Assessment of the second-level digital divide in South Africa: the case of Digital Financial Services

Thabo Karabo Makamole

Student number: 2292490

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 of Management in the field of Digital Business

Johannesburg, 2021

ABSTRACT

Financial institutions and entrepreneurs in South Africa are developing and rolling out different digital financial services (DFS) into the market. South Africa is following a similar trend as other countries by investing in financial technology to deliver services, even though not at the same scale. However, these services make up a small percentage of the market share as the use of DFS is still low. This study aimed to assess the second-level digital divide – the divide in digital skill levels and use of technology – by investigating the use of DFS in South Africa. This was achieved by investigating the influence of digital skills on the use of DFS.

The hypothesis was that digital skills positively influence the use of DFS. The hypothesis was tested via an online survey that was distributed to South African consumers using social media platforms. A total of 541 valid responses were received. Most of the respondents were between the 31-45 (49.5%) age group and the 60+ age group were the lowest with 0.9%. Most respondent's education level was a matric (28.7%) and those with no matric was lowest (3%). Most respondents were employed and were earning less than R39 999 per annum. Most of the respondents had access to a Smartphone (95.6%) and most accessed the internet from home (91.7%).

The results were analysed using multivariate analysis, which resulted in developing a new hypothesis and eliminating several original variables. A linear regression model was built to determine the contribution of different factors to using DFS. The results were mixed but showed that content creation digital skills and information digital skills contributed positively to the use of DFS. Interestingly, communication digital skills negatively influenced DFS, and English was not associated with the use of DFS as initially hypothesised.

The study concluded that only some digital skills influence the use of DFS. In addition, it was also found that generic digital skills for everyday use might assist in using a specific technology. Future research should focus on the digital skills required to use different Internet applications and conducting a comparative study between individuals in different socio-economic statuses.

KEYWORDS: Digital financial services, Fintech, digital divide, second-level digital divide, digital skills, internet skills

DECLARATION

I, **Thabo Karabo Makamole**, 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 Digital Business at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name:**Thabo Makamole** Signature: 

Signed at: …***Randburg***……

On the …**2nd** …….. day of …**December**…… 20**21**…..

DEDICATION

I dedicate this work to God, who gave me the strength to complete the Master's programme.

I also dedicate this thesis to my late grandmother, Mateboho Hoohlo, who instilled the value of education, seeking knowledge and dreaming in me.

ACKNOWLEDGEMENT

I wish to acknowledge and express my sincere appreciation to the following individuals:

My supervisor, Prof Brian Armstrong, who assisted me throughout my Master's journey. Thank you for your continued support, feedback and the way you have asked critical questions and effectively guided the research process.

Dr Jabulile Galawe for her assistance with the quantitative data analysis. Thank you for your positive attitude, encouragement and for always being willing to assist.

All the respondents who completed the questionnaire. This study would not have been possible without your assistance.

My friends who encouraged and supported me throughout the Master's programme. Thank you for helping me with distributing the questionnaire.

The lady of the house, Mahlatse Langa, who supported me throughout my Master's journey. Thank you for your patience and keeping up with my "absence" for two and a half years. You have been my motivator, sounding board, and drill sergeant when I felt lazy to work on my thesis. Thank you, my love.

My father and mother, Motabo and Mathabo Makamole, and sister, Balekile Makamole, for their encouragement and prayers from the day I told them I am starting my Master's journey.

My 2019 MMDB cohort who made this journey memorable and, most importantly, Qoqanani Mkhwanazi, my partner in crime during the research study.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF EQUATIONS

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Meaning
ADSL	asymmetric digital subscriber line
ATM	automated teller machine
B2B	business-to-business
B2C	business-to-consumer
COVID-19	Coronavirus disease of 2019
DFS	Digital Financial Services
EFA	Exploratory Factor Analysis
Fintech	Financial Technology
ICASA	Independent Communications Authority of South Africa
ICT	Information and Communication Technology
KMO	Kaiser-Meyer-Olkin
NRI	Network Readiness Index
NTIA	National Telecommunications and Information Administration
OECD	Organisation for Economic Co-operation and Development
PAF	principal axis factoring
PCA	principal component analysis
SPSS	Statistical Package for Social Scientists
U&G	Uses and Gratifications
USA	United States of America
VIF	Variance Inflation Factor
WHO	World Health Organisation

CHAPTER 1: INTRODUCTION

This chapter introduces the purpose and context of the study by defining the research problem and objectives, and discussing the significance, delimitations and terms used within the ambit of this research study.

1.1 Purpose of the study

This research aims to understand the second-level digital divide in digital financial services (DFS) in South Africa by evaluating the influence of digital/Internet skills on the use of DFS.

The following research questions gave guidance to the approach the study used to meet the research objectives:

1. How do the different Internet skills (i.e., medium Internet-related skills and Content Internet-related skills) relate to DFS use?
2. To what extent does each Internet skill influence DFS use?
3. To what extent do combined Internet skills contribute to DFS use?

1.2 Context of the study

1.2.1 South African socio-economic profile

This study needs to understand the South African socio-economic profile to understand the study's context. The consumer market in South Africa is unique and has various socio-economic inequalities. Using the income and wealth distribution amongst South Africans, the World Bank has determined that South Africa is the most unequal society globally (WorldBank, 2019, p. 226). Table 1 below gives a summary of the socio-economic profile of South Africa as per CIA data.

Table 1: South African Socio-Economic Profile

Population	56,978,635
Ethnic groups	Black African 80.9%, Coloured 8.8%, White 7.8%, Indian/Asian 2.5%
Language	isiZulu 24.7%, isiXhosa 15.6%, Afrikaans 12.1%, Sepedi 9.8%, Setswana 8.9%, English 8.4%, Sesotho 8%, Xitsonga 4%, siSwati 2.6%, Tshivenda 2.5%, isiNdebele 1.6%, Other (includes Khoi, Nama, and San languages) 1.9%
Age	0-14 years: 27.94% (male 7,894,742/female 7,883,266) 15-24 years: 16.8% (male 4,680,587/female 4,804,337) 25-54 years: 42.37% (male 12,099,441/female 11,825,193) 55-64 years: 6.8% (male 1,782,902/female 2,056,988) 65 years and over: 6.09% (male 1,443,956/female 1,992,205) (2020 est.)
Urbanisation	67.4% of the population
Literacy	87%
Education	Adults between age 24 -64 years Post-secondary:12.1%

	Secondary: 68.2% Primary: 13.6% Pre-school: 0.1% No schooling: 6.0%
Economy	An emerging economy with a growing middle class
GDP	$350 billion
GDP per capita	$12,482
Unemployment rate	28.53%

Source: CIA (2021); Lehohla (2017)

1.2.2 Financial services sector in South Africa

According to BANKSETA (2020); WCDEDT;AIFMRM (2014), the three main sub-sectors of the South African financial services industry are 1) banking, 2) insurance, and 3) asset management. The banking sector comprises local and foreign banks; however, the four banks, Absa, FirstRand, Nedbank, and Standard Bank, dominate the market (SARB, 2017).

The segmentation in the insurance sub-sector includes long-term and short-term insurers. South Africa is ranked in the top 20 for both long-term and short-term insurance and leads in the African market (WCDEDT;AIFMRM, 2014). According to the FSB (2017), 79 long-term registered insurance companies, and 95 short-term insurance companies existed in 2017. The leading organisations in the market include Old Mutual, Sanlam, Liberty Holdings, and other insurance companies like Discovery, whose focus is on health insurance (WCDEDT;AIFMRM, 2014).

The asset management sub-sector includes asset managers, stockbrokers and exchanges. There are close to 1 000 funds for investors and only 47 asset managers, with Allan Gray, Investec Asset Management, and Coronation being amongst the top three (WCDEDT;AIFMRM, 2014). The savings rate in South Africa is low, and most of the population uses savings financial services. (South Africa Savings Institute, 2017; WCDEDT;AIFMRM, 2014). As a result, those who

participate end up in funds that may not suit their needs, and most do not have direct access to the stock exchange.

In recent years, different organisations, mostly technology companies, have emerged and are disrupting these financial sectors by using technology to offer and distribute financial services to consumers (Genesis, 2019; Malanee Hutton;Trushall Bhana;Stuart Allen;Ubaid Nursoo, 2019). The disruption has led to rapid growth in the financial technology (Fintech) industry in South Africa, which is following the global trend that enables consumers to access some services they could not access directly (Arner, Barberis, & Buckley, 2015; Citi, 2016; Genesis, 2019). The growth of Fintech firms has the potential to improve consumers' financial wellness (Fang & Zhang, 2016; Vives, 2019) and simultaneously attack traditional business models and move revenue from traditional firms (Ketterer, Himmelreich, & Schmid, 2016; van der Zande, 2018).

In the South African context, the distinct segments of retail Fintech include payments, lending, savings and deposits, Insurtech, investments, financial planning and advisory (Genesis, 2019). The different segments cover the scope of DFS investigated in this study, excluding more complex instruments such as home loans, investment banking, car finance, capital raising, and business-to-business (B2B) technology providers. The question is, if Fintech continues to grow, which consumers are most likely to use it and will it create a divide between those consumers who use and do not use Fintech services?

1.2.3 Technology access and use

According to the Network Readiness Index (NRI) report by Portulans Institute (2019), overall, the highest-ranked regions in technology infrastructure readiness and adoption are European and Americas countries, followed by African countries. The biggest challenge in Africa is the lack of technology and infrastructure. Overall, the South African ranking is 72 out of 121 countries, with Mauritius being the highest-ranked African country (Portulans Institute, 2019). This report further suggests that South Africa does not have adequate access to Information and Communication Technology (ICT) infrastructure and relevant content for its citizens. The content could include cultural and social aspects

related to the people and language they use to access it. South Africa has 11 official languages (Stats SA, 2011); however, English content is the most offered (Brown & Licker, 2003).

Internet penetration globally is unequal, with the African region having the lowest Internet penetration compared with Europe (ITU, 2020). In 2017, South Africa's Internet penetration rate was 56% and has since grown to 62% in 2019 (ITU, 2017; STATS SA, 2019). Most South Africans access the Internet using an asymmetric digital subscriber line (ADSL) and broadband (Alison Gillwald, 2018). In addition, a large percentage of users access the Internet in urban areas (STATS SA, 2019). Alison Gillwald (2018) opines that a more significant percentage of Internet users first experienced the Internet using mobile phones. According to the Independent Communications Authority of South Africa (ICASA (2019), smartphone penetration in South Africa is 81.72%. Users mostly use the Internet for social media, educational searches, and job searches.

Globally, the top reasons for not using the Internet are ranked in the following order: 1) the cost of service is too high, 2) the cost of equipment is too high, 3) the Internet is not needed, 4) inadequate Internet skills, 5) lack of Internet coverage in the area, 6) have access to the Internet elsewhere, and 7) privacy or security concerns (Galperin, 2017; Alison Gillwald, 2018; Zickuhr, 2013). The biggest challenge for using the Internet is the high costs and lack of digital skills (ibid). These challenges are also persistent in the South African context.

As much as there is a rising growth of DFS, access to technology is not equal among citizens and has for decades been a challenge in many countries around the world, especially in developing countries (Chinn & Fairlie, 2007; ITU, 2020; Norris, 2001). The disadvantages of lack of access to technology include failure to access opportunities provided by technology, such as buying products and services at a bargain and participating in politics or cultural activities (Mihelj, Leguina, & Downey, 2019; J. A. Van Dijk, 2017). However, technology is not entirely to blame, as some researchers argue that it only exposes or magnifies the existing inequalities (Mihelj et al., 2019; A. J. van Deursen & van Dijk, 2014a).

The digital divide is not only reduced by having access to the Internet. In countries like the Netherlands, which has high Internet penetration, researchers found that users with access are not fully utilising the internet to their benefit (A. J. Van Deursen & van Dijk, 2019). The study by Hargittai (2001) found that the use of technology has moved from access to the technology and more towards user skills to use technology. This coined the term “second digital divide”, which focuses on Internet skills and the use of technology (Büchi, Just, & Latzer, 2016; Hargittai, 2001; Scheerder, van Deursen, & van Dijk, 2017; A. J. van Deursen & van Dijk, 2014a)Scheerder, Van Deursen, & Van Dijk, 2017; Van Deursen & Van Dijk, 2014a). This study investigated the second digital divide by focusing on the use of DFS.

1.2.4 Digital financial services: A global perspective

In recent years, the use of technology in financial services has experienced exponential growth across the world. It has become a sector on its own known as Fintech or DFS (Gomber, Koch, & Siering, 2017). This evolution from traditional financial services to new business models has attracted millions of dollars, especially in China and the United States of America (USA) (Citi, 2016; Pollari, 2016). The use of technology in financial services is not new and has been around for decades. Examples include the introduction of the automated teller machine (ATM) introduced in the early 1960s by banks (A. M. Singh, 2004) and PayPal, founded in 1998 and used for online payments, which became popular due to the rise of e-commerce in the 1990s (Guadamuz, 2004). The recent growth of technology in financial services, especially business-to-consumer (B2C) products and services, cannot be ignored. It has enabled non-financial institutions to access consumers and disrupted traditional financial institutions (Citi, 2016; Navaretti, Calzolari, Mansilla-Fernandez, & Pozzolo, 2018).

The use of DFS worldwide has not surpassed traditional financial services except in countries like China (Citi, 2016). Financial institutions are still investing money to digitise products and services. In South Africa, digital investments were made by the four leading banks (ABSA, Standard Bank, Nedbank and First National Bank) (Absa, 2018a; Capitec, 2019; Firstrand, 2019; Nedbank, 2019; Standard

Bank, 2019) and some insurance companies such as (Discovery, 2020; Old Mutual, 2020). However, less than a third of their customer base uses digital platforms (BusinessTech, 2018; BusinesTech, 2019; Capitec, 2019; Malinga, 2019; Rajgopaul, 2020; Standard Bank, 2019). These banks' financial reports show that the use of DFS by customers is still deficient. The Genesis (2019) report supports this finding by showing that DFS in South Africa hold a minimal market share compared to traditional financial services. Different barriers to consumer adoption could cause this low use of DFS.

1.2.5 COVID-19 and the financial industry

The use of DFS has become more critical to understand because of the coronavirus disease of 2019 (COVID-19) that started spreading across the world in late 2019 and was declared a global pandemic in March 2020 by the World Health Organisation (WHO) (World Health Organization, 2020). This virus has impacted every aspect of life, including the financial industry and consumers using financial services. As a result, consumers had to use DFS as they needed to continue with daily life but could not access financial services physically (Babuna et al., 2020; Baicu, Gârdan, Gârdan, & Epuran, 2020). This fast-tracked the need for consumers to access the services they needed through digital channels. This conclusion indicates that a lack of access and digital skills excluded consumers from accessing financial services. For example, in a study in Ghana, consumers needed to use digital channels to receive insurance claims (Babuna et al., 2020). Another study conducted in Romania found that COVID-19 influenced consumers when using digital channels for banking services (Baicu et al., 2020).

1.2.6 Context summary

The context described in this study shows that the division in the South African consumer market is economical and digital. Technology does not have the same impact between those consumers who are digitally empowered and those who are digitally disadvantaged. The financial services industry is stable but has opportunities to use technology to reduce costs, improve customer services, and offer new products and services (BANKSETA, 2020). The South African Fintech industry has been proliferating over the last few years; however, usage and penetration in the market are still small compared to traditional financial institutions' market share. This suggests that there are customers who are willing, able, and capable of using Fintech solutions for their financial needs. On the other hand, some customers are not using Fintech solutions despite having access to these solutions. This discovery could reflect the second-level digital divide in the customer base.

The deployment of Fintech products into this heterogeneous market has resulted in varying levels of success. The product design process and product/digital channel managers in the Fintech industry may be biased and, consequently, overlook the heterogeneity of the market that is not at the same level of digital maturity.

This study uses a conceptual model to assess the second-level digital divide by investigating two main factors that define it: 1) differences in digital skills and 2) use of DFS.

1.3 Research problem

When it comes to the use of technology, studies usually focus on a specific technology. For example, most studies focus on the banking sector when researching the adoption of digital banking. Lin (2011); Luarn and Lin (2005); Myo and Hwang (2017); Shaikh and Karjaluoto (2015); S. Singh, Srivastava, and Srivastava (2010) studied the various factors that influence the adoption of digital banking in their different contexts and did not much focus on the adoption of the full scope of DFS. The intention to use various technologies has been studied

vastly, for example, in digital banking, Internet activities, and social media. However, most studies focus on a specific type of technology, e.g. mobile banking and Internet banking, and have not investigated how digital skills cause differences in using digital banking (Brown & Licker, 2003; Chong, Ooi, Lin, & Tan, 2010; Luarn & Lin, 2005; A. J. van Deursen & van Dijk, 2014a; Venkatesh, Morris, Davis, & Davis, 2003; Venkatesh, Thong, & Xu, 2012).

Other studies took a different approach by investigating the causes of differences when using various services enabled by the Internet (e.g., cultural services, social media services, political services, and financial services) (Blignaut (2009); Hargittai (2001); Norris (2001); and Van Dijk (2005). Some researchers took this further and investigated the differences between using the Internet for political reasons (Min, 2010) and cultural reasons (Dutton & Reisdorf, 2019; Mihelj et al., 2019; Recabarren, Nussbaum, & Leiva, 2008). Several studies were industry-specific, such as investigations on the digital divide in tourism (Karanasios, 2007; Minghetti & Buhalis, 2010); however, not much research has been conducted to understand the digital divide in using DFS. According to Blank and Groselj (2014), researchers must start focusing on specific Internet uses because of the diverse nature of the Internet.

In the South African context, as mentioned above, the use of Fintech in South Africa is low compared to other markets like China and the USA (Citi, 2016; Genesis, 2019). This calls for concern because the adoption rates are low even though there is growing investment by innovators and traditional financial institutions. First National Bank's highest use of their digital platforms is related to conducting transactions, but the volume is still low relative to their customer base (Absa, 2018b; Capitec, 2019; Firstrand, 2019; Nedbank, 2019; Standard Bank, 2019). Genesis (2019) also argues that Fintech occupies little market share within the various industries despite a potential 62.2% of the population with Internet access that can use these services (STATS SA, 2019).

This study argues that acknowledging that the consumer market is technologically heterogeneous (i.e., different digital skills levels and usage differences) may lead to appropriate product responses, which, in turn, could lead to the universal adoption of Fintech by customers. Furthermore, it could also lead

to a targeted introduction and realistic expectations regarding Fintech usage in the market.

The growth of DFS requires that stakeholders understand what influences the use of DFS by consumers. Unfortunately, as much as there have been studies on the intention to use technology and the influence of digital skills on different Internet uses, there is little research on the influence of digital skills on the use of DFS. The problem is that innovators, financial institutions, and governments have not investigated the factors of consumers' everyday use of DFS. Furthermore, this lack of scientific evidence impedes strategies that can be used to increase the use of DFS and deploy these technologies in the market. Therefore, this study aims to use empirical research to understand how digital skill factors influence DFS usage.

1.4 Research objectives

In an attempt to solve the identified research problems, the following objectives are used to guide the study:

1. To review the literature on Internet-related skills;
2. To review the literature on differences in Internet usage;
3. To determine the relationship between Internet-related skills and digital financial use;
4. To determine the extent to how each Internet skills influences DFS use;
5. To determine the combined Internet skills contribution to DFS use.

1.5 Significance of the study

A unique circumstance in the South African market is deploying Fintech products into a market where the digitally empowered and digitally disadvantaged consumers coexist. How do organisations design and deploy DFS into this market such that the products are adopted, used, and diffused rapidly when considering the influence of digital skills on the use of DFS?

Stemming from the above, it is vital to understand what could influence the use of DFS in South Africa as it has the potential to increase financial inclusion and drive economic growth (Lukonga, 2018). If the use of DFS is high, it could improve the financial wellness of consumers and reduce operating costs for firms. However, sparse literature exists on why there is inequality in using DFS among those who have access to the Internet. Furthermore, the factors that influence DFS use are not fully understood (Helsper, Van Deursen, & Eynon, 2016; A. J. van Deursen & van Dijk, 2014a). This study undertakes the task of investigating what influences DFS use by South African consumers.

The Fintech sector in South Africa is still in its infant stages with offering DFS to the market. Despite the rapid growth of DFS, only a fraction of the total consumer base uses DFS for their financial needs (Genesis, 2019). There is steady growth in this sector, but those with access are still not using the products. DFS can potentially benefit financial service providers and consumers by creating products that benefit an individual's needs at any time and place (Fang & Zhang, 2016). The financial industry in South Africa is not fully benefitting from the technology due to the challenges mentioned before.

The findings are expected to:

1. Understand how to improve the use of DFS in South Africa and thus help organisations reduce costs and meet consumer needs;
2. Contribute to what entrepreneurs and innovators must take into account when developing and deploying DFS in South Africa;
3. Understand what interventions are required by stakeholders (i.e., government, Fintech firms, and traditional financial institutions) to increase the use of Fintech in South Africa;
4. To help the government in developing the right level of regulations and policies to enable the use of DFS in South Africa.

1.6 Delimitations of the study

This study is centred around South African financial services focusing on the DFS offered to consumers in the market. This study only includes consumers who have access to the Internet and excludes DFS offered to businesses. This study does not include the levels of financial literacy and how it influences DFS use. The study does not investigate the influence of socio-economic inequalities on the digital divide.

1.7 Definition of terms

Term	Definition
Digital divide	The digital divide is the unequal access and use of ICTs by different pockets of society (OECD, 2001)
Digital Financial Services	The innovation technologies adopted in the financial services industry are sometimes referred to as Fintech (Gai, Qiu, & Sun, 2018; I. Lee & Shin, 2018)
Medium-related Internet skills	Skills that give a user the ability to operate in the internet environment (Van Dijk, 2005)
Content-related Internet skills	Skills that give a user the ability to manipulate information in an internet environment to reach their goals (Van Dijk, 2005)
Financial technologies (FinTech)	The use of technology for delivering financial services (Pollari, 2016)

1.8 Assumptions

1 The Internet skills measures used in this research study involve common skills used to use any Internet service.

2 The data is collected from users who have access to the Internet and potentially use financial services.

1.9 Thesis organisation

This research report is organised into the following chapters: Chapter 2 discusses the literature on DFS and the digital divide and expands upon the theories that underpin this study. Chapter 3 discuss the research methodology used for this study. Chapter 4 presents the results of the survey. Chapter 5 discusses the results from the study and compares the findings with the literature. Finally, chapter 6 concludes the study, discusses recommendations and provides suggestions for future studies.

CHAPTER 2: LITERATURE REVIEW

This chapter discusses the digital divide, and DFS. It then reviews theories related to the digital divide and the Uses and Gratifications (U&G) Theory. Finally, the chapter concludes with discussions on different Internet skills and its influence on the use of technology.

2.1 The digital divide

This section will expand upon what the digital divide entails worldwide, and specifically in South Africa.

2.1.1 What is the digital divide?

The digital divide concept has been rigorously discussed over the past two decades. However, the phenomenon first emerged into mainstream debates in the USA by the National Telecommunications and Information Administration (NTIA), who defined it as "the gap between those who have access and those who do not have access to technology and the internet" (NTIA, 1999, p. 95). However, scholars found this definition to be limited in explaining the phenomenon because it assumes that only two types of user groups use ICTs on opposite sides of the digital divide. Furthermore, this definition assumes a user is either on the right or wrong side of the digital divide based on whether they have access or not (Hargittai, 2001).

Some interested parties did not believe in this dualistic view of the digital divide and wanted a more comprehensive definition. This comprehensive view of the digital divide is derived from a combination of technological determinism and social determinism theories. Thus, this study uses the OECD (2001, p. 5) definition of the digital divide:

> *"the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities."*

The definition by the OECD includes not only accessibility of technology but also the use of technology and determining socio-economic factors, which determine the digital divide. Other researchers define the digital divide as a gap between two groups, where one group has access to and use digital technologies, and the other does not have access (Bornman, 2016; Van Dijk, 2006). Earlier studies by Gunkel (2003) support the definition by the OECD that the term digital divide is not necessarily binary and has different dimensions to it. Gunkel (2003) and Van Dijk (2005) view show that the digital divide is multi-layered and compounded, including technology and social perspectives.

This view informs this research that technology access is not the only reason for the digital divide. However, skills and usage that determine the digital divide can be attributed to the opportunity to access technology and the development of digital skills required to use the technology (OECD, 2001). Furthermore, the digital divide can be viewed as a continuum as the appropriation of technology is dependent on resolving preceding factors necessary to appropriate the technology fluid (Van Dijk, 2005). For example, having or not having a personal computer and an Internet connection is not enough to explain why there is a digital divide. Factors such as digital skills must also be investigated. Consequently, this research study focuses on the influence of digital skills on the use of DFS.

Contemporary research on the digital divide has separated it into three self-determining levels (J. van Dijk, 2017), namely 1) the first-level digital divide, which relates to physical access to technology, including the Internet and devices (A. J. Van Deursen & van Dijk, 2019); 2) the second-level digital divide, which relates to the digital skills and use of digital technologies (Hargittai, 2001; Alexander Van Deursen & Van Dijk, 2011); and 3) the third-level digital divide, which relates to the impact and benefits derived from digital technology (A. J. Van Deursen & Helsper, 2015; K.-K. Wei, Teo, Chan, & Tan, 2011). These concepts are discussed in detail under Section 2.4 – Theoretical background.

2.1.2 Digital divide studies on skills and usage

With the growing advances in technology, the digital divide has been researched worldwide to understand its extent and the various factors that influence it (J. van Dijk, 2017). A. J. Van Deursen and van Dijk (2015b) conducted a study on the digital divide using a multifaceted model to understand Internet access. Their model included all access types defined by Van Dijk (2005), which are a) attitude, b) material access, c) digital skills (i.e., medium-related skills and content-related skills), and d) usage diversity. They concluded that all access types shape the digital divide. As much as research has focused on digital skills and usage diversity, technology contributes to the digital divide. A. J. Van Deursen and van Dijk (2015b) findings support those by Niehaves and Plattfaut (2014), who also concluded that individuals' attitudes contribute to technology use.

Each access level of the digital divide compounds the problem until the appropriation of that technology. For example, different digital skills levels determine how much a user will benefit from using the Internet (Surian & Sciandra, 2019; A. J. Van Deursen & van Dijk, 2015b). This suggests that consumers' digital skills could affect the use of different digital services available. This suggestion is supported by Helsper and Reisdorf (2017), who found that as much as the Internet offers different services, users do not fully utilise them. This conclusion implies that users' Internet skills levels could determine the use of various services. If digital products are complex, those with low digital skills levels will be excluded from accessing the service even if they intend to use the service.

It can be assumed that the difference of usage between consumers creates a gap such that those who use the technology will get opportunities and those who do not use the technology will miss out (Medlock et al., 2015; A. J. van Deursen & van Dijk, 2014a). According to Vicente and López (2010); Zillien and Hargittai (2009), consumers with different socio-economic statuses use the Internet for different purposes, and their statuses contribute to their level of use. These conclusions show that there could be a digital services usage gap between consumers with different socio-economic statuses. Wealthy individuals use the Internet for economic activities, while those with low socio-economic statuses use

the Internet for social activities (Blank & Groselj, 2015; A. J. van Deursen & van Dijk, 2014a; Zillien & Hargittai, 2009).

