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University of the Witwatersrand

School of Business Sciences

INFO 7012 FINAL RESEARCH REPORT

THE ROLE OF TRUST AND RISK IN THE ADOPTION OF SUPER APPS IN SOUTH AFRICA

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Dedication

This is dedicated to my mother Zandile Ndaba and my late grandmother Malefu Jerminah Ndaba, who both always emphasised the importance of education.

Abstract

A super app is an “all in one” mobile application that provides the user with core features and access to a wide range of third-party created “mini apps” that they can choose to activate. Typical functions within existing super apps include instant messaging, food ordering and delivery, ridesharing, appointment bookings, e-commerce and utility bill payments, among several other features. This all-in-one application has gained significant success in Asia, with WeChat and Alipay in China being the most popular super apps in the world, collectively providing over one billion users with a variety of services without having to switch between different mobile applications. Because the super app is an emerging phenomenon, the factors influencing adoption are currently ill-understood.

A preliminary review of the literature revealed that most existing studies on super apps were conducted in Asia, where numerous super apps are currently available. This gap in academic research presents an opportunity to explore super app adoption within the African context, specifically in South Africa. This study aims to determine how trust and risk influence the potential adoption of super apps in South Africa by utilising the trust-based consumer decision-making model by Kim, Ferrin, and Rao (2008) as the theoretical framework to examine the roles of trust, risk, and benefit in this process.

The study employed a quantitative research method, specifically using a survey questionnaire for data collection, and was conducted within the positivist paradigm. The findings revealed a significant positive correlation between trust and adoption intention, highlighting the crucial role of trustworthiness in the acceptance of novel technologies.

Interestingly, contrary to common belief, the study also found a positive correlation between perceived risk and adoption intention, indicating that higher perceived risk does not necessarily deter users from adopting super apps. These unexpected results underscore the complexity of user decision-making in the adoption of emerging technologies and suggest a need for further investigation into the underlying dynamics driving adoption behaviour.

Keywords: Super app, Adoption, Trust, Risk, South Africa

Table of Contents

Plagiarism Declaration ..... *i*

Acknowledgements ..... *ii*

Abstract ..... *iv*

List of Figures ..... *vii*

List of Tables ..... *viii*

CHAPTER ONE: INTRODUCTION *1*

1.1. Background **1**

1.2. Problem Statement **3**

1.3. Research Purpose and Questions **4**

1.4. Intended Contribution **4**

1.5. Delimitation of the Study **5**

1.6. Chapter Conclusion **6**

CHAPTER TWO: LITERATURE REVIEW *7*

2.1. Background **7**

2.2. Construct 1: Intention **8**

2.3. Construct 2: Risk **9**

2.4. Construct 3: Benefit **10**

2.5. Construct 4: Trust **10**

2.6. Theoretical Background and Research Model **11**

2.7. Chapter Conclusion **14**

CHAPTER THREE: RESEARCH METHODOLOGY *15*

3.1. Research Paradigm **15**

3.2. Research Design and Methodology **16**

3.3. Population and Sampling **16**

3.4. Research Instrument Design **17**

3.5. Pre- & Pilot Testing **18**

3.6. Threats to Internal and External Validity **20**

3.7. Data Analysis Strategy **21**

3.8. Ethical Considerations **22**

3.9. Chapter Conclusion **22**

CHAPTER FOUR: PRESENTATION OF RESULTS *23*

4.1. Introduction to Results **23**

4.2. Demographic Information **24**
4.3. Validity and Reliability **26**
4.4. Correlational Analysis **30**
4.5. Chapter Conclusion **33**
CHAPTER FIVE: DISCUSSION ***34***
CHAPTER SIX: CONCLUSION ***39***
6.1. Summary of Findings **39**
6.2. Implications for Theory **40**
6.3. Implications for Practice **41**
6.4. Limitations of the Study **41**
6.5. Areas of Future Research **42**
6.6. Conclusion **43**
CHAPTER SEVEN: REFERENCES ***44***
APPENDIX A: LITERATURE CONCEPT TABLE ***49***
APPENDIX B: FINAL RESEARCH INSTRUMENT ***50***
APPENDIX C: PARTICIPANT INFORMATION SHEET ***54***
APPENDIX D: CONSENT FORM ***55***
APPENDIX E: ETHICAL CLEARANCE CERTIFICATE ***56***
APPENDIX F: SUPERVISOR SUPPORT LETTER ***57***
APPENDIX G: TURNITIN REPORT ***58***

List of Figures

Figure 1: The trust-based decision-making model by Kim, Ferrin and Rao (2008).....12
Figure 2: Super App Adoption Model 13
Figure 3: Gender Distribution of the study 24
Figure 4: Age Distribution of the study.....25

List of Tables

Table 1: Constructs and Research Hypotheses....13
Table 2: Research Instrument Design....17
Table 3: Pilot Test Modifications....19
Table 4: Screening Question 1 Results....25
Table 5: Screening Question 2 Results....26
Table 6: KMO and Bartlett's Test Results....27
Table 7: Rotated Factor Matrix....28
Table 8: Results from the Principal Axis Factor Analysis....28
Table 9: Cronbach's Alpha....29
Table 10: Item Total Statistics....30
Table 11: Descriptive Statistics for Composite Variables....31
Table 12: Correlation Matrix on Composite Scores....31
Table 13: Hypothesis Testing - Supported vs Not Supported....33

CHAPTER ONE: INTRODUCTION

This chapter provides an overview of mobile applications and super apps and outlines the research questions that this study aims to address. Additionally, the intended contributions and the scope of the study are defined.

1.1. Background

The adoption of smartphones has promoted mobile applications as useful tools for communication, entertainment and mobile commerce (Etim, 2012; Ickin *et al.*, 2012; Wang and Li, 2023). Mobile phones in the last decade have evolved from basic feature phones, which were initially used for voice calls and short message service (SMS) texts, to smartphones that now incorporate different types of technology such as a camera, multimedia and a computer onto one hand-held device (Jobodwana, 2009; Etim, 2012).

Despite persisting challenges such as bandwidth limitations, latency issues, and connectivity concerns in the mobile phone market in Sub-Saharan Africa, more than 70% of the adult population on the continent and 90% in South Africa possess access to a mobile device (Etim, 2012; Demirguc-Kunt *et al.*, 2017; Munyegera and Matsumoto, 2018; ICASA, 2020; Okonkwo, Huisman and Taylor, 2020). The proliferation of mobile devices across the continent is purported to have increased even amidst the COVID-19 pandemic spanning the years 2020 to 2022 (GSMA, 2022). Having access to mobile phones is also said to drive digital and financial inclusion by driving economic growth in developing countries (Etim, 2012; Okonkwo, Huisman and Taylor, 2020; GSMA, 2022).

Mobile application adoption is rapidly growing in Africa, with mobile apps constituting integral components of all mobile services (Okonkwo, Huisman and Taylor, 2020). Mobile applications (hereafter referred to as “apps”) are developed for different services such as mobile learning, commerce, health, banking and entertainment (Okonkwo, Huisman and Taylor, 2020). Mobile apps enable users not only to call and message others but also to access and browse the internet from anywhere, communicate with others using social media, access entertainment such as games, audio and video streaming, and perform various banking functions and e-commerce (Jobodwana, 2009; Islam, Islam and Mazumder, 2010).

Gartner (2022), defines the super app as an “all in one” mobile application that provides the user with core features and access to a wide range of third-party created “mini apps” that they can choose to activate for a personalised app experience. Rather than using multiple applications with distinct functionalities, the super app consolidates these functions into a singular mobile application. According to Gartner (2022), over half of the world's population is anticipated to be engaging with multiple super apps daily by 2027.

Typical functions within existing super apps include instant messaging, food ordering and delivery, ridesharing, appointment bookings, e-commerce and utility bill payments, among many other features. This all-in-one application has gained significant success in Asia with WeChat and Alipay, the world's biggest super apps, providing over 1 billion users with a variety of services, without having to switch between different mobile applications (Liu, Ben and Zhang, 2019; Jia, Nieborg and Poell, 2022).

Most super apps initially provided users with a single service or feature before expanding and providing other services such as delivery and ridesharing (Chai, 2020; Yang et al., 2023). From a South African perspective, the super app phenomenon is presently in its infancy, with only two commonly known super apps, Uber and Vodapay (Hong, Lu and Pan, 2020; Hasselwander, 2023b). Banks such as Nedbank and Discovery Bank are also moving towards having super app-type offerings within their banking apps (Bizcommunity, 2020; Mybroadband, 2022). Considering the aforementioned statistics illustrating the rise in mobile phone usage and the utilization of mobile applications, the super app is anticipated to be embraced readily in South Africa as well.

According to Kim, Ferrin and Rao (2008), trust is a precondition for successful electronic commerce (e-commerce) as most consumers are cautious about making online purchases unless they trust the vendor. When transacting on the internet, an individual is potentially exposed to numerous financial, product and privacy risks. Therefore, it is vital to holistically consider how trust, perceived benefit and risk affect purchasing decisions on platforms such as super apps where most functions or services have a transactional element.

This study is of importance as it explored how trust, risk and perceived benefit influence an individual’s adoption of super apps in South Africa, and how much these factors impact the adoption of super apps in South Africa.

1.2. Problem Statement

The academic topic of "super app adoption" has not garnered much focus from scholars and academics in South Africa, given its novelty in both academic and technological spheres. From conducting a high-level preliminary literature review, the bulk of the existing studies on super apps were conducted in Asia where there are currently several super apps in the market (Hong, Lu and Pan, 2020; Steinberg, 2020; Huang and Miao, 2021; Jia, Nieborg and Poell, 2022; Krisnamurti, Ratnawati and Widi, 2022; Nurchayati, Riyadi, and Sartini, 2022; Santoso, Mi An and Juwono, 2022; Purwanto *et al.*, 2023; Wang and Li, 2023; Wydymus, 2023). The absence of significant academic research in this area thus created a gap for this study to explore the adoption of super apps among individuals in the South African context.

