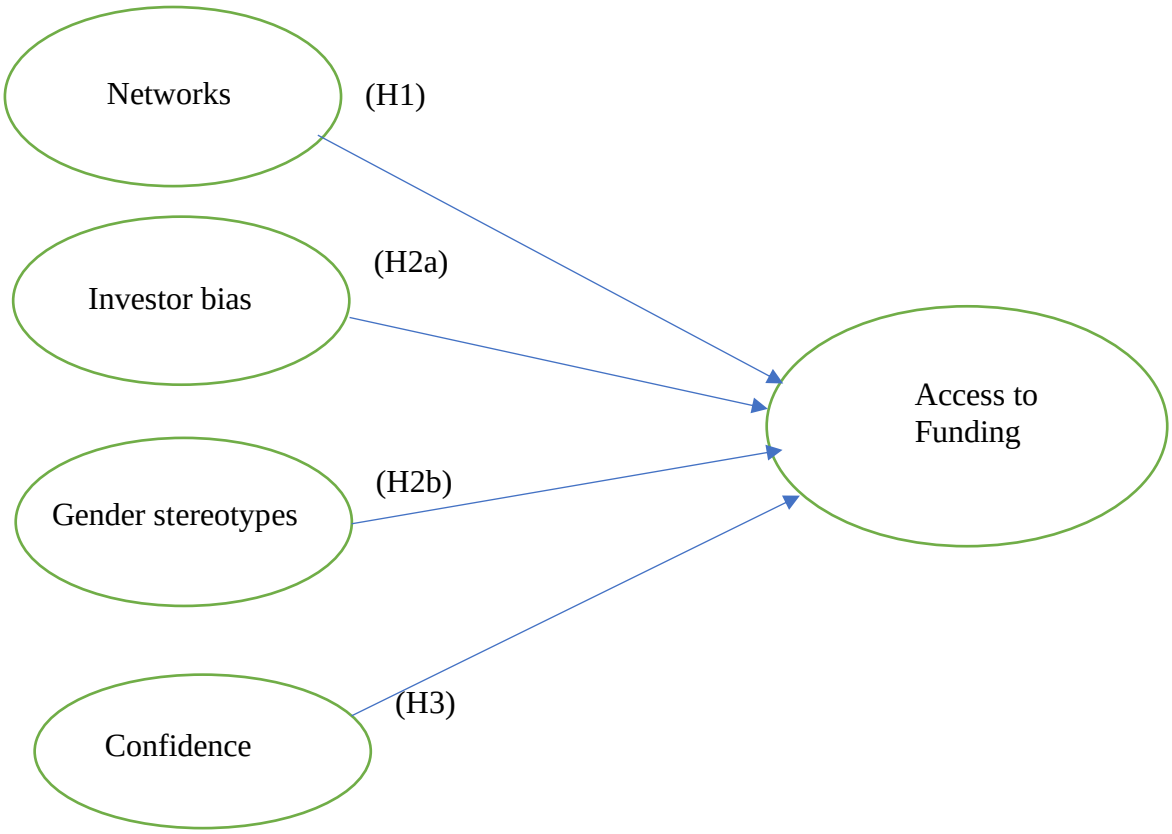

Figure 2.1: Conceptual Framework

2.9 Conclusion

This section reviewed the literature of perceived barriers to accessing funding pertaining to women entrepreneurs. Thus, the literature has illustrated that there is a strong relationship between perceived barriers and access to funding for women entrepreneurs. The literature has also illustrated how important funding is from a growth and success perspective. Thus, from the literature, the hypotheses discussed above were formed. The next chapter discusses the details pertaining to how the study is carried out, that is the methodology of the study.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

The earlier chapters served as a foundation and discussed what has already been written about on the subject and thus, far where the hypotheses were derived. The purpose of this section is to discuss the research methodology. The research methodology describes the measures that are done to carry out the study in a way that accomplishes the study's objectives. This chapter covers the following methodological ideas: the research paradigm, the research design, population and sample techniques, research instrument, including its reliability and validity, data collection techniques and procedure, and, last but not least, ethical issues related to the study.

3.2 Research Paradigm

A research paradigm can be defined as a collection of ideals and rules that guide scientists in a given field with regard to what should be researched, how it should be researched and how these results should be interpreted (Bryman, 1988). Positivism is the research paradigm used for this study. Positivism is based on the philosophical school of thinking of the nineteenth century, and was founded by Auguste Comte, the father of sociology (Neuman, 1994). The best-known aspect of positivism is how it interacts with frameworks from exchange theory and structural functional theory (Neuman, 1994). It is also deductive because positivism permits the testing of various hypotheses (Bryman & Bell, 2011). According to Simon (1996), deductive reasoning involves using logic and chronological reasoning. Neuman (1994) asserts that positivist researchers are more inclined to conduct quantitative studies and to make use of statistics, experiments, and surveys. This is due to the preference of positivist researchers for objective research, the desire to measure specifics about people, and the testing of hypotheses through meticulously analysing the data from measures (Neuman., 1994). Critics counter that because positivism reduces individuals to numbers, it is irrelevant to the real lives of people (Neuman, 1994). Positivism, on the other hand, contends that since there is only one scientific logic, science must follow it (Neuman, 1994). The purpose of this approach is to test a theory that is based on a specific observation and measurement. Positivism is a good research paradigm for this study because it allows

for the testing of multiple hypotheses. This enables me to test three different hypotheses in the study using various variables.

3.3 Research Design

Research design can be defined as an outline of the strategy that a researcher follows to address the research topic (Sanders, Lewis & Thornhill, 2016). There are three basic methodological choices, namely, quantitative, qualitative and mixed methods. The research design applied in this study is quantitative in nature. The objective of the quantitative research method is to study the relationships between variables, and these variables are measured quantitatively and then evaluated, using a variety of statistical techniques and graphical tools (Sanders et al, 2016). In addition, this method is recommended when there is a need for "accurate and statistically reliable data" (Valla, 2001, p.52).

A cross sectional approach was applied for this study to measure the variables. Sanders et al. (2016, p.166) state that "a quantitative research design may use a single data collection technique such as questionnaire and a corresponding quantitative analytical procedure". Therefore, a mono quantitative study was used for this research design. An online survey or a self-administered questionnaire was used to collect data. Self-administered surveys are popular and they also allow the researcher to collect a good amount of primary data from respondents in an economically efficient way and give the researcher control over the research process. The advantages of this type of technique is that it allows the researcher to obtain responses in real time, and it is also not time consuming (we are working under time constraints) (Schindler, 2019). In addition, the researcher can access entrepreneurs who are otherwise inaccessible (Schindler., 2019). However, the disadvantages of this technique is that it cannot be long and complex, response rates can be low and accurate mailing lists are needed in order to get data (Schindler, 2019).

3.4 Research Population and sample

3.4.1 Population

According to Bryman and Bell (2011), a population can be defined as the universe of units from which the sample is to be selected. The research population for this study consists of South African women-led technology start-ups. According to the South African Ecosystem

report (2022), Gauteng and the Western Cape have the most technology start-ups in the country. In addition, the South African technology start-up sector consists of fintech having the most startups at 30%, ecommerce and retail at 10.2%, e-health at 9%, Edtech at 8.6% and AI/IOT at 5.1 %, to name a few. The table below illustrates the South African technology start-up sector. The study was carried out throughout South Africa with the main focus on two provinces, namely the Western Cape and Gauteng, which are the provinces presumed to be the provinces with the most start-ups, the focus is on those start-ups.

The South African start-up data base from the South African eco-systems report has been identified because of its popularity. This is used by technology-entrepreneurs to register their start-ups. The businesses that are listed are categorised to classify business that are owned by women or led by both men and women, accelerated and non-accelerated in the regions of Gauteng and the Western Cape. Therefore, for the purpose of this study, this data base is used to investigate the barriers identified by this population (female founded businesses and those that are partnering with males in their ventures). The projects listed on this data based are mainly technology businesses, e.g., fin-tech, e-health and ed-tech (South African ecosystems report, 2022). The goal of this study is to concentrate on newly established HGVs.

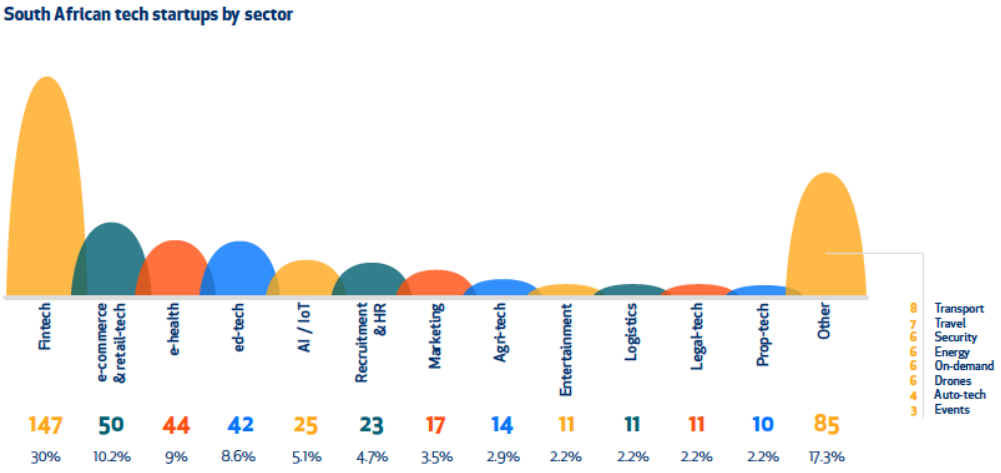

Figure 3.1: South African tech startups by sector

Source: South African Ecosystem report (2022, p.12)

3.4.2 Sample and method

Data collection can be defined as a systematic way of doing research (Schindler., 2019). Data was collected through sampling. Therefore, the non-probability sampling technique was chosen and used for this study. Consequently, unlike probability sampling which requires one to calculate the sample number, with non-probability sampling there are no rules when it comes to the sample size (Saunders et al, 2016). Therefore, the estimated targeted sample size for this study is 250.

The sampling procedure was a combination of convenient sampling and volunteer sampling. Snowballing consists of two techniques, namely, snowball sampling and self-selection sampling (Saunders et al., 2016). Through the snowballing technique, participants can be volunteered rather than chosen, and they can, in turn, identify other entrepreneurs in a similar field, whilst through self-selection, sampling entrepreneurs will identify their desire to take part in the research through appropriate media (e.g emails, tweets, letters, advertisements etc) (Saunders et al., 2016).

This study sampled women entrepreneurs who lead technology start-ups in South Africa with the main focus on Gauteng and the Western Cape, as these are the provinces with the most start-ups as identified through the South African start-up data base. It also assigned online surveys to a sample of women-technology entrepreneurs who run start-up businesses through social media platforms (Face-book, LinkedIn, Twitter and Instagram, to name a few). There are not many women/female led start-ups as only 14.3% of the South African start-ups has at least one female founder with 85% being solely founded by males (South African Ecosystem report., 2022). Furthermore, the South African Ecosystem report (2022) states that only 70 of South African tech start-ups count a female among their founding team, and South Africa boasts about 357 technology start-ups in total. In addition to that, a total of 126 are accelerated which is 25.1% South African start-ups and 364 which is about 74.3% South African start-ups are not accelerated (South African ecosystem report, 2022). Therefore, taking that into consideration, below is the sample profile.

3.5 Profile of respondents

Table 3.1: Profile of respondents

Description of respondent	Number to be sampled
Women who are leading technology start-ups or partly own technology start-ups (Chief Executive Officer, Chief Technical Officer, Operating Officer or Founders). Age: 18 years of age and above. Education level: Matriculation and above. Language: Speak all 11 official languages Population size: 357 Location: Mainly located in major cities, Johannesburg, Pretoria and Cape Town and other cities in South Africa.	250

3.6 Research instrument

The measuring instruments used was based on a self-completing questionnaire. A self-completing questionnaire is ideal for this study because it is cheap and quick to administer as we are under a time constraint and it is also convenient to respondents as most are extremely busy (Bryman & Bell, 2011). However, there are some disadvantages that come with self-completing questionnaires as respondents cannot be prompted if they are having difficulties with the questions, nor can the researcher ask them to elaborate further and lastly, it is very difficult to ask significant questions as some of the respondents either will not want to write or just do not have the time to write, to name a few of the disadvantages (Bryman & Bell, 2011).

This study relied on primary data using a web-based survey tool called Qualtrics. The objective of this instrument was to collect data on the perceived barriers towards women-led technology start-ups like networks, bias and confidence pertaining to accessing funding in the South African context. Primary data can be defined as “information collected by the researcher to address the identified research problem” (Chandna & Salimath, 2018, p. 166). This self-administered questionnaire consisted of 13 questions. The questionnaire consisted

of closed ended questions, with an option to input any additional information that the respondents might have. Respondents will read statements and indicate whether they agree or disagree with said statements. This questionnaire was based on a 5-point Likert scale ranging from 1 - strongly agree to 5 - strongly disagree. This is how the on-line survey was structured:

Section A consists of the demographics and business related data. The demographics data covers the following areas: educational level, location and race. The business related data covers the sector/industry, how the business was started, the period in which the firm has been in business, number of employees and capital sources utilized for the startup of the business.