2.1.3 The digital divide in South Africa

The penetration of mobile phones and the Internet has grown in South Africa (STATS SA, 2019), which could conclude that the digital divide is bridged or is getting bridged. However, research by Bornman (2016) shows that Internet access and the use of digital technologies are still low. This supports an earlier study by Oyedemi (2012) that found that the South African society has unequal levels of opportunity, access and uses of digital technologies.

The unequal access and use of digital technologies among South African consumers results from limited access to the Internet and a lack of skills and cultural dynamics (Bornman, 2016). Giebel (2013) states that in South Africa, the digital divide negatively impacts knowledge sharing and the information process. This suggests that not all groups in South Africa have access to available technology, and when they do, they may not have adequate skills to use the technology. Thus, there is a mixed level of use. Furthermore, economic growth and innovations may also be impeded.

2.1.3.1 Internet access and its use in South Africa

The Internet enables access to different services in South Africa; however, research has found that the frequency of accessing services using the Internet is still shallow compared to other First World countries (Bornman, 2016; Oyedemi, 2009, 2012). This could result from inadequate access to Internet infrastructure in the country (Nyahodza & Higgs, 2017). In addition, the issue of access and skills is also seen more clearly in institutions of higher learning where students may not have access to or skills required to use the technology available for their academic needs (Du Preez & Le Grange, 2020; Naidoo & Raju, 2012).

Blignaut (2009) and Fuchs and Horak (2008) found that social inequalities play a significant role in the digital divide in the South African context. This conclusion is supported by Bornman (2016); and Tustin, Goetz, and Basson (2012) that South Africans at the lower levels of the socio-economic spectrum are

technologically disadvantaged. In South Africa, gender, education and income have the most influence on the gaps found in access and usage of digital technologies (Bornman, 2016). As much as there are social challenges, Chetty, Aneja, Mishra, Gcora, and Josie (2018); Gudmundsdottir (2010); (Horrigan, 2019); Le Roux and Evans (2011) suggest that digital skills are an important factor to the use of technology in South Africa. This conclusion could mean that socio-economic status may be related to access; however, digital skills are key to driving use. For example, with a high level of digital skills users can change their socio-economic factors by applying for jobs. With digital skills, they may have better-paying jobs.

The research of Internet access and use shows that South Africa still has a long way to go before a significant number of citizens benefit from emerging technologies. The critical outcome from these studies is that citizens must have access to technology and digital skills to bridge the digital divide.

2.3 Digital financial services (DFS)

DFS are offered using new channels with new business models and are changing the finance landscape around the world (Chen, Wu, & Yang, 2019; Citi, 2016; Goldstein, Jiang, & Karolyi, 2019). The advancements in technology enable DFS to flourish (I. Lee & Shin, 2018) and compete with established traditional financial institutions in some parts of the world like China (Citi, 2016). There is extensive research on this topic because researchers, governments, and society believe that DFS will bring about financial inclusion because of accessibility and the low-cost products offered (M. Agwu, 2020; Buckley & Malady, 2015; Chen et al., 2019; Karlan et al., 2016).

2.3.1 What are digital financial services (DFS)?

There is a convergence to the definition of DFS. Begum (2018); Goldstein et al. (2019) define DFS as financial services using information technology. DFS are technology-driven financial services across all financial service sectors.

This study uses DFS and Fintech interchangeably and are defined below:

DFS are:

> "*Financial services which rely on digital technologies for their delivery and use by consumers"* (Pazarbasioglu et al. (2020, p. 1).

Fintech refers to:

> "*digital technologies that have the potential to transform the provision of financial services spurring the development of new – or modify existing – business models, applications, processes, and products"* (Pazarbasioglu et al. (2020, p. 1).

2.3.2 DFS revolution

The rapid disruption of the financial industry is caused by new technology innovations, which are either servicing the entire value chain of financial services or part of a service (Genesis, 2019). This has been made possible by an enabling regulatory environment, technology innovations, and sharing economy (I. Lee & Shin, 2018). These factors are not part of this study but will be discussed briefly to provide an overview regarding the impact of DFS.

Investments in Fintech have grown exponentially in the last few years, from $1.8 billion in 2010 to $19 billion in 2015 (Citi, 2016). According to Citi (2016), Fintech gradually forces banks and financial institutions to a "tipping point". This study shows that investors are willing to invest in Fintech because they see it as a blue ocean strategy. The value of investments in this sector hints at why research is essential and why traditional financial institutions need to be worried about future growth prospects.

Digital financial services have proven to enable fast deployment of products in a market tailored to consumers' needs compared to traditional financial products and services (Gomber et al., 2017; Lukonga, 2018). Some of the technology that opened these capabilities include big data (Fang & Zhang, 2016), which has enabled institutions to use analytics to develop products faster, understand consumer needs better and trends across their products (E. Agwu & Carter, 2014; M. Agwu, 2020; Gong & Janssen, 2015; Lin, 2013). The use of emerging technologies is helping bring financial services closer to consumers by serving unbanked and underserved consumers and even claiming this reduced financial

exclusion (Lukonga, 2018). Some prominent examples include the popularity of mobile money in countries like Kenya and Tanzania (Burns, 2018) and mobile wallets in China (Hasan, Yajuan, & Khan, 2020). DFS are not limited to only payments but also include examples of credit scoring, insurance, and wealth management (Hau, Huang, Shan, & Sheng, 2018; I. Lee & Shin, 2018). This shows that Fintech touches all sectors of the financial services industry, and businesses and consumers are impacted by this rapid growth.

Advancements in technology have enabled the Fintech revolution. Organisations can now easily create a better customer experience and develop personalised financial products (Anonymous, 2015; Gomber, Kauffman, Parker, & Weber, 2018). In addition, Fintech reduces costs, and in some markets like Kenya, this has increased the consumer's savings levels (Dupas & Robinson, 2013). These opportunities in the financial industry bring new ways of engaging with customers and servicing them. In addition, traditional financial institutions could be under pressure in their product development to compete with Fintech firms because of personalised products. These opportunities may give customers power to negotiate pricing and offerings with their service providers and they may also demand only services tailored to serve their needs.

2.3.3 Financial service Fintech disruptions

2.3.1.1 Banking sector disruption

The revolution of Fintech is impacting the banking sector's core services and requires the banking sector to be innovative and rethink its business models (Romānova & Kudinska, 2016). This argument is supported by Musabegovic, Özer, Djukovic, and Jovanovic (2019), who argues that Fintech is disrupting the core services offered by banks. The services being disrupted include payments, lending, credit scoring, and deposits. In addition, Fintechs' operational costs are low; hence services such as payments are easily disrupted because of the ease to acquire clients and low setup costs (I. Lee & Shin, 2018).

With some of these core banking services being disrupted, banks' revenue and access to client data could be reduced and change the functions of banks (Gomber et al., 2018). However, some of the reasons for the rapid adoption of

these services are the ease of use, low transaction fees, and easy access to tailor-made products and services (Wewege & Thomsett, 2019).

2.3.1.2 Insurance sector disruption

The insurance sector around the world is not being disrupted as fast as the banking sector. Therefore, it can be argued that it is a laggard in this Fintech revolution (Musabegovic et al., 2019; Wilamowicz, 2019). Wilamowicz (2019) states that this sector has growth opportunities because much of the industry has not transformed.

The opportunities of Fintech in the insurance sector are across the whole value chain of "product development, underwriting and pricing, distribution of platforms, and administration and claims processing" (Wilamowicz, 2019, p. 226). The prediction is that the emerging technologies of big data, blockchain, and artificial intelligence will be the most significant enablers of Fintech in the insurance sector (Wilamowicz, 2019; Yan, Schulte, & Lee Kuo Chuen, 2018). Across this value chain Fintech has the opportunity to improve product offerings, reduce fraud, and increase sales across all insurance products. Consumers will also choose by using insurance comparison websites such as Hippo, a South African authorised financial service provider.

2.3.1.3 Asset management sector disruption

In the asset management sector, the development of Robo advisors is disrupting the investment advisory business model (Sironi, 2016). The Robo advisors use algorithms to assist the consumers in selecting investment products that suit their financial needs (ARDÉ, 2019; Jung, Dorner, Glaser, & Morana, 2018).

Robo advisors' advantage over the traditional business models is the customer experience and cost-effectiveness (Gomber et al., 2018; Sironi, 2016). Clients may now get more returns from their services because of low costs.

2.3.4 DFS business models

According to I. Lee and Shin (2018), DFS needs an ecosystem to thrive. The required elements in the ecosystems include Fintech firms, government,

traditional financial institutions, financial customers, and technology developers. All these elements must be thriving to enable Fintech firms to flourish in a market. One of the critical elements that emerged as important is government, which talks to the enabling regulatory environment required for Fintech companies to grow (Buckley & Malady, 2015; Dupas & Robinson, 2013). Examples of an enabling environment include countries such as China, Kenya and Tanzania (Burns, 2018; Citi, 2016; Di Castri & Gidvani, 2014; Yermack, 2018).

Fintech is used across the full spectrum of the financial services industry. Thus, Fintech is available to each of the top consumer financial products. Researchers classify Fintech as a business model (I. Lee & Shin, 2018; Pazarbasioglu et al., 2020), while others categorise Fintech by the products offered to clients (Begum, 2018). The classification by I. Lee and Shin (2018) gives a more comprehensive categorisation, which includes the product and business models, which will be used in this study. Fintech start-ups are divided into six business models, namely 1) payments, 2) wealth management, 3) crowdfunding, 4) lending, 5) capital market, and 6) insurance. Table 2 below gives a summary and some examples of each Fintech business model.

Table 2: Summary of DFS business models

Business model type	Description and examples
Payment	Payments are divided into two markets – the consumer market and the wholesale and corporate market. The consumer market includes mobile wallets, digital or cryptocurrencies, and peer-to-peer mobile payments. Examples include Apple Pay, Garmin Pay, SnapScan, and PayPal.
Wealth management	Robo advisors provide automated wealth management that offers financial advice to consumers. An example is EVA, an artificial intelligence assistant that can be accessed via a mobile-friendly chat widget on Nedgroup Investments' website (ARDÉ, 2019). Wealth management also includes budget and financial transaction aggregation platforms. An example is 22seven, a free budgeting and investing application from Old Mutual.

Business model type	Description and examples
Crowdfunding	This business model connects project owners and funders facilitated by a platform, in this case, a Fintech platform. It is divided into three sub-categories, which are 1) rewards-based, 2) donation-based, and 3) equity-based. Examples include GoFundMe, CrowdFunder, and Crowdcube.
Lending	This business model enables peer-to-peer lending among consumers or businesses. This model uses data and online data sources to determine a borrower's creditworthiness. Examples include Zopa and LendingClub.
Capital market	This business model includes foreign exchange and currency trading. These have lowered barriers for individuals to trade. Examples include eToro and Xoom.
Insurance	The insurance Fintech model has cut the middleman and enabled direct relationships between insurers and consumers. They have also used other data sources to enhance their risk analysis. Examples include Ladder and Pineapple.

Source: I. Lee and Shin (2018)

DFS face numerous challenges, including risk management, regulatory frameworks, security and privacy, customer management, technology integration, and investment challenges (I. Lee & Shin, 2018). These challenges need to be resolved for Fintech to survive. Therefore, this study did not focus on analysing these challenges and the consumer perceptions of these challenges.

2.3.5 DFS in South Africa

In the last few years, different Fintech organisations have emerged, and some existing financial institutions have started using technology to offer and distribute their services (Genesis, 2019; Malanee Hutton;Trushall Bhana;Stuart Allen;Ubaid Nursoo, 2019). This has led to rapid growth in the Fintech industry in South Africa.

However, compared to other regions across the world, South Africa is still in its early stages of utilising Fintech. Comparing South Africa with other emerging economies, there is a difference in the diffusion of DFS. The adoption of mobile money in emerging economies such as Kenya, the Philippines, and Mexico has been remarkable (Citi, 2016; Muthiora, 2015).

Even though there has not been mobile money success in South Africa, there has been a rise of Fintech companies in recent years that deal with the challenges

faced by traditional firms (BANKSETA, 2020; Genesis, 2019). These Fintech firms are categorised into the following distinct segments: 1) payments, 2) lending, 3) savings and deposits, 4). Insurtech, 5) investments, 6) financial planning and advisory, 7) capital raising, and 8) B2B tech providers (Genesis, 2019). The segments are categorised into different products and services offered within the three main financial services industry sub-sectors introduced in section 1.2.2. This categorisation shows that Fintech is used across the full scope of the financial services industry with exclusions of more complex instruments such as home loans, investment banking, and car finance.

The Genesis report (2019) further defines each segment and states the estimated Fintech market size in relation to the total market size and the share of the total Fintech offerings. For example, Fintech payments contribute 30% to the total Fintech and only 3% of the total payments transaction value in the industry. Table 3 summarises the findings from the report.

Table 3: South African DFS landscape

Category	Definition	Market Insights
Payments	This includes all entities using digital channels to enable the exchange of money between parties.	30% of Fintech 3% Transaction value
Lending	Entities that use digital channels to facilitate the financing of assets.	12% of Fintech ~ 1.49% market share
Savings and deposits	Entities that use digital channels to take deposits, such as digital banking.	6% of Fintech ~ 0.09% of total deposits

Category	Definition	Market Insights
InsurTech	Entities that use digital channels of the insurance product, e.g., risk analysis, claims, and underwriting.	9% of Fintech ~ 1.1% of total premiums written
Investments	Entities that use digital channels to enable consumers to trade shares on the stock exchange.	10% of Fintech ~ 1.39% of total trades on JSE
Financial planning and advisory	Entities using robotics and artificial intelligence to offer financial planning advice to consumers.	7% of Fintech ~4.76% market share
Capital raising	Entities that use digital platforms to enable consumers to raise capital or contribute to an initiative.	4% of Fintechs ~ 0.03% of equity-based crowdfunding and 54% of rewards-based crowdfunding
B2B tech providers	Entities that develop and provide platforms to other financial institutions.	20% of Fintech

Source: Genesis (2019)

2.3.6 DFS successes

The leading countries in Fintech are China and the USA, while Europe and emerging markets are following behind (Citi, 2016). Significant investments in Fintech are skewed toward consumer segments, where payments and lending products are receiving the most funding (ibid). The success of Fintech in China can be attributed to the rise of its e-commerce industry and government policies and regulatory approach (Hasan et al., 2020).

Even though there is much activity in China, Europe and the USA, there have been successes in some African countries. The most prominent is mobile money in Kenya, Tanzania, and Uganda (Yermack, 2018). Burns (2018); Di Castri and Gidvani (2014); Yermack (2018), argue that government policies were market-led and enabled growth and mistakes by Fintech firms.

2.4 Theoretical background

The digital divide theory is still a developing theory and has not reached the level of maturity required (J. van Dijk, 2017). Therefore, this study uses the Causal and Sequential Model of Access and the Uses and Gratification Theory despite the aforesaid. This section discusses these theories and how this research study adapts these theories. Furthermore, the constructs of digital skills and usage are discussed.

2.4.1 Causal and Sequential Model of Access

The Causal and Sequential Model of Access aims to use a multi-dimensional approach to understanding the appropriation of technology in contemporary society (De Haan, 2004). Various researchers, e.g., Hargittai and Dobransky (2017); Tirado-Morueta, Mendoza-Zambrano, Aguaded-Gómez, and Marín-Gutiérrez (2017); and A. J. Van Deursen and van Dijk (2015b), have used the model across the world, especially in Europe during the last two decades to understand the digital divide in their contexts.

In his model, Van Dijk (2005) suggests that the appropriation of digital media is dependent on resolving different access gaps before appropriation. The model

defines the digital divide by four types of access required for the appropriation of technology. The four digital divide access types are 1) motivational access, 2) material access, 3) skills access, and 4) use access. Figure 1 below shows the different access types and their sequence. Different researchers started using the model, and they categorised the different access types into three digital divide levels, as graphically depicted in Figure 1 (see overleaf).

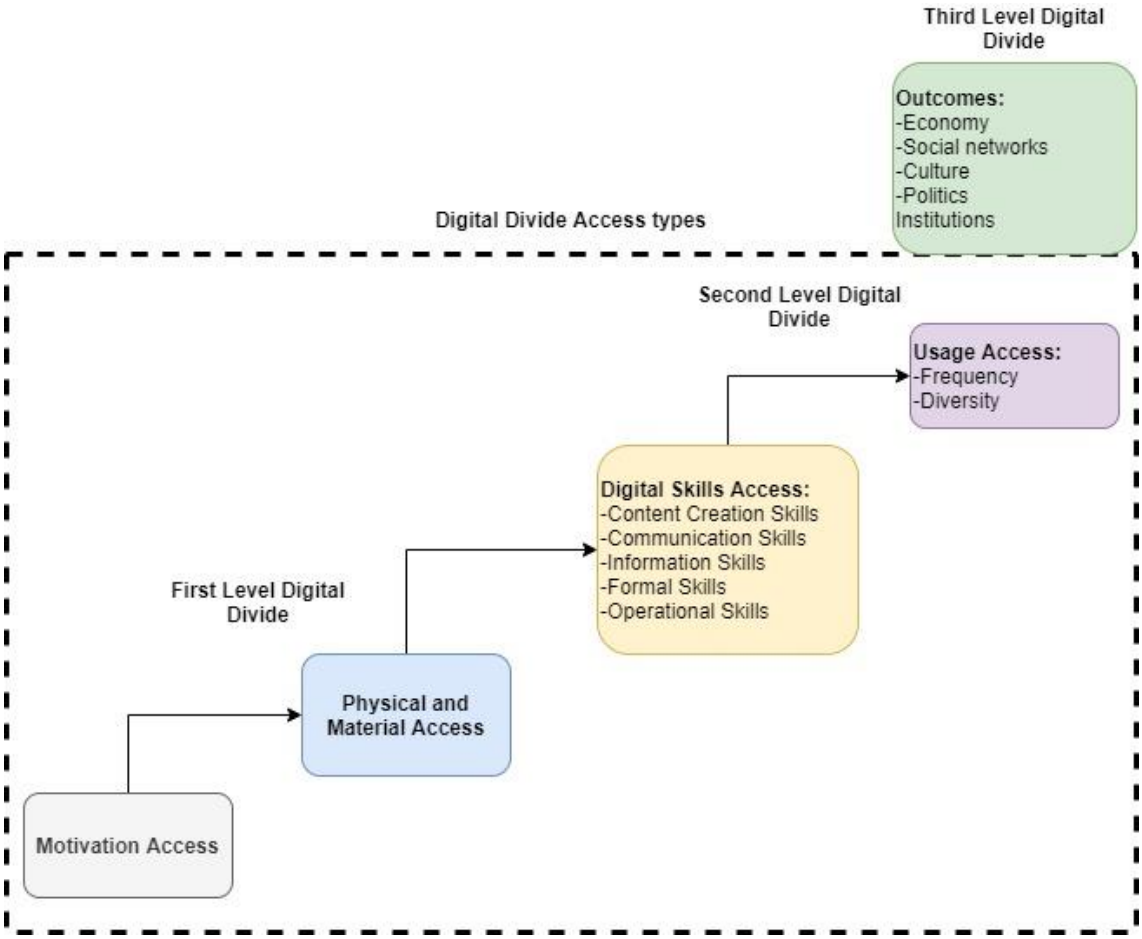


Figure 1: Casual and Sequential Model of Access

Source: Van Dijk (2005, p. 29)

2.4.1.1 First-level digital divide

Some researchers have focused on the first part of the digital divide, which talks to access, including motivation and material access. According to Ghobadi and Ghobadi (2015), motivation access is related to an individual's interest in learning about a digital technology and general motivation to try and access a digital

technology. According to Van Dijk (2005) and Bornman (2016), unknown features and benefits of using technology reduce motivation to use the technology.

When individuals are motivated to use digital technology, they will attempt to access it (Ghobadi & Ghobadi, 2015). However, high motivation to access digital technology does not indicate that an individual will have physical access to the digital technology. The availability of infrastructure, affordability and local language content create barriers for users (A. J. Van Deursen & van Dijk, 2019; Wang, Bennett, & Probst, 2011; West, 2015). The issue of affordability and language is supported by the study conducted in Africa by De Lannoy (2018), which found that affordability and language were barriers to youth using the Internet. A. J. Van Deursen and van Dijk (2015b) found that even in countries with high Internet penetration, accessibility to different types of devices creates digital inequalities.

Haffner (2017) argued that the unequal distribution of Internet infrastructure across geographies creates digital divides. The study conducted by Oyedemi (2012) found a digital divide among students in South Africa as those in urban areas have access to devices and the Internet compared to their colleagues who stay in rural areas. Theoretically, the first-level digital divide is thus explained by motivation access and physical and material access.

2.4.1.2 Second-level digital divide

Digital skills access

Researchers noticed high Internet penetration in developed countries; however, digital divides still existed (Hargittai, 2001; A. J. van Deursen & van Dijk, 2014a, 2015a). Studies were conducted to understand differences in digital skills and usage. These studies found that there remains a difference in individual skill levels, which contribute to the digital divide. These studies defined the second-level digital divide as differences between individuals who have skills to use the Internet and those who lacked these skills (Helsper & Eynon, 2013; A. J. Van Deursen, Courtois, & van Dijk, 2014). These conclusions show that digital skills levels contribute to digital inequalities because different skills enable users to access different opportunities on the Internet. This further shows that those who

lack knowledge on how to complete Internet activities will fall on the wrong side of the digital divide even if they have the same quality of physical and material access. Therefore, closing the gap on physical and material access does not close the digital divide.

Usage access

Different skills lead to different ways the Internet is used (Helsper & Eynon, 2013). Various studies found that users' skills influenced how they used the Internet (Dodel & Mesch, 2018; Hargittai & Dobransky, 2017; Helsper & Eynon, 2013; Zillien & Hargittai, 2009). In addition to these findings, various research conducted concluded that users will primarily engage in activities they are most interested in, ranging from conducting financial transactions, engaging in politics, or searching for health information (Min, 2010; A. J. Van Deursen & Helsper, 2015; A. J. Van Deursen & van Dijk, 2015b; Vicente & López, 2010). Büchi et al. (2016) concluded that equal Internet access does not result in the same level of internet use. These claims raise questions about attitude, physical access, interests, and skills. Could a user's skills increase their liking of an activity, or will their interest in activities force them to develop a particular skill? As questions are raised on what comes first, studies by A. J. Van Deursen and van Dijk (2015b) and Tirado-Morueta et al. (2017) show that the usage diversity is a cumulative result of previous access types (i.e. attitude/motivation access, physical and material access, and digital skills). Digital skills and usage diversity define the second-level digital divide.

This study used the second-level digital divide component of the Casual and Sequential Model for the investigation.

2.4.1.3 Third-level digital divide

The different activities pursued by users on the Internet lead to various benefits, such as economic uses that result in economic benefits (A. J. Van Deursen & Helsper, 2018). Furthermore, A. J. Van Deursen, Helsper, Eynon, and Van Dijk (2017), as well asA. J. Van Deursen and Helsper (2018), claim that using the Internet for one activity could benefit other activities. This view is supported by Yu (2018), who believes that users who engage in multiple uses stand to be digitally empowered. Consequently, they gain more benefits digitally and improve their day-to-day lives.

Yu's (2018) research suggests that the use of digital technology for one activity can benefit other technology uses. Some studies have concluded that the use of

digital technologies extends social inequality for those who are digitally disadvantaged (Ragnedda, 2017; Ragnedda & Ruiu, 2017; A. J. van Deursen & van Dijk, 2014a). This means that those who are not using digital technology are excluded from potential benefits in society and fall on the negative side of the digital divide. Furthermore, their research results on the third-level digital divide show the importance of previous access types related to the digital divide (A. J. Van Deursen et al., 2017). The third-level digital divide can be defined as the benefits derived from using the Internet from these previous studies. Due to the nature of the Internet, these are fluid and depends on an individual's usage.

2.4.2 Uses and Gratifications (U&G) Theory

2.4.2.1 Background

The field of mass communication has extensively researched why people use different media in mass communication research for over 40 years using the U&G Theory (Rubin, 2009). The U&G Theory has been evolving over the years, moving from the effects of media usage to the purpose of usage (Klapper, 1963). This theory has been used to understand various fields such as Internet use (LaRose, Mastro, and Eastin (2001); Stafford, Stafford, and Schkade (2004), marketing (Ketelaar and van der Laan (2009); O'Donohoe (1994)), and social media research (Raacke and Bonds-Raacke (2008); Whiting and Williams (2013).

2.4.2.2 U&G Theory definitions

This section discusses the U&G Theory developed by Katz (1974). The theory uses a psychological approach to help explain why users use the technology they are using (Rubin, 2009). This approach assumes that digital media users are deliberate and have a need or want to satisfy when choosing a media. According to Fisher (1978), the U&G approach seeks to understand the purpose or main uses of its users.

Users only use media if they expect to gain a certain level of gratification (Ku, Chu, & Tseng, 2013). They will continue using the media if this gratification continues (Kayahara & Wellman, 2007). In their research, Kayahara and

Wellman (2007) opine that the U&G framework must be split into two categories: process and content. When a user engages with digital media functions or features, it results in gratification and retrieving information that is useful to the user results in content gratification. As much as these are the defined categories in the literature, they are not fully distinct from each other and to some extend intertwined (Stafford & Stafford, 2001).

This study uses the U&G Theory to develop the DFS use gratifications that were used to measure use of DFS.

2.5 Conceptual model

This section explains the conceptual model used in this study to investigate the research objectives. The focus of the discussion is on digital skills and their relationship with usage. According to Hargittai (2001), the digital divide has moved access and understanding users' digital skills and use of technology. This study investigates the second-level digital divide by exploring digital skills and their influence on DFS use.

2.5.1 Digital skills

Once users have the motivation and access to material, they need the necessary skills (i.e., digital skills/Internet skills used interchangeably in this study) to operate the technology they want to use (Van Dijk, 2005). In other studies, research findings suggest that knowing how to operate technology is not enough to be competent but rather understanding the information presented and knowing how to use the technology to achieve goals (Brandtweiner, Donat, & Kerschbaum, 2010; Ferrari, 2012; Krumsvik, 2014). These studies support the research conducted by Hobbs (2010) that the skills required to benefit from the internet are beyond just technical skills but include the searching and analysis of information retrieved from the Internet, communication, social media participation, and the creation of digital media content.

Hargittai and Litt (2011) concluded that users who benefit the most from the Internet have advanced Internet skills levels. Tirado-Morueta et al. (2017) found

that a combination of skills is required to benefit from digital media. These findings suggest that users who only know how to operate a technology are not competent because they will not benefit from it in a digital society. This includes, for example, users who know how to open a web browser but lack the knowledge to navigate or search for information using a web browser or use the Internet to meet their intended goals (e.g., applying for a job or buying services and goods).

Ferrari (2012) defines digital competence as a combination of skills a user must perform, including searching for and comprehending information on digital media and communicating using digital media. In their study, Helsper and Eynon (2013); and Van Laar, Van Deursen, Van Dijk, and De Haan (2017), extend the understanding of digital competency by suggesting that it is beyond just technical skills but also includes social, critical, and creative skills. This broadens the scope of digital competency and shows that a combination of skills is required to achieve goals and derive benefits from digital media. These skills allow users to interact socially on digital media, search for and interpret information online, and publish content created using digital technology.

