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2025
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PropTech & The South African Residential Real Estate Sales Process: Exploring Technology-Enabled Streamlining and Technology Usage

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Research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business.

Johannesburg, 2025

ABSTRACT

The South African real estate industry is increasingly developing and exploring technological innovations and its applications. However, technological applications to the traditional residential real estate sales sector remains unexplored. Challenges have been documented relating to the the inefficiencies of the residential real estate sales process which have highlighted an opportunity to explore how property technology (PropTech) can be applied to streamlining the process and overcoming common challenges.

This research explores how PropTech solutions may be used to enable streamlining of the South African residential real estate sales process. Furthermore, this research aims to understanding the factors that influence adoption of new technology. In the South African real estate context, the study deployed a qualitative based research approach, conducting semi-structured interviews with clients (past residential property buyers and sellers) and professional residential sales property practitioners (real estate agents).

The findings revealed that many PropTech solutions, when applied effectively and along the sales process can contribute towards streamlining the process. Additionally, the findings highlighted the role of property practitioners in influencing the use and trust of PropTech Solutions. South African regulatory limitations, as well as financial costs were also found to be inhibitors of adoption. These insights aimed to contribute to the growing body of literature in real estate technology in South Africa.

KEYWORDS

Property Technology; PropTech; Residential Real Estate Sales Process; Technology Acceptance Model, Task-Technology Fit Model, Technology Adoption

DECLARATION

I, Makoba Naomi Mogodi, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: Makoba Naomi Mogodi Signature: 

Signed at Johannesburg, South Africa

On the 27th day of February 2025

DEDICATION

To my late father, thank you for instilling in me the belief in lifelong learning.

&

To my loving mother, for inspiring me daily.

ACKNOWLEDGEMENTS

Thank you to all the participants of the study for sharing honestly and openly. This would not be possible without their voices. Thank you to my Aunt Dineo for her unwavering support. Thank you to my classmates for instilling perseverance and who I am grateful to have shared the journey with. Thank you to my siblings, who by allowing me to be me, allowed me to regain my confidence.

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LIST OF ACRONYMS

Put these into alphabetical order.

TTF – Task-Technology Fit (Model)

TAM – Technology Acceptance Model

CHAPTER 1. INTRODUCTION

1.1 Statement of purpose

This research sought to explore how PropTech solutions could streamline the South African residential real estate sales process and the influences behind PropTech usage.

1.2 Background of the study

In today's society, digital technology and innovations have transformed the global landscape across multiple industries and countries (Armstrong & Lee, 2024). While some industries are at the forefront of acceptance and usage of new digital technology innovations, other industries (such as real estate) have not been as rapid in integrating such technologies (Lizam, 2019). The real estate industry, including the residential sector has been lagged in the adoption of new technological innovation (Baum, 2017), however, this has begun to change with the emergence of property technology (PropTech), and how it is evolving the industry through optimizing processes and improving efficiency (Saiz, 2020).

The real estate industry is often referred to as being relatively conservative in its propensity to adopt new technological innovations (Baum, 2017; Lizam, 2019; Warburton, 2016); however, in recent years, the adoption of property solutions across commercial real estate, as well as new developments, has shown the potential of success in the adoption of these technologies (Baum, 2017; Saiz, 2020). While these sectors have found beneficial uses of PropTech and are at the forefront of technology integration, other more traditional sectors have not fully harnessed PropTech and digital transformation despite their intentions (Clark & Marshall, 2023).

According to a 2022 South African housing market report (2022), the real estate industry contributes a large proportion (8.9%) of economic value to the country. Moreover, the residential real estate sector within this industry contributes significantly to society. The literature currently in existence has highlighted the

impact of technology in various contexts relating to the South African residential real estate industry (Clark & Marshall, 2023; Karam et al., 2022), however, little information exists on what impact PropTech solutions can have in the residential real estate sales sector in South Africa (Karam et al., 2022).

This research, therefore, sought to explore the current PropTech landscape for residential real estate sales in South Africa and examined how PropTech solutions could be an effective digital innovation in streamlining existing sales processes if used by relevant parties.

1.3 Research Problem

The consequences of failing to adapt to digital technology transformations will show themselves sooner rather than later (Clark & Marshall, 2023). Thus, while the real estate industry has traditionally been perceived as “slow-moving and conservative”, (Baum, 2017; Warburton, 2016) exploration of how digital technology solutions will impact the industry needs to be a ‘wake-up’ call.

As far as the traditional real estate sectors – such as residential real estate sales, the applications of property technology have appeared in silos, where individual technology solutions are used on a task-by-task basis (Ojekunle, 2023). Compared to 78% of UK property practitioners, only 40% of South African property practitioners use digital platforms over and above traditional property listing platforms (SA Property Association, 2023). Thus, the effectiveness of PropTech solutions may be determined by how they are used collectively in a unified process (Baum et al., 2020; Naeem et al., 2023).

For existing traditional real estate agencies/brokerages and property practitioners (the new official term for real estate agents), a consolidated view of available PropTech should not be overlooked. Many traditional real estate agencies vary regarding their rank of technological innovation maturity, and only 39% consider their acceptance and usage of automation of processes to be between 40% and 60% (Clark & Marshall, 2023). Nonetheless, the majority of these organisations believe that adaptation to the global digital transformation is necessary (Clark & Marshall, 2023).

In the South African Residential real estate sales context, the process arguably has room for improvement. Inefficiencies related to time delays, documentation inaccuracies and unclear progression steps in the sales process have resulted in dissatisfaction, added costs and resource mismanagement (Ojekunle, 2023). PropTech solutions may be used to streamline the process, increase efficiency, and provide better experience and satisfaction across all participants and activities (Ojekunle, 2023).

While one aspect of PropTech considers its functional benefits in streamlining processes, the other should include its practical acceptance and usage, given the contextual geographic and demographic landscape in which it may exist.

Therefore, the combination of PropTech's applicability and appropriateness is ultimately what may facilitate the use of these technologies and drive the efficiency of the traditional process.

The research aims to contribute towards driving practical change by reflecting the benefits and impact of the technologies available in the industry and how they may improve the processes and address common challenges encountered.