Section B consists of the variables as they have been identified in the literature review as networks, bias and confidence. For instance, this is where the 5-point Likert scale is used where value 1 is “strongly agree” and value 5 is “strongly disagree”.

There are three independent variables and one dependent variable. The three Independent variables for this instrument networks, bias and confidence consist of six items each. The dependent variable, access to funding consists of four items. There are 67 items in total on the questionnaire. Attached is the research instrument in **Appendix D**.

3.6.1 Construct and measures

3.6.1.1 *Dependent variable*

Access to funding: The access to funding measure was used to measure the respondent’s perception to access to funding in this country. The variable used for this construct was from the National Expert questionnaire (GEM report., 2017). Respondents were asked whether they agreed or disagreed with statements based on a 5-point Likert scale (1=Strongly disagree, 2-Somewhat disagree, 3-Neither agree nor disagree, 4-Somewhat disagree and 5 Strongly disagree) with four items. This consisted of questions like “In my country there is sufficient…: (1) equity funding for available and growing firms, (2) Funding available from informal investors (family, friends and colleagues) who are private individuals (other

founders for new and growing firms, (3) venture capitalist funding for new and growing firms, (4) debt funding for new and growing firms.

3.6.1.2 *Independent variables*

Networks: The networks measure was used to measure the respondent's perception of networks. The source used for this construct was from a number of different papers (Valla, 2001; Moetse, 2019). Respondents were asked whether they agreed or disagreed with statements based on a 5-point Likert scale (1=Strongly disagree, 2-Somewhat disagree, 3-Neither agree nor disagree, 4-Somewhat disagree and 5 Strongly disagree) with six items. The construct consisted of statements like (1) I gained access to a network easily, (2) I believe it is essential for successful women entrepreneurs to network, (3) Family and personal networks provide greater access to financial capital. (4) Organization and institutional networks provide greater access to financial capital. (5) Being a member of a business forum/organisation provide access to financial capital. (6) The people outside my immediate friends are not at all important.

Bias: This bias measure was used to measure the respondents' perception of investor bias and gender stereotypes. The sources used for this construct was also from a number of different papers (Valla, 2001; Alnamlah, 2012) with six items. Respondents were asked whether they agreed or disagreed with statements based on a 5-point Likert scale (1=Strongly disagree, 2-Somewhat disagree, 3-Neither agree nor disagree, 4-Somewhat disagree and 5 Strongly disagree) with six items. The construct consisted of statements like (1) I believe i have faced gender discrimination by financial markets. (2) I trust the screening and procedures of funding proposals to be unbiased. (3) I believe women experience more barriers than men in making a success of their businesses. (4) Society encourages and supports women like me to take on challenges of the business world. (5) In business, I encounter situations where I am not taken seriously because i am a woman. (6) The views held by society on the traditional roles of women (e.g wife, mother) impose negatively on my entrepreneurial endeavours.

Confidence: This measure was used to measure the respondent's perception to perceived confidence. The source used for this construct from a number of different papers (Valla,

2001; Alnamlah, 2012). Respondents were asked whether they agreed or disagreed with statements based on a 5-point Likert scale (1-Strongly disagree, 2-Somewhat disagree, 3-Neither agree nor disagree, 4-Somewhat disagree and 5 Strongly disagree) with six items. The construct consisted of statements like (1) “I experienced personal barriers e.g (lack of self-confidence, low self-esteem, isolation) when i started my business” (2) “I sought the assistance of experts (legal and financial) when i ventured on my own”, (3) “I take on challenges even in uncertainty”, (4) “I chose to go into my own businesses because of other women who inspired me.”, (5) “I sometimes feel like other entrepreneurs have skills that I don't have.”, (6) “I feel similar to the kinds of people who have what it takes to succeed in entrepreneurship”.

3.7 Data collection procedure

Qualtrics was used to collect the data needed for the research. The online survey was distributed directly to business organizations (founders) and some from the South African start-up data base and it was also posted on social networks such as WhatsApp, LinkedIn, Facebook and Twitter. The surveys were also administered through the University of the Witwatersrand student emails.

3.8 Data analysis and interpretation

Data analysis and interpretation is the process of spotting patterns and trends, using statistical methods, and presenting a summary of the data (Cooper & Schindler, 2008). As a result, the outcomes can be assessed in relation to the research questions. Thus, it is possible to evaluate the results in light of the study questions. To examine the data's variables (dependent and independent), descriptive statistics, multiple regression, and correlation analysis was used for this study's objectives.

3.8.1 Descriptive statistics

According to Fisher and Marshall (2009, p. 95) descriptive statistics can be defined as “the numerical and graphical techniques used to organize, present and analyse data.” For instance, data could be represented in the forms of graphs, tables and pie-charts to name a few. This was used to represent the data collected from the respondents, for instance representing demographics on a graph or table. This is a nominal level of measurement

where cases are sorted into several categories and dispersion is based on the frequency or the count, also known as frequency distribution (Fisher & Marshall, 2009).

3.8.2 Correlation analysis

The correlational analysis is used to explore the association between the study variables (Senthilnanthan, 2019). In addition, linear correlation is a tool for analysing to represent the closeness of one related variable to another. The correlation coefficient thus measures the degree of the relationship of the variable. This correlation coefficient was formulated by Karl Pearson (Hauke & Kossowski, 2011, as cited in Senthilnanthan, 2019). Based on the direction, the degree can be categorized as positive, zero or negative correlation (Senthilnanthan, 2019). Correlation was used to analyse the relationships between the variables, if there was one, and whether that relationship is positive or negative.

3.8.3 Multiple regression

Regression is concerned with the problem of predicting the dependent variable, based on the basis of the information provided by certain other independent variables (Senthilnanthan, 2019). The main aim of regression is to explore the dependence of one variable on another. Multiple regression is trying to understand the relationship between one dependent variables with multiple variable (Saunders, Lewis & Thornhill, 2016). The SPSS software was used to perform multiple regression on the variables.

3.9 Validity and Reliability

Testing for construct, scale, validity, and reliability is crucial because an online survey will be used to measure a variety of constructs.

3.9.1 Validity

External validity can be defined as “the extent to which a researcher can generalize the findings of the study” (Bryan, 2018, p.60). According to Rovai, Baker, and Ponton (2014), external validity is improved by randomly choosing participants from the intended audience and preserving experimental realism. Additionally, there are factors that can hinder external validity and these are participant error, participant bias, researcher error and researcher bias (Saunders et al, 2019). This study used volunteer sampling which increases the variability

of the study, and participant bias was limited by sampling women entrepreneurs in mainly Gauteng and the Western Cape regions which have the most entrepreneurs, compared to other provinces. This study decreased participant error by assuming that respondents will answer truthfully which could pose a limitation to the study. Documents will be retained to make sure that another researcher can replicate the study.

Internal validity on the other hand occurs "when your research demonstrates a causal relationship between two variables" (Saunders et al., 2019, p.203). Rovai et al (2014) argue that internal validity is critical because it gives meaning to generalizations, and at the same time the results of a high internal validity equals high credible sample. There are a number of threats that can hinder validity, and these threats range from instrumentation, past or recent events, mortality, maturation and testing to name a few (Saunders et al., 2019). Therefore, to strengthen the validity of the study, collection and written instructions were standardized. The instrument that was used for this study has been piloted by other researchers, and is therefore valid.

3.9.2 Reliability

Reliability testing is the measure in which results show consistencies between constructs (Rudolph & Leddy, 2018). The items provided in the questionnaire should show reliable results. The questions used have been piloted and used in previous studies and therefore are reliable.

3.10 Ethical considerations

This study ensured that data was gathered ethically through obtaining participants informed consent (Saunders et al., 2016). Participants know that they are not obliged to participate and were assured that their information will be kept confidential (Saunders et al., 2016). Lastly, ethics clearance was obtained from the Wits ethics committee to get approval before administering the questionnaire. The protocol number is WBS/EN388496/564.

3.11 Conclusion

This chapter presented the research design methods and context. The research design selected for this is a quantitative in nature and it adopted a positivist paradigm method. The

research was conducted using a self-administered questionnaire, and this instrument used a five-point Likert scale to measure the respondents answers to questions relating to all the constructs mentioned in the chapter. The data was then analysed using SPSS. The following were used to interpret the data - Descriptive statistics, EFA Correlation and Multiple Regression. Validity and Reliability were used to check for the consistency of the scale and also check whether the instrument measure what it was intended to measure. Lastly, ethical considerations were taken into account, meaning that consent was obtained from respondents and information was assured to be kept confidential.

CHAPTER 4: PRESENTATION OF RESULTS

4.1 Introduction

This chapter offers the data analysis, followed by a discussion on the findings, in order to test the hypotheses made in chapter 2. This chapter includes the presentation, analysis, and interpretations of the study's findings. The study's goal was to look into the perceived barriers to access to funding for women-led technology start-ups, specifically in the South African context. An online self-administered survey was used to collect the data. A total of 57 entrepreneurs responded to this questionnaire. Only 57 of 22420 total responses to the questionnaires were captured, and once the raw data was cleaned, only a total of 53 questionnaires could be used for the study. A total of 22420 questionnaires were delivered through the Wits mailing system and social media (LinkedIn primarily, WhatsApp, Facebook, Instagram). The analysis omitted three (3) questionnaires because they were unfinished and one (1) because the business was not a start-up. The self-administered questionnaire included two sections and the data gathered was presented as follows: Section one consisted of the demographics and business related data, such as educational level, location and race. The business related data covers the sector/industry, how the business was started, period in which the firm has been in business, number of employees and capital sources utilized for startup. Section two consisted of data obtained from the analysis of access to funding, networks, bias, and confidence that was investigated and also the relationship among the variables. Descriptive statistics was used to analyse the frequency and percentages and comprehend the survey questions. In addition, EFA was used to analyse the data, correlation and multiple regression were used to test the relationship between the variables (networks, bias, confidence and access to funding).

4.2 Demographic profile and business related data of the respondents

This section analyses whether the sample's business-related data and demographic characteristics had any impact on the research findings. Although the data is not the focus of the study, it is crucial to contextualize the findings and offer the relevant advice. The race, degree of education, age, and province of the respondents make up the demographic

information. The business-related information includes the industry or sector, company age, number of workers, mode of operation, and funding sources.

4.2.1 Respondents race

Participants were asked to select the race category that best matched their characteristics (see figure 4.1). According to the findings, 69.8% of respondents were black, 17% were white, 7.5% were Indian, and 6% were of coloured descent.

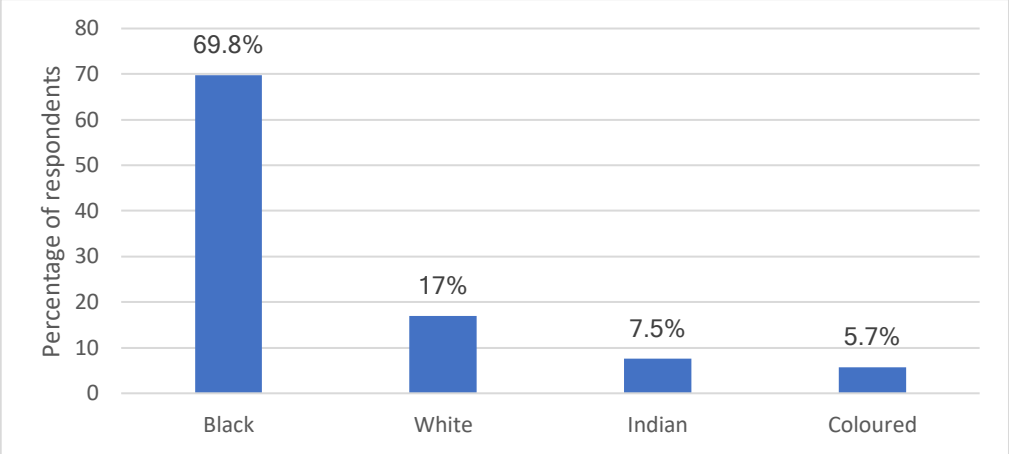

Figure 4.1: Respondents race

4.2.2 Respondents age

Participants were asked to choose the response that most accurately represented their age range (see figure 4.2). According to the data, 30.2% of respondents were between the ages of 26 and 30, followed by 47.2% of respondents who were 36 or older. Only 9.4% of respondents were between the ages of 18 and 25, while 13.2% of respondents were between the ages of 31 and 35.