Earlier studies placed digital competencies into categories. Van Deursen and van Dijk (2010); Alexander Van Deursen and Van Dijk (2011) investigated Internet skills competency among users in the Netherlands by splitting the concept into medium-related Internet skills and content-related Internet skills. Medium-related Internet skills are operational and formal, while content-related internet skills include information and strategic skills.

A. J. van Deursen, van Dijk, and Peters (2012) used previous studies and formalised Internet skills measures in digital divide research. They defined operational skills as the ability to operate a technology (i.e., putting a PC on and off), formal skills as the ability to navigate through the structures of digital media (i.e., knowledge of which links to click to get to new pages and which links to click to get back to the home page), information digital skills as skills that enable users to look for and interpret data to useful information for reaching their intended goals on digital media, and strategic skills as skills required to use technology to meet set goals.

The conclusions from these researchers show that understanding digital skills is beyond just technical skills. The categories these researchers define include skills related to the comprehension of information residing on digital media, content creation for digital media, communication skills in the digital media context, and taking opportunities afforded by digital media.

AJAM Van Deursen, Helsper, and Eynon (2014); A. J. Van Deursen and Van Dijk (2014b), defined a comprehensive digital skills framework, which was adopted within the ambit of this study. The framework comprises digital skills beyond only technical skills used in earlier studies to understand digital competency and added communication skills to content-related Internet skills. Table 4 shows the categorisation and definitions associated with the digital skills framework.

Table 4: Digital skills framework

Digital skills groups	Digital skills	Definition
Medium-related digital skills	Operation skills	The ability to operate digital technology
	Formal skills	The ability to navigate through a digital technology environment
Content-related digital skills	Information digital skills	The ability to search for and interpret information from digital technology
	Communication skills	The ability to use digital technology to communicate with other users

Digital skills groups	Digital skills	Definition
	Content-creation skills	The ability to create content to be published on digital technology

Source: A. Van Deursen et al. (2014); A. J. Van Deursen and Van Dijk (2014b)

This study uses previous definitions of digital skills that are required to use and benefit from the Internet. The skills are generic (i.e., they are not specific to a tool or application) but have been found to influence Internet use. This study focuses on financial

2.5.2 From Internet use to DFS use

Literature is not consistent with how to categorise Internet use. Previous research has focused on Internet use activities and attempted to categorise them; however, there is no consistency of these categories. Various researchers have tried to define categories for Internet use. For example, Brandtzæg, Heim, and Karahasanović (2011) developed a media-user typology to understand different user profiles using digital media. Research by Kalmus, Realo, and Siibak (2011) classified Internet use into 1) social media and entertainment, and 2) work and information. In his study about digital exclusion, Helsper (2012) defined a corresponding fields model with four categories of Internet use, namely 1) economic, 2) cultural, 3) social, and 4) personal. A. J. van Deursen and van Dijk (2014a, p. 520) classify Internet use into seven categories, namely “personal development, leisure, commercial transaction, social interaction, information, news and gaming”.

Usage access relates to the frequency and activities consumers perform on the Internet (Van Dijk, 2005). Consumers use the Internet for various activities, including entertainment, economic activities, information seeking, and social interaction (Büchi et al., 2016; Haight, Quan-Haase, & Corbett, 2014; A. J. van Deursen & van Dijk, 2014a). In their studies on Internet use, Blank and Groselj

(2014); Brandtzæg et al. (2011), defined the following dimensions*:* the amount of use, usage variety, and type of use*.* The amount of use refers to the frequency users make use of the Internet to perform an activity. The variety of use refers to the different activities users perform on the Internet. Lastly, the type of use refers to the specific use activity, such as looking for information and social interaction. This dimension gives an understanding of how users, in general, are using the Internet.

Most studies on the digital divide focused on general Internet activities. This is limited as it does not give an in-depth analysis of the type of use. The findings by Blank and Groselj (2014) and Brandtzæg et al. (2011) suggest that Internet activities are not the same across all types of users. Blank and Groselj (2014) further suggest that Internet use research must be specific to the type of use to get an in-depth understanding of what factors influence the specific type of use (e.g. entertainment, gaming, etc.). This suggestion is valid, and examples of such studies specific to the type of Internet use include research within the political divide (Min (2010); Vaccari (2013) and cultural divide (Mihelj et al. (2019); Recabarren et al. (2008).

There has not been much research on the economic divide. With the growth of DFS in recent years, this study undertakes to understand the second-level digital divide in the context of DFS. This study uses the corresponding fields model by Helsper (2012) , U&G Theory by Katz (1974) and DFS business models defined by I. Lee and Shin (2018) to describe the DFS use categories. The focus is on the economic field, particularly finance use as defined by A. J. van Deursen and van Dijk (2014a) and expanded upon in Section 2.5.3 by discussing different DFS business models. The DFS use categories used in this study include 1) payments, 2) wealth management, 3) crowdfunding, 4) lending, and 5) insurance.

2.5.3 Hypotheses development

2.5.3.1 Medium-related digital skills and DFS use

In their research, Alexander Van Deursen and Van Dijk (2011) found that operational and formal skills contribute to using the Internet when they observed participants in a lab performing tasks on the Internet. A longitudinal study in the

Netherlands on digital skills concluded that operational and formal digital skills are essential to using the Internet (A. J. van Deursen & van Dijk, 2015a). Tirado-Morueta et al. (2017) found that operational skills influence Internet use to achieve user goals.

The hypotheses derived from the literature are:

H1: Operational digital skills have a positive influence on the use of DFS.

H2: Formal digital skills have a positive influence on the use of DFS.

2.5.3.2 Content-related digital skills and DFS use

The content-related Internet skills have been found to influence the use of the Internet among the Dutch population (A. J. Van Deursen & van Dijk, 2015b). Among the content-related internet skills, the beneficial use of the Internet is dependent on the level of interpretation and comprehension of information retrieved from the Internet (Tirado-Morueta et al., 2017). A. J. A. M. van Deursen and Van Diepen (2013) found that information digital skills related to Internet skills enable users to complete tasks using the Internet. These studies suggest that if users are to benefit from the Internet, the level of their information digital skills is significant in the use of digital media. This means that a user who cannot search, interpret, and filter out untrustworthy information will determine the level of Internet use. This could be important in using DFS because users may need to search for and interpret the information retrieved to purchase financial products that meet their needs.

Users actively participate in online communities by posting comments or asking questions that other users answer (Heinonen, 2011). Creating content online is influenced by users' internet skills (Blank, 2013; Correa, 2010). Those who create content online have a high level of digital skills and are confident in their abilities (Blank & Reisdorf, 2012). These studies suggest that users with advanced digital skills will participate and contribute to the online communities of their choice. An example is users who create blogs or comment on different topics online. This could also include users who ask for assistance or complain online.

To access opportunities via the Internet, relationships are essential, leading to the importance of users' ability to communicate with others using digital tools. The study by L. Wei (2012) concludes that users' communication skills contribute to their participation in online communities. Other studies support this finding and have concluded that communication skills are essential for Internet users to access economic activities in an online environment (A. J. Van Deursen & Van Dijk, 2014b). The findings from these studies suggest that using digital communication tools influences users' uptake of Internet activities. This means that communication skills will influence DFS use where users need to use digital tools to seek information from other community members or institutions that offer financial services online.

The following hypotheses are developed from previous literature:

H3: Information digital skills have a positive influence on the use of DFS.

H4: Content creation digital skills have a positive influence on the use of DFS.

H5: Communication digital skills have a positive influence on the use of DFS.

2.5.3.3 English language and DFS

According to Johnson (2021), a large percentage of Internet content is English, followed by Chinese. This poses a challenge to those countries that do not have English as their first language. In South Africa, there are eleven official languages, where isiZulu is the most spoken first language, and English the fourth most spoken language (Stats SA, 2011). Several studies show the significant influence of the English language on Internet activities. A study in Israel concluded that there are disparities in Internet access between ethnic groups, which might also be attributed to users' occupations (Mesch & Talmud, 2011).

Some scholars view language as a factor that can create a digital divide because users cannot understand the content on the Internet (De Lannoy, 2018; A Gillwald, 2017; Srinuan & Bohlin, 2011). Knowledge and the use of English by

Romanians enabled their integration into the European Union when they could access opportunities on the Internet (Wetzl, 2010). This finding is also supported by Pick, Sarkar, and Parrish (2017), who found that knowledge of the English language influenced the adoption of ICT in Latin American, where their first language is Spanish. These findings assert that knowledge or lack of the English language can create a digital divide. Those deficient in the English language will be digitally disadvantaged.

The following hypotheses are posited:

> *H6: English language knowledge influences the user's h6a: operation skills, h6b: formal skills, h6c: information digital skills, h6d: content creation digital skills, and h6e: communication skills.*
>
> *H7: English language knowledge influences the use of DFS.*

2.5.4 Conceptual framework summary

This study used previous literature on the digital divide to develop a conceptual model to understand the second-level digital divide in the context of DFS. This model is based on the work conducted by Hargittai (2001); and Van Dijk (2005), who defined the second digital divide as differences in digital skills and uses of technology.

The model has the following independent variables related to the different digital skills found in the literature: operation skills, formal skills, information digital skills, content creation digital skills, and communication skills. English language competency was also added as an independent variable due to the research context. The independent variables in this model have been found to influence the use of technology in different studies (Tirado-Morueta et al., 2017; A. J. Van Deursen & van Dijk, 2015b; Wetzl, 2010) hence their inclusion to investigate the use of DFS.

To define the dependent variable *DFS use*, the U&G Theory (Ketelaar & van der Laan, 2009; LaRose et al., 2001; Rubin, 2009; Stafford et al., 2004) and business models defined by I. Lee and Lee (2015) were used. The U&G Theory was used

in the context of Internet use and its gratifications. The business models were used as categories of the different uses of DFS. The business models used in this study are those used exclusively by retail consumers, namely 1) payments, 2) wealth management, 3) crowdfunding, 4) lending, and 5) insurance.

This study uses the model shown in Figure 2 (see overleaf) to analyse the relationships between independent and dependent variables. Figure 2 shows the conceptual model used within the ambit of this study. It is categorised by medium-related digital skills, content-related digital skills, and English language, forming independent variables and DFS use as the dependent variable.

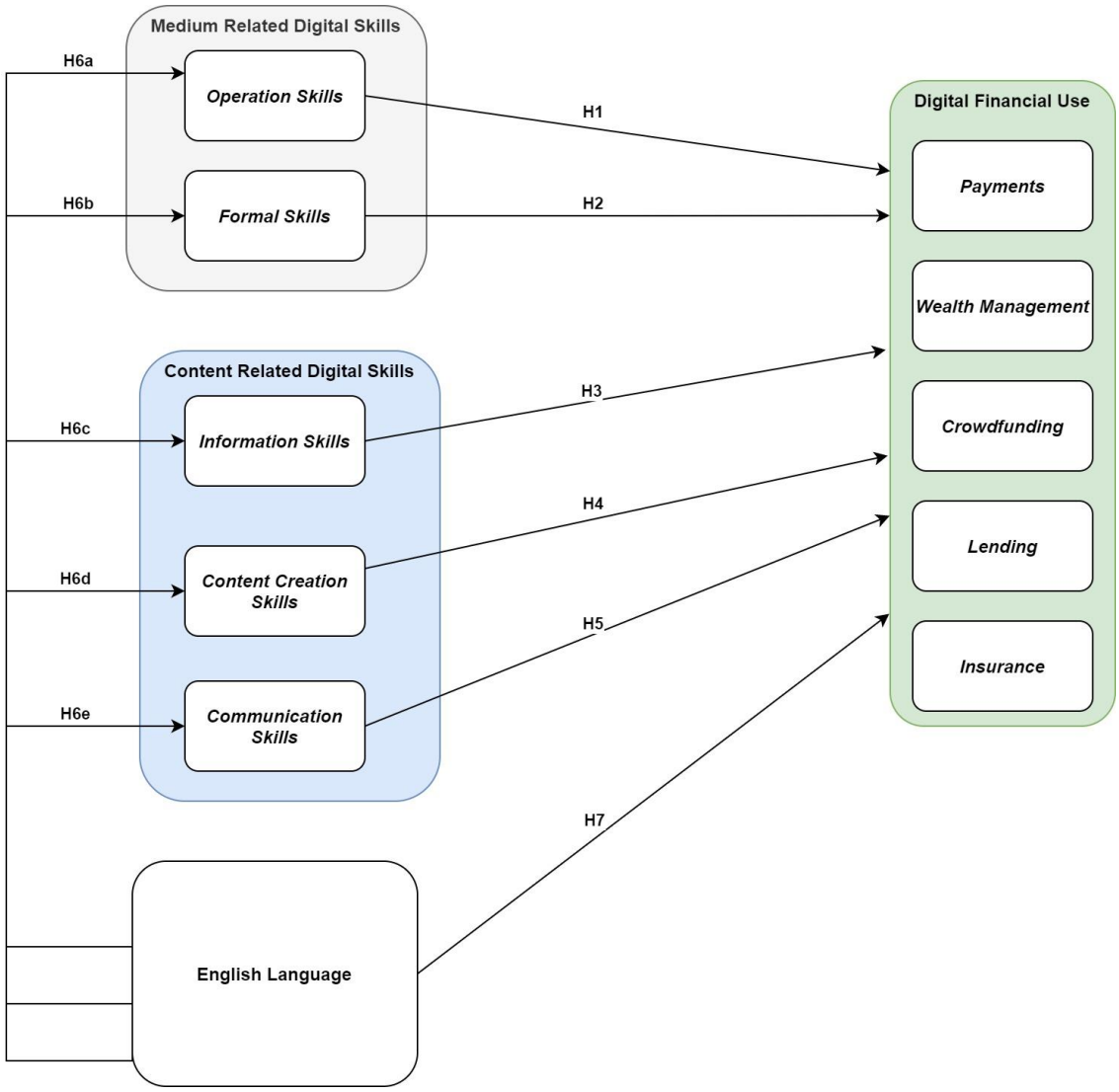


Figure 2: Conceptual model of the second-level digital divide in the context of DFS

Source: Researchers model developed from literature (Ketelaar & van der Laan, 2009; I. Lee & Shin, 2018; Van Dijk, 2005)

2.6 Literature review summary

The literature reviewed two main concepts, namely the digital divide and DFS. The literature review identified what makes up the second-level digital divide and why the focus must be given to this divide. It was established that there is a shift in research from motivational access and material access to digital skills access and usage access (i.e., a shift from the first-level digital divide to the second-level digital divide). These access levels are essential for the total appropriation of technology.

The review of the digital divide revealed that it is a multifaceted concept that is on a continuum. On a high level, the digital divide has those empowered by technology and those disadvantaged by technology. However, a closer look at this phenomenon reveals that different levels of access divide exist and the divide shifts to the next level when the other level is solved. This finding suggests that the view on the digital divide is complex (Van Dijk, 2005). In addition to the definitions, the literature on the digital divide in South Africa was analysed. It is clear from the literature that the first-level digital divide still exists; however, the focus of this study is on the second-level digital divide.

The review further focused on DFS and established that it disrupts the traditional financial industry. However, it is still a niche compared to established traditional financial services. For DFS to thrive, there must be an ecosystem with various elements that must function together. Furthermore, it was established that digital services exist for all financial products consumers use. DFS can be categorised into five primary business models for retail consumers: payments, lending, insurance, crowdfunding, and wealth management.

Empirical research was conducted to enhance the understanding of the second digital divide, specifically on DFS usage. Table 5 (see overleaf) shows the hypotheses used in this study. The next chapter defines the research methods

used by discussing the research strategy, data collection techniques, and sample selection.

Table 5: Research hypotheses summary

Hypothesis	Description
H1	*H1: Operational digital skills have a positive influence on the use of DFS.*
H2	*H2: Formal digital skills have a positive influence on the use of DFS.*
H3	*H3: Information digital skills have a positive influence on the use of DFS.*
H4	*H4: Content creation digital skills have a positive influence on the use of DFS.*
H5	*H5: Communication digital skills have a positive influence on the use of DFS.*
H6	*H6: English language knowledge influences the user's h6a: operation skills, h6b: formal skills, h6c: information digital skills, h6d: content creation digital skills, and h6e: communication skills.*
H7	*H7: English language knowledge influences the use of DFS.*

CHAPTER 3: RESEARCH METHODOLOGY

This chapter describes the research methodology used to address the hypotheses that were defined in Chapter 2.

3.1 Introduction

This study identified objectives that assisted in understanding the use of DFS in the South African market. The study's empirical objectives are:

- To determine the relationship between Internet-related skills and digital financial use;
- To determine the extent to which each Internet skill influences DFS use;
- To determine the combined Internet skills contribution to DFS use.

The empirical study focused on answering the objectives defined by using quantitative methods.

3.2 Research approach

The main focus of this empirical research was on users who have Internet access in South Africa and make use of financial services.

The philosophical worldview that was used in this study is that of post-positivism as it is based on facts, the researcher did not participate in the actual research, and the researcher's opinions did not influence the research (Ryan, 2006). This worldview is further described by Aliyu, Bello, Kasim, and Martin (2014, p. 81) as "the ontological principle and doctrine that truth and reality are free and independent of the viewer and observer". This worldview was focused on the facts and removed biases the researcher may have had.

This worldview has its shortcomings because it does not consider why people make certain decisions and engage in different activities and environments and its influence on their views (Ryan, 2006).

3.3 Research design

A survey was used as the research design method within the ambit of this study. A survey is defined as data collected and used to gain knowledge (Fowler Jr, 2013). Surveys are mainly used to study issues in Social Science across the world and enable researchers to generalise the results derived from a sample to a whole population (Leavy, 2017). Surveys can either be cross-sectional or longitudinal (Ruel, Wagner III, & Gillespie, 2015). This study used the cross-sectional method, which is defined as collecting and analysing data at a particular point in time (ibid). A questionnaire was used to gather data.

Cross-sectional surveys are cost-effective and allowed the study to access different Internet and financial services users across the country (Ruel et al., 2015). In addition to these advantages, Nardi (2015) states that surveys guarantee anonymity and, most importantly, the ability to use statistical methods for sampling and then generalising to the whole population. The Internet was used to administer the survey. Some disadvantages of using surveys include the respondent's ability to respond to the survey or inadequate response from the sample population (Glasow, 2005). Furthermore, respondents may not be truthful in their responses and may not remember some activities when responding to questions (Nardi, 2015). Different methods were used to assess and reduce the impact of these shortcomings by ensuring that questions were adapted from previous research, that they were not ambiguous, and that the flow of the survey made it easy to complete (Creswell & Creswell, 2017; Field, 2013).

The survey was the most appropriate method for this study because it reached different consumers and could use data to generalise results to the population. Survey respondents were made aware that the survey was only to be used for research purposes and that it was anonymous (D. R. Cooper, Schindler, & Sun, 2006).

3.4 Data collection methods

Data was collected from the sample using questionnaires. This method enabled the study to collect data from various consumers between 01 December 2020 and 31 January 2021.

3.4.1 Population

The target population consisted of all consumers with Internet access in South Africa. The population of users with internet access was estimated to be 62.2% of the total South African population (STATS SA, 2019).

The population excluded those who do not have Internet access. In addition, financial services offered to businesses are excluded, and only those offered to consumers were included. Examples of the services that were excluded include investment banking and business financial data aggregators.

3.4.2 Sample and sampling method

The sample for the study was derived from South African consumers over the age of 18, who had access to email, instant messaging platforms (i.e., WhatsApp), the Internet, and used social media platforms (i.e., Twitter, Facebook, LinkedIn). The reason for this choice was to gain access to consumers across South Africa who made use of the Internet at least once.

The representative sample had to present characteristics of South African consumers and should have had Internet access. For this study, probability sampling was used because it allowed the results to conclude on the entire population (Leavy, 2017; Uprichard, 2013). Simple random sampling (SRS) enabled any individuals with Internet access to be selected (ibid). The survey was placed on social media platforms and everyone with access to these platforms could complete the survey without any restrictions thus SRS was achieved.

3.4.3 Sample size

The nature of the quantitative study required a large sample size to ensure a low sampling error (Field, 2013; Leavy, 2017). There are different schools of thought

on determining the correct level of sample size for a study. Tabachnick, Fidell, and Ullman (2007) and Comrey and Lee (1992) suggest that a total sample size of 300 is suitable for quantitative studies, while Field (2013) suggest that a ratio of 10 – 15 respondents per variable is adequate. This study adopted Field's suggestion of the ratio of 10 – 15 respondents to one variable as the minimum sample size to run statistical tests.

Considering the theory, there were 12 primary variables (see Table 6 below). This study aimed to have more than 180 valid responses and considered the number of variables in the conceptual model. Data collection resulted in 541 valid responses.

3.5 The research instrument

3.5.1 Overview

An online questionnaire was used as the research instrument to conduct the research study. The advantages of using an online survey include efficiency and location-agnostics (D. Cooper & Schindler, 2011). The questions used were adapted from past studies (Durndell & Haag, 2002; Helsper, Van Deursen, & Eynon, 2015; A. J. Van Deursen & van Dijk, 2015b; A. J. van Deursen et al., 2012) to suit this study. Furthermore, DFS usage questions were adapted by expanding on Internet economic, a finance use activity defined by Helsper et al. (2016), and focused on the different Internet uses of DFS products.

3.5.2 Questionnaire

The questionnaire used in this study was divided into two sections: sociodemographic data, internet skills questions and DFS use questions.

The Internet skills construct was split into two constructs, namely 1) medium-related digital skills and 2) content-related digital skills, as defined by Helsper et al. (2015); A. J. van Deursen et al. (2012). The variables used to measure these constructs included operation and formal skills for medium-related digital skills and information digital skills, content creation digital skills, and communication skills for content-related digital skills. The question asked on these constructs

was, “*Please indicate how accurate the following statements are when thinking about how you use the Internet*”. A seven-point Likert scale (ranging from (1) Not at all true of me and (7) do not understand what you mean by that) was used to measure these constructs. However, during the data analysis, the last item on the scale was treated as a missing value and dropped to remain with a six-point Likert scale.

The DFS use construct was divided into the financial services business models identified in the literature. There are six categories of DFS business models; however, only five applied to consumers (I. Lee & Shin, 2018). The categories used in the questionnaire include payments, wealth and investments, crowdfunding, lending, and insurance. The question that was asked on the DFS use construct was, “*How often have you done the following things online in the last year?*” A seven-point Likert scale (ranging from (1) Never and (7) Don't know) was used to measure these constructs. However, during the data analysis, the last item on the scale was treated as a missing value and dropped to remain with a six-point Likert scale.

The questions met the validity and reliability measures in countries like the Netherlands and United Kingdom (A. Van Deursen et al., 2014; A. J. van Deursen et al., 2012) but have not been used in South Africa before.

Table 6 (see overleaf) summarises the research instrument. The detailed instrument can be found in APPENDIX B.

Table 6: Summary of research instrument

Factors	Latent factors	Question numbers	Items	Variable type
Demographics	Individuals	Q2 – Q3 and Q5 – Q11	9	Control variable
Language	English proficiency	Q4	1	Independent variable
Medium-related Internet skills	Operational Internet skills	Q12 – Q13	22	Independent variable
	Formal Internet skills	Q14	7	
Content-related Internet skills	Information Internet skills	Q15	11	Independent variable
	Communication Internet skills	Q16	8	
	Content creation Internet skills	Q17	6	
Digital Financial Services use	Payments FinTech use	Q18	6	Dependent variable
	Wealth and investments FinTech use	Q19	8	
	Crowdfunding FinTech use	Q20	4	
	Lending FinTech use	Q21	4	
	Insurance FinTech use	Q22	6	

Source: Author, 2021

The variables that were used as control variables on medium- and content-related Internet skills include:

- Internet experience
- Age
- Education
- Gender

3.6 Procedure for data collection

This study collected data from South African consumers who have access to the Internet. The target was to get a broad range of consumers who access the

Internet and use DFS for their financial needs. Qualtrics software was used to design, distribute, and capture respondent data. The data was collected over two months between December 2020 and January 2021.

The questionnaire was advertised on social media platforms such as LinkedIn, Twitter, and Facebook for South African consumers. Social media users saw the as one of their sponsored content on the social media platform. Springvale Online, a South-African based company, was also used to assist with the distribution of the survey. The company has a diverse range of over 40 000 respondents, who are readily available to complete online surveys. The members received a small payment from the company for every survey they completed.

The summary of responses is shown in Table 7 below. Only 541 responses were used, and 112 were removed for analysis.

Table 7: Questionnaire response rate

Respondents	Count	Percentage	Data viability
Complete survey	541	83%	Viable
Incomplete survey	112	17%	Missing data removed
Total	**653**	**100%**	

Source: Author, 2021

3.7 Data analysis and interpretation

The collected data were subjected to quality check processes to check for integrity, completeness, and errors. The data were analysed using multivariate statistical methods using the IBM Statistical Package for Social Scientists (SPSS) Statistics 26 software.

Descriptive statistics were used to show the respondents' demographics (Creswell & Creswell, 2017). The multivariate analysis process was used to understand the relationship between the various digital divide factors (Tabachnick et al., 2007). The data analysis approach tested the data for

reliability, validity, missing values, multivariate assumption violations (i.e., outliers, independence of errors and autocorrelation, normality, homoscedasticity and linearity, and multicollinearity), and concluded by performing statistical tests for the defined hypotheses (Field, 2013; Hair, Black, Babin, & Anderson, 2014).

3.7.1 Missing values data analysis approach

The data captured on Qualtrics was downloaded in an SPSS file format (i.e., *.sav) and uploaded into SPSS. The first checks performed were on missing values. The survey did not force respondents to answer every question before they moved to the next question. Due to this, responses that did not have any responses were removed from the data. In addition, seven-point Likert scale questions on skills and usage, respectively, with the last point on the scale being *I do not understand what you mean by that* and *Don't know,* were treated as missing values. The data resulted in 541 responses and 112 incomplete responses.

3.7.2 Descriptive statistics

Descriptive statistics are discussed to describe respondents' profiles and understand their Internet profiles. In addition, mean values and standard deviations were calculated. The data is presented in tables and graphs.

3.8 Validity and reliability test

The purpose of validity and reliability tests was to reduce errors by testing the validity and reliability of the instrument (Hair et al., 2014). Validity tested if the instrument used measures the concepts it proposed to measure (Thatcher, 2010). The reliability test measures the consistency of the concepts measured.

3.8.1 Validity testing

3.8.1.1 External validity testing

This study does not generalise beyond the context of the study (i.e., beyond South African borders) (Creswell & Creswell, 2017). The characteristics of respondents in this study are general and are not unique to their location within

the South African borders. In addition, the respondents are of different age groups, with varying levels of Internet experience and economic status. Since this study was conducted in South Africa, it cannot be generalised beyond the South African context and will require validation in another context. Also, the study did not predict the future or the past and will need to be performed again since the factors studied are constantly evolving. However, the results from the study can be generalised to the South African population.

3.8.1.2 Internal validity

Internal validity ensures that the instrument used measures what it is intended to measure. Internal validity focuses on the alternative explanations resulting from the relationships between the independent and dependent variables (Adler & Clark, 2014). All respondents used the same instrument to ensure internal validity once the instrument was finalised, and no changes were made during the data collection stage.

3.8.1.3 Construct validity

Construct validity examines the extent to which the variables measure the latent constructs (Hair et al., 2014). Construct validity was examined by two validity tests: convergent validity and discriminant validity (Bajpai & Bajpai, 2014). Convergent validity tests whether different instruments' measurements of the same concept are correlated (Mohajan, 2017).