While Gartner (2022) anticipates the inclusion of enterprise mobile and desktop functionalities, including workflow, collaboration, and messaging platforms, within the realm of super apps in the coming years, this study is focused on the individual's adoption of the super app. This is because existing super apps in the market are primarily targeted at individuals who require the convenience of a converged application offering. Therefore, it would be more effective to examine the adoption of super apps in individuals, as the existing African super apps are targeted towards this demographic.

Based on the super app adoption studies that were examined, there seemed to be significant evidence that trust and risk were important factors that either hindered or fostered the adoption of the super app (Hong, Lu and Pan, 2020; O'Farrell, 2020; Ngubelanga and Duffett, 2021; Nurchayati, Riyadi, and Sartini, 2022; Wallet and Hirschfield, 2022; Zhang *et al.*, 2022; Wydymus, 2023; Yang *et al.*, 2023; Zhu, Fang and Lim, 2023). However, these studies often did not fully explain how these factors affect an individual's intention to adopt the super app.

In summary, the problem statement for this study was to explore how trust and risk influence an individual's intention to adopt super apps in South Africa as this field of inquiry is currently ill-understood.

1.3. Research Purpose and Questions

The purpose of this study was to employ the trust-based consumer decision-making model for assessing the factors influencing the adoption of super apps, specifically among individuals in South Africa. This study sought to explore the following research question:

1. What are the factors that influence an individual's intention to adopt super apps in South Africa?

Sub-questions:

1.1. *To what extent does trust affect an individual's intention to adopt super apps in South Africa?*

1.2. *To what extent does perceived risk affect an individual's intention to adopt super apps in South Africa?*

1.3. *To what extent does perceived benefit affect an individual's intention to adopt super apps in South Africa?*

To answer the research questions, a literature review was conducted on super apps, specifically focusing on the factors that frame the adoption intention of super apps. The research then employed the trust-based consumer decision-making model as a theoretical framework to examine and assess relationships, significance, and the degree to which these factors influence the adoption of super apps. Finally, the results of the study were presented as well as the recommendations for both theory and practice.

1.4. Intended Contribution

1.4.1. Contribution to Theory

A limited number of studies have been conducted on super apps, particularly in African countries, since the technology is relatively new and mostly popular in Asian countries such as China, Korea, Indonesia, and Japan. Existing academic studies also appear to be notably restricted beyond the Asian region (Chai, 2020; Hong, Lu and Pan, 2020; Steinberg, 2020; Momaya, 2022; Yang *et al.*, 2023).

Thus, this study is likely to contribute to the literature on super apps and have a contextual contribution to super app research in Africa, specifically from a South African perspective. From the existing literature on super apps, the Technology Acceptance Model (TAM) was the most used theoretical model in most super app studies. This study is also likely to contribute to theory by exploring how trust, risk and benefit also affect adoption intention. By using the trust-based consumer decision-making model, this study has the potential to contribute to research on how trust and risk affect the adoption of mobile applications.

1.4.2. Contribution to Practice

Most existing super apps are typically targeted at the individual as compared to enterprises. This study offers an opportunity to contribute to the existing limited body of research concerning the adoption of super apps by end-users. Hence, this study will likely provide institutions intending to build a super app or super-app type offering, valuable insight into prospective development of their applications for end-users.

Considering the scarcity of research conducted in the domain of super apps in South Africa, the study may provide a platform upon which future super app studies can be based, as it remains a new concept in South Africa that is yet to receive academic focus.

1.5. Delimitation of the Study

Mobile applications are defined as mobile technological innovations of mobile computer software that enable users to perform numerous activities such as calling, messaging, accessing the internet for research, shopping, communication via social media, entertainment and audio and video streaming (Jobodwana, 2009; Islam, Islam and Mazumder, 2010; Okonkwo, Huisman and Taylor, 2020).

The super app is defined as an all-in-one mobile application which allows a user to perform several functions such as e-commerce, access entertainment and mobile payments without leaving the application (Zhu, Fang and Lim, 2023). Super apps are distinguished from a "single purpose" mobile application by providing users with streamlined and automated checkout procedures, ensuring uninterrupted experiences.

In contrast, single-purpose apps only offer the core functionality it was created for, i.e. instant messaging or banking (Zhu, Fang and Lim, 2023). Therefore, this study only investigated how trust, risk and benefit influence the adoption of super apps by individuals in South Africa. Investigating how trust, risk and benefit affect the adoption of "single purpose" mobile applications was outside of the scope of this study.

1.6. Chapter Conclusion

This chapter provided a background on the evolution of mobile applications and the rise of super apps, particularly in Africa. The problem statement identified a gap in academic research on super app adoption in South Africa, focusing on the influence of trust and risk on user adoption. The intended contributions of the study are twofold: to enhance theoretical understanding of super app adoption in the African context and to provide practical insights for developers and institutions. The chapter concludes by defining the study's scope, which is limited to the adoption of super apps by individuals in South Africa. The next chapter presents the literature review for this study.

CHAPTER TWO: LITERATURE REVIEW

This chapter reviews the literature on mobile applications and super apps, focusing on their adoption and integration of various services. The rise of super apps in Asia and Africa is highlighted, and the key constructs of this study: intention, risk, benefit, and trust are examined. Using the trust-based consumer decision-making model, the chapter explores factors influencing super app adoption in South Africa.

2.1. Background

The widespread adoption of smartphones in the last decade has made mobile applications useful tools that connect users to different functions and services (Hasselwander, 2023a). Super apps are mobile applications that integrate various functions and services such as instant messaging, e-commerce, delivery, travel, ridesharing and several other facilities within one application (Acevedo-Viloria *et al.*, 2021; Hasselwander, 2023a; Yang *et al.*, 2023). Super apps can offer these diverse features and functions through "mini apps" which are developed by third parties to increase the variety of services within a super app (Yang et al., 2023).

Super apps seemingly have deeper roots in Asia with Ant Group's "Alipay" the first super app launched in 2006 and Tencent's "WeChat" in China, "KakaoTalk" in South Korea, "Gojek" in Indonesia and "LINE" in Japan (Chai, 2020; Hong, Lu and Pan, 2020; Steinberg, 2020; Momaya, 2022; Yang *et al.*, 2023). Popular super apps on the African continent include Uber, and the Vodacom Group's "M-PESA" in Kenya and "VodaPay" in South Africa (Hong, Lu and Pan, 2020; Hasselwander, 2023b). South African banks such as Nedbank and Discovery Bank, have also begun moving towards having super app-type offerings within their banking apps that grant customers access to online shopping, travel and lifestyle perks, and various essential services from a diverse range of merchants (Bizcommunity, 2020; Mybroadband, 2022).

Super apps tend to initially debut a single function, for instance, instant messaging or ridesharing and then evolve to become full-fledged super apps (Momaya, 2022). For example, WeChat was founded in 2011 as an instant messaging application morphed into a social networking and e-commerce platform. M-PESA, launched in 2007, initially only

offered mobile money remittance services but now also offers shopping and international money transfers within its super app (Steinberg, 2020; Gilbert, 2021; Jia, Nieborg and Poell, 2022).

There is a notable gap in the academic research concerning the adoption of super apps in South Africa. While super apps are emerging in the African market, with examples such as M-PESA and VodaPay, there is limited understanding of the factors influencing their adoption among South African users. When reviewing the literature on super apps, several recurring themes were identified, highlighting the importance of trust, risk, and perceived benefits in the context of super app adoption. Existing studies have not adequately addressed how these factors impact the intention to adopt super apps in this context. The identification of trust, risk, and perceived benefits as key variables emerged from a comprehensive analysis of the literature, which revealed these themes as significant yet underexplored in the South African context.

Furthermore, the unique socio-economic and technological landscape of South Africa presents distinct challenges and opportunities for super app adoption. Issues such as data privacy, security concerns, and the varying levels of digital literacy among users were frequently mentioned in the literature, underscoring their relevance to this study. These factors have not been thoroughly explored in existing super app research, indicating a need for further investigation. The following sections of this literature review will examine the study's constructs through the lens of existing research findings. The literature concept table detailing the constructs of this study and the studies in which they are found is available in Appendix A of this document.

2.2. Construct 1: Intention

This bundling model, where different functions are packaged with other services as a single unit, is predominant in new fintech applications all over the world (Jia, Nieborg and Poell, 2022). With various applications to choose from, consumers have several options that provide similar functions. According to Nurchayati, Riyadi, and Sartini (2022), purchasing decisions are the consumer's preference for certain products between several brands and the intention to purchase products. Kim, Ferrin, and Rao

(2008) posit that consumers when forming an intention to behave and adopt, base their decisions on the presumption that they actively seek to make rational choices informed by available information.

2.3. Construct 2: Risk

As with most mobile applications, the super app collects a great deal of personal, behavioural and transactional data from its users to provide its services at an optimal level (Hong, Lu and Pan, 2020; Acevedo-Viloria et al., 2021; Wydymus, 2023). This could result in data privacy and security violations since this type of application gathers and stores sensitive user data in one place.

Extra measures must be implemented to preserve confidentiality, integrity, and the availability of sensitive end-user data such as their phone numbers, addresses and credit card data as super apps often delegate their functions to third party mini apps (Wydymus, 2023; Yang *et al.*, 2023). The risk is especially significant when the super app has accumulated a substantial volume of user data (Wallet and Hirschfield, 2022; Yang *et al.*, 2023).

Mini apps also rely on APIs provided by the super app to be able to perform certain functions such as launching in-app payment when completing a purchase and accessing location services for delivery (Yang *et al.*, 2023). If the granted recipient of a privileged API is broader than intended, this could lead to severe consequences such as misuse of end-users data or installation of malware on their mobile devices (Zhang *et al.*, 2022; Yang *et al.*, 2023).

Additionally, Yang et al. (2023) discovered that super apps accommodating various operating systems, like both Android and iOS, may encounter challenges in upholding uniform security measures, maintaining consistent security policies, and providing regular security updates across platforms. This situation could potentially introduce vulnerabilities exploitable by attackers.

Another risk to end users is the unauthorised sharing of their data since they may not be aware of how their data is being used or shared with other entities. By using the many different services within a super app, valuable insights could be used to profile the user's

financial and consumption behaviour patterns (Acevedo-Viloria *et al.*, 2021). Super apps may be inclined to generate revenue through the monetization of user data, involving its sale to third parties for targeted advertising or alternative purposes (Yang *et al.*, 2023).