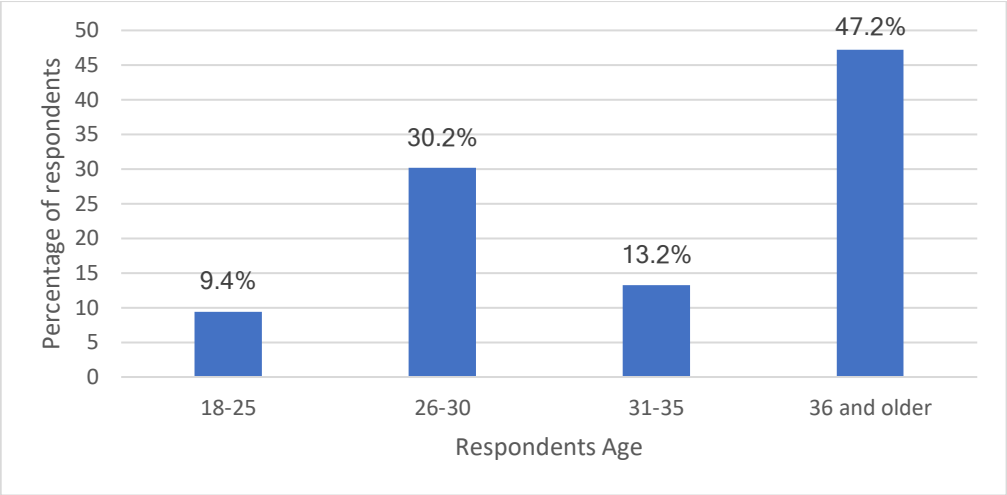

Figure 4.2: Respondents age

4.2.3 Higher Educational Qualifications of Respondents

Participants were requested to provide information about their highest degree of schooling. According to figure 4.3, out of the total responses, 9.4% have matriculated, another 9.4% have earned a diploma, 7.5% have earned a bachelor's degree, 37.7% have earned an honours degree, 28.3% have earned a master's degree, and 5.7% have earned a doctorate. These findings indicate that highly educated women make up the majority of women technology entrepreneurs.

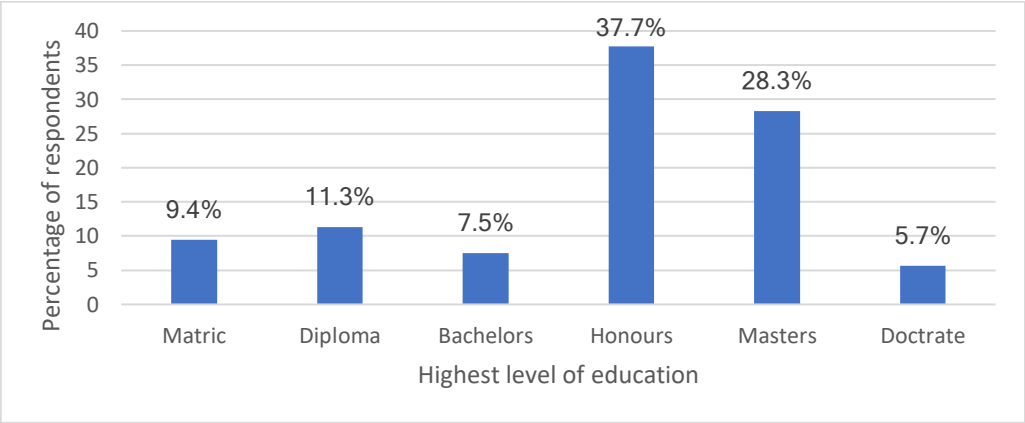

Figure 4.3: Highest level of education achieved

4.2.4 Industry/Sector

Participants were asked to identify the industry in which their company operates. Figure 4.4 shows that 5.7% of respondents worked in the advertising, marketing, and sales industries,

13.2% in the beauty, fashion, art and design, and home décor industries, 5.7% in communication, education, and training, 11.3% in finance, insurance, and commerce, 11.3% in the health and medical industry, 22% in the information and communications technology industry, 3.8% in law, 1.9% in real estate, architecture, and quantity, and 1.9% in wholesale and retail.

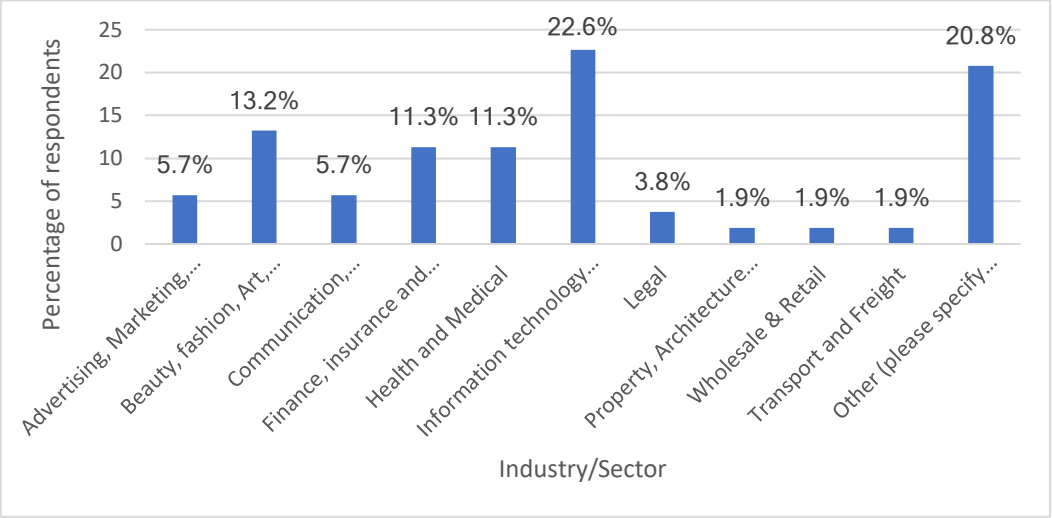

Figure 4.4: Industry/Sector

4.2.5 Location of business

Participants were asked to indicate in which province their company operates. Figure 4.5 results show that 64.2% of the respondent's businesses are based in Gauteng, 18.9% are in the Western Cape, and 17% are spread across multiple provinces, including both Gauteng and the Western Cape, the Free State, Kwa-Zulu Natal, the North-West, Mpumalanga, Limpopo, and everywhere else.

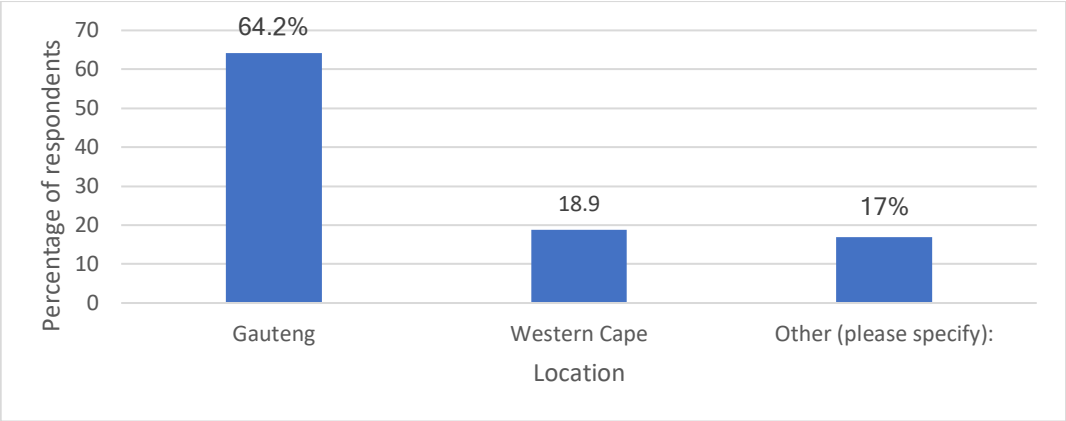

Figure 4.5: Business location

4.2.6 Business Age

Participants were prompted to choose the response that most closely matched their business age. Figure 4.6 shows an example showing that 58% of enterprises have been in existence for 1-2 years, 21% have been in operation for 3-5 years, and 21% have been in operation for six years or more.

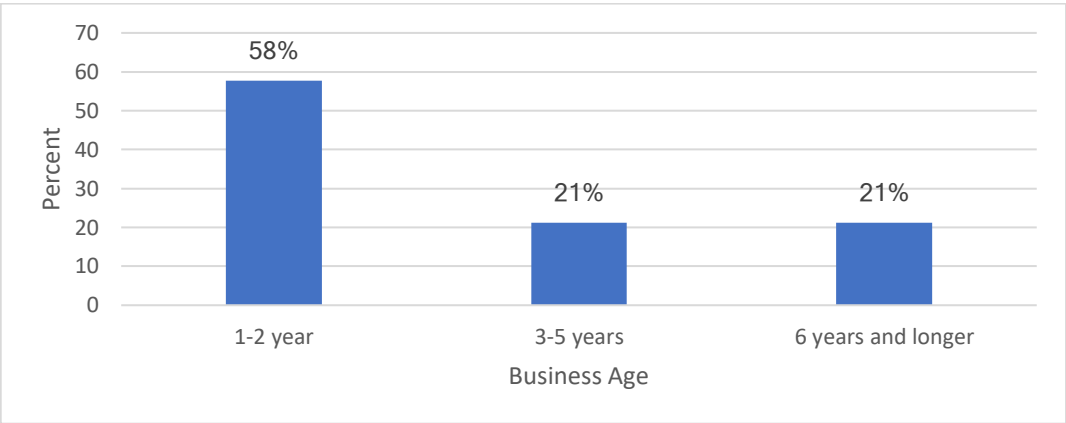

Figure 4.6: Business Age

4.2.7 Number of employees

Participants were asked to indicate the number of employees that worked for their company. 75.5% of the participants, as shown in figure 4.7, had fewer than 10 employees, followed by 13.2% with between 10 and 50, and 11.3% with more than 50.

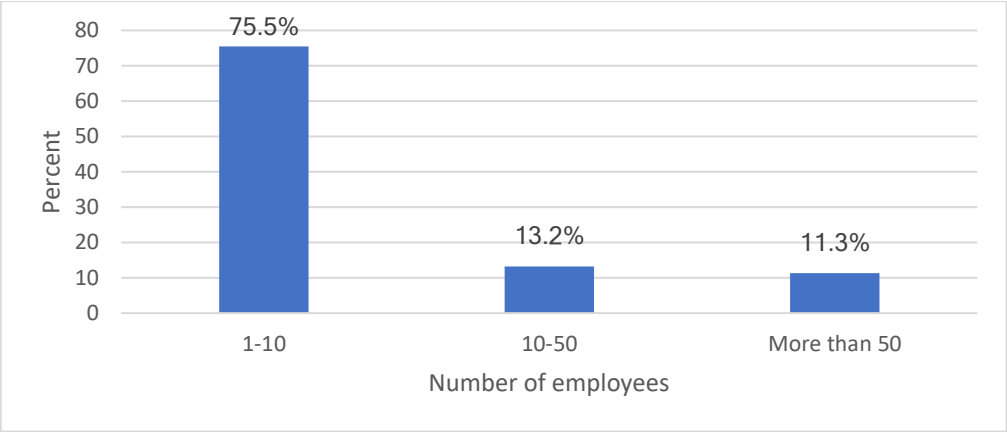

Figure 4.7: Number of employees

4.2.8 Start-up Entity

Participants were asked to describe how they launched their businesses. Figure 4.8 graphic shows that around 66% of firms were self-started, while 28,3% were started with partners, and 5.7% were formed in other ways that were not indicated.

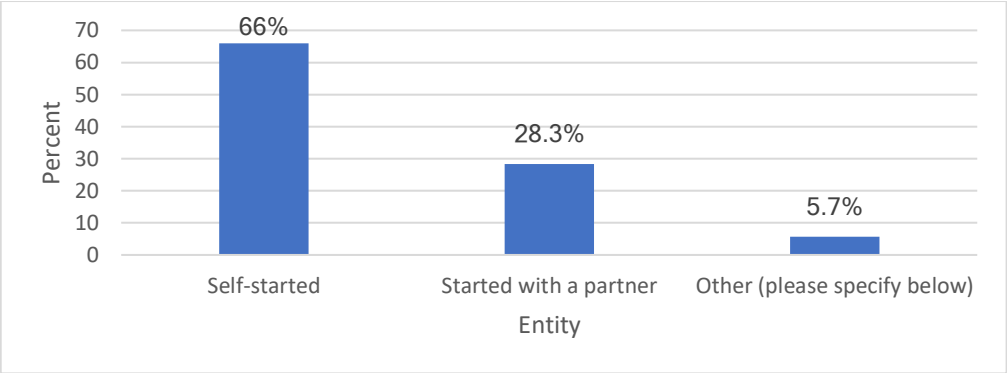

Figure 4.8: Start-up entity

4.2.9 Sources of startup Capital

Participants were asked to list the funding sources they used to launch their businesses. The data illustrated in figure 4.9 shows that 81.1% of the respondents' firms were either self-funded or started with savings, 17% were sponsored by grants and donations or from outside sources like angel investors, venture capital, or organizations like SEFA, and only 1.9% were financed by bank loans.