1.4 Research Questions

- Research Question 1 (Primary): How can current PropTech solutions be used to streamline the South African residential real estate sales process?
- Research Question 2 (Secondary): How can parties in the South African residential real estate sales process be influenced to use available PropTech solutions?

1.5 Rationale

This research aimed to contribute to the body of literature concerning PropTech and its practical applications. Additionally, it focused on the residential real estate sales sector and how PropTech had the potential to contribute positively to the stakeholders involved.

Compared to the global progression of PropTech development, South Africa faces limitations which have subsequently delayed the integration of property technology on a larger scale.

The impact of Digital Technology and change is transforming industries in real time (Armstrong & Lee, 2024). The organisations that adopt them have been shown to outperform those that do not respond to the changes. Technological change is an important factor when observing the drivers behind the socioeconomic growth and development of a country (Munasinghe & Munasinghe, 2024).

The exploration and understanding of PropTech from a practical and user-level perspective in residential real estate sales were expected to provide a deeper understanding of the acceptance and usage of existing and future PropTech in South Africa. Furthermore, gaining insights that would inform future PropTech developments was a potential outcome of the study (Clark & Marshall, 2023).

Conducted in the context of South Africa, this research sought to contribute to the global perspective of findings in the field and present practical recommendations for similar countries and demographics.

The integration of technology with existing practices in real estate ultimately requires collaboration among stakeholders. The importance lies not only in creating PropTech solutions that improve an organisation but also contribute on a societal scale to the ultimate clients. This approach could create opportunities for competitive advantage and increase the chances of technology success in the market (Clark & Marshall, 2023).

Within the PropTech ecosystem, buyers and sellers can directly access technology that can assist them effectively in pursuing a residential property purchase or sale. It is, therefore, important to explore what factors facilitate acceptance and usage of PropTech by its intended audiences and, in such instances, what PropTech solutions are most applicable and appropriate given the landscape. Disintermediation is another concern of professionals in the industry (Asensio-Soto & Navarro-Astor, 2022; Baum et al., 2020). This may raise interest and concern surrounding the position and role of Property Practitioners

in this context, and therefore, the potential of disintermediation and how to mitigate this should also be explored (Ahearne & Rapp, 2010).

The outcomes of this research could help existing real estate stakeholders gain an understanding of PropTech solutions and their practical applications and recognize PropTech as a consolidated, unified approach as opposed to individual technology solutions used in isolation. Moreover, stakeholders in the residential real estate market could gain insight into determining factors of use that appealed to their clients.

1.6 Delimitations of the Study

The following were delimitations of the study:

a) PropTech applications in the Commercial, Construction, Development, and Exclusive Investment sectors of Real Estate sales will be excluded.
b) Applications of PropTech in the Rental, Leasing and Property Management sectors will be excluded.
c) While Agency and brokerage play a role in the sales process, they will not be considered a primary focus.
d) Other stakeholders (such as Financial and Legal entities) will not be the primary focus.
e) Pre-Qualified Sellers and Buyers (Past and Prospective) and Registered South African Property Practitioners will be the primary focus of the study.

1.7 Definition of terms

PropTech (Property Technology): The technological revolution characterized by the implementation of technology innovations in the property (real estate) industry (Górska et al., 2022).

Real Estate/Property Industry: The Real Estate/ Property industry includes all buying, selling, renting and management of property (including investment, residential, commercial, construction, development, and industrial) (Harrison et al., 2024).

Real Estate Sales Process: The process, activities and actions pertaining to selling a real estate property and the consequent transfer of ownership (Floyd & Allen, 2011; Harris & Friedman, 2013).

Residential Real Estate Sales Sector: the sub-category of Real Estate property concerned with selling residential property such as single-family homes, multifamily housing, and purpose-built rental housing (Galloway, 2021).

Sales Property Practitioner: A professional (also known as a realtor, real estate agent, or agent) who provides services and facilitates activities on behalf of clients relating to the sale of a property (Mgiba, 2023).

Brokerage (Real Estate Agency): An organisation or entity that provides professional services to clients and contracts individual Property Practitioners as representatives of the organisation (Floyd & Allen, 2011).

1.8 Assumptions

- Participants had a reasonable understanding of the residential real estate sales process.
- Participants had adequate knowledge and capability of digital technology, mobile usage and internet access.

1.9 Chapter 2 Outline

The following chapter introduces the relevant literature regarding the global and South African real estate industry, describing the current context and exploring overall trends and activities. Next, the South African residential real estate process is described in detail, and challenges and limitations are explored. The literature defines and describes PropTech in the global and local context and then proceeds to explain its uses and impact. This is further contextualised in the residential real estate sales process. Finally, the section describes the factors that influence the adoption of technology and specifically PropTech. The chapter then presents the theoretical and analytical models that serve as a foundation for conducting the research. Lastly, the conceptual model is presented to contextualise all the relevant and important topics of the research.

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

The literature review examined, discussed, and evaluated the key concepts and theories related to the study's research questions. First, an overview of the residential real estate sales process was presented, and common issues related to the process were analysed. Next, an overview of the PropTech landscape related to the residential real estate sales process was explored. Specific PropTech solutions and their benefits were evaluated. Additionally, Global and South African PropTech companies were presented about each PropTech solution.

Once an overview of the PropTech and the South African residential real estate sales process was explored, the literature review then evaluated the existing PropTech solutions based on their relevance, appropriateness, and applicability to the South African context, as well as the specifics relating to the residential real estate sales process. In this regard, the factors that influenced the acceptance, adoption, and use of PropTech and the drivers of resistance from a user perspective were discussed. Finally, the identification of the most appropriate and most applicable PropTech solutions to the study was summarised and justified by theoretical, empirical, and practical sources.

The literature review concluded with an analytical framework that explored the key theoretical frameworks relating to the study. A conceptual framework derived from the theory and constructs of the research topic was presented, and finally, the research questions and hypotheses were presented.

2.2 PropTech in the Global Context

The following section defines PropTech and discusses the general categorizations of PropTech, highlighting similarities and differences in this

regard. The section also provides an overview of the global landscape of PropTech, including its history and current trends.