2.4. Construct 3: Benefit

The sheer number of applications available requires new mobile applications to be useful (Hentzen, Hoffmann and Dolan, 2022). Opening mobile applications to third-party functionality and services greatly enhances the value of the application for the end-user (Jia, Nieborg and Poell, 2022). The super app enables the user to manage all their daily activities such as making payments, online shopping, tracking deliveries, and accessing entertainment within one application on their mobile phones offering convenience to the end-user (Wydymus, 2023).

According to Huang and Miao (2021), the key design principle of a super app is enhanced efficiency for the user who is likely to have mobile applications with related functions or frequently updated versions making it difficult for the user to grasp new features. However, everything on one application would enhance the user experience entirely (Huang and Miao, 2021).

2.5. Construct 4: Trust

As stated above, using super apps could pose a huge threat to an individual's privacy as users provide a lot of sensitive data to super apps and all this data is collected and stored on one single application. Nurchayati, Riyadi, and Sartini, (2022) found that when the user trusts the application, they will not hesitate to use and reuse an application that can meet their needs.

Users also tend to trust popular brands because they can easily recognise them and are aware of how their customers are treated (Nurchayati, Riyadi, and Sartini, 2022). If the user feels safe with the brand and services provided, then they will trust the brand. Nurchayati, Riyadi, and Sartini (2022) define brand trust as a feeling of security the user has with a brand and is based on the user's thinking that the brand can be trusted.

Similarly, if a popular brand or platform that has a history of having privacy issues or not complying with standardised rules released a super app, users would be wary of how their data is being used or who it is being shared with thus resulting in them losing trust or not trusting and using the super app at all (O'Farrell, 2020; Nurchayati, Riyadi, and Sartini, 2022).

Alipay, a prominent super app globally, was initially developed with the primary goal of fostering trust between online buyers and sellers (Hong, Lu and Pan, 2020). During the initial stages of e-commerce, many consumers hesitated to engage in online shopping due to concerns about making payments for goods and not receiving anything in return (Hong, Lu and Pan, 2020; O'Farrell, 2020). The e-commerce feature within Alipay was integrated with additional everyday services like food delivery and credit facilities.

As users regularly utilized the application, trust in the super app was gradually established (Hong, Lu and Pan, 2020; O'Farrell, 2020). According to Hong, Lu, and Pan (2020), becoming familiar with the application builds trust, and consistent usage can diminish or eliminate psychological barriers preventing users from using the app. Simply, if consumers do not trust a platform, then adoption and use will be low (O'Farrell, 2020).

2.6. Theoretical Background and Research Model

Super apps have revolutionised the digital landscape by consolidating various functionalities within a single platform. Users can seamlessly perform multiple tasks and transactions through these applications, often involving payment processing or financial transactions.

Therefore, it is important to understand how trust and risk affect the individual's decision to adopt a super app. For this study, the trust-based consumer decision-making model by Kim, Ferrin and Rao (2008) was used to examine the role that trust, risk and their antecedents (in this case perceived benefit) play in the adoption of super apps in South Africa.

The original trust-based decision-making model by Kim, Ferrin and Rao (2008) is depicted in Figure 1 below.

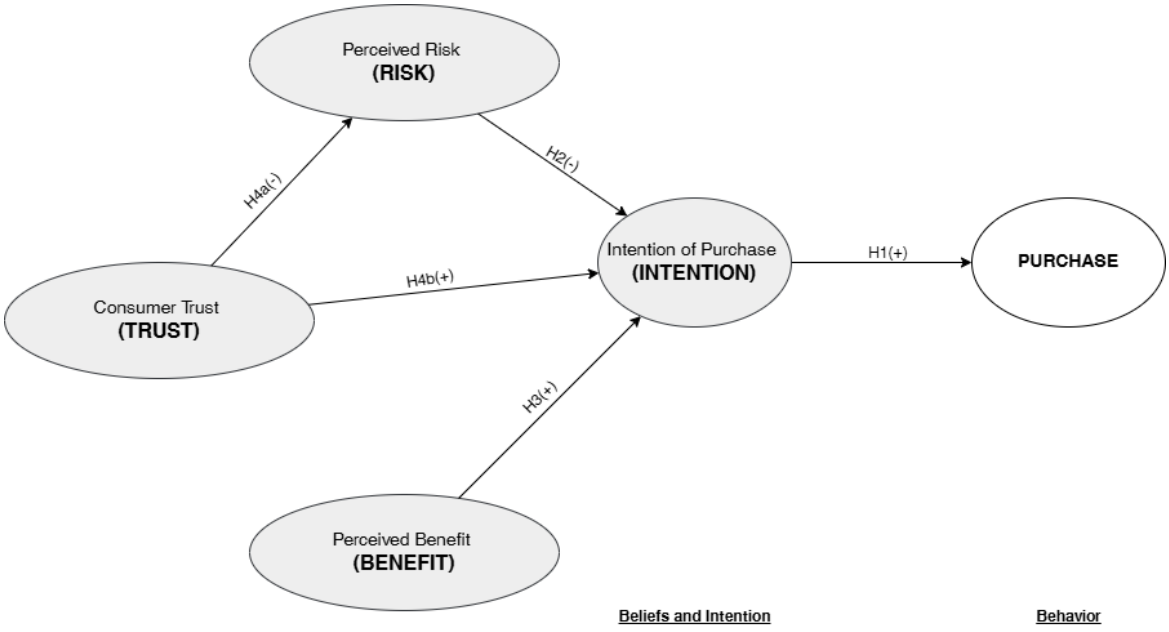


Figure 1: The trust-based decision-making model by Kim, Ferrin and Rao (2008)

This trust-based consumer decision-making model was initially developed to examine how important trust and risk are in purchasing decisions when making purchases online (Kim, Ferrin and Rao, 2008). This study used the trust-based decision-making model theory because the researcher wanted to understand how trust, perceived benefit and risk affect purchasing decisions on platforms such as super apps where most functions or services typically have a transaction/e-commerce element.

However, for this study trust, perceived risks and benefits were used to assess the intention to use and adopt super apps in South Africa. Adapting from the trust-based consumer decision-making model by Kim, Ferrin, and Rao (2008), the theoretical framework below incorporates the themes and hypotheses highlighted in the preliminary literature review.

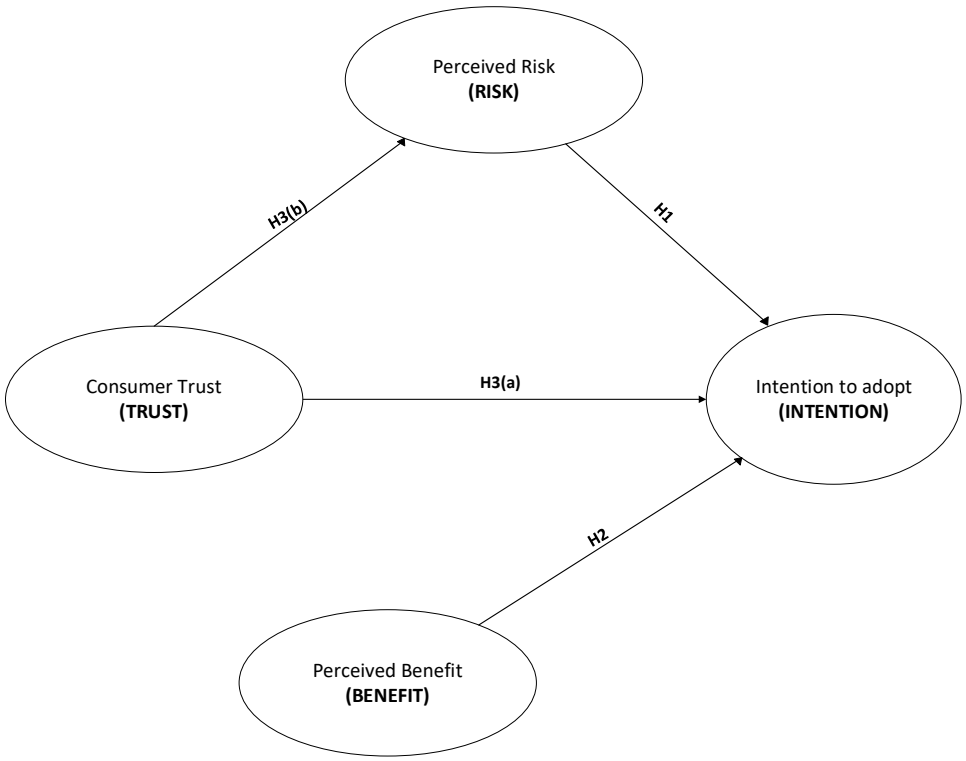


Figure 2: Super App Adoption Model

Table 1 below provides a summary of the constructs and hypotheses derived from the literature review above:

Table 1: Constructs and Research Hypotheses

Construct	Research Hypotheses
Perceived Risk	H_1: A user's perceived risk (RISK) negatively affects a user's intention (INTENTION) to adopt a super app.
Perceived Benefit	H_2: A user's perceived benefit (BENEFIT) positively affects their intention (INTENTION) to adopt a super app.
Trust	$H3_a$: The user's trust (TRUST) negatively affects the user's perceived risk (RISK) of a super app. $H3_b$: A user's trust (TRUST) positively affects the user's intention (INTENTION) to adopt a super app.

2.7. Chapter Conclusion

This literature review has examined the key factors influencing super app adoption, highlighting the importance of intention, risk, benefit, and trust. The identified research gap emphasizes the need for further study on trust and risk in the South African context. The next chapter will detail the research methodology used to explore these constructs and address the research questions.

CHAPTER THREE: RESEARCH METHODOLOGY

This chapter outlines the research methodology used in this study, beginning with the paradigm that guided the research. The research design and methodology, including the quantitative approach and survey method used to collect data, are described. The chapter also explains the population and sampling techniques used, the design of the research instrument, and the steps taken to ensure validity and reliability. Additionally, the data analysis strategy and ethical considerations are also addressed.