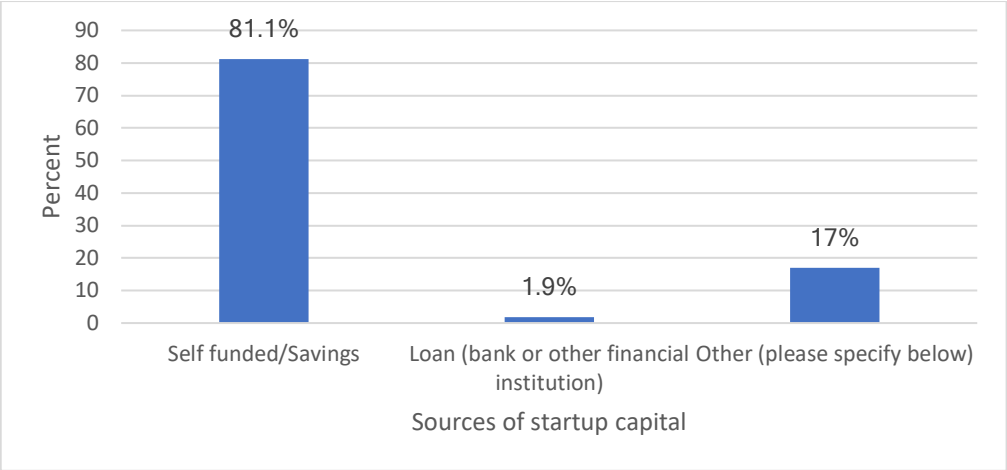

Figure 4.9: Sources of start-up capital

Table 4.1: Summary of sample of demographics

Category	Sub-category	Frequency (N)	Percent (%)
Age	18-25	5	9.3
	26-30	16	29.6
	31-35	8	13
	36 and older	25	46.3
Educational Qualifications	Matriculation	5	9.3
	Diploma	5	9.3
	Bachelors	4	7.4
	Honours	19	35.2
	Masters	17	31.5
	Doctorate	3	5.6
Race	Black	37	68
	White	9	16
	Indian	4	7.4
	Coloured	3	5.6
Industry	Health & Medical	6	11.1
	ICT	11	20.4
	Finance insurance and commerce	7	13
	Beauty, fashion, Art, Design & décor	7	13
	Other	11	20.4
Location	Gauteng	34	64.2
	Western Cape	10	18.9
	Other	9	17.0
Number of employees	1-10	40	75.5
	10-50	7	13.2
	more than 50	6	11.3
Business Entity	Self-started	35	66

Category	Sub-category	Frequency (N)	Percent (%)
	Started with a partner Other	15 3	28.3 5.7
Business Age	1-2 years 3-5 years 6 years and longer	30 11 11	56.6 20.8 20.8
Sources of capital	Self-funded Loan (bank or other financial Institution) Other	43 1 9	81.1 1.9 17

4.3 Descriptive analysis of the measurement scales

4.3.1 Frequency distribution of networks

Table 4.2 below illustrates the distribution frequencies of the responses for the items on Networks. The table shows that 77.78% of the respondents agreed with the statement "I believe it is essential to network as a female entrepreneur", 31.48% of respondents agreed with the statement that "family and personal networks provide greater access to financial capital" and 72.22% disagreed with the statement that "the people outside my immediate family are not important", however when looking at the statement "being a member of a business forum/organization provide access to financial capital" most felt neutral about the statement at 35.19%.

Table 4.2: Frequency distribution of Networks

	Statement	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
1	I gained access to a network easily.	25.93%	35.19%	18.52%	14.81%	5.56%
2	I believe it is essential for successful women entrepreneurs to network.	77.78%	9.26%	7.41%	1.85%	3.70%
3	Family and personal networks provide greater	31.48%	22.22%	16.67%	14.81%	14.81%

	Statement	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
	access to financial capital.					
4	Organization and institutional networks provide greater access to financial capital.	29.63%	29.63%	16.67%	16.67%	7.41%
5	Being a member of a business forum/organisation provide access to financial capital.	14.81%	24.07%	35.19%	20.37%	5.56%
6	The people outside my immediate friends are not at all important.	3.70%	3.70%	1.85%	18.52%	72.22%

4.3.2 Frequency distribution of investor bias and stereotypes

Table 4.3 illustrates the distribution frequencies of responses to the scale items on investor bias and stereotypes. The results therefore demonstrate that 25% of respondents either strongly agreed with the statement "I believe i have faced gender discrimination by financial markets" or felt neutral about it. The statement "I trust the screening and procedures of funding proposals to be unbiased" scored 38.89% where respondents somewhat agreed with the statement. Whilst when it comes to statements "In business, i encounter situations where i am not taken seriously because i am a woman." and "The views held by society on the traditional roles of women (e.g., wife, mother) impose negatively on my entrepreneurial endeavours" which look at stereotypes 30.19% and 33.96% strongly agreed with those statements respectively. 55.56% of respondents strongly agreed with the statement "I believe women experience more barriers than men in making a success of their businesses" as most of the respondents felt that they experience more barriers than men in making a success of their businesses.

Table 4.3: Frequency distribution of investor bias and stereotypes

	Statement	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
1	I believe I have faced gender discrimination by financial markets.	25.93%	31.48%	25.93%	14.81%	1.85%
2	I trust the screening and procedures of funding proposals to be unbiased.	7.41%	16.67%	16.67%	38.89%	20.37%
3	I believe women experience more barriers than men in making a success of their businesses.	55.56%	35.19%	3.70%	3.70%	1.85%
4	Society encourages and supports women like me to take on challenges of the business world.	7.41%	38.89%	14.81%	18.52%	20.37%
5	In business, I encounter situations where I am not taken seriously because I am a woman.	30.19%	41.51%	13.21%	11.32%	3.77%
6	The views held by society on the traditional roles of women (e.g., wife, mother) impose negatively on my entrepreneurial endeavours.	30.19%	33.96%	9.43%	24.53%	1.89%

4.3.3 Frequency distribution of confidence

Table 4.4 illustrates that Confidence 1 statement stated "I experienced personal barriers e.g., lack of self-confidence, low self-esteem isolation when i started my business", where respondents felt that they somewhat agreed, whilst positive statements like Confidence 3 "I take on challenges even in uncertainty" scored at 59.62% where respondents strongly agreed with the statement and Confidence 6 "I feel similar to the kinds of people who have what

it takes to succeed in entrepreneurship scored 48.15% where respondents strongly agreed with the statement.

Table 4.4: Frequencies distribution table for confidence

	Statement	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
1	I experienced personal barriers e.g (lack of self-confidence, low self-esteem, isolation) when I started my business.	24.07%	31.48%	7.41%	16.67%	20.37%
2	I sought the assistance of experts (legal and financial) when I ventured on my own.	25.93%	35.19%	16.67%	16.67%	5.56%
3	I take on challenges even in uncertainty.	59.62%	30.77%	5.77%	1.92%	1.92%
4	I chose to go into my own businesses because of other women who inspired me.	25.00%	36.54%	15.38%	15.38%	7.69%
5	I sometimes feel like other entrepreneurs have skills that I don't have.	27.78%	29.63%	14.81%	18.52%	9.26%
6	I feel similar to the kinds of people who have what it takes to succeed in entrepreneurship.	48.15%	42.59%	5.56%	1.85%	1.85%

4.3.4 Frequency distribution of access to funding

Table 4.5 illustrates how respondents answered when it come to their perceptions of access to funding in South Africa. Most of the respondents either strongly agreed or somewhat agreed with the statements, Access to funding 2 “In my country there is sufficient venture capitalist funding for new and growing firms” scored the highest at 42.59% with respondents somewhat disagreeing with the statement, Whilst Access to Funding 3 “In my country there is sufficient funding available from informal investors (Friends, Family & Colleagues)” scored 32.08% with respondents strongly agreeing and Access to funding 1”In my country

there is sufficient equity for new and growing firms" and Access to Funding 4 "In my country there is sufficient debt funding for new and growing firms" scored 38.89% and 37.04% where respondents somewhat agreeing with the statements respectively.

Table 4.5: Frequencies for access to funding

	Statement	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
1	In my country there is sufficient equity funding for new and growing firms	11.11%	11.11%	14.81%	38.89%	24.07%
2	In my country there is sufficient venture capitalist funding for new and growing firms.	11.11%	9.26%	16.67%	42.59%	20.37%
3	In my country there is sufficient funding available from informal investors (Family, friends, and colleagues)	3.77%	22.64%	13.21%	28.30%	32.08%
4	In my country there is sufficient debt funding for new and growing firms	1.85%	12.96%	25.93%	37.04%	22.22%

4.3.5 Exploratory Factor Analysis (EFA)

Exploratory factor analysis (EFA) was conducted on the variables to analyse the data. Exploratory factor analysis can be defined as "multivariate statistical methods used in quantitative research, and its purpose is to summarize the data and interpret and understand relationships and patterns of the observed variables in the measurement tool" (Sucuru, Yalkilmaz & Maslakci, 2022, p.3). A number of these tools were used to analyse the data in SPSS and are discussed below.

4.3.6 KMO and Bartlett's test

According to Fields (2018, p.1234) "KMO measures sampling adequacy, and can therefore be calculated for both multiple and individual variables and also represents the ratio of the squared correlations between variables to the squared partial correlation between variables".

In addition, a KMO of 0.8 or more is considered meritorious, however anything below 0.5 is considered unacceptable (Fields, 2018). The KMO for all the items as illustrated in table 4.6 is at .583 which is acceptable. It is essential to note that the KMO is low possibly due to sampling issues. However, scholars have argued that even a sample size of 50 or less may be sufficient for factor analysis (Mundfrom, Shaw & Ke, 2005, as cited in Sucuru, Yalkilmaz & Maslakci, 2022). Thus, based on the reasons above, the data is sufficient enough to run factor analysis. Though, the confidence variable was deleted completely after factor analysis was conducted on all the items, all the constructs from the Barletts Test of Sphericity were significant. This showed that there is sufficient correlation between the items on each construct to enable factor analysis. The p-value is significant at p<.001, indicating that the items have the necessary correlation to one another for factor analysis.

Table 4.6: KMO and Bartlett's Test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.583
Bartlett's Test of Sphericity	Approx. Chi-Square	245.720
	df	55
	Sig.	<.001

4.3.7 Total Variance Explained

The Principal Axis factoring approach was used to obtain the factors. This approach can be used to estimate underlying factors (Fields, 2018). Moreover, the Pro max rotation method was used, and the results are displayed below. Table 4.7 shows the distribution of variation across the 11 potential factors. All factors with eigenvalues above one should be kept (Sucuru, Yikilmaz & Maslakci (2022). Consequently, three out of 11 extracted factors have eigenvalues greater than 1.0 which is the usual standard for determining whether a factor is useful. Looking at the total variance table, there are three rows of eigenvalues, factor 3 has a cumulative variance of 64.55%.

Table 4.7: Total variance explained

Total Variance Explained							
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	2.988	27.162	27.162	2.635	23.955	23.955	2.470
2	2.493	22.663	49.825	2.078	18.895	42.850	2.243
3	1.618	14.708	64.533	1.141	10.369	53.219	1.349
4	.876	7.961	72.494				
5	.743	6.752	79.246				
6	.586	5.328	84.574				
7	.504	4.578	89.152				
8	.458	4.162	93.314				
9	.391	3.551	96.865				
10	.299	2.719	99.584				
11	.046	.416	100.000				
Extraction Method: Principal Axis Factoring.							
a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.							

4.3.8 Scree plot for dependent and independent variables

As illustrated in figure 4.10, there are three factors above the point of inflection/breakpoint of the values at eigenvalue 2 on the scree plot of eigenvalues.

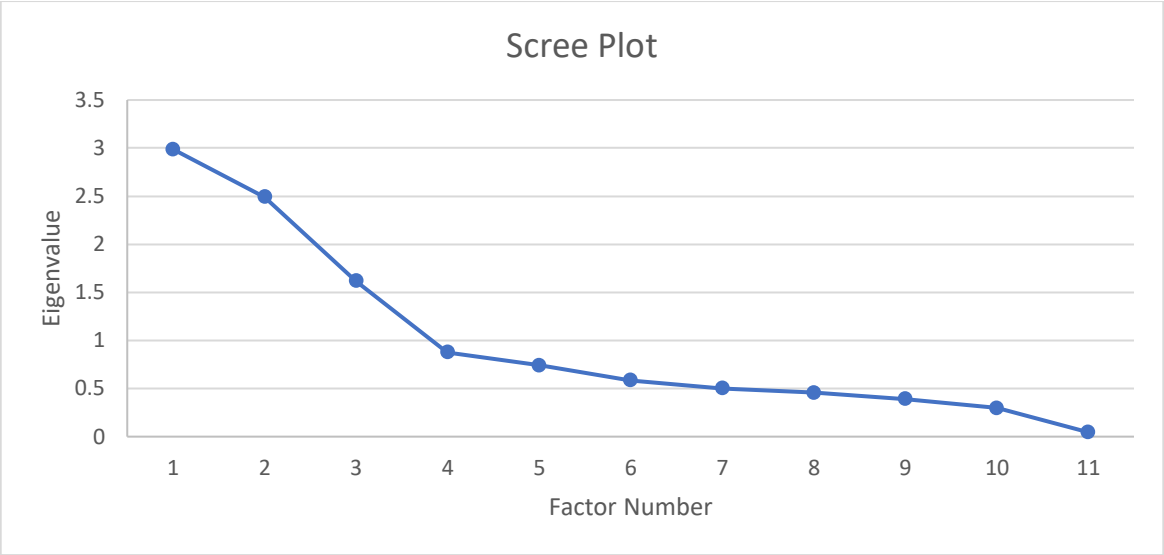

Figure 4.10: Scree plot

4.3.9 Pattern Matrix

A Principal Axis Factoring method was used to test 11 items. The cut off value was set at .40. Table 4.9 shows the final model, the results loaded on three factors: Factor one retained all four items at the end of factor analysis (scale items, Access to funding 1 "In my country there is sufficient equity for new and growing firms" and Access to Funding 4 "In my country there is sufficient debt funding for new and growing firms", Access to funding 2 "In my country there is sufficient venture capitalist funding for new and growing firms", Access to funding 3 "In my country there is sufficient funding available from informal investors (Friends, Family & Colleagues)".