2.2.1 *PropTech Definition and Scope*

The current literature defining PropTech refers to PropTech as any technology and digital innovation used in the real estate industry by any stakeholders (Baum, 2017). It relates to digital technology innovations that encompass a vast range of applications within real estate (Shaw, 2018). This includes all sectors, such as residential, development and commercial real estate, and all functions, such as building management, smart homes, sales and rentals and general brokerage operations (Tagliaro et al., 2024; Ding & Sun, 2024). As with many technologically innovative solutions, PropTech has areas of implementation challenges, but despite this, it offers numerous benefits such as increased transparency, cost efficiency and operational optimization (Kim & Kim, 2021; Clayton et al., 2019).

2.2.2 *Major Categories of PropTech*

There is a host of different categorisations of PropTech, either categorized according to the industry or sector within real estate which it serves or categorized according to the technology function it serves (Tagliaro et al., 2020; Shaw, 2018). The inconsistencies highlight the ongoing development of technology and applications in the real estate sector.

A Report published in 2017 by Andrew Baum (2017) from the University of Oxford summarized the categories of PropTech according to table 1 below:

Table 2.1: PropTech Verticals and Horizontals (Baum, 2017).

	Real Estate FinTech	Shared Economy	Smart Real Estate
Information	yes	yes	yes
Transactions/Marketplace	yes	yes	
Management/Control			yes

The PropTech Verticals (Real Estate FinTech, Shared Economy and Smart Real Estate) refer to the sub-sectors of real estate within which PropTech has been developed. The horizontals (Information, Transactions/Marketplace) refer to the primary drivers and functions of that PropTech. Comparing this taxonomy to various other categories and types, Baum (2018) showed the overlap of other literature in categorizing the technology.

In another paper, the young nature of PropTech is acknowledged as attributing to the variations in a categorization framework (Tagliaro et al., 2020). The paper compares the existing PropTech categories and finally suggests the suitability of the RSA (2019) framework that addresses the impact of technology or real estate processes (Tagliaro et al., 2020).

Figure 2.1 below (RSA, 2019) shows a taxonomy of technology impact and can be used in the case of PropTech to categorize the types of PropTech applicable to the study.



Figure 2.1: A Taxonomy of Technology Categories (RSA, 2019)

The literature shows vast differences in PropTech categorisation and varies on the applications that are included or excluded. Nonetheless, the definition remains a commonality. There is no agreed categorisation of PropTech, and existing literature aims to clarify PropTech applications but does not provide a consensus on a superior structure, leaving studies to apply the categorization approach most applicable.

2.2.3 *Global PropTech Trends*

Globally, PropTech is emerging as a viable solution for appraisals, property transactions and overall management of property across residential and commercial (Aihie, 2020). Over 50 Countries have organised networks related to PropTech and PropTech development, forming communities such as PropTechRussia, Austrian PropTechInitiative, PropTechBelgium, SwissPropTech, PropTechDach, PropTechSpain, UKPropTechAssociation, and PropTechAsia (Siniak et al., 2020). PropTech has opened doors for innovations in real estate, including product innovation and reimagining traditional business models. Additionally, the benefits of increased productivity, profitability (Asensio-Soto & Navarro-Astor, 2022), improved efficiency in operations (Ojekunle, 2023), and customer-facing services are driving forces behind organisations adopting this technology (Siniak et al., 2020).

In Africa, the PropTech trends are similar and growing, with research in a Nigerian study showing that 71% of PropTech users experience the benefits of improved decision-making, reduced costs and overall efficiency improvements (Ojekunle, 2023).

An additional discussion in PropTech trends pertains to the real estate workforce and how it may be impacted. Literature suggests the potential disintermediation of practitioners (Asensio-Soto & Navarro-Astor, 2022), while contrastingly, there is evidence suggesting the emergence of new roles within the industry (Saiz, 2020).

The global PropTech landscape is fast evolving to the emerging trends within the real estate industry, however in global conversations related to PropTech, African and developing nations contribution is limited. Given the differing economic and cultural real estate industries across the globe, it was valuable to explore technology and trends that are applicable in a practical sense for developing countries, and specifically South Africa.

2.3 The South African PropTech Landscape

2.3.1 *PropTech in South Africa*

Major PropTech categories in South Africa include data & analytics, management software, innovation in user experience and digital innovation, to name a few (Clark & Marshall, 2023). Data & Analytics form a major component in South African PropTech, where insights on customer behaviour patterns, market trends, and data-supported negotiations play a role in efficiency and competitive advantage (Clark & Marshall, 2023). Management software in real estate has emerged to provide data processing, communication and operational productivity (Clark & Marshall, 2023).

2.3.2 *Key Players and Market*

Property technology in Africa and South Africa is evolving. Many organizations and associations have emerged in response to the global trends of PropTech.

An overview of the South African PropTech landscape can be seen in Figure 2.2 below:



Figure 2.2: South African PropTech Map (Godoy & Boyle, 2019)

The figure provides an overview of the prominent PropTech companies in South Africa, highlighting Services & Software, as well as Selling & Letting as having greater market focus (Godoy & Boyle, 2019).

There is a growing number of South African companies in the PropTech space (See Figure 2.3 below). It is estimated that there are currently 150 PropTech companies in South Africa and numerous startups in development (Clark & Marshall, 2023). Additionally, many associations and industry bodies, such as Africa PropTech Forum (APF), SA PropTech Association, and PropTech Africa Association, have emerged. (Clark & Marshall, 2023)



Figure 2.3: South African PropTech Landscape (Clark & Marshall, 2023)

2.3.3 *Macro and Market Influences of PropTech Growth*

While technology-enabled innovation is growing in South Africa, some challenges inhibit its adoption and integration on a large scale. These include factors such as inconsistencies in foundational infrastructure (power, connectivity), the legal and regulatory environment and a lack of local funding in the industry (Clark &

Marshall, 2023). Despite these challenges, PropTech development and adoption continue to grow, albeit at a slower rate.