3.1. Research Paradigm

A research paradigm, according to Oates (2005), refers to a set of assumptions or perspectives concerning a specific aspect of the world. Understanding the paradigm that shapes the research context is advantageous for conducting research and acquiring or generating knowledge. For this study, the positivist paradigm served as the guiding framework.

Oates (2005) and Saunders et al. (2019) define the positivist paradigm as underlying the "scientific" method as it is based on what can be objectively observed and tested to assure unambiguous and precise knowledge. The positivist paradigm firmly maintains that the world "exists independently" and can be examined through observations, measurements, and model production (Oates, 2005). The researcher must be neutral and disassociate themselves together with their values from the research being conducted to avoid manipulating their findings (Žukauskas, Vveinhardt and Andriukaitiene, 2018; Saunders *et al.*, 2019).

In the context of this study, the positivist paradigm is particularly suitable as it supports the use of quantitative research methods, such as surveys, to empirically test theories and formulate hypotheses (Oates, 2005; Rehman and Alharthi, 2016). This approach also aligns with the study's objective to investigate the factors influencing the adoption of super apps in South Africa by collecting and analysing numerical data. Given that this study aims to produce objective and generalisable findings that contribute to both theoretical understanding and practical applications in the field of mobile application adoption, employing the positivist approach is the most appropriate choice.

3.2. Research Design and Methodology

Bhattacherjee (2012) defines the research design as a detailed strategy for gathering data in an empirical research study. As this research was explanatory, meaning that it sought explanations of observed phenomena, the quantitative research design which is intended to collect quantitative data such as numeric scores and metrics was employed to address the main research question " What are the factors that influence an individual's intention to adopt super apps in South Africa?". Data collection utilized the survey method, particularly effective for obtaining consistent data from large participant cohorts.

This approach is particularly suitable for discerning patterns in the data that can be extrapolated to a broader population beyond the surveyed group (Oates, 2005). Quantitative research also involves the testing of theories (Bhattacherjee, 2012). Following this methodology, this study utilized the trust-based decision-making model as a framework. The data collected during the data collection process was utilized to assess the theory's importance and validate the obtained results. Four hypotheses stemming from the model were examined to test the fit of the theory.

3.3. Population and Sampling

Bhattacherjee (2012) defines a sample as the chosen target population from which the researcher will collect data for their study. The sample for the research was selected using the non-probability sampling method of convenience sampling, where the sample is drawn from the population that is close to the researcher (Bhattacherjee, 2012). Due to time constraints, the snowball sampling method was also employed to recruit participants who met the criteria of being adults residing in South Africa and owning a smartphone. This involved asking initial respondents to share the study with other potential participants who met the study's criteria. This approach helped to expand the sample size and ensure a diverse range of participants.

Furthermore, the survey questionnaire was distributed by the university's registrar to 35,915 students at the University of the Witwatersrand. In total, 637 individuals responded, with 627 expressly consenting to participate. Of these participants, 620 were aged 18 or older and eligible to take part in the study.

By combining the sampling methods (convenience and snowball), the study was able to gather data from a varied and representative sample of the target population, thereby enhancing the reliability and generalisability of the findings.

3.4. Research Instrument Design

Data collection for this study was conducted utilising an online survey questionnaire deployed on the Qualtrics platform. The decision to employ a questionnaire as the data collection method was grounded in its suitability for studies where the primary unit of analysis, be it an individual, group, or object under investigation, is the individual, as elucidated by Bhattacherjee (2012).

A predefined questionnaire developed by Kim, Ferrin and Rao (2008) and adapted to align with the parameters of this study was administered to all participants, ensuring uniformity in questioning to prevent any selective bias in the process. The survey utilized a five-point rating scale, commonly referred to as a Likert-type scale, with labels ranging from 'Strongly Disagree' to 'Strongly Agree'. The table presented below illustrates the measurement of constructs in the questionnaire for this study, encompassing both the literature-derived and theoretical constructs.

Table 2: Research Instrument Design

Construct	Question
Intention	• INTENTION1: The experiences of others using the super app would influence my decision to adopt a super app. • INTENTION 2: Having a positive experience using the super app is important in deciding whether I should adopt the super app. • INTENTION 3: If I felt confident in my ability to use the super app I would be more likely to adopt it. • INTENTION 4: When considering adopting a super app, it is important that I have control over my personal data.
Trust	• TRUST 1: If others in my community recommend using a super app, I would be more likely to adopt a super app.

Construct	Question
	• TRUST 2: The attitude of my peers towards adopting a super app is an important factor to me. • TRUST 3: The reputation of the super app service provider plays a significant role in my decision to adopt a super app. • TRUST 4: Positive interaction with the super app would encourage me to continue using it in the future.
Perceived Risk	• RISK 1: When considering adopting a super app, it is important to me that the super app clearly communicates its data privacy and data ownership policies. • RISK 2: The super app's data privacy and security measures are important to me when deciding whether to adopt it. • RISK 3: I will still adopt a super app if my personal data such is shared with third parties to complete transactions within the super app. • RISK 4: I worry that adopting a super app could make me vulnerable to data privacy and security violations.
Perceived Benefit	• BENEFIT 1: Positive feedback on the benefits of using the super app from other people will encourage me to adopt it. • BENEFIT 2: The perceived benefits (e.g., the all-in-one app proposition) I gain from using the super app increase my willingness to adopt it. • BENEFIT 3: The convenience I gain from using the super app increases my willingness to adopt it. • BENEFIT 4: The benefits of ease-of-use impact my decision to adopt a super app.

3.5. Pre- & Pilot Testing

Given that the research instrument originated from a validated questionnaire by Kim, Ferrin, and Rao (2008), the developers of the trust-based decision-making model, a decision was made not to pre-test the research instrument before distributing the survey. The research instrument underwent pilot testing to improve its face validity and to

ascertain the comprehensibility of the questions for potential respondents. Five participants, comprising both individuals from the general population and peers in the Information Systems domain, were chosen for pilot testing. After the pilot test, slight adjustments were made to some of the questions based on the feedback received from the pilot test participants. Table 4 below outlines the modifications incorporated into the research instrument after the pilot test. The final research instrument is available in Appendix B of this document.

Table 3: Pilot Test Modifications

Before Pilot Testing	After Pilot Testing	Adjustment Made
The experiences of others using the super app influences my decision to adopt a super app.	The experiences of others using the super app **would** influence my decision to adopt a super app.	Incorporated the phrase "would influence my decision..." to mitigate potential leading elements in the question.
Positive interaction with the super app will encourage me to continue using it in the future.	Positive interaction with the super app **would** encourage me to continue using it in the future.	Altered the expression from "will encourage" to "would encourage" with the aim of diminishing any perceived leading influence in the context of the statement.
The super app's data security measures are critical when deciding whether to adopt it.	The super app's data privacy and security measures are **important to me** when deciding whether to adopt it.	Incorporated the phrase "important to me" in response to participant feedback during the pilot test, as the original formulation lacked clarity regarding the recipients of the specified security measures.

Before Pilot Testing	After Pilot Testing	Adjustment Made
I will still adopt a super app if my personal data is shared with third parties.	I will still adopt a super app if my personal data is shared with third parties **to complete transactions within the super app**.	Incorporated the phrase "to complete transactions within the super app" in response to feedback from pilot test participants who expressed uncertainty regarding the reference to third parties.
I worry that adopting a super app could make me vulnerable to financial loss.	I worry that adopting a super app could make me vulnerable to **data privacy and security violations**.	Modified the terminology from "vulnerable to financial loss" to "vulnerable to data privacy and security violations" to address the ambiguity surrounding the definition of "financial loss."
If I felt more confident in my ability to navigate technical issues with the super app, I would be more willing to adopt it.		This question was omitted in its entirety due to its lack of clarity.

3.6. Threats to Internal and External Validity

Bhattacherjee (2012) defines internal validity as testing the relationship between the cause and effect. Responses from individuals who took part in the pilot test of the study were excluded from the results survey to avoid compromising the internal validity of the research. However, as non-probability sampling was employed, the sample selection wasn't entirely random, and not all South African adults possessing smartphones took part in the survey.

External validity is the generalisability that can be applied to the results of this study to the entire population (Bhattacherjee, 2012). Using a non-random sampling method (convenience sampling) was an inevitable constraint in the study, considering the constraints imposed by available time and resources. However, the findings from this study can potentially be generalized to the South African adult population since the study received responses from over 600 participants, which surpassed the intended target of 384 participants. This exceeds the deemed sufficiency criteria maximum variability, a preference for a 95% confidence level, and a precision of ±5%.

3.7. Data Analysis Strategy

The data collected for this study was analysed using the IBM statistical software package (SPSS V29.0.2.0). Data analysis, according to Oates (2005) is the process of looking for data and drawing conclusions from the data collected. In this study, both descriptive and inferential analyses were applied to analyse the gathered data.

Bhattacherjee (2012) defines descriptive analysis as the statistical interpretation, totalling, and presentation of the relevant constructs or the relationships among these constructs. In contrast, inferential analysis involves hypothesis testing to evaluate theoretical propositions. To enhance internal consistency reliability, characterized by Bhattacherjee (2012) as a gauge of uniformity among various items within the same construct, Cronbach's alpha was employed.

Bivariate correlation was employed to identify relationships between the values for one variable and another, where the strength of the relationship is analysed using -1 and +1 to measure the correlations between the constructs listed above (Bhattacherjee, 2012). A matrix of correlations, delineating variable names in both the first row and column and indicating bivariate correlations between the variables in the respective cells, was utilised to examine the relationships among the variables in this study (Bhattacherjee, 2012).

To determine whether two variables were correlated, linear regression was used to predict the correlation between the two. The stronger the correlation coefficient, the better the prediction (Bhattacherjee, 2012). The abovementioned hypotheses were

tested to validate or reject the propositions for the sample. The null hypothesis, which is the assumption that no relationship exists, was used to ascertain the presence of a relationship among the constructs examined in this study (Oates, 2005).

3.8. Ethical Considerations

The School of Business Sciences' ethics committee approved this study unconditionally under protocol number **CBUSE2176**. The ethical clearance certificate is available in Appendix E of this document. The ethical protocols established by the University of the Witwatersrand were followed before conducting the survey. Before completing the questionnaire, participants were required to give informed consent, indicating their willingness to allow the researcher to utilise their responses. This consent form also stipulated that the participant's identity shall remain anonymous and that confidentiality will be maintained.