Factor two retained only four of the six items at the end of factor analysis items Bias6, Bias5, Bias3 and Bias1. This is after Bias2 was removed as it did not load, and Bias 4; Bias2 "I trust the screening procedures of funding proposals to be unbiased" and Bias 4 "Society encourages and supports women like me to take on the challenges of the business world" loaded onto factor three together with the networks variables, scale items Networks 5 "Being a member of a business forum/organization provide access to financial capital" and Networks 2 "I believe it is essential for successful women entrepreneurs to network".

Taking that into consideration, the Bias4 item was combined with the networks factors and changed to Networks. When it comes to the confidence construct, it was deleted completely

at the end of the factor analysis as it only retained two factors. According to scholars, it is generally accepted that at least three variables are needed to create factor analysis from the variables that can be reserved in EFA (Sururu, Yikilmaz & Maslakci, 2022). In addition, the formation of two or fewer variables should be considered only when the correlation between the variables is highly correlated and the correlation value is higher that .7 (r< .70) (Sururu, Yikilmaz & Maslakci, 2022).

Table 4.8: Pattern matrix

Pattern Matrix[a]

	Factor			
	1	2	3	4
AccesstoFunding1	.991			
AccesstoFunding2	.965			
AccesstoFunding4	.531			
AccesstoFunding3	.404			
Bias6		.829		
Bias5		.721		
Bias3		.661		
Bias1		.624		
Bias4			.669	
Networks2			.595	
Networks5			.547	
Confidence6				.655
Confidence3				.651

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.[a]
a. Rotation converged in 6 iterations.

Table 4.9: Final Pattern Matrix

Final Pattern Matrix[a]

	Factor		
	1	2	3
AccesstoFunding1	.999		
AccesstoFunding2	.946		
AccesstoFunding4	.529		
AccesstoFunding3	.401		
Bias6		.823	
Bias5		.721	
Bias3		.652	
Bias1		.618	
Bias2			.660
Networks5			.574
Networks2			.538

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in five iterations.

4.4 Reliability of measurement scales

4.4.1 Reliability of testing of Access to funding

The Cronbach Alpha is used to "demonstrate that tests and scales that have been constructed or adopted for research projects are fit for the purpose" (Taber, 2018, p.1). The Access to Funding scale, which had four items, was subjected to reliability testing using the Cronbach Alpha coefficient. Table 4.10 illustration of the total Cronbach Alpha demonstrates that the items obtained a Cronbach □=.805. This indicates that the reliability of all four items under factor one was adequate. When looking at Table 4.11, the items Access to Funding 1 and 2 have a lower Cronbach value if they are deleted, and the item Access to Funding will have a lower Cronbach value if removed as well, falling to □=.792. However, when looking at the final item Access to Funding 3, the Cronbach value will rise to □=.846 if that item is deleted. This item was kept as it would not change Cronbach Alpha significantly.

Table 4.10: Reliability-access to funding

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.805	.804	4

Table 4.11: Reliability-access to funding

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
AccesstoFunding1	10.77	7.663	.773	.862	.673
AccesstoFunding2	10.79	7.883	.775	.858	.674
AccesstoFunding4	10.65	10.212	.541	.311	.792
AccesstoFunding3	10.68	9.914	.428	.205	.846

4.4.2 Reliability of testing of Investor Bias and Stereotype

Table 4.12 illustrates that the Bias overall reliability statistic kept a total of four items, and the Cronbach Alpha scale registered a value of □=.791. Table 4.13 shows that the scale would fall between □=.770 and □=.763 if scale components Bias5, Bias3, and Bias1 were deleted. When looking at item Bias6 in table 4.13, the Cronbach Alpha would drop to

□=.685 if this item were removed. The scale met the minimal requirements, so this item was kept.

Table 4.12: Reliability-Investor bias and stereotypes

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.791	.792	4

Table 4.13: Reliability- Investor bias and stereotype

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
Bias6	6.14	5.886	.700	.515	.685
Bias5	6.33	6.605	.623	.448	.727
Bias3	6.90	7.818	.559	.313	.763
Bias1	6.14	7.040	.539	.308	.770

4.4.3 Reliability of testing of Networks

The total number of statistics for the Networks measure was three, and the Cronbach Alpha scale was equal to □=.580 as illustrated by table 4.14. This item kept two separate variables, though. Bias4 "Society supports and encourages me as a woman to take on the challenges of the economic sector. While Networks 5 said "Joining a business forum or organization

provides access to financial capital," Networks 2 read "I believe networking is crucial for successful women entrepreneurs." The items were maintained together because, according to table 4.15, eliminating each of them would not have improved the Cronbach.

Table 4.14: Reliability- Networks

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.580	.588	3

Table 4.15: Reliability-Networks

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
Networks_	4.23	2.986	.385	.150	.501
Networks5	4.49	3.562	.390	.156	.477
Networks2	5.81	3.887	.409	.168	.464

4.4.4 Summary of reliability measurements

Table 4.16 below shows the summary of the reliability results. According to Hinton, Brownlow, McMurray and Cozens (2004, p.363) “an alpha that is above 0.75 generally indicates a scale of high reliability, and 0.5 to 0.75 is generally accepted as indicating a

moderately reliable scale". Thus, the overall reliability of the total reliability for Access to funding showed that the instrument achieved acceptable reliability at □=.805, Bias at □=.791 and lastly, Networks at □=.580, although low, is acceptable.

Table 4.16: Summary of reliability measurements

Constructs/Factors	Number of items	Cronbach Alpha
Access to funding	4	.805
Bias	4	.791
Networks	3	.580

This changed the hypotheses as it means that only two out of the three hypotheses are tested instead of three. Therefore, from the table, access to funding was tested for reliability as it retained all its factors. However, when looking at Bias only four out of six factors were retained, therefore only those were tested for reliability. And lastly, networks retained three items and therefore, only those factors were tested for reliability.

4.4.5 Outliers

The box plot is used to check for outliers, and the findings, as illustrated in figure 4.11, demonstrate that none exist for any of the factors.

Table 4.17: Case processing summary

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
ACCESS TO FUNDING	53	100.0%	0	0.0%	53	100.0%
NETWORKS	53	100.0%	0	0.0%	53	100.0%
BIAS	53	100.0%	0	0.0%	53	100.0%

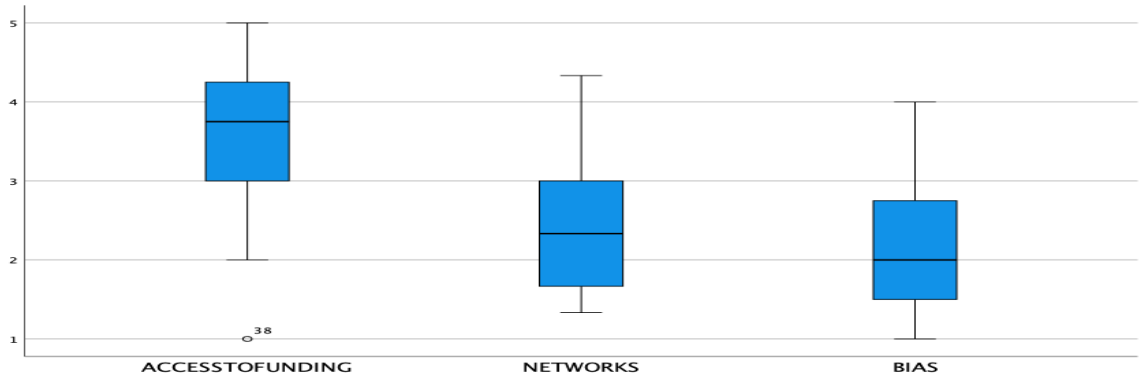

Figure 4.11: Outliers

4.5 Normality testing between the dependent and independent variables

The distribution's symmetry and level (peakness or flatness) are measured by skewness and kurtosis. According to Bryne (2010), data is considered normally distributed if skewness is between -2 to +2 and kurtosis is between -7 to +7. Table 4.18 shows that the data are sufficiently close to a normal distribution based on the results of the normality tests, as none of the data have a skewness greater than +-2 and none have a Kurtosis greater than +-7, respectively.

Table 4.18: Normality testing

Statistics

		ACCESS TO FUNDING	NETWORKS	BIAS
N	Valid	53	53	53
	Missing	0	0	0
Mean		3.5737	2.4214	2.1252
Median		3.7500	2.3333	2.0000
Mode		4.00	2.00	1.00[a]
Skewness		-.451	.698	.471
Std. Error of Skewness		.327	.327	.327
Kurtosis		-.408	-.308	-.633
Std. Error of Kurtosis		.644	.644	.644
Minimum		1.00	1.33	1.00
Maximum		5.00	4.33	4.00
Sum		189.40	128.33	112.63

a. Multiple modes exist. The smallest value is shown

4.5.1 Linearity testing between the dependent and independent variables

Pearson correlation was tested to establish the relationship between the variables. It was determined that the data was normally distributed. According to Senthilnathan (2019), there are different spectrums when it comes to correlation, and interpreting correlation as illustrated below.

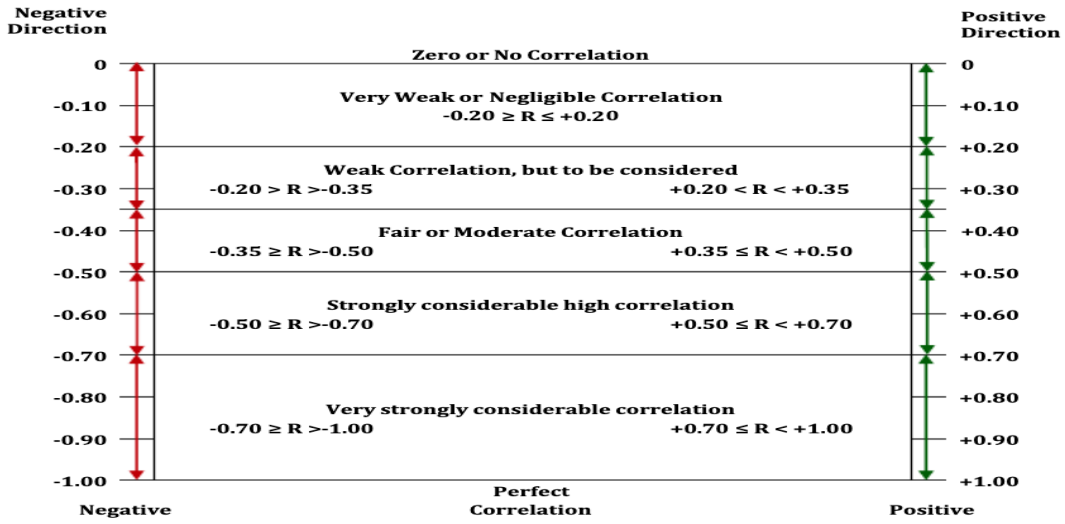

Figure 4.12: Linearity testing

Source: Senthilnathan (2019, p.4)

Hypothesis 1 states that perceived networks strongly influences access to funding for women-led technology start-ups in South Africa. Pearsons rho in table 4.19 illustrates that perceived networks and access to funding are positively correlated at .144 although not strongly correlated, and also not significant at .303, as the p-value is greater than .05.

Hypothesis 2 (a) and (b) state that perceived investor bias and gender stereotypes strongly influences access to funding for women-led technology start-ups in South Africa as illustrated in table 19 are also positively correlated at .108, the correlation is weak as it is less than .3 however, the p-value is greater than .05 at .441, meaning that it is not significant.

Table 4.19: Linearity Testing

Correlations

		ACCESS TO FUNDING	NETWORKS	BIAS
ACCESSTOFUNDING	Pearson Correlation	1	.144	.108
	Sig. (2-tailed)		.303	.441
	N	53	53	53
NETWORKS	Pearson Correlation	.144	1	-.129
	Sig. (2-tailed)	.303		.358
	N	53	53	53
BIAS	Pearson Correlation	.108	-.129	1
	Sig. (2-tailed)	.441	.358	
	N	53	53	53

4.6 Regression Analysis

Multiple regression was carried out in order to assess the degree of influence that perceived gender stereotypes and networks have on access to funding. It was performed to examine the associations and hypotheses produced between the dependent (Access to Funding) and independent variables (Networks and Bias). This permits the relationship between multiple independent and a single dependent variable. The hypotheses are:

Hypothesis 1 states Perceived networks strongly influences access to funding for women-led technology start-ups in South Africa.

Hypothesis 2 (a) and (b) state that:
(a) Perceived investor bias strongly influences access to funding for women-led technology start-ups in South Africa.
(b) Perceived gender stereotypes strongly influences funding for women-led technology start-ups in South Africa.