Additionally, on a market level, the executive and industry level awareness of the effectiveness of technological innovation and integration in providing efficiency form part of the major driving influences of PropTech in the industry (Godoy & Boyle, 2019). This is reflected in the growing number of industry bodies standing for this technology and investing in research that provides empirical evidence to attest to the technology's benefits (Godoy & Boyle, 2019).

However, the ability to implement technology solutions is found to be significantly lower compared to similar international companies (Warburton, 2016). While global companies consider technology as a critical business driver, South African real estate companies have been found to be less experienced and, thus, less likely to use these technologies (Warburton, 2016). Therefore, while the global PropTech community continues to grow, South Africa may lag behind.

This emphasised the importance of the study's aim to grow the body of academic literature within the PropTech space as it relates to the South African real estate industry. Before discussing how PropTech can be used in the real estate industry, the literature on the real estate processes for contextual purposes of the study was presented. The following section begins with a definition and an exploration of the residential real estate sales process.

2.4 The South African Residential Real Estate Sales Process

This section evaluated and discussed literature and concepts relating to the South African residential real estate sales process. It further highlighted the most common issues and challenges related to the process.

2.4.1 *Overview of the Traditional Residential Real Estate Sales Process*

The residential real estate sales process describes the key stages and activities involved in the sale of a single residential property, usually from a seller to a single

buyer (Floyd & Allen, 2011; Harris & Friedman, 2013). While the details during the process can vary from agency to agency, (Apelqvist & Carlberg, 2018) it generally follows the process in Figure 2.4. The figure outlines the pre-sale, during, closing, and post-sales phases, which outline the overall process. Each phase has multiple steps, which will be discussed in detail below.



Figure 2.4: The 4 Phases of the Residential Real Estate Sales Process

a. ***Phase 1: Pre-Sale***

The pre-sale process includes all activities before listing a property (See Figure 2.5 below). This describes the pre-negotiation between a seller and a property practitioner in reaching an agreement for service provision. During the pre-sale phase, a seller approaches a brokerage or agency (Harris & Friedman, 2013). They work with a property practitioner to discuss their needs and requirements, the terms of service, and their responsibilities and role (Floyd & Allen, 2011).



Figure 2.5: The Pre-Sales Phase of the Residential Real Estate Sales Process

A property practitioner will conduct a *property valuation* to determine the property's value. They should provide the seller with a market report, discuss the selling price and commission, and provide suggestions on home improvements and repairs in preparation for the sale. The seller is responsible for *property preparation,* which includes all the activities related to the home improvements

and repairs, as well as overall decluttering of the home in preparation for viewings.

The property practitioner is also responsible for collecting *legal and financial documentation* from the seller. This includes information relating to the property (bills), proof of ownership (title deed and identity verification), and disclosure forms (of property condition for the buyer). A *mandate* contract is signed between the property practitioner and seller, detailing the specifics of the right to sell on the seller's behalf. The property practitioner is responsible for capturing images of the property and information relevant to prospective buyers (amenities, etc) in preparation for listing the property for sale.

b. *Phase 2: During-sale*

Once a mandate document has been signed, the during-sales process follows. It includes listing and marketing the property, scheduling and facilitating viewings for prospective buyers, presenting the Offer to Purchase (OTP) to the seller, and facilitating the price negotiation leading to the final contractual agreement of sale (see Figure 2.6 below).



Figure 2.6:The During-Sale Phase of the Residential Real Estate Sales Process

Throughout this phase, the property practitioner is responsible for *communicating* with the seller to provide regular updates regarding the status of the property, feedback from prospective buyers, and potentially price counselling (Floyd & Allen, 2011) if prospective buyers show little interest in the market. Additionally, the property practitioner is responsible for buyer qualification, which reviews whether the prospective buyer has the financial capability to purchase the property.

c. *Phase 3: Closing*

Once there is a signed agreement of sale between the buyer and seller, the property is officially sold but enters the closing phase of the sales process (See figure 2.7 below). Both parties conduct a *final walk-through* as a final inspection of the agreed-upon condition of the property. There is a *disbursement of funds*, where the buyer's funds are transferred to the seller, usually through a 3rd party (Floyd & Allen, 2011).



Figure 2.7: The Closing Phase of the Residential Real Estate Sales Process

There is additional *signing of documentation*, including the title deed, mortgage (for the buyer), and a closing disclosure form. Following this is the *title transfer*, which transfers ownership from the seller to the buyer (Harris & Friedman, 1984/2013). Once all necessary documentation is signed and monetary funds are transferred, the *keys are handed over* to the buyer.

During the entire process, the property practitioner is responsible for facilitating communication and documentation between all parties, including legal and financial entities, where necessary. It is their role to ensure the smooth transition of sale (Harris & Friedman, 1984/2013).

d. *Phase 4: Post-Sale*

During the post-sale process, the sale and closing are concluded, and the keys are handed over to the buyer. Again, the property practitioner facilitates this practical transfer and ensures that everything occurs seamlessly (Floyd & Allen, 2011).

Based on the service received by the seller and buyer, they may become loyal advocates and maintain communication with the agency or property practitioner. Generally, it is an opportunity for the property practitioner to add these clients to

their database and manage the relationship with them via marketing communications. About 40% of property practitioners stay in contact with their clients after a sale is concluded (Rudansky-Kloppers & Strydom, 2004). The goal of this phase is to maintain contact to receive future opportunities through these clients (either via referral or advocacy).

The overview of the residential real estate sales process sought to provide a foundation of the context and focus area of the study, and further to highlight the various steps and stages involved in the process itself. The following section explored the literature on issues, challenges and inefficiencies related to the process. This formed part of the study's foundation in exploring the use of PropTech in problem-solving and improvement of real estate processes.

2.4.2 *Issues, Challenges and Inefficiencies in the Traditional Process*

The overall sales process has characteristics of being lengthy, complex, and time-consuming (Apelqvist & Carlberg, 2018; Naeem et al., 2023; Ploythanachai et al., 2023). There are common issues that arise and will be discussed below.

a. *Financing Issues*

The issues concerning financial capabilities and circumstances apply to both buyers and sellers (Oladiran & Dickins, 2024). Buyers often express interest in purchasing a particular property but have either not been qualified yet (approved for a mortgage) (Floyd & Allen, 2011), or even if they have been pre-qualified, they later do not meet the requirements due to changes to their credit score and financial standing (Ehrs & Lindfors, 2018). This means that while an offer can be accepted and signed, changes in the buyer's financial position will only cause the sale to be cancelled later during the closing stage.