Participation in the study was completely voluntary, and if participants chose not to continue at any point in the questionnaire, they were welcome to stop. In such cases, their decision was respected without any attempt to force or persuade participants, and the response was disregarded. As this study has been completed, the data will be stored on a secure cloud storage platform for five years before it is destroyed. The participant information sheet and consent form are available in Appendix C and Appendix D, respectively.

3.9. Chapter Conclusion

This chapter has detailed the research methodology, including the guiding paradigm, research design, sampling methods, and data analysis strategy. Ethical considerations were also addressed to ensure the integrity of the study. The next chapter will present the results of the study.

CHAPTER FOUR: PRESENTATION OF RESULTS

This chapter presents the results of the study, based on data collected from the survey participants. Data pre-processing, including cleaning and outlier removal, was conducted to ensure the reliability and accuracy of the analysis. The following sections will detail the demographic information of the participants, the validity and reliability of the data, and the results of the hypothesis testing.

4.1. Introduction to Results

Throughout the data collection phase, 637 individuals engaged in the survey. Initially, from employing Cochran's formula to calculate categorical data assuming maximum variability, a desired 95% confidence level, and a precision of ±5%, a sample size of approximately 384 participants was deemed adequate for the study. Consequently, the study obtained 65.89% more responses than originally anticipated.

Notably, among this cohort, 620 participants explicitly affirmed that their age was above 18, indicated a comprehensive understanding of the voluntary nature of their involvement, and formally consented to commence their participation in the study. The study experienced a single instance of non-completion by 1 participant; consequently, their data has been systematically excluded from the subsequent analysis. Therefore, the study amassed a total of 620 responses (pre-screening,) which were subsequently subjected to analysis.

Data pre-processing methods, including data cleaning, were employed to prepare the collected data for analysis, which is crucial prior to statistical analysis or predictive modelling (Hair *et al.*, 2014). Eliminating missing data and outliers enhances the reliability and accuracy of the analyses, ensuring that the dataset is comprehensive and reflective of the studied phenomenon. Particularly in multivariate analysis, thorough data examination is essential due to the potential compounding effects of outliers, assumption violations, and missing data across multiple variables (Hair et al., 2014).

4.2. Demographic Information

The demographic data from the participants' responses was probed to understand the characteristics of individuals participating in the study and trends within the population included in the study. Respondents were first asked which gender they identify as. The sample consisted of 232 male respondents (37.4 %), 379 female respondents (61.4 %), 5 respondents (0.8%) who identified as non-binary/third gender and 4 respondents (0.6%) who preferred not to say which gender they identified as (N=620)

The bar chart in Figure 3 below gives an overview of the gender distribution among the individuals in this study.

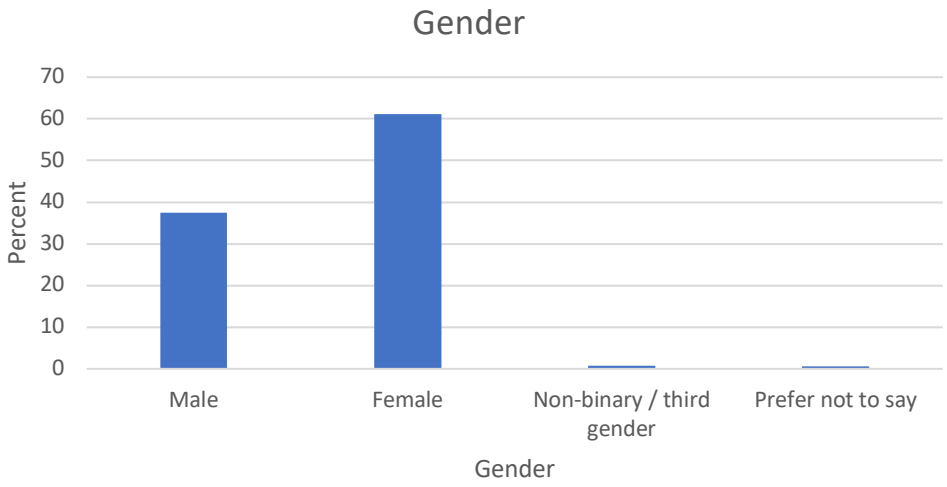


Figure 3: Gender Distribution of the study

Respondents were also asked their age. The sample consisted of 339 participants who were between 18-24 years old (53.3 %), 163 participants who were between 25-34 years old (25.6 %), 87 participants who were between 35-44 years old (13.7 %), 23 participants who were between 45-54 years old (3.6 %), 6 participants who were between 55-65 years old (0.9 %), and 2 who were older than 65 years old (0.3 %) (N=620).

The pie chart in Figure 4 below provides an overview of the age distribution among the individuals in this study.

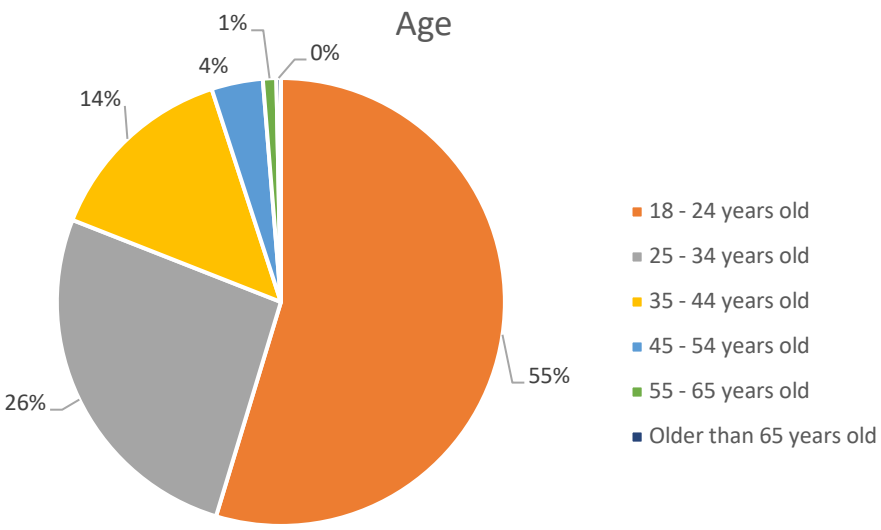


Figure 4: Age Distribution of the study

To ensure that the survey gathered responses exclusively from the intended sample population (individuals residing in South Africa and who own a smartphone), screening questions were introduced. The first screening question required the participant to confirm whether they resided in South Africa. 617 out of 620 participants confirmed that they lived in South Africa, while the remaining three indicated that they did not. Consequently, the sample size for this study was adjusted to 617 participants. Table 4 below gives an overview of the responses.

Table 4: Screening Question 1 Results

Do you live in South Africa?		
	Frequency	Percent
Yes	617	99.5%
No	3	.5%
Total	620	100

The second screening question required participants to confirm if they owned a smartphone. 600 out of 617 participants confirmed that they owned a smartphone, while the remaining seventeen indicated that they did not. Consequently, the sample size for this study was adjusted to 600 participants. Table 5 below gives an overview of the responses.

Table 5: Screening Question 2 Results

Do you own a smartphone?		
	Frequency	Percent
Yes	600	97.2%
No	17	2.8%
Total	617	100

4.3. Validity and Reliability

Before the data collected can be used to perform hypothesis testing, it was necessary to demonstrate the validity and reliability of the variables that were used to measure the super app adoption factors. A factor analysis, which is an interdependence method that aims to define the inherent structure among the variables in the analysis was conducted to explore the data structure by examining the correlation among the constructs of this study (Hair et al., 2014).

4.3.1. Validity Statistics

The Kaiser-Meyer-Olkin (KMO) test was used to ascertain the adequacy of the sample size for factor analysis. The KMO value in this study amounted to 0.757 which indicated the suitability of the data for factor analysis as values that exceed 0.600 are considered significant (Hair *et al.*, 2014). The data was also subjected to Bartlett's test of sphericity to evaluate the uniformity of variances and to identify the necessary level of correlation among the variables for conducting a correlation analysis (Hair *et al.*, 2014).

A Bartlett's test of sphericity with a statistically significant result where $p < 0.05$ suggested that there were adequate correlations among the variables to continue with the analysis (Hair *et al.*, 2014). In this study, $p < 0.001$ which indicated even greater statistical significance than $p < 0.05$. It indicates compelling evidence of significant correlations among the variables, fulfilling the requirements to advance with the analysis.

The results from these tests are depicted in Table 6 below.

Table 6: KMO and Bartlett's Test Results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.757
Bartlett's Test of Sphericity	Approx. Chi-Square	1554.971
	df	36
	Sig.	<.001

Factor loadings depict the degree of correlation between each variable and the factor, with higher loadings indicating a stronger association of the variable with that factor (Hair *et al.*, 2014). They serve to interpret the significance of each variable in defining the factors. Factors that are lower than .500 are not considered to be significant whereas variables exhibiting higher loadings are deemed more influential and play a greater role in characterising or labelling a factor (Hair *et al.*, 2014).

In such cases, the primary aim of factor analysis is to optimise the alignment of each variable with a distinct factor, often achieved through rotation of the factor matrix.
Hair et al. (2014) suggest that variables may be excluded if they meet any of the following criteria: Presenting insignificant loadings, displaying insufficient communality despite significant loadings, or indicating cross-loadings.

To uphold the validity of this study, certain variables were excluded from the analysis, including Intention 1, Intention 4, Trust 7, Trust 8, Risk 11, Risk 12, and Benefit 13. This was either because the factor loadings were either below .400, the unrotated factor matrix lacked a complete set of factor loadings (i.e., had significant cross-loadings), or it did not optimize the loadings of each variable on a single factor. This phenomenon may have stemmed from ambiguities in how the questions in the research instrument were formulated, resulting in varying loadings across different variables.

This resulted in a four-component solution for super app adoption questions (N =600). The four factors previously described align with dimensions that are identifiable and can be associated with concepts possessing sufficient content validity (Hair *et al.*, 2014). Table 15 below presents the Principal Axis Factor Analysis with Varimax Rotation (the default rotational method on SPSS). The single cross-loading on Intention 2 is not considered to be significant as it is below the threshold of .500.