4.6.1 Diagnostic model summary

According to the results, as illustrated in Table 4.20, the Durbin-Watson is at 1.799, this therefore suggests that as the value is roughly or close to 2, it can be assumed that there is

no correlation between the residuals and thus, can be accepted. When it comes to the total variation between the p-value of 0.037% which means that only 3% of what is happening to access to funding is explained by the two predictors/variables (Networks/Bias and Access to funding).

Table 4.20: Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.193[a]	.037	-.001	.96522	1.799

a. Predictors: (Constant), BIAS, NETWORKS

b. Dependent Variable: ACCESSTOFUNDING

4.6.2 ANOVA

ANOVA tests if there is a linear association between at least one of the independent variables (investor bias, stereotypes and networks) and the dependent variable (access to funding). The results in table 4.21 therefore show that the p-value is greater than 0.05 at .389. This means that the relationship between the variables is not significant. When looking at the F-value is at .962, therefore, it can be concluded that since the F-value is greater than the p-value, therefore bias/gender stereotypes and networks are not significant to access to funding.

Table 4.21: ANOVA table

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.793	2	.896	.962	.389[b]
	Residual	46.583	50	.932		
	Total	48.376	52			

a. Dependent Variable: ACCESSTOFUNDING
b. Predictors: (Constant), BIAS, NETWORKS

4.6.3 Coefficients

The results in the table indicate that there are no multicollinearity difficulties because the VIF state on the coefficient is less than 10 at 1.017. Both of the dimensions have a beneficial impact on financing access, but when it comes to significance, neither is significant because bias and networks are both larger than .05. As a result, the networks have little impact on how easily women-owned technology businesses may obtain finance. At the same time, prejudice and stereotypes have little impact on their capacity to obtain money. According to the Beta coefficients, just 12% of bias/stereotypes and only 16% of networks had an impact on receiving financing.

Table 4.22: Coefficients

Coefficients									
Model	**Unstandardized B**	**Coefficients Std. Error**	**Standard Coefficients Beta**	**t**	**Sig.**	**95.0% Confidence Lower Bound**	**Interval for B Upper Bound**	**Collinearity Tolerance**	**Statistics**
1(Constant)	2.181	.565		5.014	<.001	1.689	3.947		
Networks	.183	.159	.161	1.148	.257	-.137	.503	.983	1.017
Bias	.147	.160	.129	.920	.362	-.174	.469	.983	1.017
Dependent variable: ACCESSTOFUNDING									

4.6.4 Assumptions

The following assumptions were examined to see if they met multiple regression requirements. Using a histogram, the assumption of normality is generated. The standard residual looks to be regularly distributed, as seen in figure 4.13. This result is further validated using the p-plot. The p-plot is aligned to the straight line or diagonal line in Figure 4.14, showing that the residual is sufficiently close to normal. Given that the scatter plot indicates a linear relationship, additional homoscedasticity tests were carried out.

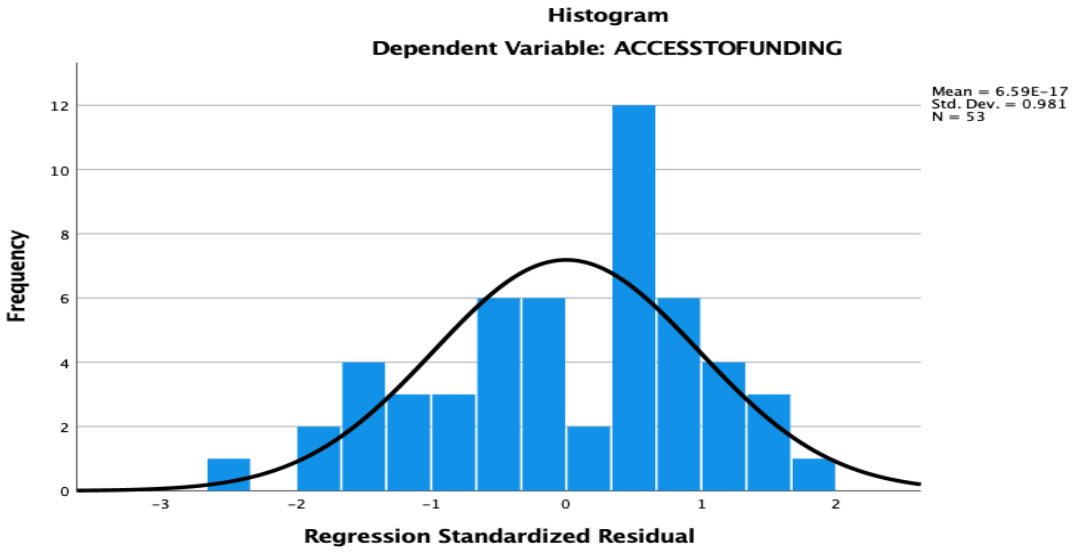

Figure 4.13: Histogram

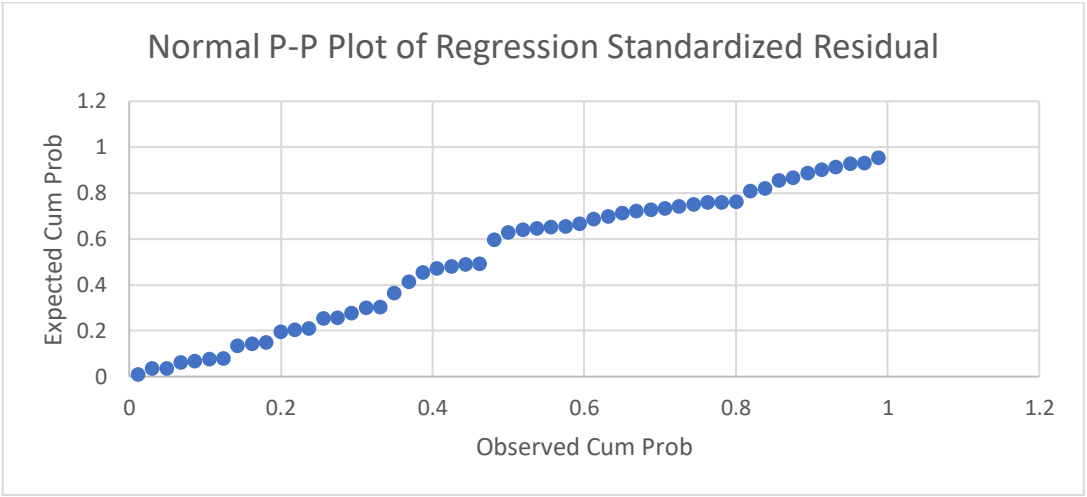

Figure 4.14: Normal P-Plot of Regression Standardised Residual

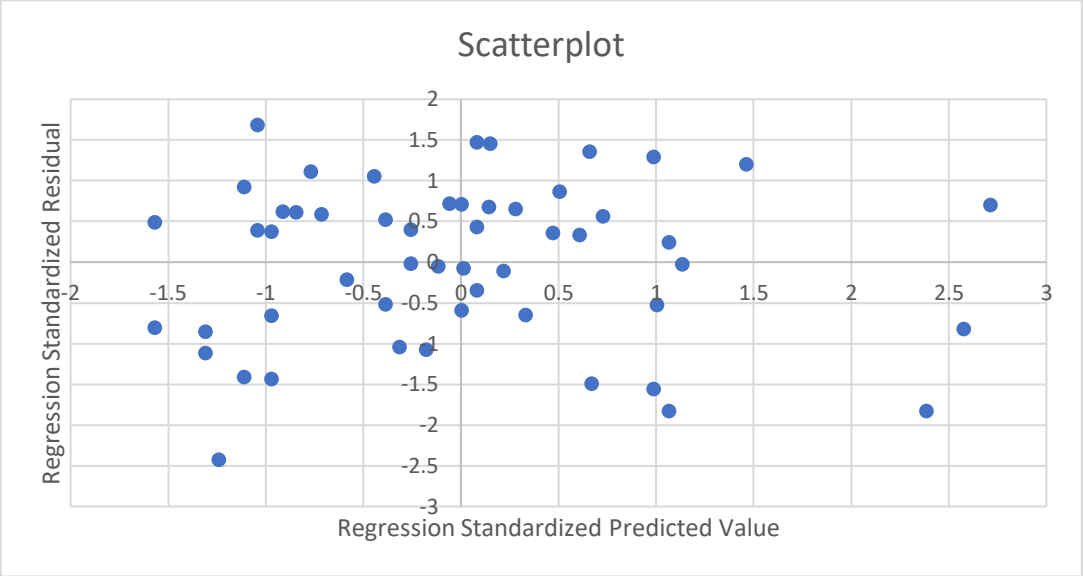

Figure 4.15: Scatterplot

4.6.5 Hypothesis Result

Table 4.23: Hypothesis Results

	Hypotheses	Testing Outcome (Accept or Reject)
H1	Perceived networks strongly influences access to funding for women-led technology start-ups in South Africa.	Reject
H2	a) Perceived investor bias strongly influences access to funding for women-led technology start-ups in South Africa. (b) Perceived gender stereotypes strongly influences access to funding for women-led technology start-ups in South Africa.	Reject Reject
H3	Perceived confidence (self-efficacy) strongly influences access to funding for women-led technology start-ups in South Africa.	Null and void

4.7 Summary of the results

The data collected was analysed using the hypotheses created in chapter 2 and using the statistical methods described in chapter 3. The results showed that there is a positive but weak influence between perceived networks, investor bias and stereotypes with access to funding. Even though there is a relationship between the variables, the results also showed that the relationship is not significant. The first and the second hypotheses were not supported because the influence is not as strong as previously hypothesized. However, the third hypothesis failed validity, and therefore no further testing was undertaken.

CHAPTER 5: DISCUSSION OF EMPIRICAL FINDINGS OF STUDY AND CONCLUSIONS

5.1 Introduction

Based on the results in Chapter 4, this chapter further explains the findings from the demographics and the multiple regression analysis used to test the hypothesis formulated in the study. The chapter also concludes the report, discusses the key findings, the implications, limitations and suggestions for future research. The aim of the research was to investigate the perceived barriers to accessing funding for women-led technology start-ups. The discussion presented in this section is similar to the findings from the literature.

5.2 Demographic profile of the respondents

The data for the study was collected using an online survey. Challenges were experienced during the data collection process, as the response rate was low. The questionnaire was distributed using Qualtrics through a survey link on various social media sites like LinkedIn, Twitter, Facebook and Instagram. The questionnaire was also distributed to Wits students through the Wits student mailing list. This however did not significantly improve the response rate as only 57 responses were recorded and after data cleaning, only 53 responses were usable for analysis.

5.2.1 Respondents Age

The respondents were asked to indicate their age range. It was found that about 47.2% of the respondents indicated that they were 36 and older, in contrast to 9.4% of respondents were between the ages of 18-25. Whilst 30.2% of respondents are between the ages of 26-30 and those between the ages of 31-35 comprised 13.2%. According to the GEM report, South Africa is one of 12 economies where the rate of women starting businesses has increased, with 11.1% of working-age women participating in this type of activity (MasterCard, 2022). In South Africa, women can start working at any age between 15 and 64.

5.2.2 Respondents Race

The respondents were also asked to indicate their race. It was found that 69.8% of the respondents were black, followed by 17.0% who were white, respondents of Indian and

coloured descent were under 10% and constituted of 7.5% and 5.7% respectively. The largest group in the country, the Black population, comprises 49,071 people, according to Statistics SA (2022), followed by the White population, which numbers 4639, the Coloured population, which numbers 5340, and the Indian/Asian population, which numbers 1555.

5.2.3 Higher Educational Qualifications of the respondents

The respondents were asked to indicate their highest level of education. The results show that most of the respondents were postgraduate degree holders, with 37.7% possessing an Honours degree followed by a Master degree at 28.3%, and those possessing a doctorate degree at 5.7%. According to a Statistics SA report that compared gains made in educational participation, looking at the gender gap in education and labour market participation of three generations, the results show that women are doing better than men when it comes to educational outcomes (Manyethela, 2020). In addition, this is indication of the high level of expertise that is required in setting up a technological enterprise in South Africa.

5.2.4 Location of business

The respondents were asked to indicate where their start-ups operate. Most of the respondents' businesses operate from Gauteng province at 64.2%, followed by 18.9% operating from the Western Cape and other businesses operating from either Gauteng, Western Cape and other provinces at 17%. Gauteng and the Western Cape are where the majority of South Africa's technological start-ups are located (South African ecosystem report, 2022).

5.2.5 Industry/Sector

The respondents were asked to indicate the industry in which they operate. The results show that most of the respondents were in the Information technology and Computers sector at 22.6%, followed by the Beauty, fashion, Art and Design and Décor sector at 13.2% and Health/Medical sector and Finance, insurance and commerce following at 11.3% each.

5.2.6 Business Age

The respondents were asked to indicate the number of years they have been in business. Most of the respondent's businesses have been operating for 1-2 years, at 56.6%, followed by 3-5 years and 6-years and older, both comprising 20.8% each. This illustrates that most

of the businesses are still in their infancy stage as they have been operating for two years or less.