To test convergent validity, an exploratory factor analysis technique was used. Different scholars propose different values to interpret factor loadings. According to Stevens (2012), factor loadings greater than 0.4 must be interpreted, while Field (2013) suggests that those greater than 0.3 must be interpreted. For this study, the researcher chose to start interpreting factor loadings greater than 0.3.

Discriminant validity measures the level of correlation between two or more distinct concepts (Hair et al., 2014). If the correlation between the two concepts is high, the discriminant validity assumption is violated (Mohajan, 2017). The correlations between constructs were interpreted and values less than 0.3 were considered low, and discriminant validity was not violated.

3.8.2 Reliability Testing

Reliability tests measure the extent to which the research instrument can be repeated for research (Drost, 2011). According to Creswell and Creswell (2017), to measure a research instrument for reliability, Cronbach Alpha (α) is the most widely used test to examine the internal consistency of an instrument. In addition, Creswell states that Cronbach's alpha must be used to measure internal consistency with values ranging between 0 and 1, also adding that the acceptable scores are between 0.7 and 0.9. The digital divide instrument used in the past had α values of between 0.76 and 0.82. Examples include those of Ain, Kaur, and Waheed (2016); Khan, Hameed, and Khan (2017), (A. Van Deursen et al., 2014); A. J. Van Deursen and van Dijk (2015b); A. J. van Deursen et al. (2012).

In this study, a reliability test was performed on the extracted factors, and the cut-off used was 0.7.

3.9 Statistical techniques

The study's objective was to investigate the relationships between Internet skills and the use of DFS. The decision trees suggested by Field (2013); and Hair et al. (2014) were used to determine what statistical procedures should be used to meet these objectives. For this study, the Pearson correlation and multiple regression techniques were used to create a linear regression model that predicts the use of DFS (Field, 2013; Hair et al., 2014).

3.9.1 Pearson's Correlation Coefficient

Pearson's correlation examines the relationships between variables (Field (2013). This technique gives two important insights: 1) the strength of the linear relationships between independent variables and the dependent variable and 2) among the independent variables. It also provides the direction of the relationship between the variables (Field, 2013).

3.9.2 Spearman's correlation coefficient

One of the variables is non-parametric, and consequently, Spearman's correlation coefficient was used to examine the relationship between independent variables and the dependent variable but for non-parametric variables (Field, 2013). The results give insight into the strength and direction of the relationship.

3.9.3 Exploratory Factor Analysis (EFA)

Exploratory factor analysis was used to identify the underlying factors in the data. The purpose of this analysis was to identify questionnaire items that converge and are independent of other variables (Tabachnick et al., 2007). The aim was to reduce the number of variables without losing much information and identifying the data structure (Hair et al., 2014). The sample size analysis was done to check whether EFA could be performed on the data.

Sample size: Sample size is necessary before conducting EFA to ensure generalisation of the results to the South African population. According to Stevens (2012), 300 is an acceptable sample size, while Field (2013) and Hair et al. (2014) suggest a ratio of 10 – 15:1 respondents per variable to obtain the acceptable sample size. This study had a sample size of 541 and was considered acceptable because it met the adequate sample size criteria using the absolute sample size or ratio.

EFA resulted in five factors, including one dependent variable. To simplify the data, the EFA produced a correlation matrix, extraction method, rotation method, and retention method used to perform further analysis on the remaining factors (Field, 2013; Tabachnick et al., 2007).

Correlation: Correlation results showed the relationship between factors and their strengths. In addition, this analysis gave information on the construct validity of the retained factors (Mohajan, 2017).

Factor extraction: Two methods of factor extraction were considered for this study based on available literature: principal component analysis (PCA) and principal axis factoring (PAF). There is no consensus on the extraction method to

use. According to Field (2013), PCA is mainly used to reduce data, while factor analysis uses mathematical models to identify the underlying constructs in the data (Stevens, 2012). This study used PAF for analysis because the researcher wanted to perform factor analysis and reduce the data. Rotation improved the analysis of the extracted factors (Hair et al., 2014). In addition, the factors were checked for negative loadings to determine which items required reversal (Hair et al., 2014). The results did not show any negative loadings, and none of the items had to be reversed.

Factor rotation: The purpose of factor rotation was to enable a more simplified interpretation of the factors extracted (Hair et al., 2014). Unlike the orthogonal rotation method, the oblique rotation method provided correlation results between factors (Costello & Osborne, 2005; Hair et al., 2014; Stevens, 2012). Using SPSS, the Promax with Kaiser normalisation method was used. Once the factors have been rotated, the next task was to determine which factors to retain.

Factor retention: According to Field (2013), retaining factors for further analysis requires multiple techniques. The techniques considered in this study were Kaiser's criterion, scree plots, and variance percentage. The Kaiser's criterion states that factors with eigenvalues greater than one (1) must be retained (Hair et al., 2014). However, Kaiser's criterion method is a challenge as it results in too many factors being retained, which is not optimal for further analysis (Field, 2013). The other method which is much more reliable to use for retaining factors is the scree plot (Field, 2013). The scree plot also uses eigenvalues but the factors retained are at the point of inflexion (Field, 2013). Comparing the two methods with Kaiser's criterion, seven (7) factors would be retained; however, the factors were reduced to five (5) using the scree plot. The scree plot result was accepted in this study because the factors retained explained over 50% variance.

Once the EFA was completed, the multivariate assumptions were tested.

3.10 Multivariate statistics assumptions

To perform further analysis on the data, statistical tests were applied to ensure that there were no multivariate analysis assumption violations as this could lead

to misleading results (Tabachnick et al., 2007). The study's objectives were to understand the relationship between Internet skills and English language proficiency as independent variables and DFS use as a dependent variable. Therefore, the multivariate statistical technique was used (Tabachnick et al., 2007).

The multivariate statistical procedure included exploratory factor analysis and hierarchical multiple regression analysis. The following assumptions were tested as required to ensure the analysis could be performed (Field, 2013; Tabachnick et al., 2007): outliers, normality, independent errors, autocorrelation, multicollinearity, and linearity.

3.10.1 Outliers assumption test

Outliers are defined as the extreme responses on a variable that can cause regression model unreliability (Hair et al., 2014; Tabachnick et al., 2007). There are multiple reasons why variables may contain outliers, ranging from missing values, mistakes when capturing data, data subjects not being part of the population, and the distribution of the variable in the sample (Tabachnick et al., 2007). Thus, it is crucial to identify the outliers and remove them from the dataset for further analysis (Field, 2013).

Boxplots were used in this study to identify the extreme values because they show a graphical representation of the median, extreme scores, and interquartile range (Field, 2013). In this study, the independent variables did not have extreme values and were considered acceptable. However, the dependent variable has outliers. To fix the outliers on the dependent variable, a log transformation was performed on the variable because of the positive skewness (Field, 2013).

3.10.2 Normality assumption test

To perform multivariate techniques, normality assumes that the variable responses are normally distributed (Stevens, 2012). Various tests can be used to test normality. The tests include Shapiro-Wilk and Kolmogorov-Smirnov tests and skewness and kurtosis tests (Hair et al., 2014). According to Field (2013), the Shapiro-Wilk and Kolmogorov-Smirnov tests are unreliable because of the

sample size of 541. Thus, kurtosis and skewness tests were used to assess the normal distribution of factors. The kurtosis describes how tall or flat the distribution is compared to a normal distribution, while skewness describes whether the distribution is leaning towards the left or the right (Hair et al., 2014). A positive skew means the distribution is leaning towards the left, and a negative skew means the data is leaning towards the right.

According to Hair et al. (2014) and Chan (2003), a heavily skewed distribution has values outside the range between -2 and +2, and a normal distribution has the skewness and kurtosis values of 0 (Field, 2013). Other scholars, Cohen, Cohen, West, and Aiken (2013) and Curran, West, and Finch (1996), use the cut-off of 2 for skewness and 7 for kurtosis. This study used the cut-offs suggested by these scholars. As mentioned above, the log transformation was applied on the dependent variable DFSU to ensure it does not violate the assumption of normality. All the other variables were within limits found in the literature.

3.10.3 Independence of errors and autocorrelation assumption test

This assumption assumes that the errors on independent variables are uncorrelated (Stevens, 2012). The violation of this assumption will create dispersion, resulting in the overconfidence of the relationship between the independent and dependent variables (Field, 2013).

To test this assumption, the independent errors were tested using the ZRESID (residual values) and ZPRED (predicted values) (Field, 2013). The P-P plot was used to provide a graphical representation to show that the assumption is not violated.

Autocorrelation is another assumption related to tests if errors of variables are correlated (Field, 2013). To test this assumption, the Durbin-Watson test was performed. The Durbin-Watson value must be between 0 and 4, indicating no autocorrelation and the independent errors assumption is not violated (Field, 2013). The results, as presented in the next chapter, show that this assumption was not violated.

3.10.4 Multicollinearity assumption test

To test the multicollinearity assumption, the correlation between variables must not be greater than 0.9 (Field, 2013). This test checks if the independent variables are independent of each other such that there is no singularity between the variables (Hair et al., 2014). If this happens, the regression model built will not be reliable as an independent variable's unique prediction to the outcome cannot be assessed.

The test performed on the data showed no multicollinearity between the independent variables, and thus the assumption was not violated, and the model was built.

3.10.5 Linearity and the homoscedasticity assumption test

The purpose of the linearity test was to check if independent and dependent variables correlate. The test was essential because the violation of the assumption would result in an invalid linear regression model (Field, 2013; Tabachnick et al., 2007). Scatterplots and Pearson's correlation matrix were used to test linearity. The graphical representation in the form of scatterplots was excellent but difficult to read, and hence, for this study, Pearson's correlation matrix was used (Field, 2013).

The homoscedasticity assumption tests the variance of the dependent variable concerning each of the independent variables (Hair et al., 2014). If there were much variance, it would invalidate the regression model because the confidence level and significance would be incorrect. According to Field (2013), to evaluate the results of this assumption, scatterplots were used, and the results showed that the assumption was not violated. After testing all assumptions, hierarchical multiple regression techniques were performed on the data.

3.11 Hierarchical multiple regression procedure

The objective of the multiple regression analysis techniques was to build a model that examines the relationship between the independent variables and dependent variable and to show prediction of the dependent variable from independent

variable values (Hair et al., 2014). A linear regression model was built such that the contribution of each independent variable explaining the dependent variable was assessed (Field, 2013).

This study has four independent variables, namely 1) English language proficiency, 2) information Internet skills, 3) content creation Internet skills, and 4) communication Internet skills, which were all used to predict the use of DFS. The regression model was built in two stages. The first stage had only control variables, and the second stage added the independent variables to the first model using the backward elimination method.

The three sequential methods for building a regression model are forward selection, stepwise selection, and backward elimination (Stevens, 2012). To meet the study's objectives, the backward elimination method was considered appropriate for this study because it has many variables in the model, unlike forward selection and stepwise selection (Field, 2013; Stevens, 2012).

The results from the model enabled this study to determine the contribution of each independent variable to predict the dependent variable. The R-squared measure was used to determine the independent variable’s unique contribution to the dependent variable’s variance (Field, 2013).

3.12 Limitations of the study

The study used simple random sampling to collect data. This form of sampling may be a challenge because there is no guarantee that data will be diverse. Due to the sampling method selected, there is a possibility that those selected may not have used DFS. Also, due to the multifaceted nature of the digital divide described, approaching different groups in the market did not guarantee that all sides of the digital divide were included.

Another limitation was the methodology, which did not allow understanding why the respondents did what they did. In addition, the method did not provide insight into how the respondent’s lifestyles and daily activities contributed to their use of DFS.

3.13 Ethical considerations

The questionnaire was distributed after receiving approval from the University of the Witwatersrand ethics committee. In addition, the respondents in the survey were informed that they might continue to complete the survey only if they granted permission to the researcher. This was mentioned in the survey purpose and objective section at the beginning of the survey. They were also told that they do not have to answer questions they did not want to answer and could stop completing the survey at any time without consequences. The survey also clearly stated that the data was only to be used for this study's research purposes and that it was to be kept confidential and anonymous. Before the questionnaire was distributed, the researcher received ethics clearance from the University of the Witwatersrand (see APPENDIX A).

3.14 Conclusion

This chapter discussed in detail the statistical methods and tests used in this study. The first section focused on the research strategy used. This was followed by a discussion on data collection, which included the target population, sampling technique, research instrument, and data collection strategy used within the ambit of this research study. The research instrument was adapted from previous studies, and social media was extensively used to distribute the questionnaire.

The chapter went further to discuss the data analysis and interpretation of the results guided by statistical theories. Thereafter, the extraction of factors and the validity and reliability of these factors were expanded upon. The study used multivariate statistical techniques, and therefore, the tested assumptions were discussed. All assumptions were not violated, and the study continued to build a regression model.

This chapter concluded by discussing the multiple regression used, the limitations of the study, and the ethical considerations applicable to this study. The next chapter presents the results of the research study.

CHAPTER 4: PRESENTATION OF RESULTS

4.1 Introduction

The chapter first screens the quality of the data and then discusses the demographic profile of the respondents. Next, the reliability and validity of the scales and constructs are tested to reduce the data dimensions. Finally, the chapter concludes by presenting the regression analysis and results from the hypothesis testing.

4.2 Data screening and quality

Before conducting any analysis, the data were screened to ensure good quality data. A dataset with 653 responses was screened using SPSS v26. However, after removing missing values, representing 5% of the data and incomplete responses, the eligible data for further analysis was 541.

4.3 Demographic profile of respondents

4.3.1 Gender

As part of the survey, the respondents were asked to indicate their gender. Those who did not wish to state their gender were allowed to omit the question. Table 8 below represents respondents' gender distribution. The results show that most respondents' (61.4%) were female. Only 0.2% of the respondents wished not to state their gender.

Table 8: Gender

Gender	Frequency	Percentage (%)
Male	207	38.4
Female	331	61.4
Rather not say	1	0.2
Total	**539**	**100.0**

Source: Author, 2021

4.3.2 Age

Table 9 shows that most respondents fell within the 31 – 45 (49.5%) age group, followed by the 18 – 30 (42.9%) age group. The 46 – 60 year age group and 60+ year group were the lowest with 6.7% and 0.9%, respectively. These results suggest that more focus should be given to the older generation concerning digital studies in the future to understand their digital skills and DFS use better.

Table 9: Age Group

Age	Frequency	Percentage (%)	Cumulative percentage (%)
18 – 30	231	42.9	42.9
31 – 45	267	49.5	92.4
46 – 60	36	6.7	99.1
60+	5	0.9	100.0
Total	**539**	**100.0**	

Source: Author, 2021

4.3.3 English language proficiency

The respondents' English language proficiency results show that 62.8% have advanced English language proficiency, followed by 35.2% who have intermediate English language proficiency. Those with beginner and no basic proficiency of the language were 1.5% and 0.6%, respectively. These results

suggest that most respondents understand written English, and their knowledge enables them to use the Internet (see Table 10).

Table 10: English language knowledge

		Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
Valid	No basic knowledge	3	0.6	0.6	0.6
	Beginner	8	1.5	1.5	2.0
	Intermediate	189	34.9	35.2	37.2
	Advanced	337	62.3	62.8	100.0
	Total	**537**	**99.3**	**100.0**	

Source: Author, 2021

4.3.4 Education

The respondents' education levels varied from having no matric to possessing a Doctoral degree. Table 11 (see overleaf) shows that most respondents have matric (28.7%), followed by a Bachelor's degree (23.7%) and diplomas (19.4%). The remainder of the respondents has an Honours/Postgraduate degree (14%), followed by a Master's degree (9.2%), no matric (3%), and a Doctoral degree (2%). These results reflect data that was collected among professionals using LinkedIn, colleagues in the industry, and other social medial platforms such as Facebook and Twitter.

Table 11: Education levels

		Frequency	Percentage (%)	Valid percentage (%)	Cumulative percentage (%)
Valid	No matric	16	3.0	3.0	3.0
	Matric	155	28.7	28.7	31.6
	Diploma	105	19.4	19.4	51.0
	Bachelor's degree	128	23.7	23.7	74.7
	Honours/ Postgraduate degree	76	14.0	14.0	88.7
	Master's degree	50	9.2	9.2	98.0
	Doctoral degree	11	2.0	2.0	100.0
	Total	**541**	**100.0**	**100.0**	

Source: Author, 2021

4.3.5 Employment status

Table 12 shows that the majority (63.1%) of the respondents are employed, followed by those who are unemployed (24.8%) and full-time students (11.5%). The smallest percentage of respondents (0.6%) represent retired respondents. The results show that most respondents have some level of income, which could imply that they may need financial services.

Table 12: Employment status

		Frequency	Valid percentage (%)	Cumulative percentage (%)
Valid	Unemployed	134	24.8	24.8
	Employed	341	63.1	88.0
	Retired	3	0.6	88.5
	Full-time student	62	11.5	100.0
	Total	**540**	**100.0**	

Source: Author, 2021

4.3.6 Annual income

Table 13 below shows that 62.8% of the respondents earn less than R200 000 per annum. Respondents with the lowest annual income (29.5%) earn less than R39 999 per annum. This result could be attributed to the fact that the unemployed represent the second-highest percentage concerning the respondents' employment status, as shown in Table 12 above. A total of 19.1% of the respondents earn between R200 000 and R499 999, followed by the groups who earn R40 000 – R99 999 (16.8%) and R100 000 – R199 999 (16.6%), respectively. Only 14.6% of the respondents earn R500 000 – R1.19 million, followed by 3.5% who earn more than R1.2 Million annually.

Table 13: Annual income

Annual income	Frequency	Valid percentage (%)	Cumulative percentage (%)
Less than R39 999	153	29.5	29.5
R40 000 – R99 999	87	16.8	46.2
R100 000 – R199 999	86	16.6	62.8
R200 000 – R499 000	99	19.1	81.9
R500 000 – R1.19M	76	14.6	96.5
R1.2M or more	18	3.5	100.0
Total	**519**	**100.0**	

Source: Author, 2021

4.4 Internet profile

4.4.1 Internet experience

The majority of the respondents (69.8%) first experienced the Internet when they were 11 – 20 years, followed by those aged 1 – 10 (18%), 21 – 30 (9.3%), 31 – 40 (1.1%) and 40+ (1.9%), respectively. Table 14 shows the distribution of the respondents' Internet experience.

Table 14: Internet experience

Age Internet accessed	Frequency	Valid percentage (%)	Cumulative percentage (%)
1 – 10	95	18.0	18.0
11 – 20	369	69.8	87.7
21 – 30	49	9.3	97.0
31 – 40	6	1.1	98.1
40+	10	1.9	100.0
Total	**529**	**100.0%**	

Source: Author, 2021

4.4.2 Weekly hours of Internet use

The results in Table 15 show that most respondents (52.9%) use the Internet for more than 24 hours per week. A total of 21.9% of the respondents uses the Internet 6 to 12 hours per week, followed by 20.4% that uses the Internet for 13 to 24 hours per week. Those who use the Internet for less than 5 hours per week represent only 4.8% of the respondents.

Table 15: Weekly Internet use in hours

Weekly hours	Frequency	Valid percentage (%)	Cumulative percentage (%)
Less than 5 hours	26	4.8	4.8
6 – 12 hours	118	21.9	26.7
13 – 24 hours	110	20.4	47.1
More than 24 hours	285	52.9	100.0
Total	**539**	**100**	

Source: Author, 2021

4.4.3 Device Access

The results show that 95.6% of respondents have access to a smartphone, followed by 80% who have access to a laptop. The respondents had the least access to desktop computers (34.2%) and tablets (29.8%). These results suggest that most respondents may be accessing the Internet through their smartphones. Table 16 shows the distribution of the respondents' device access.

Table 16: Device access

Device	Percentage (%)
Smartphone	95.6
Laptop	80
Tablet	34.2
Desktop computer	29.8

Source: Author, 2021

4.4.4 Internet access points

The results show that most respondents have access to the Internet at home (91.7%), followed by those who have access to the Internet when on the move (49.5%) and have access while at school (46.2%). A total of 29.8% of the respondents who access the Internet from somewhere else, like internet cafés or libraries, represent 29.8% of the respondents. The results suggest that building Internet infrastructure has progressed, especially mobile broadband and fibre to the home. Table 17 shows the distribution of respondents' Internet access points.

Table 17: Internet access points

Internet access point	Percentage (%)
Home	91.7
In transit (e.g., in a taxi on a mobile phone)	49.5
Work/School/University	46.2
Somewhere else (i.e., Internet café, public library, someone's house)	29.8

Source: Author, 2021

4.5 Validity – Exploratory factor analysis

To test for construct validity, exploratory factor analysis was used; however, the sample size first had to be checked to ensure adequate factor analysis. Exploratory factor analysis was applied to the data to identify the cluster of variables converging to factors and reducing the number of variables while retaining as much original information as possible (Field, 2013). Exploratory factor analysis was used within the ambit of this research study to determine the factors used for further analysis and whether they correlate (Stevens, 2012).

4.5.1 Sample adequacy

The sample size informs the method that must be used to test the instrument's validity (Field, 2013). This study received 541 valid responses, and this sample size is adequate to use according to the Kaiser-Meyer-Olkin (KMO) test (Field, 2013). The results in

Table 18 (see overleaf) show that the KMO of 0.927 is considered marvellous (Field (2013). Bartlett's test of sphericity sig. is .000, which indicates that factor analysis can be used to extract the factors (Hair et al., 2014).

Table 18: KMO and Bartlett's test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.927
Bartlett's Test of Sphericity	Approx. Chi-Square	14805.178
	df	1225
	Sig.	.000

Source: Author, 2021

4.5.2 Factor extraction and rotation methods

Principal axis factor analysis was applied to 86 items as it was expected that the factors would correlate. The Promax rotation method extracted the factors to correlate between the factors (Hair et al., 2014). After applying several iterations, 50 out of the 86 items converged into five factors. Figure 3 shows the scree plot of eigenvalues. The five factors are those with an eigenvalue greater than 1.

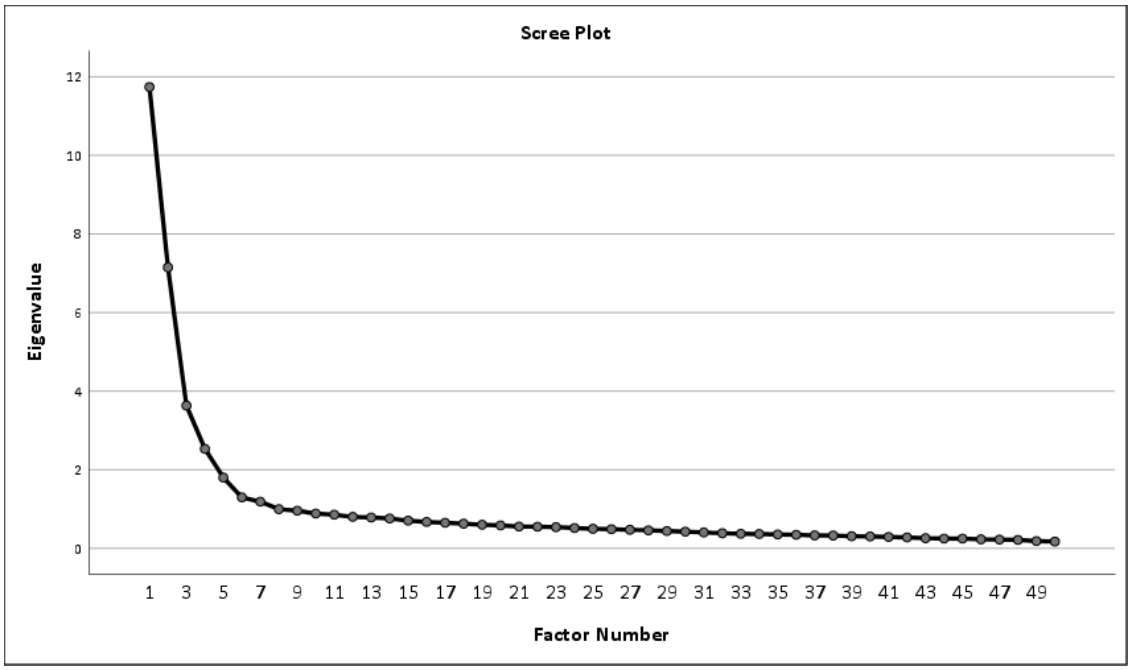


Figure 3: Scree plot

Source: Author, 2021

4.5.3 Total variance

Using the Kaiser-Meyer method, the total variance is explained by seven factors with an eigenvalue greater than 1. The total variance of the seven factors is 58.67% (see Table 19 overleaf). However, when using the scree plot displayed in Figure 3 above, the inflexion point adopted five factors for this study. The total variance explained from the five factors is 53.70%.

Table 19: Total variance Kaiser-Meyer method

Factor	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	11.740	23.479	23.479	11.264	22.528	22.528	10.689
2	7.149	14.298	37.777	6.620	13.239	35.767	6.536
3	3.632	7.264	45.041	3.156	6.312	42.079	6.009
4	2.531	5.061	50.102	2.005	4.010	46.089	5.169
5	1.800	3.600	**53.703**	1.238	2.475	48.564	4.815
6	1.297	2.594	56.296				
7	1.188	2.376	58.672				
8	.997	1.994	60.666				
9	.957	1.913	62.580				
10	.886	1.771	64.351				
11	.855	1.711	66.062				
12	.801	1.602	67.664				
13	.785	1.570	69.234				
14	.760	1.520	70.754				
15	.705	1.409	72.163				
16	.671	1.343	73.506				
17	.650	1.300	74.806				
18	.628	1.256	76.061				
19	.601	1.202	77.263				
20	.584	1.168	78.431				
21	.554	1.108	79.539				
22	.549	1.098	80.637				
23	.540	1.080	81.717				
24	.518	1.036	82.753				
25	.497	.995	83.747				
26	.487	.973	84.720				
27	.473	.945	85.666				
28	.459	.919	86.584				
29	.441	.882	87.467				
30	.425	.850	88.316				
31	.406	.811	89.127				
32	.385	.770	89.897				
33	.370	.740	90.637				
34	.365	.731	91.368				
35	.352	.704	92.072				
36	.346	.691	92.763				
37	.330	.660	93.424				
38	.325	.651	94.074				
39	.309	.617	94.692				
40	.304	.608	95.300				
41	.291	.582	95.881				
42	.278	.555	96.436				
43	.258	.516	96.953				
44	.249	.498	97.450				
45	.248	.496	97.947				
46	.229	.457	98.404				
47	.223	.447	98.850				
48	.216	.432	99.282				
49	.185	.371	99.653				
50	.173	.347	100.000				

Extraction method: Principal axis factoring

[a] When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Source: Author, 2021

4.5.4 Convergent validity

Convergent validity measures the correlation between two measures, such that a high correlation shows that the measures are related (Drost, 2011; Hair et al., 2014). In this study, the factor pattern matrix is preferred over the factor structure matrix as it will show the individual contribution of each factor. It shows how each of the variables contributes to each of the five factors and does not focus on the correlation among the factors and the variance between variables and factors (Hair et al., 2014). Researchers do not agree on the preferred thresholds for factor loadings, as some proposes using factor loadings greater than 0.4 while others suggest using 0.5 (Drost, 2011; Field, 2013; Stevens, 2012). However, Hair et al. (2014) use a rule of thumb that factor loadings greater than 0.5 are practically significant and point to acceptable validity. For this study, the variables with loadings greater than 0.5 were kept. The results from the oblique rotation are shown in the pattern matrix in Table 20 below.