Conversely, the seller may choose to sell their property due to financial distress or a need for financial liquidity (Consumer Affairs Victoria, 2012). This can impact how the seller negotiates the surrounding commission and the asking price (Floyd

& Allen, 2011). Furthermore, this can prompt sellers to sell even when market demand is down, thereby accepting a purchase price below their desired price.

b. *Inspection Problems*

While due diligence is often undertaken during the sales process, problems are sometimes discovered during home inspections (after an OTP is made), including defective items such as structural problems, pest infestations, or outdated systems (Apelqvist & Carlberg, 2018). This may cause the need for renegotiation or even the deal's breakup.

c. *Appraisal Challenges*

Inconsistencies between the price made at the time of the sale and the appraised value oftentimes are the roadblocks (Górska et al., 2022; Putatunda, 2019). If so, the buyer has to be lucky to find additional funds. Appraisals can also work against a seller (Oladiran & Dickins, 2024), who may find out later that the listed price for their property does not match the indicative market price (Floyd & Allen, 2011). Literature shows how this challenge relates to an underlying lack of transparency in the real estate sales process for both buyers and sellers (Asensio-Soto & Navarro-Astor, 2022).

d. *Title Issues*

Title Deed issues often occur during the real estate sales process (Harris & Friedman, 2013). Property title issues arising from unresolved ownership claims may cause closing delays or problems with the closing (Floyd & Allen, 2011). In such instances, the documentation and verification of documentation plays an important role in preventing and future legal, financial or domestic issues further along the process (Floyd & Allen, 2011).

e. *Contract Disputes*

In some cases, the buyer and the seller may disagree about some terms of the purchase agreement (OTP), like contingencies, timelines or even the final price(Ahearne & Rapp, 2010; Harris & Friedman, 2013)So, buyers and sellers are likely to be at odds. Additionally, the seller and the property practitioner may

disagree on the terms of the mandate regarding commission percentage and listing price.

f. ***Market Conditions***

The real estate sales market is cyclical, and therefore, changes in the property market may lead to changes in sale prices, demand, and the time it takes to complete the transaction (Górska et al., 2022; Karam et al., 2022). Helping the seller understand the role of market fluctuations can assist when this issue arises in the absence of mutual understanding (Floyd & Allen, 2011); properties often stay on the market much longer than was originally anticipated.

g. ***Emotional Factors***

Emotional turmoil might kick in during negotiations, especially when selling among parties who are very fond of their homes. As a result, random irrational decisions or screaming matches may occur during the selling process. Emotional factors also contribute to price negotiations, where both parties may fail to meet an agreement due to personal reasons.

h. ***Closing Delays***

Problems with the proper documentation, the procurement of finances or the successful completion of inspections might be reasons behind the delay in closing (Apelqvist & Carlberg, 2018). The processing of financing and delays thereof are cited as delaying contributors in the process (Mgiba, 2023).

2.4.3 *Conclusion of Residential Real Estate Sales Process*

The purpose of the section was to outline the phases of the residential real estate sales process, highlighting the important actions and activities of each phase and the relevant parties involved. In addition, the common issues relating to the process were discussed to highlight a number of inefficiency gaps relating to the process. This led to the next section, which discussed PropTech as it relates to the residential real estate sales process, as well as PropTech solutions that may address the common issues and inefficiencies of the process.

2.5 Technology-Enabled Streamlining of the Residential Real Estate Sales Process

Certainly, the real estate industry is experiencing a significant transformation with the involvement of PropTech (Property Technology) (Clark & Marshall, 2023). They are inventive approaches that have been presented to the market in recent years to optimise the residential real estate sales process concerning its efficiency, accessibility and effectiveness (PwC & PropTech Lab, 2023).

While PropTech presents many opportunities, there are still barriers such as traditional mindsets that may hinder the growth of new innovations (Ullah et al., 2018) and therefore, each technology solution explored in this section, considers existing success as well as limitations or challenges associated with the technology. However, as shown in a 2023 study in Bangkok, PropTech was found to positively impact business operations and customer satisfaction when introduced in the residential real estate sales process (Ploythanachai et al., 2023). Below is an outline of the most relevant and applicable residential real estate sales process PropTech solutions.

2.5.1 *Property Listings:*

Property Listing PropTech refers to the technology involved in online platform listings of property for sale (Baum et al., 2020). It includes online platforms—either real estate websites or multi-listing platforms (that consolidate syndicated listings across the internet) (Naeem et al., 2023). The key features of these platforms include filtered searches and keyword searches (Oladiran & Dickins, 2024).

2.5.2 *Virtual Reality Tours*

Virtual Reality Tours is an additional subset of property listing technology (Chowdhury, 2021). The rise of VR tours became prevalent during the COVID-19 pandemic when physical movement was restricted (Ehrs & Lindfors, 2018). However, it has come to be more widely used. The virtual reality tours provide a semi-immersive virtual reality, allowing users to view a property as if they were

physically there in person (Carrillo, 2008). It is accessible on most devices and can increase the chances of prospective buyers making contact to view and/or purchase the property (Oladiran & Dickins, 2024). Conversely, VR tours can assist prospective buyers in deciding on having to schedule a viewing or attend a showhouse (Oladiran & Dickins, 2024). Virtual tours have been shown to improve the decision-making of prospective buyers during their property search, as well as enhance their overall experience (Ehrs & Lindfors, 2018).

2.5.3 *Agent Matching*

Agent Matching refers to technology that allows users to refine and select an agent or agency for their home-selling or home-buying purposes (Katchen, 2024). Currently, most individuals use search engines or word of mouth to find a suitable agent. Agent Matching PropTech allows for more personalised and efficient matching based on Agent experience and expertise, location, and property preferences (Katchen, 2024). Hoom is a new matchmaking service that connects estate agents and property sellers (HOOM, 2024). AI has also been used as the backbone technology of agent-matching (Katchen, 2024). Prospective buyers and sellers can input their preferences and requirements into a system and instantly receive personalised recommendations of agencies and property practitioners (Katchen, 2024).