5.2.7 Sources of Capital

The respondents were asked to indicate how they funded their businesses. Most of the respondents' start-ups were self-funded at 81.1%, whilst only 1.9% was funded through a loan and 17.9% were funded through other means, for instance, venture capital and angel investors. Women business owners have a history of raising money for their ventures. Most South African women entrepreneurs, according to Seed Academy, operate from home, funding their companies with modest amounts of capital while managing clients and raising capital (Tech central, 2016).

5.2.8 Business Entity

The respondents were asked to indicate how they started their business. The results indicate that most of the respondents started their business on their own at 66%, whilst 28% started with a partner/s at 28.3% and about 5.7% were started through other means which were not indicated. According to a survey by Seed Academy, which attempted to understand the fundamentals of entrepreneurs in South Africa, largely focused on women and youth, found that 59% of entrepreneurs, who were primarily women, are the sole founders of their businesses (Tech central, 2016).

5.2.9 Number of Employees

The respondents were asked to indicate the number of employees who work in their businesses. The results revealed that 75.5% had 1-10 employees, whilst 13.2% had 10-50 employees and only 11.3% had more than 50 employees. In South Africa, only 4% of business owners employ more than 10 people, according to Seed Academy (Tech central, 2016).

5.3 Discussion pertaining to Hypothesis 1

The study sought to investigate the perceived barriers to accessing funding for women-led technology start-ups in South Africa. First, we looked at the perceived networks and influence on access to funding.

Hypothesis 1 states that perceived networks strongly influence access to funding for women-led technology start-ups.

The results concluded that there is a positive relationship between the perceived networks and access to funding. The regression coefficient revealed that perceived networks influence access to funding by 16% for women led technology startups in South Africa. The model showed that perceived networks and access to funding for women-led technology start-ups in South Africa are positively but moderately correlated (B= .183). A high percentage of respondents believed that it is important to network in order for them to be successful. It is, however, also important to strike a balance between formal and informal networks (Hampton et al., 2011). According to the literature discussed in chapter 2, because women's networks contain relatives and friends and other women, and their networks have been found to be limiting resulting in limited information (Carranza et al., 2018). Yet, these networks are useful to female entrepreneurs because the majority of informal networks offer the financial resources (e.g startup capital) required to launch the firm (Carranza et al., 2018). This demonstrates the value of informal networks for female business owners because they provide a dependable source of initial funding (Nziku & Struthers, 2017; Carranza et al, 2018). Some scholars argue that women are less likely to work closely with co-workers and business advisers in their network than males are, as they find it challenging to use these networks to acquire more business-related services (Vadnjal, 2020). However, this is contrast to the literature discussed in chapter 2 as it states it is because of "masculine fraternal cultures" and not because they aren't qualified or ambitious enough (Marlow & McAdam, 2013). Additionally, women are less focused on strategic networking and are more emotionally closed, homogeneous, and less open, which is detrimental to the success and continued existence of the business (Vadnjal, 2020). Carranza et al. (2018) argues that as much as women gain from informal networks, they also lose out as these networks drain them of their resources. Thus, women technology entrepreneurs could benefit more if they had a good balance of formal networks (weak ties) too. This is because weak ties are more likely to provide resources like funding (Venter & Urban, 2015; Urban, 2011).

To determine whether perceived networks and access to funding have a positive relationship, a Pearson rho analysis and regression analysis were conducted However, contrary to expectations, the overall model was found to not be significant, with a p-value of .303, higher than .05. This means that perceived networks have no noticeable impact on the ability of women-led technology enterprises in South Africa to obtain financing. However, this does not discredit how important networks are in aiding entrepreneurs to access funding. Social capital is one of the essential resources that an entrepreneur can have. According to Venter and Urban (2015), this is because through social capital, people can obtain institutional support and these include current resources and potential resources that are available through an actor's network of connections. Moreover, Nziku (2012, 2013) claims that social networks have a significant influence on how the majority of women entrepreneurs start their businesses. The resource dependency theory further states that an entrepreneur's endurance is reliant on the accessibility of resources in the entrepreneurial eco-system (Fuboh & Moss, 2021). Therefore, a crucial resource, such as finance, is important for women to thrive in their entrepreneurial journey. Nonetheless, there are obstacles for female entrepreneurs, including discrimination by financial institutions, as illustrated by the respondents. For instance, researchers argue that women who seek financial assistance are at a disadvantage because institutions, like banks, may not personally know the prospective female entrepreneur (Nziku & Struthers., 2017). Nziku and Struthers (2017) claim that in many women developing countries face difficulties throughout the initial development and growth stages of their businesses. For instance, women are unable to offer fixed and variable assets as collateral, thus banks frequently charge them higher credit rates (Nziku & Struthers, 2017). Consequently, personal savings, extended family networks, community savings, and informal networks are the sole sources of money available to them (Nziku, 2016, as cited in Nziku & Struthers, 2017). Furthermore, informal ties are not able to offer huge amounts of capital that will be able to assist a technology entrepreneur to be able to continuously sustain the business.

In conclusion, based on the results of the study it can be concluded that although perceived networks positively influence access to funding, however the relationship is moderate and not as strong as previously hypothesized. In addition to that, the overall model is not significant either for women-led technology start-ups in South Africa.

Table 5.1: Hypothesis 1

Hypothesis	Results (Accept or Reject)
H1: Perceived networks strongly influences access to funding for women-led technology start-ups.	Reject

5.4 Discussion pertaining to Hypothesis 2

Secondly, we looked at the perceived investor bias and stereotypes influence on access to funding.

Hypothesis 2 (a) and (b) state that:

(a) Perceived investor bias strongly influences access to funding for women-led technology start-ups in South Africa.

(b) Perceived gender stereotypes strongly influences access to funding for women-led technology start-ups in South Africa.

There is a positive relationship between the perceived investor bias, stereotypes and access to funding. The regression coefficient revealed that perceived investor bias and stereotypes influences access to funding by 12% for women led technology start-ups in South Africa. This overall model showed that there is a positive but weak relationship between perceived investor bias, gender stereotypes and access to funding for women-led technology start-ups in South Africa (B= .147). This means that perceived investor bias and stereotypes do influence access to funding, however this is to a minimal extent. This is confirmed by a high percentage of respondents who believe that they have faced gender discrimination by financial markets, and the fact that many have encountered situations where they have not been taken seriously because they are women. Therefore, one can conclude that women are not seriously seen as contenders in entrepreneurship as much as men. According to the literature discussed in chapter 2, gender plays a big role in a variety of ways, investors tend to have a bias against women entrepreneurs (Guzman & Kacperczyk, 2019). Thus, because female ventures are so rare, women entrepreneurs are hardly seen as good fits for founder

positions which results in them not getting funded as much compared to their male counterparts (Guzman & Kacperczyk, 2019). In addition, women are perceived as riskier investments than their male counterparts because they are believed to be different in terms of their objectives, behaviours and resources (Alsos & Ljunggren., 2017). At the same time, because men are perceived to similar to these investors, this increases the likelihood of investors backing male entrepreneurs (Guzman & Kacperczyk, 2019).

To determine whether perceived bias, gender stereotypes, and financial access have a positive relationship, a Pearson rho analysis and a regression analysis were conducted. According to the Pearson rho, p-value, which was more than .05 at .441 showed that the overall model was not significant, contrary to what was expected. This means that perceived investor bias and gender stereotypes have no noticeable impact on the ability of women-led technology enterprises in South Africa to obtain funding. This is in support of the view discussed in chapter two. This lends credence to the claim made by some academics that women must be empowered in order to access resources that will allow them to overcome the stereotypical attitudes they encounter on a daily basis from institutions e.g banks (Chinomona & Marizizi, 2015). Women have historically been denied the opportunity to develop their strategic abilities, thus it is important to emphasize this. Additionally, some scholars argue that there is no proof of gender discrimination by financial institutions, however they argue that female entrepreneurs are the ones who perceive gender discrimination (Wang, Zhu & Deng, 2020). This view contrasts with the literature in chapter 2 that investors do not fund based on sex but rather based on whether an entrepreneur exhibits stereotypical feminine traits, which is evidence of gender discrimination itself (Balachandra et al, 2019). However, this result does not completely discredit the perceived bias and gender stereotypes' influence on access to funding.

In conclusion, based on the results of the study, it can be concluded that although the relationship between perceived investor bias, gender stereotypes and access to funding relationship is positive, it is weak and not as strong previously hypothesized. The overall model is also not as significant for women-led technology start-ups in South Africa.

Table 5.2: Hypothesis 2

Hypotheses	Results (Accept or Reject)
H2: (a) Perceived investor bias strongly influences access to funding for women-led technology start-ups in South Africa.	Reject
H2: (b) Perceived gender bias strongly influences access to funding for women-led technology start-ups in South Africa.	Reject

5.5 Discussion pertaining to Hypothesis 3

Thirdly, we looked at perceived confidence (self-efficacy) and its influence on access to funding.

Hypothesis 3 states that:

Perceived Confidence (self-efficacy) strongly influences access to funding for women-led technology start-ups in South Africa.

The confidence construct was put through validity testing, however by the end of the factor analysis process, it had completely fallen off as a construct as there were fewer than three items left during factor analysis. Therefore, the confidence construct failed validity, and thus neither correlation nor regression was performed on the construct. Thus, given this, the confidence variable failed validity because one could argue that women encounter far greater challenges in their everyday lives and this has made them more resilient. The literature described in chapter 2 that claims women entrepreneurs lack self-confidence, because of the environment and societal standards where men are rewarded for confident behaviour and women are not (Duffy, 2021; Davidson & Hume, 2020). According to Javadian & Singh (2012) women in Iran encounter obstacles on a daily basis however they don't deem the fear of failure or lack of confidence to be significant of concern. The same could be argued for women-led technology entrepreneurs in South Africa as the country is still a young democracy and South African women were historically marginalized, and because the majority of them are still finding their feet (e.g., building their wealth and credit), most of them have built resilience. One could argue that the environment does not

affect their confidence. In addition to that their high levels of education could also be one of the reasons why the confidence construct did not hold any water. Some scholars argue that the higher educated you are, the easier it will be to adopt innovative ideas and skills (Esiobu, Onubuogu & Ibe, 2015). According to the findings of this study, more than 60% of the women who participated in the study possess a post-graduate degree. This contrasts to the literature that states that women have low self-confidence, especially when pitching to investors despite the level of education, experience and profits being similar to that of their male counterparts and that is why they struggle to access funding (With et al., 2021). Moreover, women in the technology industry are required to be highly confident, especially since the industry is such a saturated and male dominated sector. This supported by Duffy (2016) that confidence plays a large role in entrepreneurship, it is not only about being innovative but also about having faith in your own abilities.

Table 5.3: Hypothesis 3

Hypothesis	Results
H3: Perceived Confidence (self-efficacy) strongly influences access to funding for women-led technology start-ups in South Africa	Null and void

5.6 Conclusion

The study studied the relationships that exist between networks, bias/gender stereotypes, confidence and access to funding. The study's significant conclusion and key empirical findings are outlined in this part. To investigate the hypothesis generated, this study used a questionnaire approach, based on a positivist research paradigm. Based on data gathered from 53 South African women-led technology firms, an empirical study was created. Cronbach's alpha was used to test the reliability, and the results met even the strictest requirements. The measuring scale's exploratory factor analysis (EFA) demonstrated that the items may be categorized and assessed precisely. To examine the correlations between the dependent and independent variables, multiple regression was used. Out of the three hypotheses, one failed validity, the other two were tested. The remaining hypotheses were

tested however, both hypotheses, although positively related, the relations were weak and were not significant. Multiple regression was also conducted. It showed a positive relationship between networks and access to funding. The model also showed a positive relationship between bias/stereotypes and access to funding. It was concluded that perceived networks, bias stereotypes and access to funding have a positive, but weak relationship with access to funding for women-led technology start-ups in South Africa therefore rejecting both hypothesis 1 and hypothesis 2.

The results confirm findings that base the importance of strong ties for South Africa entrepreneurs compared to weak ties. Thus, women-led technology start-ups struggle to gain the necessary resources from these types of networks as female technology entrepreneurs within the South African context gain access to funding using their strong ties networks. Although the relationship is weak, it is however positive. At the same time although weak ties (formal ties) are essential, informal ties can make it difficult for women entrepreneurs to locate suitable business support. When it comes to investor bias, one can argue that because we live in such a patriarchal society, it is not surprising that women in the South African context perceive that bias and gender stereotypes play a role in them being able to attain funding whether the discrimination is overt or covert.

5.7 Summary of main objectives, hypotheses and main findings

Then aim of study was to investigate the barriers to accessing funding for women-led technology start-ups in South Africa. Technology start-ups are essential to the economy and have the ability to boost employment and economic growth significantly. Despite the fact that South Africa's technological entrepreneurship scene is still developing, women's under-representation in this industry is a reason for concern. One of the main issues facing women-led technology firms is a lack of access to sufficient funding. As a result, obstacles like networks, prejudice, gender stereotypes, and confidence gap have been mentioned as some of the reasons why women-led technology entrepreneurs cannot acquire sufficient finance, therefore, influencing the percentage of women who choose to start their own businesses.