Table 20: Pattern matrix[a]

	Factor				
	Digital Financial Services use (DFSU)	**Information digital skills (IDS)**	**Content creation digital skills (CCDS)**	**Operational digital skills (ODS)**	**Communication digital skills (CDS)**
UseInsuranceTech05	.803				
UseLendingTech02	.781				
UseCrowdFunTech03	.757				
UseCrowdFunTech04	.752				
UseWealthInvestTech06	.741				
UseLendingTech03	.741				
UseInsuranceTech04	.726				
UseWealthInvestTech05	.715				
UseLendingTech01	.701				
UseCrowdFunTech01	.697				
UseCrowdFunTech02	.697				
UseWealthInvestTech03	.695				
UseInsuranceTech02	.665				
UseInsuranceTech01	.654				
UseWealthInvestTech08	.652				
UseWealthInvestTech07	.637				
UseWealthInvestTech04	.633				
UsePaymentTech03	.602				
UsePaymentTech06	.524				
FormalSkills05		.858			
FormalSkills06		.800			
FormalSkills03		.778			
FormalSkills04		.759			
FormalSkills07		.736			
	Factor				

	Digital Financial Services use (DFSU)	Information digital skills (IDS)	Content creation digital skills (CCDS)	Operational digital skills (ODS)	Communication digital skills (CDS)
InformationalSkills07		.667			
InformationalSkills04		.659			
InformationalSkills11		.561			
InformationalSkills02		.510			
Environment14			.753		
Environment13			.736		
ContentCreation05			.692		
ContentCreation06			.654		
ContentCreation03			.635		
Environment11			.620		
Environment12			.612		
ContentCreation04			.601		
Environment05			.549		
Mobile02				.750	
Mobile05				.743	
Mobile01				.675	
Environment01				.636	
Mobile03				.630	
Mobile06				.592	
Environment06				.562	
CommunicationSkills02					.690
CommunicationSkills03					.656
CommunicationSkills04					.638
CommunicationSkills08					.609
CommunicationSkills07					.548
CommunicationSkills01					.545

Extraction Method: Principal axis factoring
Rotation Method: Promax with Kaiser normalisation[a]
[a] Rotation converged in six iterations

Source: Author, 2021

Most of the items have factor loadings greater than 0.60, except for eight items. The pattern matrix shows a mix of results where some items have loaded to constructs as expected, while others did not. The items loaded on the expected constructs are Factor 5, communication digital skills (CDS) and Factor 1, DFS use (DFSU).

The items of two constructs, informational skills and formal skills, loaded together onto Factor 2, referred to as information digital skills (IDS) in this study. The items that converged relate to online information, searching, presenting, and interpreting information. The other two constructs that have items loading together is the Internet environment and the content creation items loaded on Factor 3, content creation digital skills (CCDS). The items that converged into Factor 3 relate to the knowledge of understanding the environment for content creation. The other set of items loaded together is the mobile Internet

environment loaded on Factor 4, operational digital skills (ODS). As much as the items loading on Factor 4 were not entirely expected, the result is reasonable as the items have loaded on the same factor.

Items with factor loadings less than 0.5 were dropped. These included the internet operating environment skills construct and DFS use, which had nine items that did not load, followed by the informational skills construct (seven items), and communications skills, formal skills, and content creation digital skills (two items), each not loading.

Most of the items have factor loadings greater than 0.5 on constructs, except those mentioned above. The exploratory factor analysis results show the acceptable validity of constructs for the research instrument.

4.5.5 Discriminant validity

The exploratory factor analysis results show convergence because the items loaded strongly on their constructs, and as expected, they showed divergence because of weak loadings on the other constructs.

Table 21: Factor correlation matrix

Factor	DFSU	IDS	CCDS	ODS	CDS
DFSU	1.000				
IDS	.397	1.000			
CCDS	.330	.034	1.000		
ODS	-.239	-.274	.233	1.000	
CDS	-.159	-.280	.373	.499	1.000

DFSU=Digital Financial Services Use, IDS=Information Digital Skills, CCDS=Content Creation Digital Skills, ODS=Operational Digital Skills, CDS=Communication Digital Skills

Source: Author, 2021

The correlations between constructs are expected to be low (see Table 21 above). Most of the correlations are lower than 0.3, except for the four cells highlighted in grey. This result indicates that the constructs are not measuring the same thing and are divergent. The constructs with coefficients greater than 0.3 are expected to measure the same group of skills. The negative correlation

between DFSU and ODS and CDS suggests that those who use DFS are not dependent on how well they can operate or communicate in an Internet environment. The other negative correlation coefficients between IDS and CDS and ODS suggest that individuals with IDS can use and manipulate information and are not dependent on operating and communicating in the Internet environment.

4.6 Reliability analysis

It is essential to assess the quality and consistency of variables measuring a construct to measure the same construct consistently. Thus, an instrument must be tested for internal consistency (Hair et al., 2014). Cronbach's alpha (α) is mostly used for scale consistency. However, researchers report different limits for reliability. For example, Brown and Jayakody (2008), Hair et al. (2014), and Field (2013) report that the scale is reliable if Cronbach's alpha is > 0.7. However, for exploratory studies, Hair et al. (2014) suggest that s Cronbach's alpha score > 0.60 is acceptable.

When testing reliability, it is also essential to perform an item analysis of the constructs. According to Robinson (2018), a construct must have at least three items for reliability. The constructs extracted all have more than three items. The results show that the DFSU construct has the highest Cronbach's alpha value of 0.946, and CDS has the lowest Cronbach's alpha value of 0.812, which all show excellent results. Table 22 provides a summary of the reliability test results.

Table 22: Factors' Cronbach alpha summary

Factor	Construct name	Items	Cronbach's alpha (α)	Cronbach's alpha based on standardised items
1	Digital financial services use (DFSU)	19	0.944	0.946
2	Information digital skills (IDS)	9	0.895	0.895
3	Content creation digital skills (CCDS)	9	0.875	0.878
4	Operational digital skills (ODS)	7	0.841	0.846
5	Communication digital skills (CDS)	6	0.808	0.812

Source: Author, 2021

As listed in Table 23, all five factors were valid, their scales reliable, and eligible for further analysis. A composite score was computed for each factor using the mean and was used as a variable in the regression model.

4.7 Correlational analysis

This section focuses on the relationship between factors by showing the strength and direction of the relationship. The factors retained and analysed further are those that passed the statistical tests. The analysis was performed using Pearson's correlation matrix for the factors identified when analysing the data. The Pearson's correlation ranges between -1 (negative correlation) and +1 (positive correlation) and measures the relationship between two variables. According to Field (2013), correlation effects of ±0.1 are weak, ±0.3 are medium, and ±05 are strong. Table 23 below shows the correlation values of factors extracted in this study.

Table 23: Pearson correlation matrix

Correlations

		LogDigital_Financial Services Use (LogDFSU)	Information Digital Skills (IDS)	Content Creation Digital Skills (CCDS)
Information Digital Skills (IDS)	Pearson Correlation	.326**		
	Sig. (2-tailed)	.000		
	N	541		
Content Creation Digital Skills (CCDS)	Pearson Correlation	.341**	-.002	
	Sig. (2-tailed)	.000	.970	
	N	541	541	
Communication Digital Skills (DCS)	Pearson Correlation	-.078	-.213**	.412**
	Sig. (2-tailed)	.069	.000	.000
	N	541	541	541

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

Source: Author, 2021

Table 23 above shows only the factors that were retained for further analysis. Results show that the highest correlation between the predictor variables is between CDS and CCDS. Conversely, the lowest correlation between the predictor variables is between CDS and IDS.

The results also show that there is a correlation between the predictor variables and the outcome variable LogDFSU. However, the DCS is showing the weakest correlation with LogDFSU. The correlation between the independent variable IDS and dependent variable LogDFSU is $r = .326$, $p<0.01$, which is positively correlated and significant. The correlation between the independent variable CCDS and dependent variable LogDFSU is $r = .341$, $p<0.01$, and is the most significant correlation between the independent and dependent variable. The weakest correlation is between the independent variable DCS and the dependent variable LogDFSU, which is -.078, $p>0.01$, showing a negative correlation that is not significant.

The summary of correlations between factors is displayed below:

- LogDFSU is positively correlated with IDS and CCDS
- LogDFSU has a weak negative correlation with DCS
- IDS is significantly negatively correlated with DCS and has an insignificant correlation with CCDS
- CCDS is positively correlated with CDS

4.8 Regression assumptions testing

Like any other statistical technique, regression has assumptions that should not be violated for the results to be reliable and meaningful. The results for the assumption testing are discussed below.

4.8.1 Outliers

The factors extracted from the data were tested to ensure that there were no outliers. To identify outliers, boxplots we used. Figure 4 below shows the boxplots including outliers, and Figure 6 to Figure 8 shows the boxplots after removing outliers. Furthermore, due to the outliers on factor DFSU, a log transformation was performed, and the results are shown in Figure 4: Boxplot with outliers

Source: Author, 2021

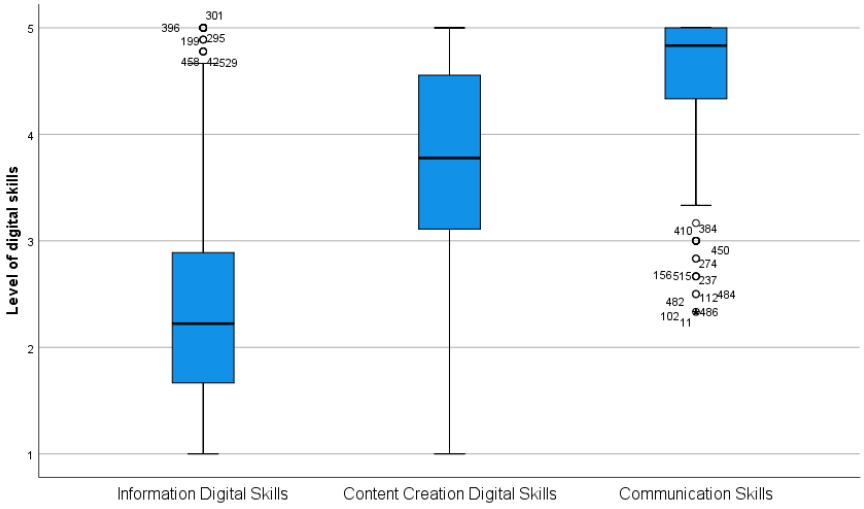


Figure 4: Boxplot with outliers

Source: Author, 2021

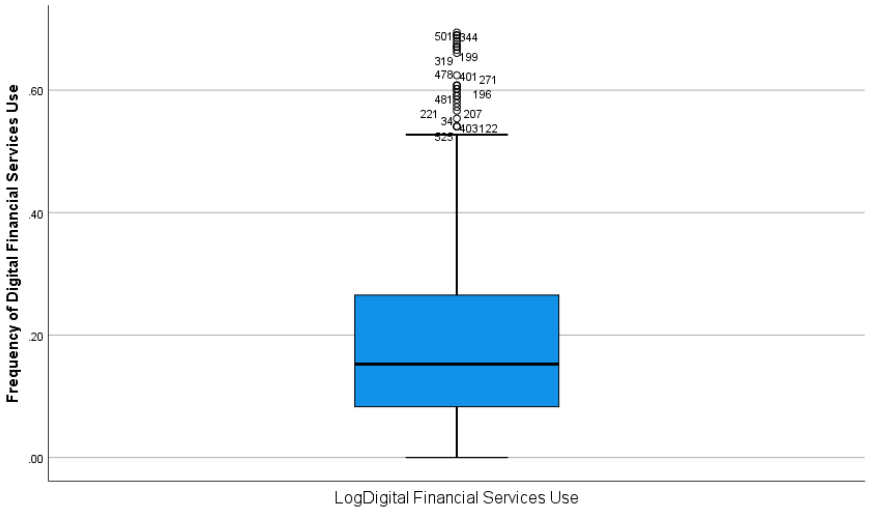


Figure 5: LogDigital financial services use with outliers

Source: Author, 2021

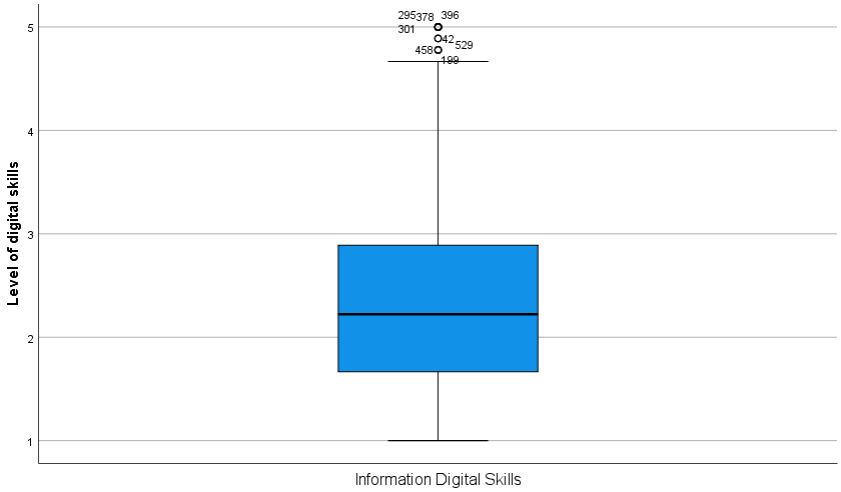


Figure 6: Information digital skills without extreme values

Source: Author, 2021

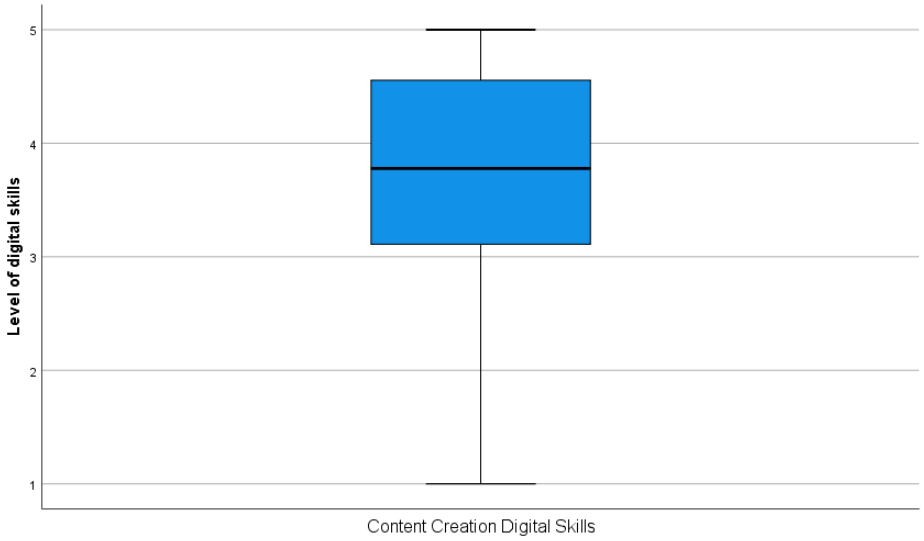


Figure 7: Content creation digital skills without extreme values

Source: Author, 2021

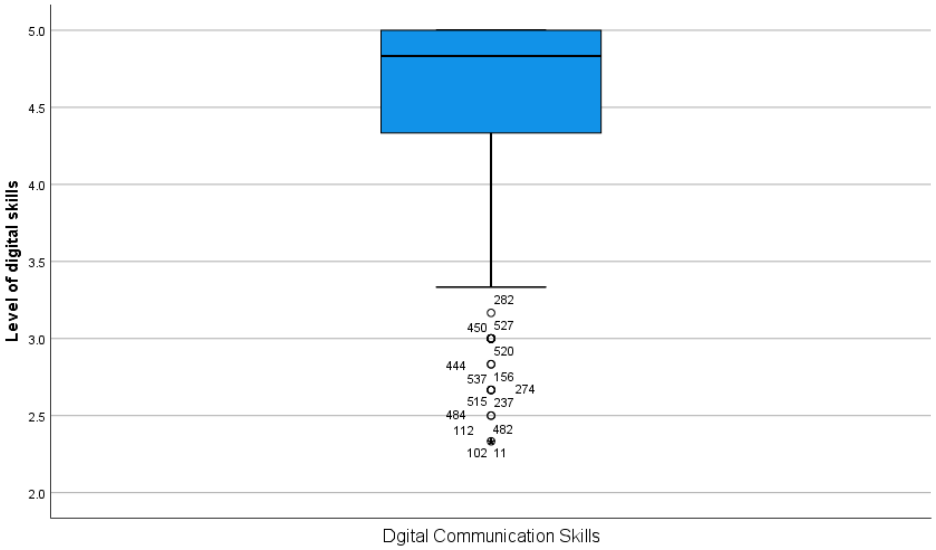


Figure 8: Communication digital skills without extreme values

Source: Author, 2021

4.8.2 Normality

In this study, graphs and descriptive statistics were used to assess the normality of the factors. Normality was assessed using skewness and kurtosis. Table 24 (see overleaf) excluded the ODS factor because the data quality was insufficient for further analysis.

Table 24: Construct normality results

Statistics

	DFSU	LogDSFU	IDS	CCDS	CDS
N Valid	541	541	541	541	541
Missing	0	0	0	0	0
Mean	1.7108	.1997	2.4052	3.7381	4.5767
Std. Error of Mean	.03412	.00682	.04305	.03858	.02412
Median	1.4211	.1526	2.2222	3.7778	4.8333
Mode	1.21[a]	.08[a]	2.00	5.00	5.00
Std. Deviation	.79353	.15861	1.00139	.89726	.56093
Skewness	**2.109**	**1.241**	**.939**	**-.512**	**-1.773**
Std. Error of Skewness	.105	.105	.105	.105	.105
Kurtosis	**4.406**	**1.008**	**.225**	**-.397**	**3.258**
Std. Error of Kurtosis	.210	.210	.210	.210	.210
Minimum	1.00	.00	1.00	1.00	2.33
Sum	925.53	108.04	1301.22	2022.33	2475.99

[a] Multiple modes exist. The smallest value is shown

DFSU=Digital Financial Use, IDS=Information Digital Skills, CCDS=Content Creation Digital Skills, ODS=Operational Digital Skills, CDS=Communication Digital Skills

Source: Author, 2021

Table 24 shows the normality results of the constructs that were used for further analysis. The results show that the constructs have skewness values close to 0 and within the recommended range that is acceptable. The DFSU factor is heavily skewed to the left, with a skewness value of 2.109 and a kurtosis value of 4.406, where the skewness value is above the cut-off value.

According to Field (2013), when there is a problematic factor, and the aim is to understand the relationships between factors, transforming only the complex variable is sufficient. For this analysis, the DFSU factor is transformed. Since DFSU is positively skewed and has a positive kurtosis, the Log transformation was used. The results show the transformed factor named LogDFSU with an improved skewness value of 1.241 and an improved kurtosis value of 1.008, close to a normal distribution and both within the cut-off values.

4.8.3 Independence of errors

The Independence of errors test assesses if the variance of the outcome variable is similar across the application of all independent variables (Field, 2013). Figure 9 below shows that the assumption of homoscedasticity is not violated.

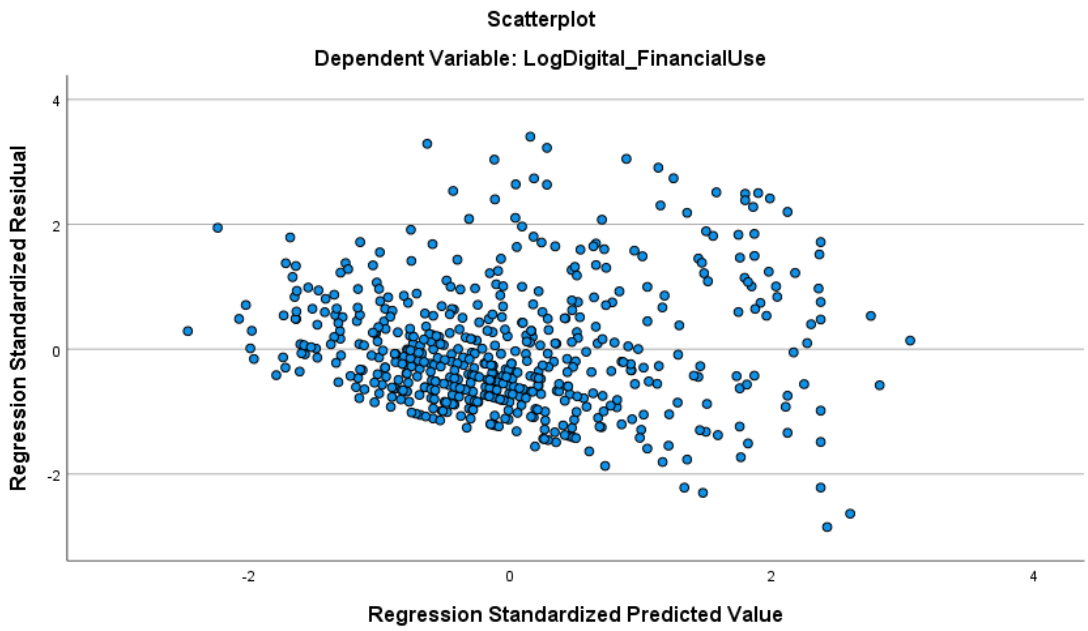


Figure 9: Scatter plot of standardised residuals against the dependent variable

Source: Author, 2021

Also, the independent errors were tested using the ZRESID and ZPRED. The P-P plot in Figure 10 (see overleaf) shows that the homoscedasticity assumption is not violated. Figure 9 above shows that the errors are normally distributed.

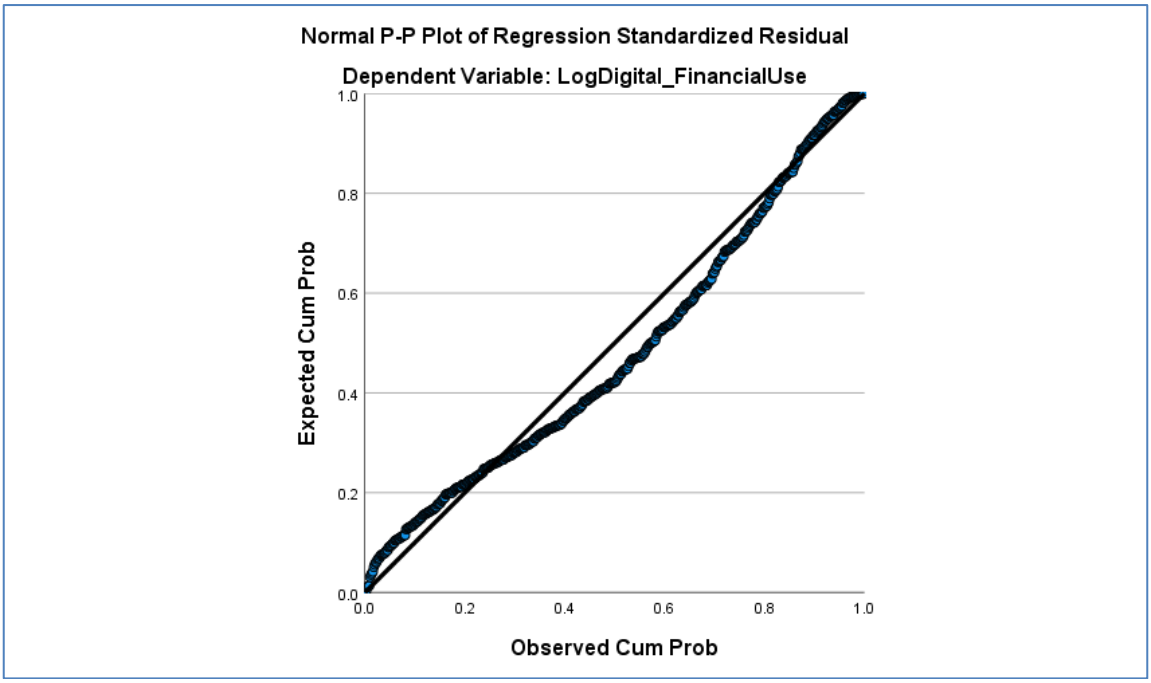


Figure 10: P-P plot – Log digital financial services use

Source: Author, 2021

4.8.4 Autocorrelation assumption testing

According to Field (2013), a model must have correlations between the standard errors. This assumption must not be violated because the standard errors' significance and confidence interval tests will be invalid. Also, the estimated independent variables will not be optimal when using least squares (Field, 2013). The Durbin-Watson test is performed to test this assumption. Table 26 below shows that the result from the Durbin-Watson test is 2.093.

4.8.5 Multicollinearity assumption testing

The correlation coefficient results in Table 23 (refer to Section 0) show no multicollinearity between the factors because all correlations are less than 0.9. The independent variables' tolerance and Variance Inflation Factor (VIF) range between .721 to .916 and 1.091 to 1.387, respectively, within the recommended ranges where tolerance must be greater than 0.2 and the VIF less than 10 (Field, 2013). Table 25 below shows the summary of tolerance and VIF.

Table 25: Collinearity statistics

Independent variables	Collinearity statistics	
	Tolerance	VIF
Content Creation Digital Skills (CCDS)	.721	1.387
Communication Digital Skills (CDS)	.756	1.323
Information Digital Skills (IDS)	.916	1.091

Source: Author, 2021

4.8.6 Linearity assumption testing

This study used Pearson's correlation to test linearity. This test aims to view the correlation between the dependent and independent variables. The linearity test is vital in regression analysis because if it fails, the tested model will be invalid (Field, 2013; Tabachnick et al., 2007). Table 23 (refer to Section 4.7) shows the Pearson correlation results. The results show linearity between the independent and dependent variables.

4.9 Hierarchical multiple regression

This section tests if the hypotheses defined are accepted or rejected by making use of hierarchical multiple regression. First, the model fit is interpreted, and then the actual hypotheses are tested.

4.9.1 Regression model fit

The relationship between the dependent and independent variables is analysed to test if the model is a good fit.

Table 26 below shows the results of the models. Model 1 shows the model results with just the control variables of education, Internet experience, gender, and age. Model 2 analyses the relationship between the dependent variable LogDFSU and the following predictor variables: CDS, IDS, and CCDS with the control variables used in Model 1.

Table 26: Hierarchical multiple regression model summary

Model summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.220[a]	.049	.041	.15531	.049	6.657	4	522	.000	
2	.505[b]	.255	.245	.13780	.207	48.016	3	519	.000	2.093

[a] Predictors: (Constant), Education, Internet_Experience, Gender, Age

[b] Predictors: (Constant), Education, Internet_Experience, Gender, Year_Born, Digital Communication_Skills, Information Digital Skills, Content Creation Digital Skills

[c] Dependent Variable: LogDigital_FinancialUse

Source: Author, 2021

Model 1 results show that the R Square is .049, which means that the control variables contribute 4.9% of the variability in DFS use. The difference between Adjusted R Square and R Square is .008. According to Field (2013), the difference is slight, which is good. This difference indicates that by surveying the whole population, there will be 0.8% less variation to the use of DFS. Furthermore, the Sig. F Change value is $p<0.05$, which indicates that Model 1 is significant, and the control variables are significant to the variability of the DFS use.