2.5.4 *Digital Contracts & Digital Document Exchange*

Digital contracts refer to the legally binding contractual agreements used throughout the real estate sales process that exist digitally (Naeem et al., 2023). This technology phenomenon highlights the digitalisation and dematerialization of technology innovation (Márquez, 2024). Solutions such as *Adobe*, *DocuSign* and PandaDoc are examples of technology used across industries that can be applied in the residential real estate sales process (Polovinka, 2024). In the context of Real Estate sales processes, it allows for all documentation to be digitalised, stored, shared and signed securely (Warburton, 2016). Digital documentation has been shown to accelerate processes by 30% in a case study for *PurpleBrick* (A UK-based real estate platform) (Baum et al., 2020), highlighting

how this form of PropTech may contribute to streamlining the sales process for sellers, buyers, and property practitioners. While the digitalization of documentation is not a new or innovative technology, its use and adoption in real estate has not become the industry norm (Lee, 2023).

2.5.5 *Remote Closings & Consultations*

Remote Closing refers to the final sale closing of a real estate sale (Baum, 2017; World Economic Forum, 2021a). Traditionally, the sale closing occurs in person, where the property practitioner would travel back and forth between clients, lenders, and attorneys, ensuring all documentation is submitted and signed and the final payment is made (Harris & Friedman, 2013). Remote closing requires pre-closing documentation preparation and remote identity verification, followed by a remote signing, notarisation and fund transfer, and then digital document storage, remote recording and remote reporting (Norton, 2018).

Essentially, technology can facilitate the entire transaction with all relevant parties, all remotely (Norton, 2018). This improves the efficiency of the process and reduces time due to travelling. In America, remote closings have shown to increase drastically in a short period, with a 43% growth recorded in 2 years (from 2019) (Polovinka, 2024). This provides a global contrast to how South Africa's regulations may hinder PropTech adoption applied to the same context. However, in South Africa, there are still technological adoption concerns, regulatory compliance issues (Clark & Marshall, 2023), cybersecurity concerns and a potential negative impact on user experience. Additionally, the importance of face-to-face contact remains a consideration within the process (Asensio-Soto & Navarro-Astor, 2022). Moreover, the buyer in the process can more easily use this system compared to the seller.

2.5.6 *Crowdfunding*

Crowdfunding is a FinTech solution that allows individuals to pool financial resources to invest (Harrison et al., 2024). Applied to residential property sales, crowdfunding enables the joint purchase of a residential property. Although it is

inherently a FinTech solution and has applications related to equity of real estate investments (ESCP Business School, 2023), the role it plays in the purchase of a residential property and how it impacts the buyer and the process as a whole can indeed be significant (Baum et al., 2020; Saiz, 2020).

2.5.7 *Market Data, Insights, & Analytics*

Technology use in the gathering, understanding and decision-making related to various facets of residential property sales is a significant contributor to the changing landscape of real estate in South Africa (Clark & Marshall, 2023). Real Estate sales often face an information asymmetry problem, where important information of the market, property and parties involved is not equally accessible or known (Tagliaro et al., 2021). Throughout the entire sale process, important information for buyers, sellers, and property practitioners helps decision-making and improves efficiency and transparency. Thus, technology and innovative digital solutions in this realm are applicable and useful. The key PropTech solutions regarding market data collection, analysis, and insights are evaluated below.

a. *Automated Valuation Models*

Technologies like comparable sales analysis and pricing models are examples of PropTech innovation in automated valuation modelling (Oladiran & Dickins, 2024). Success has been shown with *Lianjia*, a China-based platform specialising in property valuation, which has been effective in implementing technology innovations to real estate (Saiz, 2020). Exercised within the residential real estate industry in South Africa, these technologies provide real estate professionals with enhanced tools for accurate property evaluation and thus result in better decision-making and added value to clients during sales processes (Baum et al., 2020).

i. **Comparable Sales Analysis**

A CMA or Comparable Sales Analysis is a concept adapted in real estate to assist in evaluating the price of a property by juxtaposition to similar properties that have recently been sold within the neighbourhood (Saull et al., 2020). CMA PropTech

tools often possess the following features: database integration, automated reporting, market trends analysis and user-friendly interfaces (Siniak et al., 2020).

ii. Pricing Models

Pricing Models decompose the value of the property into the characteristics and features that are essentially responsible for its price (Putatunda, 2019). PropTech solutions that apply this type of model typically consist of feature valuation, dynamic pricing models and visualisation tools (Siniak et al., 2020). These models have been shown to be effective in justifying property prices using machine learning, which aims to increase the accuracy of pricing and reduce discrepancies (Putatunda, 2019).

b. *Predictive Analytics*

i. Predictive Analysis for Listings

Predictive analytics in real estate utilises data-driven algorithms that predict future property values based on historical data, market tendencies, and economic prospects (World Economic Forum, 2021). This analysis provides insights into the listing market (properties for sale) and can suggest current and future pricing and timing. This PropTech solution typically includes machine learning models (property and region similarity algorithms) (Putatunda, 2019) and market trend algorithms (economic indicator-based analysis) (World Economic Forum, 2021). A study in 2019 evaluated various machine learning algorithms and found them to be effective in property pricing predictions and highlighted their effectiveness when used in India's property market (Putatunda, 2019). Compared to other PropTech, predictive analytics research is still growing but shows promise, nonetheless. Moreover, predictive analysis in PropTech is used for geospatial analysis (Baum, 2017; World Economic Forum, 2021).

ii. Demand Modelling

Demand modelling tools project the demand for properties based on economic conditions and, in doing so, attempt to predict future demand (Karam et al., 2022). These typical applications usually rely on dynamic data analytics, which observes

socio-demographic and economic changes to anticipate demand for various property types, as well as behavioural insights, which seek to gain insight into engagement and interests based on user behaviour with property listings (Munasinghe & Munasinghe, 2024).

c. *Web Scraping*

Web scraping allows for the automated collection of property listing data from various real estate websites (Baum et al., 2020; World Economic Forum, 2021). The key aspects of this listing data aggregation process include automated data collection, real-time updates and data normalisation for effective data extraction and intelligence (Naeem et al., 2023).