It is crucial that efforts are created to promote entrepreneurship by enhancing access to finance for women-led firms, given the significance of high growth start-ups such as

technology start-ups. According to the study's findings, the relationship between networks and access to funding are moderately but positively correlated. This implies that having a network can improve the likelihood of gaining access to a resource as crucial as finance. It was discovered, nevertheless, that perceptions of networks have no bearing on whether or not women-led technology firms are able to secure finance. This may be largely attributed to the kinds of networks (strong or weak) that women business owners have and how helpful those networks are. This is based on the fact that weak ties rather than strong ties have been attributed to increase an entrepreneur's chances of obtaining resources like access to funding, especially in the long term.

The data collected also revealed that there is a positive but weak and not significant relationship between perceived investor bias and stereo types and access to funding for women-led technology start-ups. This finding suggests that societal perceptions in terms of how men view women within the entrepreneurship space does have some influence as to whether women-led technology start-ups access funding or not. The fact that technology entrepreneurship is male dominated also adds to this. This includes those who are willing to fund women. However, the relationship between the two variables was found to not be as significant as the perception could be on the women's side.

5.8 Implications of the study

5.8.1 Implications for Researchers

The findings of this study have important implications for researchers, especially those that are in the African context. Thus, given that the literature on financial constraints for women-led digital businesses has received scant attention in poor nations, the empirical findings of this study are relevant. Additionally, South Africa's technological entrepreneurial scene is continuously developing. Therefore, in order to support the arguments made in the literature, particularly in light of the South African context, empirical evidence is still required.

By highlighting the difficulties women technology entrepreneurs have in obtaining financing, the findings will contribute to the South African literature on entrepreneurship. Thus, considering the economic role that technology start-ups play in South Africa shows that there is a need for extensive literature to be developed that not only highlights barriers

that women-led start-ups face within the technology space but also determining the funding links and their effect is important. Moreover, it is clear that a body of research is required that not only identifies the challenges that female-led companies encounter in the technology sector but also identifies the funding relationships and their impact.

5.8.2 Implications for Policy makers

The findings of this research also have important implications for policies, the main objective of policy makers is to drive the development of technology start-ups, especially those created or founded by women. It is imperative that government develop initiatives to assist women technology entrepreneurs with obtaining funding within the space. Therefore, it is in policy makers and government's interest to work with different actors within the investor space (e.g., VCs, banks) to create an environment where women feel comfortable enough to start their ventures knowing that they will be supported in financing their businesses and not struggle.

5.8.3 Limitations

There are some limitations that were identified for the study. Firstly, there were only 53 valid responses that could be used for the study therefore, the study could have benefitted by the use of a larger sample size to provide significantly conclusive results regarding the barriers to accessing funding for women-led technology startups. In addition, due the small number of participants who were willing to partake in the study, other provinces, although minimal, were also included in the responses. Secondly, the results of the study might also be biased as the majority of the respondents are from the Gauteng area, compared to other provinces such as the Western Cape. The Western Cape has a higher number of technology start-ups than Gauteng. Thirdly, although the use of a questionnaire is easier to circulate and much cheaper, however this might have posed as a limitation as the study might have required some more in-depth explanations from respondents. In addition, this questionnaire should be tested in a study with a much larger sample size or source a questionnaire that can produce a much higher Cronbach Alpha. Fourthly, because of the limited time constraints to collect the data, this resulted in a much smaller sample used to collect data for the study, as well as not having adequate time to do some data collection exercises. And lastly,

technology entrepreneurship is still in its infancy in South Africa therefore the number of entrepreneurs in this field is limited, particularly among women. Therefore, there is limited literature on this topic.

5.9 Suggestions for further research

Opportunities for future research to perhaps conduct a similar study are provided, based on the current study's limitations. Future researchers should therefore consider conducting the same study using a mixed methods approach where they could combine the scientific questionnaire with interviews and get a more in-depth understanding of the barriers to accessing funding for women-led technology start-ups as they are a very important part of entrepreneurship and the economy. Additionally, considering the complexity of the issues faced by women entrepreneurs, researchers may want to focus on other obstacles that may have a significantly greater impact on access to funding.

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APPENDIX A: ETHICS CLEARANCE CERTIFICATE

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

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

Ethics Clearance Certificate

Ethics protocol number: WBS/EN388496/564
This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

Project title	Barriers to accessing funding for women entrepreneurship technology start-ups in South Africa.
Investigator / Researcher	Miss Claire Mogotsi
Nature of Project	MM in Entrepr & New Venture Creation
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed confidentialty.
Issue Date of Certificate	2022-10-20
Expiry date	Date of submission of the project / research 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: _____

APPENDIX B: SUMMARY OF QUESTIONNAIRE

High level factors	Constructs	Section	Question	Items	Variables
Introduction	None	Front page			Other
Demographics And business related data.	Individual and business	A	Q1, Q2 Q3, Q4, Q5, Q6, Q7 and Q8	45	CV
Barrier 1	Networks	B	Q9	6	IV
Barrier 2	Bias	B	Q10	6	IV
Barrier 3	Confidence	B	Q11	6	IV
Access to funding	Finance	B	Q12	4	DV

Total items:67

APPENDIX C: CONSENT FORM

Good day respondent,

My name is Claire Mogotsi. I am a Master of Management in the field of Entrepreneurship and New Venture Creation at Wits Business School, Johannesburg. As part of my studies, I have undertaken a research project. I am investigating the perceived barriers to accessing funding for women-led tech start-ups in South Africa. In order to collect data for my study, I am requesting women from the ages of 18 and above who are leading or founders of tech-startup businesses to complete the attached survey.

This survey will take between 10-15 min to complete. No costs are involved should you choose to participate. There will be no benefits if you choose to participate, and no penalties or disadvantages if you choose not to participate. You may withdraw at any point from this study, and choose not to answer questions if do not want to. This questionnaire is confidential and voluntary. This study does not require your name, ID or any identifying information and the information shared will not be divulged to anyone else and will be held securely.

This study will be written as a research report and therefore available through the University library website. And only with your permission will the data be used by other researchers in an anonymised format. Should you have any concerns or complaints regarding the Ethical procedures of this study you are welcome to contact the University Human Research Ethics Committee at 011 717 1408 or email at hrecnon-medical@wits.ac.za. Should you require further information regarding the study please contact me.

Yours sincerely,
Researcher: Claire Mogotsi
Email: 388496@students.wits.ac.za
Supervisor: Prof Boris Urban
Phone: 011 717-3762

N/B: If you know anyone else who fits the criteria and might be interested in participating in the study, please pass this invitation to them as well.

Yes, I consent to this study. (1)

APPENDIX D: RESEARCH INSTRUMENT

Q1 Please indicate the industry or sector which your business currently operates.

Advertising, Marketing, Sales and Public relations (1)

Agriculture (2)

Beauty, fashion, Art, Design & Decor (3)

Communication, Education, Training (4)

Entertainment (5)

Finance, insurance and commerce (6)

Government/Pubic services (7)

Health and Medical (8)

Hospitality, Travel and Tourism (9)

Human resources and Personnel (10)

Information technology and computers (11)

Legal (12)

Manufacturing and Heavy Industry (13)

Media & Publishing (14)

Mining (15)

Property, Architecture and Quantity surveying (16)

Wholesale & Retail (17)

Transport and Freight (18)

Other (please specify below) (19)

_____

Q2 Please indicate your highest level of education achieved.

Matric (1)

Diploma (2)

Bachelors (3)

Honours (4)

Masters (5)

Doctorate (6)

Q3 Please indicate the period for which your company has been in Business.

1-2 year (1)

3-5 years (2)

6 years and longer (3)

Q4 What is your age range?

18-25 (1)

26-30 (2)

31-35 (3)

36 and older (4)

Q5 Please indicate your race.

Black (1)

White (2)

Indian (3)

Coloured (4)

Other (please specify below) (5)

_____

Q6 Total numbers of employees employed in your business (full-time, part-time & contractual)

1-10 (4)

10-50 (5)

More than 50 (6)

Q7 Please indicate how you started your business

Self-started (1)

Started with a partner (2)

Inherited (3)

Buyout (4)

Other (please specify below) (5)

_____

Q8 In which Province does your start-up operate?

Gauteng (1)

Western Cape (2)

Other (please specify): (3) _____

Q9 Please indicate the capital sources utilised for the startup of your business

Self-funded/Savings (1)

Loan (bank or other financial institution) (2)

Loan (family and friends) (3)

Other (please specify below) (4)

_____

Q10 Networks-Using a scale from 1-strongly disagree to 5-strongly agree, please read each statement carefully, and indicate the number that reflects your degree of agreement.

	Strongly agree (1)	Somewhat agree (2)	Neither agree nor disagree (3)	Somewhat disagree (4)	Strongly disagree (5)
I gained access to a network easily. (1)					
I believe it is essential for successful women entrepreneurs to network. (2)					
Family and personal networks provide greater access to financial capital. (3)					

Organization and institutional networks provide greater access to financial capital. (4)	
Being a member of a business forum/organisation provide access to financial capital. (5)	
The people outside my immediate friends are not at all important. (6)	

Q11 Bias-Using a scale from 1-strongly disagree to 5-strongly agree, please read each statement carefully, and indicate the number that reflects your degree of agreement

	Strongly agree (1)	Somewhat agree (2)	Neither agree nor disagree (3)	Somewhat disagree (4)	Strongly disagree (5)
I believe i have faced gender discrimination by financial markets. (1)					
I trust the screening and					

procedures of funding proposals to be unbiased. (2)

I believe women experience more barriers than men in making a success of their businesses. (3)

Society encourages and supports women like me to take on challenges of the business world. (4)

In business, i encounter situations where i am not taken seriously because i am a woman. (5)

The views held by society on the traditional

roles of women (e.g wife, mother) impose negatively on my entrepreneurial endeavours. (6)	

Q12 Confidence-Using a scale from 1-strongly disagree to 5-strongly agree, please read each statement carefully, and indicate the number that reflects your degree of agreement.

	Strongly agree (1)	Somewhat agree (2)	Neither agree nor disagree (3)	Somewhat disagree (4)	Strongly disagree (5)
I experienced personal barriers e.g (lack of self-confidence, low self-esteem, isolation) when i started my business. (1)					
I am sought the assistance of experts (legal and financial) when i ventured on my own. (2)					

I take on challenges even in uncertainty. (3)	
I chose to go into my own businesses because of other women who inspired me. (4)	
I sometimes feel like other entrepreneurs have skills that i don't have. (5)	
I feel similar to the kinds of people who have what it takes to succeed in entrepreneurship. (6)	

Q13 Access to Funding

Using a scale from 1-strongly disagree to 5-strongly agree, please read each statement carefully, and indicate the number that reflects your degree of agreement.

	Strongly agree (1)	Somewhat agree (2)	Neither agree nor disagree (3)	Somewhat disagree (4)	Strongly disagree (5)

In my country there is sufficient equity funding for new and growing firms (1)
In my country there is sufficient venture capitalist funding for new and growing firms. (2)
In my country there is sufficient funding available from informal investors (Family, friends and colleagues) (3)

In my country there is sufficient debt funding for new and growing firms (4)

CONSISTENCY MATRIX

Title: Barriers to accessing funding for women entrepreneurship technology start-ups in South Africa. Research question: What influence do barriers have towards women-led tech start-ups in accessing funding in South Africa?							
Aim of research	Literature Review	Hypotheses	Research Questions	Variables (dependent and independent)	Sources of Data	Types of data	Analysis
The aim of is to investigate the perceived barriers to accessing funding for women-led tech start-ups in accessing funding particularly in the South African context.	Social Capital Venter and Urban (2015); Lerner, Brush and Hisrich (1995); Carranza, Dhakal and Love (2018); Nziku and Struthers (2017) Resource dependency and resourced based theory.	1)Perceived networks strongly influences access to funding for women-led technology startups in South Africa. 2a) Perceived investor bias strongly influences access to funding for women-led technology	1) What degree of influence do networks have on access to funding? 2a) What degree of influence does investor bias have on access to funding?	IV 1: Networks IV 2 (a): Investor Bias IV2 (b): Gender stereotypes IV 3: Confidence (Self-efficacy) DV: Access to funding	Questionnaires Self-administered Online Surveys	Primary data Ordinal data. 5 likert scale) Nominal data	Descriptive analysis Correlation analysis Multiple regression

	(Fuboh & Moss, 2021, p.1); (Henard & McFadyen, 2012) Social role theory (Balachandra, 2019); (Wheadon & Duval-Couetil, 2018). Signaling theory (Alsos & Ljunggren., 2017; Guzman & Kacperczyk., 2019) Self-efficacy (Bandura., 1997; (Hackett and Betz.,1981)	startups in South Africa. 2b) Perceived gender stereotypes strongly influences access to funding for women-led technology startups in South Africa. Perceived confidence (Self-efficacy) strongly influences access to funding for women-led technology startups in South Africa.	2b) What degree of influence do gender stereotypes have on access to funding? 3) What degree of influence does confidence (self-efficacy) have on access to funding?				