The results from Model 2 show that R Square is .255, which means that the predictor variables of CDS, IDS, and CCDS account for 25.5% of the variability of DFSU. Also, the results show that the Adjusted R Square is .245, which is very close to R square. The two values are close to a difference of 0.01. This is good because the two values are close to each other (Field, 2013). Furthermore, this result suggests that if the whole population were surveyed, there would be 1% less variation in the use of DFS. Also, using Stein's formula (Field, 2013) shown on Equation 1 below, the adjusted value is 0.245, which is close to R Square, which shows that the model's cross validity across different samples is good (Field, 2013). The value of Sig. F Change value is $p<0.05$, which indicates that Model 2 is significant.

A comparison between Model 1 and Model 2 shows that both models are significant and that the independent variables contribute significantly more than the control variable to predict the outcome. The R Square change is 20.7%, which is a large percentage of the overall model.

Equation 1: Stein's formula

$$adjusted\ R^2 = 1 - \left[\left(\frac{n-1}{n-k-1}\right)\left(\frac{n-2}{n-k-2}\right)\left(\frac{n+1}{n}\right)\right](1 - R^2)$$
$$= 1 - [(1.006)(1.006)(1.002)](0.745)$$
$$= 1 - 0.755$$
$$= 0.245$$

It is also essential to test the model to improve the dependent variable's prediction when not using the independent variables concerning the model's errors (Field, 2013). Table 27 shows the ANOVA results.

Table 27: ANOVA results

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.642	4	.161	6.657	.000[b]
	Residual	12.591	522	.024		
	Total	13.233	526			
2	Regression	3.378	7	.483	25.410	.000[c]
	Residual	9.856	519	.019		
	Total	13.233	526			

[a] Dependent Variable: LogDigital_FinancialUse

[b] Predictors: (Constant), Education, Internet_Experience, Gender, Year_Born

[c] Predictors: (Constant), Education, Internet_Experience, Gender, Year_Born, Communication_Skills, Information Digital Skills, Content Creation Digital Skills

Source: Author, 2021

Table 20 (refer to Section 4.5.4) show that both models are statistically significant, with $p<0.05$. Model 1's F-statistic is 6.657 and $p<0.05$, and Model 2's F-statistic is 25.410 and $p<0.05$. These results suggest that the regression models used significantly predict the dependent variable.

4.9.2 Beta coefficients

In addition to the model fit, the contribution of each independent variable to the model is assessed. Table 28 below shows the results of the coefficients of each independent variable to the model.

Table 28: Independent variable coefficients and descriptive statistics

Descriptive statistics

	Mean	Std. Deviation	N
LogDigital Financial Services Use (LogDFSU)	.1997	.15861	541
Information Digital Skills (IDS)	2.4052	1.00139	541
Content Creation Digital Skills (CCDS)	3.7381	.89726	541
Communication Digital Skills (CDS)	4.5767	.56093	541

Coefficients

Model		Unstandardised Coefficients		Standardised Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.181	.076		2.372	.018	.031	.331		
	Gender	-.059	.014	-.182	-4.215	.000	-.086	-.031	.983	1.017
	Year_Born	.002	.001	.115	2.329	.020	.000	.004	.750	1.334
	Internet_Experience	6.214E-5	.001	.003	.058	.954	-.002	.002	.799	1.251
	Education	-.008	.005	-.072	-1.646	.100	-.017	.002	.943	1.060
2	(Constant)	.049	.083		.592	.554	-.114	.213		
	Gender	-.017	.013	-.052	-1.293	.197	-.042	.009	.886	1.128
	Year_Born	.001	.001	.036	.815	.416	-.001	.002	.719	1.392
	Internet_Experience	.000	.001	-.019	-.447	.655	-.002	.001	.794	1.259
	Education	.001	.004	.011	.287	.774	-.007	.010	.912	1.096
	Content Creation Digital Skills	.070	.008	.397	8.900	.000	.055	.086	.721	1.387
	Digital Communication_Skills	-.052	.012	-.182	-4.186	.000	-.076	-.027	.756	1.323
	Information Digital Skills	.045	.006	.286	7.229	.000	.033	.058	.916	1.091

[a] Dependent Variable: LogDigital_FinancialUse

Source: Author, 2021

The results in Table 28 above show the coefficients of the three independent variables and control variables. Model 2 shows that the only statistically significant variables are CCDS, CDS and IDS. All the control variables are not statistically significant because $p>0.05$. Below the contribution of each independent variable is assessed.

- **Content Creation Digital Skills (CCDS):** B = 0.070 indicates that improving CCDS by one unit increases DFSU by 0.070 units. The t value is 8.900, and CCDS have the most significant impact on DFSU. Also, β = 0.397, which points out that as CCDS increases by one standard deviation,

the use of DFS increases by 0.397 standard deviations. This is only true if IDS and CDS remain constant. The results show that the standardised coefficient is 39.7% at a significance level of $p<0.05$. This shows that there is a positive influence on DFSU.

- **Information Digital Skills (IDS):** B = 0.045 indicates that the improvement of IDS by one unit increases DFSU by 0.045 units. The t value is 7.229. IDS have the second most significant impact on the use of DFS. Also, β = 0.286, the results point out that as IDS increase by a standard deviation, the use of DFS increases by 0.286 standard deviations. This is only true if the CCDS and CDS remain constant. The results show that the standardised coefficient is 28.6% at a significance level of $p<0.05$. This shows that there is a positive influence on DFSU.
- **Communication Digital Skills (CDS)**: B = -0.052 indicates that an increase in CDS by one unit will decrease DFSU by 0.052 units. The t value is -4.186, showing that CDS have the most minor and negative impact on DFSU. Also, β = -0.182, the results point out that as CDS increase by a standard deviation, the use of DFSU decreases by -0.182 standard deviations. This is only true if IDS and CCDS remain constant. The results show that the standardised coefficient is -18.2% at a significance level of $p<0.05$. This shows that there is a negative influence on DFSU.

In Table 28 above, the coefficients show that tolerance is >0.2 and VIF <10, which shows no collinearity between the independent variables.

Section 4.10 below presents the results of the hypothesis testing.

4.10 Hypothesis testing

4.10.1 Hypotheses testing approach

When performing different statistical tests, some variables identified in the literature were eliminated for the purpose of this study, and new factors emerged from the exploratory factor analysis, as mentioned in the sections above. Due to this, not all the original hypotheses were tested. Table 29 below shows the

reasons not testing other hypotheses. This is followed by the hypotheses, which were tested within this research study. The tested hypotheses are provided in Sections 4.10.2 – 4.10.5 below.

Table 29: Hypothesis changes

Original hypothesis	Reason for revising/not testing the hypotheses
H1: Operational digital skills have a positive influence on the use of DFS	Operational digital skills could not pass the validity test
H2: Formal digital skills have a positive influence on the use of DFS.	Formal digital skills items converged into other factors and some were dropped
H6: English language knowledge influences the user's h6a: operation skills, h6b: formal skills, h6c: information digital skills, h6d: content creation digital skills, and h6e: communication skills. H7: English language knowledge influences the use of DFS	The two hypotheses were revised into one hypotheses due to other factors did not pass statistical tests.

Source: Author, 2021

4.10.2 Hypothesis 3 results

H3: Information digital skills positively influence DFS use

The study tested the influence of Information Digital Skills on the use of DFS. The results in Table 28 above show that the Information Digital Skills positively influence DFS use where 1 unit of Information Digital Skills increases the use of DFS by 0.045 units. The hypothesis is supported and is significant.

4.10.3 Hypothesis 4 results

H4 Content creation digital skills positively influence DFS use

This study tested the influence of content creation digital skills on the use of DFS. The results from Table 28 above show that content creation digital skills positively influence DFS use. The results show that a unit of content creation digital skills increases DFS use by 0.070 units. The hypothesis is supported and significant.

4.10.4 Hypothesis 5 results

H5 Communication digital skills positively influence DFS use

The study tested the influence of communication digital skills on the use of financial services. The results in Table 28 above show that digital skills negatively influence the use of DFS. The results show that a one unit increase in communication digital skills decreases DFS use by 0.052 units. This hypothesis is not supported but significant and indicates that an increase in communication digital skills decreases DFS use.

4.10.5 Hypothesis 6 results

H6: English language proficiency has a positive association with H6a (content creation digital skills) and H6b (digital financial services use)

Spearman's correlation was used to test English proficiency because the variable is dichotomous (Field, 2013). The results are presented in Table 30 below.

Table 30: English proficiency correlations

Correlations

			LogDigital_Financial Services Use	English_Language
Spearman's rho	English_Language	Correlation Coefficient	-.005	
		Sig. (2-tailed)	.905	
		N	537	
	Content Creation Digital Skills	Correlation Coefficient	.360**	.090*
		Sig. (2-tailed)	.000	.037
		N	541	537

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Source: Author, 2021

Table 30 above shows a weak negative correlation between English proficiency and LogDFSU with Spearman's correlation coefficient r_s = -.005 and statistically insignificant p>0.05. The other correlation between content creation digital skills and English proficiency shows a weak positive correlation of r_s = .090, which is statistically significant at p < .05.

These results indicate that the correlation between English proficiency and LogDFSU is insignificant. However, the correlation between content creation digital skills and English proficiency is significant, but the correlation is weak. These results show that high levels of English proficiency are not directly associated with DFS use but are associated with content creation digital skills competency, even though weak.

Hypothesis 6, which stipulates that English language proficiency positively correlates with H6a content creation digital skills, is supported, and H6b digital financial services use is insignificant. The hypothesis is not supported.

4.11 Summary of results

This chapter analysed and interpreted the results of the survey. A total of 653 responses were received. After the data cleansing process (to delete missing values), 541 responses were left and used for analysis.

The results show that the survey respondents were primarily female (61.4%). Furthermore, the largest group of respondents was within the 31 – 45 age group, which make up 49.5% of the respondents. Respondents show a high level of education, with most of the respondents having post-matric education ranging from diplomas to doctoral degrees. Only 3% of the respondents did not have a matric certificate. Employed respondents represented 63.1% of the survey, with 29.5% earning less than R39 999 annually.

The survey results show that 69.8% of the respondents accessed the Internet in the age category 11 – 20 years, which corresponds with the result that most respondents are between 31 and 45 years. The results show that 52.9% of the respondents spend more than 24 hours on the Internet per week, and 95.6% have access to a smartphone. Most of the respondents access the Internet from home.

The results were further analysed using exploratory factor analysis to extract factors that are together. The data produced five factors: digital financial services use, information digital skills, content creation digital skills, operational digital skills, and communication digital skills. Reliability was tested using Cronbach's alpha, and validity was tested using discriminant validity and analysing the factor correlations. It was concluded that the data is reliable and valid for further testing.

Hierarchical multiple regression was chosen as a method to build a model for this study. Before the model could be built, the following regression assumptions were tested: outliers, normality, independent errors, autocorrelation, multicollinearity and linearity. A log transformation was applied to the DFSU factor because it failed the outlier assumption. After transformation, it was acceptable to a normal distribution. The ODS factor was dropped because it had too many outliers that could not be fixed to allow statistical tests. This approach enabled the analysis of

factors that pass statistical tests and are reliable; however, it suggests that the ODS factor needs to be reviewed in detail for this type of study. The contribution of these skills to this study is not considered and may need to be analysed in future studies to identify the operational skills required for the diverse use of the Internet. All the other regression assumptions were satisfied, and the regression models were built.

The first regression model build (Model 1) included only the control variables, namely education, age, gender and Internet experience. This model accounted for only 4.9% of the variability and is low compared to Model 2. Model 2 included the predictor variables, which contributed 20.7% of variability to the use of DFS. This indicated that the control variables' contribution to the model is not substantial compared to the digital skills factors.

Because the EFA extracts new factors, four hypotheses were developed. IDS and CCDS correlated positively with the dependent variable. The CDS correlation is negative and weak. The results accepted Hypothesis 3, Hypothesis 4 and Hypothesis 6b, while Hypothesis 5 and Hypothesis 6a were rejected.

The results are summarised in
Table 31 below and show all the hypotheses tested and the key outcomes of each.

Table 31: Hypotheses testing results summary

Hypothesis	Description	Beta/ Correlation	Significant (p<0.05)/ Insignificant	Supported/ Not Supported
H3	*Information digital skills positively influence DFS use*	B = .286	Significant (p=0.00)	Supported
H4	*Content creation digital skills positively influence DFS use*	B = .397	Significant (p=0.00)	Supported
H5	*Communication digital skills*	B = -.182	Significant	Not supported

Hypothesis	Description	Beta/ Correlation	Significant (p<0.05)/ Insignificant	Supported/ Not Supported
	positively influence DFS to use		(p=0.00)	
H6	*English language proficiency has a positive association with H6a (content creation digital skills) and H6b (digital financial services use)*	H6a: r_s = -0.005 H6b: r_s = 0.090	H6a: Insignificant (p=0.905) H6b: Significant (p=0.037)	H6a: Not supported H6b: Supported

Source: Author, 2021

The results show that IDS and CCDS influence DFS to use. However, CDS and the level of English proficiency do not have a significant influence on the use of DFS.

CHAPTER 5: DISCUSSION OF FINDINGS

5.1 Introduction

The study undertook to assess the second-level digital divide by examining the relationship between digital skills (medium-related skills and content-related skills) and the use of DFS. Furthermore, the effect of each of these skill types on DFS use was assessed. The data analysis results showed items on medium-related skills and content diverging, and converging into new factors. In this chapter, the tested hypotheses in Chapter 4 are discussed, followed by the literature and a discussion on applying these findings.

5.2 Main findings

This section discusses the findings regarding the influence of digital skills on DFS use in the South African context. Table 32 below shows the summary of the hypotheses results.

Table 32: Hypothesis results summary

Hypothesis	Description	Beta/ Correlation	Significant (p<0.05)/ Insignificant	Supported/ Not Supported
H3	*Information digital skills positively influence DFS use*	B = .286	Significant (p=0.00)	Supported
H4	*Content creation digital skills positively influence DFS use*	B = .397	Significant (p=0.00)	Supported
H5	*Communication digital skills positively influence DFS to use*	B = -.182	Significant (p=0.00)	Not supported

Hypothesis	Description	Beta/ Correlation	Significant (p<0.05)/ Insignificant	Supported/ Not Supported
H6	*English language proficiency has a positive association with H6a (content creation digital skills) and H6b (digital financial services use)*	H6a: r_s = -0.005 H6b: r_s = 0.090	H6a: Insignificant (p=0.905) H6b: Significant (p=0.037)	H6a: Not supported H6b: Supported

Source: Author, 2021

5.2.1 Information digital skills and DFS use

H3: Information digital skills positively influence DFS use

Hypothesis 3 is significant and supported. This factor is not as strong as content creation digital skills; however, it is still significant. The items that converged on this factor relate to navigating through digital platforms and finding needed information while on the digital platform. The findings indicate that information digital skills have a positive influence on the use of DFS. Consumers' ability to search, find and interpret information on the Internet impacts their use of DFS. This means that consumers who can search the Internet and identify helpful and dangerous information are more likely to use different DFS as they can assess which applications are high risk and which ones are not. When examining the relationship between information digital skills and DFS use, the results show a moderate relationship (β = 0.286) between information digital skills and DFS use.

This result shows that information digital skills have a moderate impact on DFS use. One of the reasons why the influence of information digital skills could be moderate is because of the effort that has been placed on making user interfaces on DFS user-friendly (Adama, Shehu, Adepoju, & Jimoh, 2017) and, to an extent, push users to specific information that will require less searching, filtering, and navigating through multiple screens to complete a task. This result suggests that with exemplary user interfaces, high levels of information digital skills are not required.

The findings of this study support those of A. J. Van Deursen and van Dijk (2015b), who found that information digital skills have a positive effect on Internet usage diversity. This shows that users with these skills have the capabilities to use different applications. A. J. Van Deursen (2012) found that users who lack information digital skills have challenges using the Internet for various activities. This suggests that information digital skills are essential to users. However, Helsper and Eynon (2013) found that the relationship between information digital skills and related information usages is not very strong. These studies indicate that information digital skills are essential to Internet usage even though they might not be powerful, depending on users' goals. The Causal and sequential model of access used in this study is thus supported that information internet skills influence internet usage diversity. The focus of this study was on digital financial services which is part of the internet usage diversity.

In summary, information digital skills impact DFS use. The results show that the relationship between information digital skills and DFS use is significant and moderate. This means that consumers who can search and comprehend information are more likely to use DFS than consumers who lack information digital skills.

5.2.2 Content creation digital skills and DFS use

H4: Content creation digital skills positively influence DFS use

Hypothesis 4 shows that having content creation digital skills positively influences the use of DFS use. The questionnaire items that converged for this factor show that people with this skill are active on the Internet and indicate that they might be using various digital platforms to meet their daily needs. The results in this context show that these consumers can manoeuvre the digital environment by identifying safe software applications, know how to fix problems, have some level of understanding of cyber threats, create content and publish it, and have more potential to use DFS.

This result also indicates that those individuals with high content creation digital skills in a digital environment know what is sound or potentially malicious. Furthermore, they are also confident to post their content online and know what

is appropriate. These could give them the confidence to know if a digital financial service is a scam or not and have the ability to avoid malicious transactions. It is, therefore, logical that users with this skill, even though not directly related to DFS, will have a positive relationship with the DFS as they would with other digital platforms. This result indicates that individuals that are comfortable overall in the digital environment are more likely to adopt new technologies, including DFS.

In addition, they are also confident of performing various transactions on DFS platforms. The relationship of content creation digital skills to the use of DFS is $\beta = 0.397$. This is a significant and moderate relationship and shows that content creation digital skills influence DFS use. This implies that a lack of these skills will result in little or no use of DFS. In other words, users must be comfortable with using digital platforms such as DFS.

In this study, some content-related digital skills diverged and converged into other variables; however, the finding supports the previous research conducted by A. J. Van Deursen and van Dijk (2015b), where they used a model to test the sequence of different Internet access types and Internet use. They found that content-related digital skills contribute to Internet usage. When a user has content-related digital skills, it increases the diversity of Internet applications and services use. A. J. Van Deursen and van Dijk (2015b) suggest that content creation digital skills are critical skills required for using diverse Internet applications. The study by Correa (2010) found a positive correlation between users' Internet skills and the content they produced online. These findings support this study because the activities users perform online are based on the skills they possess. On this finding the Causal and sequential model of access is supported. Users with content creation skills are able to diversify their internet usage and this is displayed by the results when it relates to digital financial services use.

In summary, the results show a relationship between content creation digital skills and DFS use. The results are significant and show a moderate relationship. This indicates that users who are comfortable operating in the Internet environment are most likely to use DFS.

5.2.3 Communication digital skills and DFS use

H5: Communication digital skills positively influence DFS use

Hypothesis 5 was not supported. The findings indicate that communication digital skills do not influence consumers' use of DFS. The communication digital skills measured in this study are the generic use of digital platforms and most social media used to communicate via the Internet. Furthermore, the findings show that the communication digital skills defined in the literature relating to sending, receiving, and interpreting messages to make decisions and perform transactions on digital platforms (A. J. Van Deursen & Van Dijk, 2014b), are not essential for the use of DFS. These skills relate to using digital communication channels such as email, social media platforms, and instant messaging to communicate with other individuals via the Internet and are not necessarily crucial for DFS use. This result is interesting because it suggests that as DFS are rolled out, digital communication platforms between the bank and customers might not have evolved much because the consumer's ability to communicate on digital platforms does not influence DFS use. In addition, this finding raises questions on the type of customer service strategy to develop for financial institutions as the "Untact" service strategy suggested by S. M. Lee and Lee (2020) might not be ready for the South African DFS market as this will not increase the use of a service. This could be because customers still prefer traditional customer service channels such as call centres, intermediary consultations, or walk-ins for raising queries and complaints with their service providers. Due to the way customers are serviced, users' communication digital skills are currently not crucial for their DFS use. Furthermore, the lack of these skills could negatively influence the use of DFS. The relationship of communication digital skills to the use of DFS is $\beta = -0.182$. The relationship is significant but weak and shows that communication digital skills influence DFS use negatively, even though weak.

Previous studies show that different users' Internet activities may result from a specific type of skill they have. Helsper and Eynon (2013) found in their study, for example, that social skills had a strong relationship with social activities online. This indicates that some online activities require specific skills. A. J. Van Deursen et al. (2014) opine that communication digital skills are essential for social

interactions in digital media, and the most advanced communication skills enable users to perform transactions and make decisions on economic activities. These studies suggest that communication skills are the most important when the main activity involves interaction with other users online and are not that essential to use DFS. The communication digital skills need to be explored further on all types of Internet uses. In addition, future studies should explore whether communication skills online need to be redefined differently for social interactions and economic and educational use.

This study and previous studies show that communication digital skills are specific to the Internet activity a user is engaging with. There are minimal user interactions when users are engaged while using DFS. The primary purpose of using these services is mainly commercial transactions and not interactions with the service providers. Hence, communication digital skills have a weak relationship with DFS use. This indicates that as much as financial institutions are developing digital services for their customers, the mode of interaction is still traditional as users with communication digital skills are not likely to use their digital services. The Causal and sequential model of access used in this study is not supported that communication skills influence internet usage. This could be related to the required digital skills to use digital financial services. Communication skills as defined in the theoretical framework do not influence digital financial services use.

5.2.4 English language proficiency, content creation digital skills and DFS use

H6: English language proficiency has a positive association with H6a (content creation digital skills) and H6b (digital financial services use)

The findings from Hypothesis 6 are mixed and not all supported. The results indicate that English language proficiency does not influence the use of DFS use but does influence content creation digital skills. These results show no correlation between English and DFS use, which suggests that a user does not require a high level of English language proficiency to use DFS; however, they may need English to improve their content creation digital skills.

The mixed results show that the relationship between English language proficiency and DFS use is weak and insignificant, where $r_s = -0.005$ and $p=0.905$. On the other hand, the relationship between English language proficiency and content creation digital skills is weak but significant where $r_s = 0.090$ and $p=0.037$. These results show that English language proficiency only positively affects content creation digital skills. This raises interesting questions about the influence of English on Internet use and its association with digital skills in South Africa. For this research, English language proficiency and DFS use could be insignificant because most respondents indicated that they have intermediate to advanced English skills, which put English as a prerequisite to who will use DFS and hence does not influence use. This could also mean that individuals might know the essential words required to perform basic transactions and that there is no need to have a good command of the language.

Considering that the respondents indicated that they have intermediate to advanced English proficiency, the results suggest that the influence of English on DFS cannot be ascertained even though DFS in South Africa are primarily offered in English. This study was conducted using English, which suggests that users know English well enough to navigate and understand the information presented to them.

There are not many studies that investigated the relationship between English language proficiency and content creation digital skills. However, studies on English proficiency and Internet use suggest that content creation is not depending much on language. Users can now produce content in their native language, especially on social media platforms (Ananiadou, McNaught, Thompson, Rehm, & Uszkoreit, 2012). This study contradicts previous studies because results indicate that English is a prerequisite for content creation digital skills. This could also be influenced by the respondents' proficiency in the language.

Previous studies about Internet usage, especially in Africa, show that English language proficiency is a barrier to Internet use as most services are in English (De Lannoy, 2018). A study byA Gillwald (2017), which investigated barriers to Internet use in some of Africa's big economies, found that users experienced the

English language as a barrier to usage because they cannot fully understand what they are writing and reading. While findings in other countries show that command of the English language is an essential factor in the use of the Internet for economic activities (Guillén & Suárez, 2005; Hargittai, 1999; Ono & Zavodny, 2007; Pearce & Rice, 2013), this study cannot ascertain the influence of English on the use of the financial services of the Internet investigated in this study. This study shows a contradiction that English language proficiency is an essential factor in using the Internet for financial services, primarily in countries where English is not the first language. The findings of Hypothesis 6b are unsupported. English is not associated with the use of financial services on the Internet.

These findings raised two issues when it comes to English proficiency in the South African context. First, English language proficiency influences content creation digital skills even though the relationship is weak. The second finding is that English proficiency is not significant for DFS use even though most services are offered in English. English, however, has no influence on consumers who understand the English language to create content online when using DFS. Furthermore, it could be that there were more respondents with high levels of English proficiency than those with a weak command of the language.

5.3 Conclusion

In this chapter, the research findings were discussed and contrasted with existing literature. Each hypothesis was discussed in detail, previous literature was analysed to link with this study's results, and lastly, possible practical implications of the results were given. The results showed that digital content creation digital skills, information digital skills, and English language proficiency significantly correlate with DFS use. In addition, communication digital skills did not have much of an impact on DFS use. Also, the relationship between English language proficiency and digital content creation digital skills was insignificant. The following chapter concludes the study by discussing the objectives, contributions, recommendations, limitations, and future research.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This study aimed to assess the second digital divide in DFS. This was achieved by investigating the influence of various digital skills on the use of DFS.

This chapter concludes the research undertaken by summarising the main findings from the research and discussing the implications to management, policymakers, and academics. Finally, the chapter concludes by highlighting the limitations of the research and providing recommendations for future research.

6.2 Summary of main findings

This study adapted existing theories in an attempt to meet the research objectives. The Casual and Sequential Model of Access and the Uses and Gratifications Theory were used to define the conceptual model. These models identified digital skills as independent variables and the use of DFS as the dependent variable. Some of the factors were dropped during the statistical tests, and not all hypotheses were tested. (refer to Chapter 5, Section 5.2) shows the results from the tested hypotheses. Not all hypotheses were supported. The unsupported hypothesis results show that communication skills negatively influence DFS use, and the influence of English language proficiency on DFS use also proved to be negative. The communication skills tested were generic but related to communicating in the Internet environment, which was used to test its ability to influence DFS. The results show that this factor has a weak negative influence on DFS, indicating that increased communication skills decrease DFS use. This finding requires further exploration to understand which basic communication skills are required to use DFS and investigate whether the communication skills are unique to specific uses of the Internet.

The influence of the English language on DFS was not supported. This was an exciting finding as it contradicts previous studies. This result could be attributed to the fact that the respondent's English proficiency was intermediate to high.

However, these aspects need to be explored further by focusing on users with different levels of English proficiency across diverse everyday uses of the Internet. This would enable us to understand its influence, especially in a South African context where English is not the most spoken language despite it being the business language of choice.

The hypotheses that were supported were H3, H4, and H6b. The results show that content creation digital skills and information digital skills influence the use of DFS. In addition, English proficiency was found to influence the use of content creation digital skills. The most substantial influence was on content creation digital skills, and the weakest was information digital skills.

The influence of content creation digital skills on DFS use suggests that users who are comfortable using digital platforms are most likely to use DFS as it acts as a digital platform that serves users' needs.

The information digital skills results are interesting because they proved to be weaker than the supported hypothesis. The results suggest that the ability to navigate, search for and interpret information using the Internet influences DFS use. This may need to be explored further because there is an effort to make user interfaces of these financial services platforms more user-friendly, which might lower the requirement to have high levels of information digital skills.

English proficiency is associated with content creation digital skills. This finding suggests that English influences the basic use of digital platforms in a South African context and creates and publishes content. The association between content creation and English was not strong; however, it indicates that respondents are comfortable creating content on digital platforms; however, some level of English proficiency is required.

Using regression analysis, the independent factors used in this study contributed directly to DFS use. Content creation digital skills and information digital skills were the most significant contributors to DFS use. This indicates that users who develop these skills are more likely to use DFS.