Table 7: Rotated Factor Matrix

Rotated Component Matrix [a]				
	Component			
	1 Benefit	2 Risk	3 Trust	4 Intention
INTENTION 2				.912
INTENTION 3				.603
TRUST 5			.734	
TRUST 6			.905	
RISK 9		.903		
RISK 10		.913		
BENEFIT 14	.779			
BENEFIT 15	.842			
BENEFIT 16	.805			
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 5 iterations.				

A factor analysis with Varimax rotation was performed on the revised 9-item research instrument to confirm assumptions regarding normality, linear relationships, and variable correlations (Hair et al., 2014).

Table 8: Results from the Principal Axis Factor Analysis

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.261	36.230	36.230	3.261	36.230	36.230	2.351	26.125	26.125
2	1.587	17.636	53.866	1.587	17.636	53.866	1.674	18.597	44.722
3	1.071	11.895	65.761	1.071	11.895	65.761	1.444	16.046	60.768
4	.842	9.351	75.113	.842	9.351	75.113	1.291	14.345	75.113
5	.597	6.637	81.750						

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
6	.502	5.579	87.329						
7	.477	5.296	92.625						
8	.343	3.814	96.439						
9	.320	3.561	100.000						
Extraction Method: Principal Component Analysis.									

4.3.2. Reliability Statistics

Hair *et al.* (2014) defines reliability as consistent measurements of a variable across different occasions or conditions and suggests employing various diagnostic measures like Cronbach's alpha and an item-total statistics table to assess internal consistency, hence the approach undertaken for this study. The internal consistency of the measurement scales was assessed using the Cronbach's alpha (α) coefficient, with a threshold of 0.70 or higher considered reliable and acceptable (Hair et al., 2014). The reliability statistics value obtained through SPSS for all 9 items of this study was 0.753, indicating a commendable level of internal consistency for the scale. This measure is presented in Table 9 below.

Table 9: Cronbach's Alpha

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.753	.762	9

Additionally, an Item-Total Statistics table was generated to validate Cronbach's alpha and offer insights into how individual items contribute to the overall scale's reliability. Guidelines indicate that the correlations between individual items and the total score should be above .50, and the correlations between items themselves should be above .30 (Hair et al., 2014).

While some items in the item-total statistics for the variables of this study are depicted in Table 10 below reflect a score of less than .30, it was necessary to retain these variables as they measured key constructs (i.e. risk) of this study.

Table 10: Item Total Statistics

Item-Total Statistics					
Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
INTENTION 2	15.54	14.226	.373	.190	.740
INTENTION3	14.33	13.186	.488	.303	.722
TRUST 5	14.86	12.568	.496	.354	.719
TRUST 6	14.41	12.797	.324	.226	.758
RISK 9	15.51	14.073	.306	.460	.749
RISK 10	15.42	14.241	.247	.450	.758
BENEFIT 14	14.99	12.190	.571	.425	.706
BENEFIT 15	15.27	12.522	.589	.521	.705
BENEFIT 16	15.26	12.992	.574	.459	.711

4.4. Correlational Analysis

After conducting a factor analysis, composite scores were then calculated on the remaining variables for the four constructs of this study:

- Intention,
- Trust,
- Risk,
- Benefit.

Table 11 below illustrates the descriptive statistics for the composite variables utilized in the subsequent stage of data analysis.

Table 11: Descriptive Statistics for Composite Variables

Composite Variables										
	N	Min	Max	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
							Statistic	Std. Error	Statistic	Std. Error
Composite Intention	600	1.50	4.50	2.0150	.53798	.289	.908	.100	.741	.199
Composite Trust	600	1.00	5.00	2.3117	.79672	.635	.363	.100	-.162	.199
Composite Risk	600	1.00	5.00	1.4825	.66710	.445	1.795	.100	3.965	.199
Composite Benefit	600	1.00	5.00	1.7767	.63571	.404	.820	.100	1.164	.199

The composite scores were then used as input for Pearson's product-moment correlation coefficient to comprehend the strengths of the relationships between the variables, this is depicted in Table 12 below. Pearson's product-moment correlation coefficient was selected over Spearman's correlation due to the presence of a linear relationship between the variables and their adherence to the assumptions of normality (Field, 2018).

Table 12: Correlation Matrix on Composite Scores

	Intention	Trust	Risk	Benefit
Intention	1	.281**	.172**	.504**
Trust	.281**	1	.069	.404**
Risk	.172**	.069	1	.161**
Benefit	.504**	.404**	.161**	1
**. Correlation is significant at the 0.01 level (2-tailed).				

Hypothesis 1: A user's perceived risk (RISK) negatively affects a user's intention (INTENTION) to adopt a super app.

The relationship between Risk (M=1.4825; SD=.66710) and Intention (M=2.0150; SD=.53798) was analysed. The correlation between these variables produced a sample correlation coefficient of 0.172, which is statistically significant at the 0.01 level (r=0.172, p<0.01). This result indicates a positive and significant relationship between Risk and Intention, which does not support Hypothesis 1. Therefore, the null hypothesis cannot be rejected.

Hypothesis 2: A user's perceived benefit (BENEFIT) positively affects their intention (INTENTION) to adopt a super app.

The relationship between Benefit (M=1.7767; SD=.63571) and Intention (M=2.0150; SD=.53798) was analysed. The correlation between these variables produced a sample correlation coefficient of 0.504, which is statistically significant at the 0.01 level (r=.504, p<0.01). This supports Hypothesis 2, indicating a positive and significant relationship between Benefit and Intention thus rejecting the null hypothesis.

Hypothesis 3a: The user's trust (TRUST) negatively affects the user's perceived risk (RISK) of a super app.

The relationship between Risk (M=1.4825; SD=.66710) and Trust (M=2.3117; SD=.79672) was analysed. The correlation between these variables produced a sample correlation coefficient of 0.069, which is not statistically significant at the 0.01 level, considering that the p-value (p< 0.01) exceeds the significance level. Therefore, this is insufficient evidence to support Hypothesis 3a to support the hypothesis that a user's perceived risk negatively affects their trust in a super app.

Hypothesis 3b: A user's trust (TRUST) positively affects the user's intention (INTENTION) to adopt a super app.

The relationship between Trust (M=2.3117; SD=.79672) and Intention (M=2.0150; SD=.53798) was analysed. The correlation between these variables produced a sample correlation coefficient of 0.281, which is statistically significant at the 0.01 level (r=0.281, p<0.01). This supports Hypothesis 3b, indicating a positive and significant relationship between Trust and Intention thus rejecting the null hypothesis.

In summary, the findings provide valuable insight into the factors influencing the adoption of super apps in the South African context. Three out of the four hypotheses were supported however, there was insufficient evidence to support the hypothesis that perceived risk negatively affects trust in a super app. Moreover, the results underscore the importance of trust in driving adoption intention, with a significant positive correlation observed between trust and intention to adopt a super app.

Table 13 below outlines the hypotheses that were supported and not in this study.

Table 13: Hypothesis Testing - Supported vs Not Supported

Hypothesis	Supported	Not Supported
Hypothesis 1: A user's perceived risk negatively affects a user's intention to adopt a super app.		X
Hypothesis 2: A user's perceived benefit positively affects their intention to adopt a super app.	X	
Hypothesis 3a: The user's trust negatively affects the user's perceived risk of a super app.		X
Hypothesis 3b: A user's trust positively affects the user's intention to adopt a super app.	X	

4.5. Chapter Conclusion

This chapter has presented the results of the study, including demographic information, validity and reliability assessments, and hypothesis testing outcomes. The findings of this study provide valuable insights into the factors influencing the adoption of super apps in South Africa. Two out of the four hypotheses were supported, highlighting the significant roles of trust and perceived benefits in shaping user intentions. The next chapter will discuss these results in detail, interpreting their implications for theory and practice.

CHAPTER FIVE: DISCUSSION

In this section, the findings corresponding to each of the abovementioned research questions are discussed. The research questions are revisited, and an examination of the results outlined in the previous chapter is presented. These findings are subsequently aligned with the constructs from the trust-based decision-making model to ascertain consistency or divergence from the proposed hypotheses.

5.1. Factors that influence an individual's intention to adopt super apps in South Africa

The primary focus of this study was to address the research question: 'What are the factors influencing individuals' intentions to adopt super apps in South Africa?' To answer this question, a literature review was conducted. The review explored various aspects that could affect an individual's decision to adopt a super app, including convenience, usefulness, security, personal information, privacy, and trust. Through this exploration, three main factors, namely, trust, risk, and benefit, emerged as significant influencers of super app adoption. These factors align with the constructs in the trust-based decision-making model by Kim, Ferrin and Rao (2008).

5.2. To what extent do these factors affect an individual's intention to adopt super apps in South Africa?

The sub-research questions sought to determine the impact of these factors on super app adoption among South African adults. Addressing these questions involved employing quantitative methods to analyse data collected from the targeted population.

5.2.1. To what extent does perceived risk affect an individual's intention to adopt super apps in South Africa?

The study investigated the influence that perceived risk has on the intention to adopt a super app. Based on the trust-based decision-making model by Kim, Ferrin, and Rao (2008), the hypothesis posited that a user's perceived risk negatively affects their intention to adopt a super app. However, the findings from this study indicate a positive and significant correlation between risk and intention, with a correlation coefficient of 0.172 which contradicts the hypothesis and suggests that individuals are still likely to adopt a super app even if there is a perceived risk associated with its use.

Several studies in the literature on super apps have highlighted perceived risks, such as the collection of extensive personal, behavioural, and transactional data, leading to data privacy and security breaches, unauthorized data sharing, and the monetization of user data, as deterrents to the intention to adopt super apps (Hong, Lu and Pan, 2020; Acevedo-Viloria *et al.*, 2021; Zhang *et al.*, 2022; Wydymus, 2023).

This unexpected finding may be attributed to the novelty of super apps in the South African context, where respondents may not fully grasp the potential risks or their implications when providing personal and transactional data to complete FICA verifications and having this sensitive data stored in a central place or the risk of exploitation by hackers.