2.5.8 *Brokerage (Property Practitioner) Operations*

PropTech solutions for professionals' operations are a collection of technological innovations that aim to improve the efficiency, productivity, and profitability of real estate brokerage firms (Ahearne & Rapp, 2010; Kirk, 2019; Lizam, 2019). These solutions streamline processes, improve customer interactions, and provide valuable insights (Oladiran & Dickins, 2024), ensuring that property practitioners can navigate the complexities of the real estate market effectively (Ahearne & Rapp, 2010)The divisions and sections related to these solutions are mostly from the categories of Customer Relationship Management (CRM), marketing, Property Information, Automation, and Workflow Optimization.

a. *Customer Relationship Management (CRM)*

i. **Automated Communications Management**

Customer relationship management involves the targeting, nurturing, tracking, conversion, insights and database management of potential (leads) and current clients (Baum, 2017). For a property practitioner, using marketing automation and available social media and digital technologies to conduct these tasks is a valuable approach (Baum et al., 2020; Saull et al., 2020).

Leads (referring to potential buyers and sellers) can be tracked, nurtured and ultimately converted to a client (for which monetary remuneration is received in exchange for service) (Mugunthan & Kalaiarasi, 2017). For existing clients (in the pipeline of the residential real estate sales process), managing updates, communication and documentation and automating updates can facilitate a smooth process and satisfaction (Acosta et al., 2024) while minimizing costs and time associated with a sale. Furthermore, the implementation of customer relationship management solutions has the potential to increase market share and profit for brokerages due to increased efficiency in communication (Mugunthan & Kalaiarasi, 2017).

Technologies such as Chatbot, Email and direct marketing platforms (Oluwunmi & Agara, 2023), and social media are just some examples of technologies that have been shown to play a significant role in the residential real estate sales process (Oladiran & Dickins, 2024).

Various platforms offer integration of digital communication platforms that allow users to access communications from clients from multiple digital online sources (Mugunthan & Kalaiarasi, 2017).

b. *Property Information*

i. Property and Owner Information

Property Information technology includes the individual and aggregated consolidation of all information relating to a property or market (Floyd & Allen, 2011). When working with a single seller, a property practitioner often requires documentation and information relating to the property in question (Consumer Affairs Victoria, 2012). Specific characteristics relating to a property's size, zoning and location are important aspects that inform the mandate negotiation during a residential sale. Additionally, information about the seller and their ownership status is also valuable information required in a sale.

ii. Condition Assessment

Condition assessment and documentation refer to the condition of a property and the inspection and disclosure of the property (Consumer Affairs Victoria, 2012; Harris & Friedman, 2013). Numerous applications provide digitally captured inspection information and allow for comprehensive detail. This includes tools for ascertaining the physical condition of the properties, identifying the repairs, and calculating the costs of such repairs.

c. *Automated Scheduling*

i. Appointment Booking

Automated tools provide customers with the option of making arrangements for them to view properties or for them to have consultations with property practitioners at suitable times, which is the preferred way of booking appointments on the part of customers (Mugunthan & Kalaiarasi, 2017).

d. *Workflow Optimization*

i. Task Automation

Property practitioners benefit from any tasks in their regular schedule that they can automate (Mugunthan & Kalaiarasi, 2017). This usually consists of administrative tasks and can free time to focus on client-specific responsibilities and enhance their overall service delivery. Task automation technology has been shown to reduce manual labour tasks and improve efficiency (Oluwunmi & Agara, 2023). Literature has also found that PropTech solutions can benefit task optimisation during the sales process, with findings showing up to 72% improvement in task performance (Acosta et al., 2024).

ii. Collaboration Tools

Collaboration tools are like communication apps and item trackers where members of the team can be effectively kept informed on the way things are done in the brokerage operation (Oladiran & Dickins, 2024).

2.5.9 *Conclusion of PropTech Solutions in Real Estate Sales Process*

This section presented PropTech solutions that apply holistically to the residential real estate sales industry. It also reflected the existing scarcity of research publications related to these technologies and how, similarly to studies in this PropTech, there are limitations in evaluating them (Ullah et al., 2018). To understand the technological landscape of PropTech, a description of the literature relating to the existing PropTech solutions was explored.

The following section of the literature review examines and evaluates the acceptable usage of PropTech solutions within the context of South Africa and further discusses the current technology landscape of South Africa and aspects that promote technology acceptance and usage, as well as specific and contextual aspects that lead to resistance and inaccessibility of PropTech solutions.

2.5.1 *Proposition 1*

Having provided a definition and description of current PropTech solutions related to the research study and an evaluation of the current residential real estate sale process, a proposition relating to the primary research question was presented.

Proposition 1: A combination of PropTech solutions that fit the characteristics of tasks undertaken during the residential real estate sales process can streamline it.

2.6 Adoption and User Behaviour towards PropTech Solutions

2.7 PropTech Acceptance and Usage in South Africa

It can be suggested that the use of PropTech solutions in streamlining the residential real estate sales process is primarily determined by the correct fit (and appropriateness) (Goodhue & Thompson, 1995; Warburton, 2016). This

suggests the functional purpose of the technology and its degree of alignment with the various tasks in the process (Ahearne & Rapp, 2010). However, the availability of each PropTech solution in South Africa does not directly suggest its use. Only through actual use can PropTech solutions streamline the process (Górska et al., 2022). Therefore, this section examines and evaluates factors relating to the acceptance, use, and precursors for use in South Africa.

2.7.1 *Acceptance and Adoption of PropTech in South Africa*

South African Real Estate organisations are aware but somewhat less responsive to the impact of PropTech on their market positioning and their overall survival (Clark & Marshall, 2023). Several major issues are responsible for the acceptance and adoption of PropTech in South Africa's residential real estate market. Generally, the acceptance of new technology is predicated on perceived usefulness and perceived ease of use (Lai, 2017; Ocampo, 2024). Similar to other developing countries, unique challenges surrounding financial ability, access, awareness and trust of technology and infrastructure inadequacies contribute to the usage (or lack thereof) of PropTech solutions (Ojekunle, 2023). The key factors influencing acceptance and use will be discussed below.