6.3 Implications to academics

There is a vast amount of research on digital divides worldwide, especially in Europe and the USA; however, not much research has been conducted in South Africa. In addition, research on the digital divide has focused on the general use of the Internet and not on its specific use. This study contributes to the literature on the digital divide, especially in South Africa and DFS literature, as DFS use and its relation to the digital divide has previously not been investigated. Furthermore, the study contributes to the existing body of knowledge by using empirical data for different digital skills required for DFS use in South Africa.

In previous Internet studies, it has been found that English proficiency influences Internet use while utilising specific Internet applications; however, the influence was not significant. This study focused on DFS use, and the findings contradict that of previous studies. This is an interesting finding considering that English is not the first language in South Africa despite English being the business language used on the Internet. This informs academia that they need to explore this factor further by testing the influence of English proficiency on different Internet uses. This could assist in understanding the influence of language on the use of Internet applications and its contribution to the digital divide, especially in countries where English is not the first language but is the preferred business language.

This study contributes to the digital economy body of knowledge by highlighting that there must be a focus on specific uses of the Internet and that different divides depend on use. The framework used in this study forms a basis to address the “digital financial divide”. It can be used in other contexts as it has been tested for reliability and validity. This framework can be extended to include other factors contributing to financial services use, such as financial literacy. Also, the framework can be broken down by focusing on specific sectors that grow rapidly, such as Insurtech (Wilamowicz, 2019).

6.4 The implication to the financial services industry

As investors pour money into innovations in the financial services industry, they must understand that not all consumers will use their services. The barriers of

digital consumer skills must be taken into consideration when designing interfaces for DFS. The implications are discussed below.

The digital skills that mainly contributed to digital financial use were content creation digital skills, and information digital skills. The first implication to DFS is on the consumer persona they must attract and convert to use their services. To increase their customer base, the influence of content creation digital skills on DFS use indicates that financial institutions' customer acquisition strategy must focus on attracting users who have low content creation digital skills. For example, these users could have the internet but are not comfortable around the Internet environment, do not know how to create content, and are generally uninterested in the Internet. This strategy could increase the customer base and the use of digital platforms.

Information digital skills also influence DFS use. Financial institutions must focus on user interface designs by making them user-friendly and easy to find and interpret the information presented to them. In addition, the strategy on user interface design must push users to pages where they need to execute. When information is easy to find and use, users with low information digital skills will use DFS. To increase the use of DFS, user interfaces must be intuitive to attract users with inadequate information digital skills.

English proficiency was found not to influence use. However, organisations may need to think about using multilingual interfaces on their platforms to cater to South Africa's language diversity.

6.5 Implications to policymakers

According to Lukonga (2018), DFS have the potential to improve financial inclusion. If this is true, the government must be aware of what is driving their use. In this study, digital skills contributed to the use of DFS. This indicates that citizens must be equipped with basic Internet skills to use and benefit from using DFS. Government must develop a policy that will equip at least high school students with information digital skills, content creation digital skills and communication skills. In addition, policymakers must focus on interventions that

can develop these skills for generations born between 1940 and 1994. The most critical generation is those born between 1970 and 1994 because they are active in the economy but did not grow up using technology and are the most disadvantaged when using the Internet.

6.6 Research limitations

The study focused on all retail DFS defined in the literature. This limits in-depth analysis of a specific sector and the digital divide in that sector. Because of this study's South African context, it may not yield the same results in other African countries or BRICS (Brazil, Russia, India, China, and South Africa) countries. For example, China is advanced in its DFS, which is different from South Africa even though it is still classified as an emerging economy. This study used an online survey to collect data, which might have created challenges for respondents who could not ask questions they did not understand. A quantitative study was suitable for this study but is limited because users cannot be asked why they gave the answers.

6.7 Future research

Future research must close the gap in the limitations identified in this study and extend a similar study to other countries with a similar socio-economic profile as South Africa. The use of the Internet for different activities is fluid. Despite Helsper and Eynon (2013) suggesting that skills and the use of one activity may influence others, future researchers should assess if digital skills for different applications are similar or each use requires "specific Internet skills" and application-based skills. Rozkrut and Rozkrut (2019) propose specific skills that users must have to use DFS. This needs to be explored further to understand if specific digital skills are required for different Internet applications, or generic digital skills for everyday use are adequate. In addition, other factors such as financial literacy that influences financial services use must be investigated as part of understanding DFS use.

The determinants of the second-level digital divide must be investigated to understand better the exogenous factors that influence the digital divide. In addition, comparative research must be conducted on socio-demographic factors, for example, a study of the digital divide between individuals in different socio-economic statuses. Researchers must also move away from the general use of the Internet and focus on specific uses to better understand why there is a divide in that particular use, for example, investigating the use of the Internet for economic activities only. Around the world, there is sparse research on the third-level digital divide. Consequently, future research can explore this by investigating the outcomes of using DFS, which, in turn, can also lead to investigating the influence of DFS on financial inclusion. Lastly, future research should also conduct qualitative research to understand the digital divide in DFS use.

REFERENCES

Absa. (2018a). *2018 Integrated Report*. Retrieved from http://absa2018ar.africa/pdf/Absa_Group_2018_Integrated_Report.pdf

Absa. (2018b). Absa customers embrace ChatBanking on WhatsApp [Press release]. Retrieved from https://www.absa.co.za/media-centre/press-statements/2018/absa-customers-embrace-chatbanking-on-whatsapp/

Adama, V. N., Shehu, I. S., Adepoju, S. A., & Jimoh, R. G. (2017). *Towards designing mobile banking user interfaces for novice users.* Paper presented at the International Conference of Design, User Experience, and Usability.

Adler, E. S., & Clark, R. (2014). *An invitation to social research: How it's done*: Nelson Education.

Agwu, E., & Carter, A.-L. (2014). Mobile phone banking in Nigeria: benefits, problems and prospects. *International Journal of Business and Commerce, 3*(6), 50-70.

Agwu, M. (2020). Can technology bridge the gap between rural development and financial inclusions? *Technology Analysis & Strategic Management*, 1-11.

Ain, N., Kaur, K., & Waheed, M. (2016). The influence of learning value on learning management system use: An extension of UTAUT2. *Information Development, 32*(5), 1306-1321.

Aliyu, A. A., Bello, M. U., Kasim, R., & Martin, D. (2014). Positivist and non-positivist paradigm in social science research: Conflicting paradigms or perfect partners. *J. Mgmt. & Sustainability, 4*, 79.

Ananiadou, S., McNaught, J., Thompson, P., Rehm, G., & Uszkoreit, H. (2012). *The English language in the digital age*: Springer.

Anonymous. (2015). The Fintech revolution: A wave of startups is changing finance—For the better. *The Economist*.

ARDÉ, A. (2019). Putting robo advisers to the test - Digital advice is easy to access. Retrieved from https://www.sowetanlive.co.za/business/money/2019-11-01-robo-advisers-to-the-test/

Arner, D. W., Barberis, J., & Buckley, R. P. (2015). The evolution of Fintech: A new post-crisis paradigm. *Geo. J. Int'l L., 47*, 1271.

Babuna, P., Yang, X., Gyilbag, A., Awudi, D. A., Ngmenbelle, D., & Bian, D. (2020). The impact of Covid-19 on the insurance industry. *International journal of environmental research and public health, 17*(16), 5766.

Baicu, C. G., Gârdan, I. P., Gârdan, D. A., & Epuran, G. (2020). The impact of COVID-19 on consumer behavior in retail banking. Evidence from Romania. *Management & Marketing, 15*.

Bajpai, S., & Bajpai, R. (2014). Goodness of measurement: Reliability and validity. *International Journal of Medical Science and Public Health, 3*(2), 112-115.

BANKSETA. (2020). *Sector Skills Plan 2020 -2025: ENABLING SKILLS DEVELOPMENT IN THE BANKING AND ALTERNATIVE BANKING SECTOR*. Retrieved from

Begum, M. F. (2018). An Overview of Digital Financial Services in India: Concept, Initiatives and Advantages. *Asian Journal of Management, 9*(3), 1139-1144.

Blank, G. (2013). WHO CREATES CONTENT? *Information, Communication & Society, 16*(4), 590-612. doi:10.1080/1369118X.2013.777758

Blank, G., & Groselj, D. (2014). Dimensions of Internet use: amount, variety, and types. *Information, Communication & Society, 17*(4), 417-435.

Blank, G., & Groselj, D. (2015). Digital Divide| Examining Internet Use Through a Weberian Lens. *International Journal of Communication, 9*, 21.

Blank, G., & Reisdorf, B. C. (2012). THE PARTICIPATORY WEB. *Information, Communication & Society, 15*(4), 537-554. doi:10.1080/1369118X.2012.665935

Blignaut, P. (2009). A bilateral perspective on the digital divide in South Africa. *Perspectives on Global Development and Technology, 8*(4), 581-601.

Bornman, E. (2016). Information society and digital divide in South Africa: results of longitudinal surveys. *Information, Communication & Society, 19*(2), 264-278.

Brandtweiner, R., Donat, E., & Kerschbaum, J. (2010). How to become a sophisticated user: a two-dimensional approach to e-literacy. *New media & society, 12*(5), 813-833.

Brandtzæg, P. B., Heim, J., & Karahasanović, A. (2011). Understanding the new digital divide—A typology of Internet users in Europe. *International Journal of Human-Computer Studies, 69*(3), 123-138.

Brown, I., & Jayakody, R. (2008). B2C e-commerce success: A test and validation of a revised conceptual model. *The Electronic Journal Information Systems Evaluation, 11*(3), 167-184.

Brown, I., & Licker, P. (2003). Exploring differences in internet adoption and usage between historically advantaged and disadvantaged groups in South Africa. *Journal of Global Information Technology Management, 6*(4), 6-26.

Büchi, M., Just, N., & Latzer, M. (2016). Modeling the second-level digital divide: A five-country study of social differences in Internet use. *New media & society, 18*(11), 2703-2722.

Buckley, R. P., & Malady, L. (2015). Building consumer demand for digital financial services–the new regulatory frontier. *Journal of Financial Perspectives, 3*(3).

Burns, S. (2018). M-Pesa and the 'market-led'approach to financial inclusion. *Economic Affairs, 38*(3), 406-421.

BusinessTech. (2018). Is Capitec now the biggest bank in South Africa? Retrieved from https://businesstech.co.za/news/banking/269891/is-capitec-now-the-biggest-bank-in-south-africa/

BusinesTech. (2019). Battle of the banks: South Africa's big 5 banks compared. Retrieved from https://businesstech.co.za/news/banking/339319/battle-of-the-banks-south-africas-big-5-banks-compared/

Capitec. (2019). *Integrated Annual Report 2019*. Retrieved from South Africa: https://www.capitecbank.co.za/globalassets/pages/investor-relations/financial-results/2019/annual-report/integrated_annual_report_2019.pdf

Chan, Y. (2003). Biostatistics 101: data presentation. *Singapore medical journal, 44*(6), 280-285.

Chen, M. A., Wu, Q., & Yang, B. (2019). How valuable is FinTech innovation? *The Review of Financial Studies, 32*(5), 2062-2106.

Chetty, K., Aneja, U., Mishra, V., Gcora, N., & Josie, J. (2018). Bridging the digital divide in the G20: skills for the new age. *Economics: The Open-Access, Open-Assessment E-Journal, 12*(2018-24), 1-20.

Chinn, M. D., & Fairlie, R. W. (2007). The determinants of the global digital divide: a cross-country analysis of computer and internet penetration. *Oxford Economic Papers, 59*(1), 16-44. doi:10.1093/oep/gpl024

Chong, A. Y. L., Ooi, K. B., Lin, B., & Tan, B. I. (2010). Online banking adoption: an empirical analysis. *International Journal of Bank Marketing*.

CIA. (2021). The World Fact Book 2021. Retrieved from https://www.cia.gov/the-world-factbook/countries/south-africa/

Citi, G. (2016). Digital disruption: how FinTech is forcing banking to a tipping point. *Global Perspectives and Solutions*.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2013). *Applied multiple regression/correlation analysis for the behavioral sciences*: Routledge.

Comrey, A., & Lee, H. (1992). Interpretation and application of factor analytic results. *Comrey AL, Lee HB. A first course in factor analysis, 2*, 1992.

Cooper, D., & Schindler, P. (2011). Qualitative research. *Business research methods, 4*(1), 160-182.

Cooper, D. R., Schindler, P. S., & Sun, J. (2006). *Business research methods* (Vol. 9): Mcgraw-hill New York.

Correa, T. (2010). The participation divide among “online experts”: Experience, skills and psychological factors as predictors of college students' web content creation. *Journal of Computer-Mediated Communication, 16*(1), 71-92.

Costello, A. B., & Osborne, J. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical assessment, research, and evaluation, 10*(1), 7.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*: Sage publications.

Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological methods, 1*(1), 16.

De Haan, J. (2004). A multifaceted dynamic model of the digital divide. *It & Society, 1*(7), 66-88.

De Lannoy, A. (2018). Youth, Deprivation and the Internet in Africa.

Deursen, A. J. A. M. v., & van Dijk, J. A. G. M. (2010). Measuring Internet Skills. *International Journal of Human–Computer Interaction, 26*(10), 891-916. doi:10.1080/10447318.2010.496338

Di Castri, S., & Gidvani, L. (2014). Enabling Mobile Money Policies in Tanzania: A'Test and Learn'Approach to Enabling Market-Led Digital Financial Services. *Available at SSRN 2425340*.

Discovery. (2020). *DISCOVERY INTEGRATED ANNUAL REPORT 2020*. Retrieved from https://www.discovery.co.za/assets/discoverycoza/corporate/investor-relations/2020/integrated-annual-report-2020.pdf

Dodel, M., & Mesch, G. (2018). Inequality in digital skills and the adoption of online safety behaviors. *Information, Communication & Society, 21*(5), 712-728.

Drost, E. A. (2011). Validity and reliability in social science research. *Education Research and perspectives, 38*(1), 105.

Du Preez, P., & Le Grange, L. (2020). The COVID-19 pandemic, online teaching/learning, the digital divide and epistemological access. *Unpublished paper*.

Dupas, P., & Robinson, J. (2013). Savings constraints and microenterprise development: Evidence from a field experiment in Kenya. *American Economic Journal: Applied Economics, 5*(1), 163-192.

Durndell, A., & Haag, Z. (2002). Computer self efficacy, computer anxiety, attitudes towards the Internet and reported experience with the Internet, by gender, in an East European sample. *Computers in Human Behavior, 18*(5), 521-535.

Dutton, W. H., & Reisdorf, B. C. (2019). Cultural divides and digital inequalities: attitudes shaping Internet and social media divides. *Information, Communication & Society, 22*(1), 18-38.

Fang, B., & Zhang, P. (2016). Big data in finance. In *Big data concepts, theories, and applications* (pp. 391-412): Springer.

Ferrari, A. (2012). Digital competence in practice: An analysis of frameworks. *Sevilla: JRC IPTS.(DOI: 10.2791/82116)*.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*: sage.

Firstrand. (2019). *annual report for the year ended 30 June*. Retrieved from https://www.firstrand.co.za/media/investors/annual-reporting/firstrand-annual-integrated-report-2019.pdf

Fisher, B. A. (1978). Perspectives On Human Communication. In (pp. 0-0).

Fowler Jr, F. J. (2013). *Survey research methods*: Sage publications.

FSB. (2017). *FSB Annual Report 2017*. Retrieved from

Fuchs, C., & Horak, E. (2008). Africa and the digital divide. *Telematics and informatics, 25*(2), 99-116.

Gai, K., Qiu, M., & Sun, X. (2018). A survey on FinTech. *Journal of Network and Computer Applications, 103*, 262-273.

Galperin, H. (2017). Why are half of Latin Americans not online? A four-country study of reasons for Internet non-adoption. *International Journal of Communication, 11*, 23.

Genesis. (2019). Fintech Scoping in South Africa [Press release]. Retrieved from https://www.masthead.co.za/wp-content/uploads/2020/01/2020_02_04_Fintech-Scoping-in-South-Africa.pdf

Ghobadi, S., & Ghobadi, Z. (2015). How access gaps interact and shape digital divide: a cognitive investigation. *Behaviour & Information Technology, 34*(4), 330-340. doi:10.1080/0144929X.2013.833650

Giebel, M. (2013). Digital divide, knowledge and innovations. *Journal of Information, Information Technology, and Organizations, 8*, 1-24.

Gillwald, A. (2017). Internet use barriers and user strategies: perspectives from Kenya, Nigeria, South Africa and Rwanda. *New York: Mozilla Foundation*.

Gillwald, A. (2018). *Measuring digital inequality in SA*. Retrieved from South Africa: researchICTafrica.net

Glasow, P. A. (2005). Fundamentals of survey research methodology. *Retrieved January, 18*, 2013.

Goldstein, I., Jiang, W., & Karolyi, G. A. (2019). To FinTech and beyond. *The Review of Financial Studies, 32*(5), 1647-1661.

Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of Management Information Systems, 35*(1), 220-265.

Gomber, P., Koch, J.-A., & Siering, M. (2017). Digital Finance and FinTech: current research and future research directions. *Journal of Business Economics, 87*(5), 537-580.

Gong, Y., & Janssen, M. (2015). Demystifying the benefits and risks of Lean service innovation: a banking case study. *Journal of Systems and Information Technology, 17*(4), 364-380. doi:10.1108/JSIT-03-2015-0019

Guadamuz, A. (2004). PayPal: The Legal Status of P2P Payment Systems.

Gudmundsdottir, G. (2010). From digital divide to digital equity: Learners' ICT competence in four primary schools in Cape Town, South Africa. *International Journal of Education and Development Using ICT, 6*(2), 84-105.

Guillén, M. F., & Suárez, S. L. (2005). Explaining the global digital divide: Economic, political and sociological drivers of cross-national Internet use. *Social forces, 84*(2), 681-708.

Gunkel, D. J. (2003). Second thoughts: toward a critique of the digital divide. *New media & society, 5*(4), 499-522.

Haffner, J. (2017). *Critical infrastructures, critical geographies : Towards a spatial theory of the digital divide*.

Haight, M., Quan-Haase, A., & Corbett, B. A. (2014). Revisiting the digital divide in Canada: The impact of demographic factors on access to the internet, level of online activity, and social networking site usage. *Information, Communication & Society, 17*(4), 503-519.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis: Pearson new international edition*.

Hargittai, E. (1999). Weaving the Western Web: Explaining differences in Internet connectivity among OECD countries. *Telecommunications Policy, 23*(10-11), 701-718.

Hargittai, E. (2001). Second-level digital divide: Mapping differences in people's online skills. *arXiv preprint cs/0109068*.

Hargittai, E., & Dobransky, K. (2017). Old Dogs, New Clicks: Digital Inequality in Skills and Uses among Older Adults. *Canadian Journal of Communication, 42*(2).

Hargittai, E., & Litt, E. (2011). The tweet smell of celebrity success: Explaining variation in Twitter adoption among a diverse group of young adults. *New media & society, 13*(5), 824-842.

Hasan, M. M., Yajuan, L., & Khan, S. (2020). Promoting China's inclusive finance through digital financial services. *Global Business Review*, 0972150919895348.

Hau, H., Huang, Y., Shan, H., & Sheng, Z. (2018). Fintech credit, financial inclusion and entrepreneurial growth. *Unpublished working paper*.

Heinonen, K. (2011). Consumer activity in social media: Managerial approaches to consumers' social media behavior. *Journal of Consumer Behaviour, 10*(6), 356-364.

Helsper, E. J. (2012). A corresponding fields model for the links between social and digital exclusion. *Communication theory, 22*(4), 403-426.

Helsper, E. J., & Eynon, R. (2013). Distinct skill pathways to digital engagement. *European Journal of communication, 28*(6), 696-713.

Helsper, E. J., & Reisdorf, B. C. (2017). The emergence of a "digital underclass" in Great Britain and Sweden: Changing reasons for digital exclusion. *New media & society, 19*(8), 1253-1270.

Helsper, E. J., Van Deursen, A., & Eynon, R. (2016). Measuring types of Internet use. *From Digital Skills to Tangible Outcomes project report. Oxford: London School of Economics, University of Twente, Oxford Internet Institute. Retrieved July, 25*, 2016.

Helsper, E. J., Van Deursen, A. J., & Eynon, R. (2015). Tangible outcomes of Internet use: from digital skills to tangible outcomes project report.

Hobbs, R. (2010). *Digital and Media Literacy: A Plan of Action. A White Paper on the Digital and Media Literacy Recommendations of the Knight Commission on the Information Needs of Communities in a Democracy*: ERIC.

Horrigan, J. B. (2019). Reaching the Unconnected: Benefits for kids and schoolwork drive broadband subscriptions, but digital skills training opens doors to household internet use for jobs and learning. *Technology Policy*

Institute(Aug. 2019), https://techpolicyinstitute. org/wpcontent/uploads/2019/08/Horrigan_Reaching-the-Unconnected. pdf.

ICASA. (2019). *The state of the ICT sector report in South Africa*. Retrieved from South Africa:

ITU. (2017). *Individuals using the Internet (% of population) - South Africa*.

ITU. (2020). *ITU Regional Global Key ICT Indicator Aggregates*. Retrieved from https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

Johnson, J. (2021). Most common languages used on the internet 2020. Retrieved from https://www.statista.com/statistics/262946/share-of-the-most-common-languages-on-the-internet/

Jung, D., Dorner, V., Glaser, F., & Morana, S. (2018). Robo-advisory. *Business & Information Systems Engineering, 60*(1), 81-86.

Kalmus, V., Realo, A., & Siibak, A. (2011). Motives for Internet use and their relationships with personality traits and socio-demographic factors. *Trames: A Journal of the Humanities and Social Sciences, 15*(4), 385.

Karanasios, S. (2007). Ecuador, the digital divide and small tourism enterprises. *Journal of Law and Governance, 2*(3).

Karlan, D., Kendall, J., Mann, R., Pande, R., Suri, T., & Zinman, J. (2016). *Research and impacts of digital financial services*. Retrieved from

Katz, E. (1974). Utilization of mass communication by the individual. *The uses of mass communications: Current perspectives on gratifications research*, 19-32.

Kayahara, J., & Wellman, B. (2007). Searching for culture—high and low. *Journal of Computer-Mediated Communication, 12*(3), 824-845.

Ketelaar, P. E., & van der Laan, M. (2009). Uses and gratifications approach to marketing communications: How te serve the interests of all stakeholder groups.

Ketterer, H., Himmelreich, H., & Schmid, C. (2016). Ensuring digital readiness in financial services.[online] BCG Perspectives. In.

Khan, I. U., Hameed, Z., & Khan, S. U. (2017). Understanding online banking adoption in a developing country: UTAUT2 with cultural moderators. *Journal of Global Information Management (JGIM), 25*(1), 43-65.

Klapper, J. T. (1963). Mass communication research: An old road resurveyed. *Public Opinion Quarterly, 27*(4), 515-527.

Krumsvik, R. J. (2014). Teacher educators' digital competence. *Scandinavian Journal of Educational Research, 58*(3), 269-280.

Ku, Y.-C., Chu, T.-H., & Tseng, C.-H. (2013). Gratifications for using CMC technologies: A comparison among SNS, IM, and e-mail. *Computers in Human Behavior, 29*(1), 226-234.

LaRose, R., Mastro, D., & Eastin, M. S. (2001). Understanding Internet usage: A social-cognitive approach to uses and gratifications. *Social science computer review, 19*(4), 395-413.

Le Roux, C., & Evans, N. (2011). Can cloud computing bridge the digital divide in South African secondary education? *Information Development, 27*(2), 109-116.

Leavy, P. (2017). *Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches*: Guilford Publications.

Lee, I., & Lee, K. (2015). The Internet of Things (IoT): Applications, investments, and challenges for enterprises. *Business Horizons, 58*(4), 431-440.

Lee, I., & Shin, Y. J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. *Business Horizons, 61*(1), 35-46.

Lee, S. M., & Lee, D. (2020). "Untact": a new customer service strategy in the digital age. *Service Business, 14*(1), 1-22.

Lehohla, P. (2017). Education series volume III: Educational enrolment and achievement, 2016.

Lin, H.-F. (2011). An empirical investigation of mobile banking adoption: The effect of innovation attributes and knowledge-based trust. *International Journal of Information Management, 31*(3), 252-260.

Lin, H.-F. (2013). Determining the relative importance of mobile banking quality factors. *Computer Standards & Interfaces, 35*(2), 195-204.

Luarn, P., & Lin, H.-H. (2005). Toward an understanding of the behavioral intention to use mobile banking. *Computers in Human Behavior, 21*(6), 873-891.

Lukonga, M. I. (2018). Fintech, inclusive growth and cyber risks: focus on the MENAP and CCA regions.

Malanee Hutton;Trushall Bhana;Stuart Allen;Ubaid Nursoo. (2019). *The SA Fintech In Motion Report*. Retrieved from https://www.rmb.co.za/files/pdf/other/fintech-report.pdf

Malinga, S. (2019). Nedbank notches up 1.7m digitally active customers. Retrieved from https://www.itweb.co.za/content/P3gQ2qGXzRmvnRD1

Medlock, S., Eslami, S., Askari, M., Arts, D. L., Sent, D., De Rooij, S. E., & Abu-Hanna, A. (2015). Health information–seeking behavior of seniors who use the internet: a survey. *Journal of medical Internet research, 17*(1), e10.

Mesch, G. S., & Talmud, I. (2011). Ethnic differences in Internet access: The role of occupation and exposure. *Information, Communication & Society, 14*(4), 445-471.

Mihelj, S., Leguina, A., & Downey, J. (2019). Culture is digital: Cultural participation, diversity and the digital divide. *New media & society, 21*(7), 1465-1485.

Min, S.-J. (2010). From the digital divide to the democratic divide: Internet skills, political interest, and the second-level digital divide in political internet use. *Journal of Information Technology & Politics, 7*(1), 22-35.

Minghetti, V., & Buhalis, D. (2010). Digital divide in tourism. *Journal of Travel Research, 49*(3), 267-281.

Mohajan, H. K. (2017). Two criteria for good measurements in research: Validity and reliability. *Annals of Spiru Haret University. Economic Series, 17*(4), 59-82.

Musabegovic, I., Özer, M., Djukovic, S., & Jovanovic, S. (2019). Influence of financial technology (FinTech) on financial industry. *Економика пољопривреде, 66*(4).

Muthiora, B. (2015). Enabling mobile money policies in Kenya: Fostering a digital financial revolution. *GSMA Mobile Money for the Unbanked*.

Myo, S. T. K., & Hwang, G.-H. (2017). Effect of Mobile Devices on the Use Intention and Use of Mobile Banking Service in Myanmar. *Journal of Digital Convergence, 15*(6), 71-82.

Naidoo, S., & Raju, J. (2012). Impact of the digital divide on information literacy training in a higher education context. *South African Journal of Libraries and Information Science, 78*(1), 34-44.

Nardi, P. M. (2015). *Doing survey research*: Routledge.

Navaretti, G. B., Calzolari, G., Mansilla-Fernandez, J. M., & Pozzolo, A. F. (2018). Fintech and Banking. Friends or Foes? *Friends or Foes*.

Nedbank. (2019). *INTEGRATED REPORT FOR THE YEAR ENDED 31 DECEMBER 2019*. Retrieved from https://www.nedbank.co.za/content/dam/nedbank/site-assets/AboutUs/Information%20Hub/Integrated%20Report/2019/2019%20Nedbank%20Group%20Integrated%20Report%20(High-res)%20(C).pdf

Niehaves, B., & Plattfaut, R. (2014). Internet adoption by the elderly: employing IS technology acceptance theories for understanding the age-related digital divide. *European Journal of Information Systems, 23*(6), 708-726.