Such data typically includes names, cell phone numbers, addresses, card information, and, in some cases, ID numbers, which super apps require to comply with South Africa's Financial Intelligence Centre Act (FICA) 38 of 2001. This act aims to combat financial crimes such as money laundering and terrorist financing by mandating financial institutions and those that carry out functions akin to those of financial institutions such as super apps to collect accurate and up-to-date customer information (South African Government, 2001).

5.2.2. To what extent does perceived benefit affect an individual's intention to adopt super apps in South Africa?

The study hypothesised that there is a positive relationship between the perceived benefits and adoption intention of a super app. Several super app adoption studies highlighted various benefits including convenience which signifies the ease and efficiency of task completion or service access using the super app; usefulness which relates to the degree to which an app effectively meets users' needs and objectives; and platformisation which refers to the transformation of standalone apps into "all-encompassing" platforms that offer a wide range of services and functionalities within a single ecosystem (Steinberg, 2020; Ngubelanga and Duffett, 2021; Hentzen, Hoffmann and Dolan, 2022; Jia, Nieborg and Poell, 2022; Krisnamurti, Ratnawati and Widi, 2022; Momaya, 2022; Hasselwander, 2023a; Wydymus, 2023; Zhu, Fang and Lim, 2023).

The hypothesis derived from Kim, Ferrin, and Rao's (2008) trust-based decision-making model suggests that a user's perceived benefit positively affects their intention to adopt a super app. The findings of this study align with this hypothesis suggesting that as users perceive greater benefits from utilising a super app, their intention to adopt it also increases. Specifically, the correlation analysis revealed a strong positive relationship between perceived benefits and adoption intention, with a correlation coefficient of 0.504, indicating that perceived benefits significantly influence the intention to adopt super apps. This implies that as users recognise the benefits of using a super app, they are more likely to adopt it, aligning with previous research on the perceived benefits of super apps. Therefore, this study provides additional evidence that perceived benefits indeed heighten the intention to adopt a super app, even within the South African context, where super app usage is not as widespread as it is in markets such as Asia.

5.2.3. To what extent does trust affect an individual's intention to adopt super apps in South Africa?

This study also investigated the influence that trust has on the adoption of super apps. Existing literature on super app adoption, including studies by Hong, Lu, and Pan (2020), Ngubelanga and Duffett (2021), Nurchayati, Riyadi, and Sartini (2022), and Zhu, Fang, and Lim (2023), consistently suggest that user trust in a mobile application leads to greater willingness to use and continue using the app, provided it meets their needs. Essentially, when users feel confident in the brand and its services, they are more likely to trust the brand and consequently adopt and utilise its services (Nurchayati, Riyadi, and Sartini, 2022).

The findings of this study align with the existing literature and the hypothesis derived from the trust-based decision-making model, which states that a consumer's trust positively affects the consumer's intention to adopt a super app. Specifically, the correlation analysis revealed a strong positive relationship between trust and adoption intention, with a correlation coefficient of 0.281, indicating that trust significantly influences the intention to adopt super apps. This is expected since individuals are more inclined to adopt something when they perceive it as trustworthy, which highlights the importance of trustworthiness in driving acceptance and adoption of novel technologies such as super apps.

Additionally, the study also hypothesised that a user's trust negatively affects the consumer's perceived risk of adopting a super app. However, the findings from this study did not show a strong enough relationship between trust and perceived risk to support this hypothesis. In other words, the level of trust in a super app does not significantly affect the perceived risk associated with it, based on the data analysed. It is possible that in the context of this study, other factors may have played an influential role in shaping users' perceptions. For instance, the novelty of super apps in the South African context, combined with users' limited understanding of potential risks, could have mitigated the impact of trust on perceived risk. Additionally, factors such as convenience and perceived benefits may have overshadowed the influence of trust on perceived risk.

Some existing studies suggested that becoming familiar with the application builds trust, and consistent usage can diminish or eliminate psychological barriers preventing users from using the app (Hong, Lu and Pan, 2020). However, from this study, we cannot conclude that lower trust leads to higher perceived risk when it comes to adopting a super app. While existing literature often suggests that trust reduces perceived risk, the results from this study indicate a more nuanced relationship.

These findings emphasise the importance of considering contextual factors and user perspectives when investigating the factors influencing technology adoption. There is a need for additional research to explore these dynamics and to guide the formulation of strategies aimed at enhancing trust and addressing perceived risk in the context of super app adoption.

5.3. Summary of Discussion Chapter

The study aimed to identify and analyse the factors influencing individuals' intentions to adopt super apps in South Africa. The primary research question explored the factors affecting the adoption of super apps. The literature review identified trust, risk, and benefit as significant influencers. These factors align with the constructs in the trust-based decision-making model. The sub-research questions of this study focused on the extent to which these factors (trust, perceived risk and perceived benefit) impact super app adoption among South African adults, using quantitative methods to analyse the data.

The first hypothesis (H_1) suggested that perceived risk negatively affects the intention to adopt a super app. However, the findings showed a positive and significant correlation between risk and intention, contradicting the hypothesis. This indicates that individuals may still adopt super apps despite perceived risks. The novelty of super apps in South Africa and limited awareness of potential risks might explain this unexpected result.

The second hypothesis (H_2) posited a positive relationship between perceived benefits and adoption intention. The findings supported this hypothesis, revealing a strong positive correlation between perceived benefits and adoption intention. This suggests that as users recognize more benefits, their intention to adopt super apps increases, consistent with previous research.

The study also examined the impact of trust on adoption intention (H_{3b}) which, supported by existing literature, suggested that trust positively affects adoption intention. The findings confirmed this, showing a significant positive correlation between trust and adoption intention. However, the study did not find a strong relationship between trust and perceived risk (H_{3A}), indicating that trust does not significantly affect perceived risk in this context. Other factors, such as the novelty of super apps and users' limited understanding of risks, may have influenced this outcome.

The findings of this study emphasise the importance of considering contextual factors and user perspectives in technology adoption studies. Further research is needed to explore these dynamics and develop strategies to enhance trust and address perceived risks in the context of super app adoption.

5.4. Chapter Conclusion

This chapter discussed the study's findings, highlighting the significant roles of trust, risk, and perceived benefits in super app adoption in South Africa. Trust was found to be a key factor influencing user intentions. The practical implications for developers and policymakers were also addressed. The next chapter will summarise the study, discuss the limitations, and provide recommendations for future research.

CHAPTER SIX: CONCLUSION

This chapter summarises the findings of the study, which aimed to identify the factors influencing the adoption of super apps in South Africa. It explores the roles of trust, perceived risk, and perceived benefit and their impact on user intentions. The chapter also discusses the theoretical and practical implications of the findings, highlights the study's limitations, and suggests areas for future research. Finally, it concludes by reflecting on the contributions of the study to the existing body of knowledge on super app adoption.

6.1. Summary of Findings

This study sought to address the primary research question: What are the factors that influence an individual's intention to adopt super apps in South Africa? To achieve this goal, three factors identified through a thorough review of relevant literature on super apps were examined: trust, perceived risk, and perceived benefit. Additionally, the three sub-questions were explored: How do (1) trust, (2) perceived risk, and (3) perceived benefit affect an individual's intention to adopt super apps in South Africa?

Following this, a researcher-administered survey was conducted with a sample of 600 individuals, to evaluate the factors influencing the intention to adopt a super app. Individuals of various age groups, who own a smartphone and reside in South Africa participated in the research. The survey aimed to explore how adoption factors influence the adoption of super apps among individuals in South Africa, specifically addressing the sub-research questions.

This was accomplished by employing quantitative research techniques to examine the relationships between these factors and to assess the significance of these factors and their impact on super app adoption. The findings from this analysis were used to assess the validity and precision of the modified super app adoption model employed in this study, which is derived from the trust-based decision-making model proposed by Kim, Ferrin, and Rao (2008). The study found a significant positive correlation between trust and intention to adopt a super app, supporting the hypothesis that trust positively influences adoption intention.

Moreover, there is a positive correlation between perceived benefit and adoption intention, suggesting that users are more inclined to adopt super apps when they perceive greater benefits. However, unexpectedly, the correlation between perceived risk and adoption intention was positive and significant, suggesting that higher perceived risk does not necessarily deter users from adopting super apps. In addition, the study did not find a statistically significant relationship between trust and perceived risk, indicating that trust may not directly mitigate perceived risk in the context of super app adoption.

6.2. Implications for Theory

The trust-based decision-making model was employed in this study to investigate the impact that trust, risk, and benefit have on the adoption of super apps. These adoption factors formed part of the original trust-based decision-making model which was created by Kim, Ferrin and Rao (2008). The findings from this study suggest that trust and perceived benefits may have a stronger influence on the adoption intention of super apps compared to the perceived risk of adopting a super app in the current South African context.

These findings carry substantial implications for scholars delving into the adoption of super apps, offering a valuable foundation for future research frameworks. While most studies reviewed in the literature relied on the technology acceptance model (TAM) as a theoretical lens, the decision to employ the trust-based consumer decision-making model in this study is justified by the inherent e-commerce and transactional elements of super apps.

This unique perspective enhances the understanding of super app adoption dynamics. As Gartner (2022) has predicted a surge in super app popularity in the coming years, future studies could delve deeper into how trust, perceived and unnoticed risks, and benefits not only influence adoption but also sustain usage of super apps, building upon the foundations laid by this study.

6.3. Implications for Practice

The findings of this study offer valuable insights for individuals or organisations aiming to build and promote the adoption of a super app in South Africa. Firstly, the significant positive correlation between trust and adoption intention underlines the importance of building trustworthiness in super app platforms. Practitioners looking to develop super apps should prioritise measures to enhance user trust through transparent data handling practices and robust security protocols.

Moreover, the positive correlation between perceived benefit and adoption intention highlights the significance of emphasising the value proposition of super apps to users. This could be done by highlighting the diverse functionalities and conveniences offered by super apps, thereby enhancing their perceived benefits and adoption likelihood.

The positive correlation between perceived risk and adoption intention suggests that users may be willing to overlook certain risks associated with super apps. However, practitioners should not disregard risk mitigation efforts. Instead, they should focus on addressing user concerns through effective risk management strategies, and continuous improvement of platform security.