Norris, P. (2001). *Digital divide: Civic engagement, information poverty, and the Internet worldwide*: Cambridge university press.

NTIA. (1999). *Falling Through the Net: Defining the Digital Divide* (3). Retrieved from USA: https://www.ntia.doc.gov/report/1999/falling-through-net-defining-digital-divide

Nyahodza, L., & Higgs, R. (2017). Towards bridging the digital divide in post-apartheid South Africa: a case of a historically disadvantaged university in Cape Town. *South African Journal of Libraries and Information Science, 83*(1), 39-48.

O'Donohoe, S. (1994). Advertising uses and gratifications. *European Journal of Marketing, 28*(8-9), 52-75.

OECD, D. (2001). Understanding the digital divide. *Paris: Organization for Economic Cooperation and Development*.

Old Mutual. (2020). *OLD MUTUAL LIMITED INTEGRATED REPORT 2020*. Retrieved from https://www.oldmutual.com/v3/assets/blt566c98aeecc1c18b/blt33229052e0be04bb/607d830813f73c4f7972eaef/2020_Integrated_Report.pdf

Ono, H., & Zavodny, M. (2007). Digital inequality: A five country comparison using microdata. *Social Science Research, 36*(3), 1135-1155.

Oyedemi, T. D. (2009). Social inequalities and the South African ICT access policy agendas. *International Journal of Communication, 3*, 18.

Oyedemi, T. D. (2012). Digital inequalities and implications for social inequalities: A study of Internet penetration amongst university students in South Africa. *Telematics and informatics, 29*(3), 302-313.

Pazarbasioglu, C., Mora, A. G., Uttamchandani, M., Natarajan, H., Feyen, E., & Saal, M. (2020). Digital financial services. *World Bank Group*.

Pearce, K. E., & Rice, R. E. (2013). Digital divides from access to activities: Comparing mobile and personal computer Internet users. *Journal of communication, 63*(4), 721-744.

Pick, J. B., Sarkar, A., & Parrish, E. (2017). The Digital Divide in Latin America and the Caribbean: A Multivariate and Geospatial Analysis.

Pollari, I. (2016). The rise of fintech: Opportunities and challenges. *AJAF*(3), 15.

Portulans Institute. (2019). *The Network Readiness Index 2019 : Towards a Future-Ready Society*. Retrieved from Washington D.C.,USA: https://networkreadinessindex.org/wp-content/uploads/2020/01/The-Network-Readiness-Index-2019_VJan2020.pdf

Raacke, J., & Bonds-Raacke, J. (2008). MySpace and Facebook: Applying the uses and gratifications theory to exploring friend-networking sites. *CyberPsychology & Behavior, 11*(2), 169-174.

Ragnedda, M. (2017). *The third digital divide: A Weberian approach to digital inequalities*: Routledge.

Ragnedda, M., & Ruiu, M. (2017). Social capital and the three levels of digital divide.

Rajgopaul, D. (2020). FNB's total transaction values performed on all digital channels topped R1.2tn. Retrieved from https://www.iol.co.za/business-report/companies/fnbs-total-transaction-values-performed-on-all-digital-channels-topped-r12tn-45189491

Recabarren, M., Nussbaum, M., & Leiva, C. (2008). Cultural divide and the Internet. *Computers in Human Behavior, 24*(6), 2917-2926.

Robinson, M. A. (2018). Using multi-item psychometric scales for research and practice in human resource management. *Human Resource Management, 57*(3), 739-750.

Romānova, I., & Kudinska, M. (2016). Banking and Fintech: a challenge or opportunity? In *Contemporary issues in finance: Current challenges from across Europe*: Emerald Group Publishing Limited.

Rozkrut, M., & Rozkrut, D. (2019). Towards Measurement Framework of Digital Skills in Finance. In *Effective Investments on Capital Markets* (pp. 121-133): Springer.

Rubin, A. M. (2009). Uses-and-gratifications perspective on media effects. In *Media effects* (pp. 181-200): Routledge.

Ruel, E., Wagner III, W. E., & Gillespie, B. J. (2015). *The practice of survey research: Theory and applications*: Sage Publications.

Ryan, A. B. (2006). Post-positivist approaches to research. *Researching and Writing your Thesis: a guide for postgraduate students*, 12-26.

SARB. (2017). *Bank Supervision Department: Annual Report 2017*. Retrieved from https://www.resbank.co.za/content/dam/sarb/publications/reports/pa-annual-reports/2018/8507/01-BankSupAR2017.pdf

Scheerder, A., van Deursen, A., & van Dijk, J. (2017). Determinants of Internet skills, uses and outcomes. A systematic review of the second-and third-level digital divide. *Telematics and informatics, 34*(8), 1607-1624.

Schumacher, A., Erol, S., & Sihn, W. (2016). A maturity model for assessing Industry 4.0 readiness and maturity of manufacturing enterprises. *Procedia CIRP, 52*(1), 161-166.

Shaikh, A. A., & Karjaluoto, H. (2015). Mobile banking adoption: A literature review. *Telematics and informatics, 32*(1), 129-142.

Singh, A. M. (2004). *Trends in South African internet banking.* Paper presented at the Aslib Proceedings.

Singh, S., Srivastava, V., & Srivastava, R. (2010). Customer acceptance of mobile banking: A conceptual framework. *Sies journal of management, 7*(1).

Sironi, P. (2016). *FinTech innovation: from robo-advisors to goal based investing and gamification*: John Wiley & Sons.

South Africa Savings Institute. (2017). 6 Challenges to Financial Inclusion in South Africa. Retrieved from https://www.savingsinstitute.co.za/6-challenges-to-financial-inclusion-in-south-africa/

Srinuan, C., & Bohlin, E. (2011). Understanding the digital divide: A literature survey and ways forward.

Stafford, T. F., & Stafford, M. R. (2001). Identifying motivations for the use of commercial web sites. *Information Resources Management Journal (IRMJ), 14*(1), 22-30.

Stafford, T. F., Stafford, M. R., & Schkade, L. L. (2004). Determining uses and gratifications for the Internet. *Decision Sciences, 35*(2), 259-288.

Standard Bank. (2019). 2019 Interim Results Summary. Retrieved from https://reporting.standardbank.com/2019-interim-results-summary/

Stats SA. (2011). *Census 2011 Census in brief* (03-01-41). Retrieved from Statistics South Africa, Private Bag X44, Pretoria 0001: http://www.statssa.gov.za/census/census_2011/census_products/Census_2011_Census_in_brief.pdf

STATS SA. (2019). *Inequality Trends in South Africa: A multidimensional diagnostic of inequality* (03-10-19). Retrieved from http://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf

Stevens, J. P. (2012). *Applied multivariate statistics for the social sciences*: Routledge.

Surian, A., & Sciandra, A. (2019). Digital divide: addressing Internet skills. Educational implications in the validation of a scale. *Research in Learning Technology, 27*.

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (Vol. 5): Pearson Boston, MA.

Thatcher, R. W. (2010). Validity and reliability of quantitative electroencephalography. *Journal of Neurotherapy, 14*(2), 122-152.

Tirado-Morueta, R., Mendoza-Zambrano, D. M., Aguaded-Gómez, J. I., & Marín-Gutiérrez, I. (2017). Empirical study of a sequence of access to Internet use in Ecuador. *Telematics and informatics, 34*(4), 171-183.

Tustin, D., Goetz, M., & Basson, A. H. (2012). Digital divide and inequality among digital natives: A South African perspective. *African Journal of Business Management, 6*(31), 9140-9150.

Uprichard, E. (2013). Sampling: bridging probability and non-probability designs. *International Journal of Social Research Methodology, 16*(1), 1-11. doi:10.1080/13645579.2011.633391

Vaccari, C. (2013). *Digital politics in Western democracies: A comparative study*: JHU Press.

van der Zande, J. (2018). Banks and digitalization. In *The Rise and Development of FinTech* (pp. 327-349): Routledge.

Van Deursen, A., Helsper, E. J., & Eynon, R. (2014). Measuring digital skills. *From digital skills to tangible outcomes. Project Report. Recuperado de: www. oii. ox. ac. uk/research/projects*.

Van Deursen, A., & Van Dijk, J. (2011). Internet skills and the digital divide. *New media & society, 13*(6), 893-911.

Van Deursen, A. J. (2012). Internet skill-related problems in accessing online health information. *International journal of medical informatics, 81*(1), 61-72.

Van Deursen, A. J., Courtois, C., & van Dijk, J. A. (2014). Internet skills, sources of support, and benefiting from Internet use. *International Journal of Human-Computer Interaction, 30*(4), 278-290.

Van Deursen, A. J., Helsper, E., Eynon, R., & Van Dijk, J. A. (2017). The compoundness and sequentiality of digital inequality. *International Journal of Communication, 11*, 452-473.

Van Deursen, A. J., & Helsper, E. J. (2015). A nuanced understanding of Internet use and non-use among the elderly. *European Journal of communication, 30*(2), 171-187.

Van Deursen, A. J., & Helsper, E. J. (2018). Collateral benefits of Internet use: Explaining the diverse outcomes of engaging with the Internet. *New media & society, 20*(7), 2333-2351.

van Deursen, A. J., & van Dijk, J. A. (2014a). The digital divide shifts to differences in usage. *New media & society, 16*(3), 507-526. doi:10.1177/1461444813487959

Van Deursen, A. J., & Van Dijk, J. A. (2014b). *Digital skills: Unlocking the information society*: Springer.

van Deursen, A. J., & van Dijk, J. A. (2015a). Internet skill levels increase, but gaps widen: A longitudinal cross-sectional analysis (2010–2013) among the Dutch population. *Information, Communication & Society, 18*(7), 782-797.

Van Deursen, A. J., & van Dijk, J. A. (2015b). Toward a multifaceted model of internet access for understanding digital divides: An empirical investigation. *The information society, 31*(5), 379-391.

Van Deursen, A. J., & van Dijk, J. A. (2019). The first-level digital divide shifts from inequalities in physical access to inequalities in material access. *New media & society, 21*(2), 354-375.

van Deursen, A. J., van Dijk, J. A., & Peters, O. (2012). Proposing a survey instrument for measuring operational, formal, information, and strategic internet skills. *International Journal of Human-Computer Interaction, 28*(12), 827-837.

van Deursen, A. J. A. M., & Van Diepen, S. (2013). Information and strategic Internet skills of secondary students: A performance test. *Computers & Education, 63*, 218-226.

van Dijk, J. (2017). Afterword: The state of digital divide theory. In *Theorizing digital divides* (pp. 199-206): Routledge.

Van Dijk, J. A. (2005). The Deepening Divide: Inequality in the Information Society. In. doi:10.4135/9781452229812

Van Dijk, J. A. (2006). Digital divide research, achievements and shortcomings. *Poetics, 34*(4-5), 221-235.

Van Dijk, J. A. (2017). Digital divide: Impact of access. *The international encyclopedia of media effects*, 1-11.

Van Laar, E., Van Deursen, A. J., Van Dijk, J. A., & De Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. *Computers in Human Behavior, 72*, 577-588.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 425-478.

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 157-178.

Vicente, M. R., & López, A. J. (2010). A multidimensional analysis of the disability digital divide: Some evidence for Internet use. *The information society, 26*(1), 48-64.

Vives, X. (2019). Digital disruption in banking. *Annual Review of Financial Economics, 11*, 243-272.

Wang, J.-Y., Bennett, K., & Probst, J. (2011). Subdividing the digital divide: differences in internet access and use among rural residents with medical limitations. *Journal of medical Internet research, 13*(1), e25.

WCDEDT;AIFMRM. (2014). *Financial Services Sector Assessment Report 2014*. Retrieved from http://www.aifmrm.uct.ac.za/wp-content/uploads/AIFMRM-DEDT-Financial-Services-Sector-Assessment-Report-2014.pdf

Wei, K.-K., Teo, H.-H., Chan, H. C., & Tan, B. C. (2011). Conceptualizing and testing a social cognitive model of the digital divide. *Information systems research, 22*(1), 170-187.

Wei, L. (2012). Number Matters: The Multimodality of Internet Use as an Indicator of the Digital Inequalities. *Journal of Computer-Mediated Communication, 17*(3), 303-318. doi:10.1111/j.1083-6101.2012.01578.x

West, D. M. (2015). Digital divide: Improving Internet access in the developing world through affordable services and diverse content. *Brookings Institution*.

Wetzl, A. (2010). Digital education in Eastern Europe: Romania's modern affair with technology. *Computers and Composition, 27*(2), 112-123.

Wewege, L., & Thomsett, M. C. (2019). *The Digital Banking Revolution: How Fintech Companies are Transforming the Retail Banking Industry Through Disruptive Financial Innovation*: Walter de Gruyter GmbH & Co KG.

Whiting, A., & Williams, D. (2013). Why people use social media: a uses and gratifications approach. *Qualitative Market Research: An International Journal*.

Wilamowicz, A. (2019). The Great FinTech Disruption: InsurTech. *Banking & Finance Law Review, 34*(2), 215-238. Retrieved from https://www.proquest.com/scholarly-journals/great-fintech-disruption-insurtech/docview/2207838951/se-2?accountid=15083

World Health Organization. (2020). WHO Director-General's opening remarks at the media briefing on COVID-19-11 March 2020. In: Geneva, Switzerland.

WorldBank. (2019, 10 Oct 2019). The World Bank In South Africa. Retrieved from https://www.worldbank.org/en/country/southafrica/overview

Yan, T. C., Schulte, P., & Lee Kuo Chuen, D. (2018). Chapter 11 - InsurTech and FinTech: Banking and Insurance Enablement. In D. Lee Kuo Chuen & R. Deng (Eds.), *Handbook of Blockchain, Digital Finance, and Inclusion, Volume 1* (pp. 249-281): Academic Press.

Yermack, D. (2018). *FinTech in Sub-Saharan Africa: What Has Worked Well, and What Hasn't*. Retrieved from

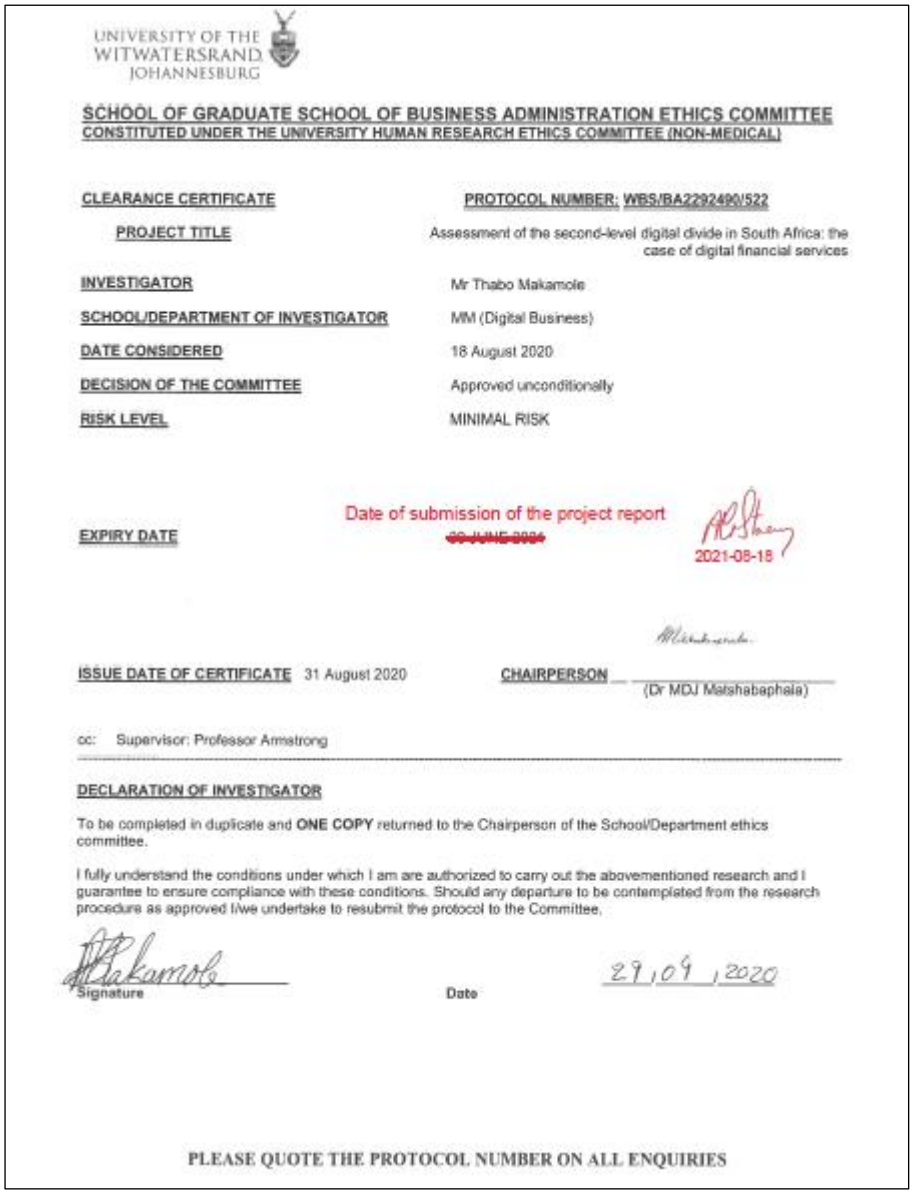
Yu, Z. (2018). Third-Level Digital Divide in English Teaching and Learning. *International Journal of Information and Communication Technology Education (IJICTE), 14*(3), 68-80.

Zickuhr, K. (2013). Who's not online and why.

Zillien, N., & Hargittai, E. (2009). Digital distinction: Status-specific types of internet usage. *Social Science Quarterly, 90*(2), 274-291.

APPENDIX A

Ethics clearance letter



UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

SCHOOL OF GRADUATE SCHOOL OF BUSINESS ADMINISTRATION ETHICS COMMITTEE
CONSTITUTED UNDER THE UNIVERSITY HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: WBS/BA2292490/522**
PROJECT TITLE	Assessment of the second-level digital divide in South Africa: the case of digital financial services
INVESTIGATOR	Mr Thabo Makamole
SCHOOL/DEPARTMENT OF INVESTIGATOR	MM (Digital Business)
DATE CONSIDERED	18 August 2020
DECISION OF THE COMMITTEE	Approved unconditionally
RISK LEVEL	MINIMAL RISK

EXPIRY DATE Date of submission of the project report ~~30 JUNE 2021~~ 2021-08-18

ISSUE DATE OF CERTIFICATE 31 August 2020 **CHAIRPERSON** (Dr MDJ Matshabaphala)

cc: Supervisor: Professor Armstrong

DECLARATION OF INVESTIGATOR

To be completed in duplicate and **ONE COPY** returned to the Chairperson of the School/Department ethics committee.

I fully understand the conditions under which I am are 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/we undertake to resubmit the protocol to the Committee.

Signature Date 29,09,2020

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

APPENDIX B

Survey Introduction to participant

Dear participant

My name is Thabo Makamole. I am a master's student currently completing my final year of Masters of Management in the field of Digital Business at Wits Business School. I would like to invite you to kindly participate in an anonymous survey as part of my research study titled: "Assessment of the second-level digital divide in South Africa: the case of digital financial services"

Digital technologies are changing the way we perform different tasks in our lives and they affecting different areas of our lives including but not limited to education, finance, retail and communication. In recent years, there has been a growth of the use of technology to offer consumers different financial services around the world including South Africa. The question is whether consumers are using this services and what influences their use.

This study seeks to understand the differences in consumer's digital skills and how they influence the consumer's use of digital financial services.

All responses are completely anonymous and none of the results can be tracked back to any individuals. As a respondent, please note that your participation is completely voluntary and you can withdraw from participating. All data collected is strictly confidential and will only be used for academic purposes.

The questionnaire should take 15 minutes to complete, your co-operation is appreciated.

By continuing with the survey you are giving consent that you will partake in this study.

Should you have any questions or comments regarding this survey, you are welcome to contact me via email at: 2292490@students.wits.ac.za

Kind regards

Thabo Makamole

Research instrument: Questionnaire

	Demographics						
Q1	**Gender**						
	Male	Female	Rather not say				
Q2	**Age**						
	18 - 30	31-45	46-60	61 or older			
Q3	**What is the level of your English Language?**						
	No basic knowledge	Beginner	Intermediate	Advanced			
Q4	**Highest Level of Education**						
	No Matric	Matric	Diploma	Bachelors	Honours/Post Graduate	Masters degree	Doctoral degree
Q5	**Employment status**						
	Unemployed	Employed	Retired	Student			
Q6	**Annual Income**						
	No Income	R1 - R99 999	R100 000 - R199 999	R200 000 - R499 000	R500 000 - R1.19M	R1.2M or more	
Q8	**Internet Experience**		Age in years (e.g. 16)				
	How old were you when you first used the internet? By using the internet we mean accessing online content (e.g. websites, apps) through a desktop computer, laptop, mobile or any other device. Please write in your age in years						

	Places the Internet is accessed			
	In the past month have you used the Internet....? Please tick a box for each one that applies to you			
	At home	At work or at school or at university	While on the move (e.g. bus, taxi, uber through a mobile device)	Somewhere else (e.g. internet café, public library, at someone's house)
Q9				

	Which of the following do you have					
	An email account (1)	A Social Networking Site (e.g. Facebook, LinkedIn) (2)	A blog (3)	A microblog (e.g. Twitter, Tumblr account) (4)	A smartphone (5)	A Tablet, iPad or eReader (6)
Q10						

Digital Skills Section

	Internet Skills Please indicate how accurate the following statements are when thinking about how you use the Internet		**Not at all true of me**	**Not very true of me**	**Neither true nor untrue of me**	**Mostly true of me**	**Very true of me**
	Medium Related Skills						
	Operational skills	**Operating mobile Internet**					
Q11		I know how to connect to a WIFI network					
Q12		I know how to download apps to my mobile device					
Q13		I know how to turn my mobile phone off					
Q14		I know how to keep track of the costs of mobile app use					
Q15		I know how to install apps on a mobile device					
Q16		I know how to use the apps on my mobile device					
		Operating the Internet environment					
Q17		I know how to open a new tab in my browser					
Q18		I know how to go to the previous page when browsing the Internet					
Q19		I know how to use the refresh function					
Q20		I know how to use shortcut keys (e.g. CTRL-C for copy, CTRL-S for save)					

	Internet Skills Please indicate how accurate the following statements are when thinking about how you use the Internet		**Not at all true of me**	**Not very true of me**	**Neither true nor untrue of me**	**Mostly true of me**	**Very true of me**
Q21		I know how to bookmark a website					
Q22		I know how to download files					
Q23		I know how to upload files					
Q24		I know how to adjust privacy settings					
Q25		I know how to download/save a photo I found online					
Q26		I know how to open downloaded files					
Q27		I know which apps/software are safe to download					
Q28		I know how to make pop-ups or ads disappear					
Q29		I know some good ways to avoid computer viruses					
Q30		If a technical problem occurs while I am using the Internet, I usually know how to fix the problem					
		Operating Internet-based search engines					
Q31		I know how to open a Web address directly without using a search engine like Google					
Q32		I know how to complete online forms					
Q33	**Formal Skills**	I tend to have no problems finding my way around a website					
Q34		I know where to click to go to a different webpage					
Q35		I find it hard to find a website I visited before					
Q36		Sometimes I end up on websites without knowing how I got there					
Q37		All the different website layouts make working with the Internet difficult for me					
Q38		I find the way in which many websites are designed confusing					
Q39		I get tired when looking for information online					
	Content related skills						
Q40	**Informational skills**	It is easy for me to find information I want online					
Q41		I should take a course on finding information online					
Q42		I know how to use a wide range of strategies when searching for information					
Q43		I find it hard to decide what the best keywords are to use for online searches					
Q44		I am confident selecting search results					
Q45		I normally look at more than the top three search results					
Q46		Sometimes I find it hard to verify information I have retrieved					
Q47		I feel confident in my evaluation of whether a website can be trusted					
Q48		I generally compare different websites to decide if information is true					
Q49		I carefully consider the information I find online					

	Internet Skills Please indicate how accurate the following statements are when thinking about how you use the Internet		**Not at all true of me**	**Not very true of me**	**Neither true nor untrue of me**	**Mostly true of me**	**Very true of me**
Q50		I sometimes trust fake news					
Q51	**Communication Internet skills**	I know when I should and shouldn't share information online					
Q52		I am careful to make my comments and behaviours appropriate to the situation I find myself in online					
Q53		I know how to change who I share content with (e.g. friends, friends of friends or public)					
Q54		I know how to remove friends from my contact lists					
Q55		I am confident about writing a comment on a blog, website or forum					
Q56		I feel comfortable deciding who to follow online (e.g. on services like Twitter or Tumblr)					
Q57		I know how to use emoticons (e.g. smileys, emoji or text speak)					
Q58		I know which information I should and shouldn't share online					
Q59	**Content Creation Internet Skills**	I would feel confident putting video content I have created online					
Q60		I would feel confident writing and commenting online					
Q61		I know how to create something new from existing online images, music or video					
Q62		I know how to make basic changes to the content that others have produced					
Q63		I know how to design a website					
Q64		I know which different types of licences apply to online content					

Digital Financial Services Use

	Digital Financial Services Use How often have you done the following things online in the last year? Please tick one option per row			Never	Less than once a Month	Monthly	Weekly	Several times per day	Don't Know
Q65	Payments	Make purchases using apps on my mobile wallets (i.e. Apple pay, Google pay, Snap scan,Zapper)							
Q66		Send money to friends and family using payment apps (i.e. banking app or website, M-Pesa, MyMo)							
Q67		Make payments using crypto wallet e.g. Luno							
Q68		Have received money through an online platform (e.g. PayPal)							
Q69		Paid my bills or fines online							
Q70		Used to platform to send money across the border (e.g. Mukuru)							
Q71	Wealth and Investments	Used robo advisor to decide on where to invest my money							
Q72		Used online trading platforms to buy shares and unit trusts							
Q73		Bought cryptocurrency on cryptocurrency trading platforms							
Q74		Bought shares on alternative stock exchanges (e.g. A2X, AltX, 4AX)							
Q75		Used a financial management tool to view all my finances (e.g. 22Seven)							
Q76	Crowdfunding	Have raised money for charity using an online funding platform							
Q77		Have donated money for charity using an online platform (e.g. FundMe)							
Q78		Have raised money for a business venture using an online funding platform							
Q79		Have donated money for a business venture using an online funding platform							
Q80	Lending	Have used an online service to apply for a short term loan (e.g. Wonga)							

	Digital Financial Services Use How often have you done the following things online in the last year? Please tick one option per row			Never	Less than once a Month	Monthly	Weekly	Several times per day	Don't Know
Q81		Have used an online credit facility when making purchases online (e.g. Mobicred)							
Q82		Have lend my money to borrowers through an online platform							
Q83		Have bought airtime using airtime advance							
Q84	**Insurance**	Have used an online platform to compare insurance quotes (e.g. Hippo)							
Q85		Have applied for insurance on an online platform or mobile app							
Q86		Have claimed from my insurance using an online platform or mobile app							
Q87		Have insured my high value items bought online using an e-commerce website							
Q88		Have insured my valuables through peer-to-peer insurance (e.g. Pineapple insurance, FoSho Insurance)							