Furthermore, the absence of a statistically significant relationship between trust and perceived risk implies that trust-building initiatives may not directly mitigate perceived risks. Therefore, practitioners need to adopt a holistic approach that addresses both trust-building and risk mitigation strategies to foster greater user confidence in super app adoption.

6.4. Limitations of the Study

This study encountered several limitations worth noting. Firstly, given the novelty in both academic and technological spheres of the research phenomenon, particularly outside of Asia, including South Africa, there was limited academic literature available on the factors that affect super app adoption to conduct the literature review. To address this challenge, any published journal article that mentioned “super apps” was relied upon to gather relevant literature.

Secondly, the survey method provided a limited depth of understanding, especially on the hypothesis that gave an unexpected finding. The survey method typically provides limited opportunities for respondents to elaborate on their answers or provide context (Bhattacherjee, 2012).

Finally, many of the responses from this survey were gathered after the survey was distributed to the University of the Witwatersrand student community. This study utilised non-probability sampling methods, specifically convenience sampling and snowball sampling. As a result, the sample may not fully represent the target population, potentially affecting the generalisability of the findings.

6.5. Areas of Future Research

Potential areas for future research based on this study could include conducting qualitative studies such as interviews or focus groups that could offer a deeper understanding of the underlying motivations and perceptions driving super app adoption. Longitudinal studies to track changes in super app adoption behaviour over time to gain valuable insights into the evolving dynamics of adoption factors could also be conducted.

Furthermore, future studies could also compare super app adoption patterns and factors across different cultural contexts such as focusing on specific generational cohorts such as millennials or “Gen-Z” to identify cultural-specific influences on adoption behaviour.

Considering the limitation mentioned above, where the respondents of this study were predominantly students at the University of the Witwatersrand, future research could explore a wider distribution of the survey across the country to ensure a more representative sample.

Finally, future studies could also explore the impact of other emerging technologies such as artificial intelligence and blockchain on super app adoption to provide insights into future trends in mobile application adoption.

6.6. Conclusion

This research has enriched the current body of super app literature by underscoring the pivotal roles of trust, risk, and benefit in influencing super app adoption. The identification of these factors primarily emanated from a comprehensive review of existing literature on super apps. The theoretical framework employed in this study, the trust-based decision-making model by Kim, Ferrin, and Rao (2008), was chosen due to its alignment with the adoption factors elucidated in the literature review.

Quantitative data collection methods, specifically a survey questionnaire, were subsequently used to assess and determine the degree of association among the adoption factors and to gauge their significant impact on the proposed model. By making use of this technique, trust and benefit emerged as the most significant factors for adoption intention. By using the trust-based decision-making model proposed by Kim, Ferrin, and Rao (2008), this research made an additional contribution to the field of super app literature by filling a research gap in the context of super app adoption in South Africa.

Previous studies predominantly concentrated on super app adoption in the Asian region, employing the technology acceptance model (TAM) as the prevailing lens for investigating super app adoption. This study presented an opportunity to explore the impact of trust, risk, and benefit on adoption intention within the South African context. The findings not only enrich the scholarly discourse but also provide practical guidance for individuals and organisations navigating the evolving landscape of digital technology adoption.

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APPENDIX A: LITERATURE CONCEPT TABLE

Source	Perceived Benefit	Perceived Risks	Trust
Hentzen, Hoffmann and Dolan (2022)	X	X	
Wallet and Hirschfield (2022)		X	
Yang *et al.* (2023)		X	
Huang and Miao (2021)	X		
Jia, Nieborg and Poell (2022)	X		
Wydymus (2023)	X	X	
Hasselwander (2023)	X		
Santoso, Mi An and Juwono (2022)			X
Zhang *et al.* (2022)		X	
Hong, Lu and Pan (2020)		X	X
Acevedo-Viloria *et al.* (2021)		X	
O'Farrell (2020)			X
Nurchayati, Riyadi, and Sartini (2022)			X

APPENDIX B: FINAL RESEARCH INSTRUMENT

Super App Adoption Questionnaire	
Screening and Demographic Questions	
Gender	☐ Female ☐ Male ☐ Prefer not to answer
Age:	☐ < 18 years old ☐ 18 – 24 years old ☐ 25 – 34 years old ☐ 35 – 44 years old ☐ 45 – 54 years old ☐ 55 – 65 years old ☐ Older than 65 years old
Do you reside in South Africa?	☐ Yes ☐ No
Do you own a smartphone?	☐ Yes ☐ No

Super App Adoption Questions	Please select the number that best represents how you feel about the statement				
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Construct 1: Intention					
1. The experiences of others using the super app influences my decision to adopt a super app.	1	2	3	4	5
2. Having a positive experience using the super app is important in deciding whether I should adopt the super app.	1	2	3	4	5
3. If I felt confident in my ability to use the super app, I would be more likely to adopt it.	1	2	3	4	5
4. When considering adopting a super app, it is important that I have control over my personal data.	1	2	3	4	5
Construct 2: Trust					
1. If others in my community recommend using a super app, I would be more likely to adopt a super app.	1	2	3	4	5
2. The attitude of my peers towards adopting a super app is an important factor to me.	1	2	3	4	5

Super App Adoption Questions	Please select the number that best represents how you feel about the statement				
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
3. The reputation of the super app service provider plays a significant role in my decision to adopt a super app.	1	2	3	4	5
4. Positive interaction with the super app would encourage me to continue using it in the future.	1	2	3	4	5
Construct 3: Risk					
1. When considering adopting a super app, it is important to me that the super app clearly communicates its data privacy and data ownership policies.	1	2	3	4	5
2. The super app's data privacy and security measures are important to me when deciding whether to adopt it.	1	2	3	4	5
3. I will still adopt a super app if my personal data such is shared with third parties to complete transactions within the super [illegible]	1	2	3	4	5
4. I worry that adopting a super app could make me vulnerable to data privacy and security violations.	1	2	3	4	5
Construct 4: Benefit					

Super App Adoption Questions	Please select the number that best represents how you feel about the statement				
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1. Positive feedback on the benefits of using the super app from other people will encourage me to adopt it.	1	2	3	4	5
2. The perceived benefits (e.g., the all-in-one app proposition) I gain from using the super app increase my willingness to adopt it.	1	2	3	4	5
3. The convenience I gain from using the super app increases my willingness to adopt it.	1	2	3	4	5
4. The benefits of ease-of-use impact my decision to adopt a super app.	1	2	3	4	5

APPENDIX C: PARTICIPANT INFORMATION SHEET



Good day,

My name is Mpumelelo Ndaba. I am a masters student in Information Systems at the University of the Witwatersrand, Johannesburg. I am conducting a research study on Super Apps, investigating **"the role of trust and risk in the adoption of super apps in South Africa."**

I am inviting you to take part in a questionnaire. The data collected will be handled confidentially. The survey is designed to be completed within 10 minutes. To be eligible to participate, you should be an adult residing in South Africa. Your involvement in this study is entirely voluntary, and you may choose to discontinue your participation at any point by simply closing the survey window or tab. Your identity will remain anonymous, with no personal identifiers or data collected beyond your demographic details.

If you have any questions during or afterwards about this research, please get in touch with me at the details listed below. This study will be written up as a research report available online through the university library website. If you wish to receive a summary of this report, I will be happy to send it to you (optional). The data collected from this research project will be stored in a password-protected computer and kept for five years. With your permission, the data collected from this research project may be used by other researchers in an anonymised format.

Should you require additional information regarding the study, please get in touch with me at Mpumelelo Ndaba 1117811@students.wits.ac.za. My supervisor can also be contacted at mitchell.hughes@wits.ac.za

Yours sincerely,
Mpumelelo Ndaba

APPENDIX D: CONSENT FORM



Title of project: The Role of Trust and Risk in the Adoption of Super Apps in South Africa.

Name of researcher: Mpumelelo Ndaba

I consent to participate in this research project. The research has been explained to me and I understand what my participation will involve.

The research study was explained to me. I understand what this study is about.	YES	NO
I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.	YES	NO
I agree that my responses may be used in the researcher's study and give them permission to publish.	YES	NO
I agree that my participation will remain anonymous, my name or other identifying data will not be used by the researcher in their research report.	YES	NO
I agree that other researchers may use the information I provide in the survey (depending on their own ethics clearance being obtained) but my name and any personal information will not be used or passed on.	YES	NO

…… (signature)
…… (name of participant)
…… (date)

APPENDIX E: ETHICAL CLEARANCE CERTIFICATE

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

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

CLEARANCE CERTIFICATE **PROTOCOL NUMBER: CBUSE2176**

PROJECT TITLE	The role of trust and risk in the adoption of super apps in South Africa.
INVESTIGATOR	Mpumelelo Ndaba
SCHOOL/DEPARTMENT OF INVESTIGATOR	School of Business Sciences
DATE CONSIDERED	02 February 2024
DECISION OF THE COMMITTEE	Approved Unconditionally
RISK LEVEL	Minimal Risk
EXPIRY DATE	31 December 2027

ISSUE DATE OF CERTIFICATE 07 February 2024 **CHAIRPERSON** _____
(Neetu Ramsaroop)

cc: Supervisor: Mitchell Hughes

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.

_____ 07 , 02 , 2024
Signature **Date**

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

APPENDIX F: SUPERVISOR SUPPORT LETTER

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG | Wits Business School
Sculpting global leaders

14 February 2024

MCom (Information Systems)

Wits Business School
Faculty of Commerce, Law and Management (CLM)
University of the Witwatersrand

Supervisor Support Letter: Circulation of survey/questionnaire

This letter serves to confirm that Mpumelelo Ndaba (1117811) is currently under my supervision for her MCom (Information Systems) research report. I would be extremely grateful if you would arrange for her survey/questionnaire to be circulated to the university's staff and student communities.

Should you require any further information I can be reached at the contact details below.

Sincerely



Mitchell Hughes
Programme Director: Digital Programmes
Wits Business School
Tel: 071 247 9576
E-mail: mitchell.hughes@wits.ac.za

APPENDIX G: TURNITIN REPORT

Mpumelelo Ndaba - The role of trust and risk in the adoption of super apps in South Africa.docx

ORIGINALITY REPORT

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