2.7.2 *Factors Influencing Acceptance & Resistance*

a. *Technological Infrastructure*

The constant increase in mobile devices and the Internet in South Africa provides the ideal platform for using PropTech applications, however, overall technology infrastructure and internet access remains a challenge (Warburton, 2016). With internet access, individuals have greater options for finding solutions that streamline residential real estate sale processes. Therefore, to fully realise the potential of PropTech solutions, infrastructure concerning technology is a major factor impacting the acceptance of widespread PropTech use (Karam et al., 2022).

b. *User Awareness and Education*

One of the primary influences behind using PropTech is the awareness of the technology's existence, an understanding of its benefits and how it can be used (Baum et al., 2020), and finally, the ability to use it (Karam et al., 2022). A lack of PropTech awareness was cited as the primary reason for not using PropTech (Ojekunle, 2023), further indicating the substantial influence of awareness alone. In South Africa, the information divide relating to digital transformation is a key inhibitor preventing individuals from accessing technologies. Additionally, a lack of trust can pose a threat to the acceptance of PropTech. This lack of trust may be legitimate (platforms that are not valid and legal), but it can also result from a lack of knowledge and understanding and other personal perceptions.

c. *Regulatory Environment*

Government regulations and laws that support technological developments help in the implementation of PropTech systems (Ahearne & Rapp, 2010). In South Africa, the laws governing ICT usage in various industries inhibit the ability to use the technology itself, even if the user may be motivated (Warburton, 2016). The legal and regulatory environment as it relates to ICT and new technology innovations is a prominent weakness affecting the development, investment and use of PropTech (Ojekunle, 2023). Literature has shown the alignment of national regulatory policy and legislature to be critical in the effective deployment and usage of new technologies in the industry (Ojekunle, 2023).

d. *Market Demand*

The escalating demand for simple and functional property transactions is the driver for moving to PropTech solutions. Moreover, the demand for market transparency, particularly in real estate, has shown drastic increases according to a 2018 Global Real Estate Transparency Index (Siniak et al., 2020), indicating a growing trend towards addressing stakeholder needs within the industry. While many PropTech start-ups are on the horizon in South Africa (following global trends), the unique needs of the South African residential real estate sales market will be a large determinant of acceptance.

e. ***Cost Considerations***

In addition to market demand, the financial implications of PropTech solutions to its end users are often a large determining factor in the acceptance of the technology (Karam et al., 2022). While there may be a willingness and intention, if the cost is too high for the individual, they will likely resist using it (Górska et al., 2022). Thus, the measures to minimise costs associated with technology implementation are important factors in the eventual use (Ploythanachai et al., 2023).

f. ***Organization Strategy***

The advocacy and acceptance of PropTech solutions may be primarily driven by industry organizations that, through usage, transform the norms of the industry (about PropTech acceptance and use) (Clark & Marshall, 2023). While technology transformation is important, many professionals and organisations do not prioritise it over other strategic objectives.

2.7.3 *Proposition 2*

This section has examined the external factors and preceding factors that influence the use of PropTech solutions, which affect what PropTech solutions can be used towards streamlining the residential real estate sale process. Concerning the secondary research question, this led to proposition 2:

Proposition 2: External variables such as regulation, cost, and access, as well as perceptions around ease-of-use and degree of personal usefulness, are factors which influence the use of available PropTech solutions in South Africa's residential real estate sales process.

2.8 Analytical Framework

This section discussed the theoretical and conceptual frameworks related to the research topic and focus.

2.8.1 *Theoretical Framework*

a. *Task-Technology Fit (TTF) Model*

The research aims to explore how technology used in the residential real estate process may streamline the process. To interpret how PropTech may aim to streamline the process, the Task-Technology Fit (TTF) model was selected as the theoretical framework to aid in the interpretation of findings.

The TTF model examines how well a proposed technology aligns with the tasks it is intended to support. In the context of the research, the TTF illustrates the applicability and effectiveness of PropTech solutions concerning the activities involved in the sales process. The TTF model was originally proposed by Goodhue and Thompson (1995) to propose that technology usage that positively impacts performance should be utilized and must be a good fit to the tasks it supports (Goodhue & Thompson, 1995). The model in Figure 2.8 below is a depiction of this theoretical framework.

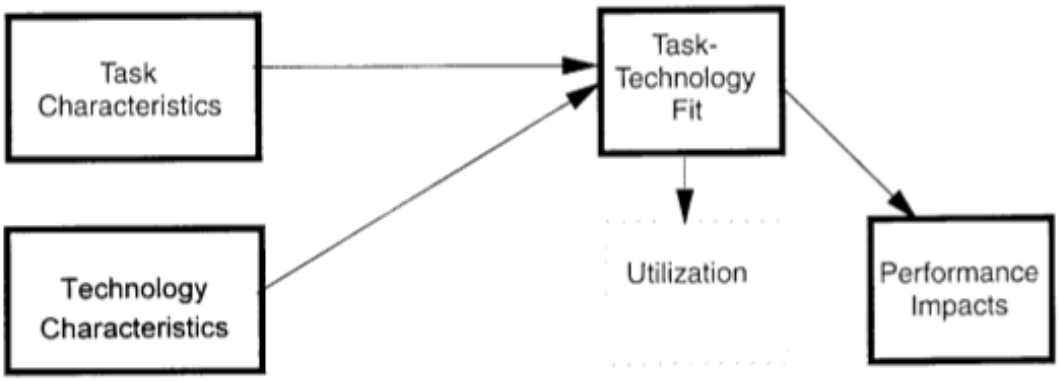

Figure 2.8: Task Technology Fit (Fit Focus) (Goodhue & Thompson, 1996)

The above model focuses on the technology fit of a proposed technology based on the characteristics of the task to which it is applied. This theoretical model provides an interpretive structure to individual constructs in the study, namely, understanding technology (PropTech) characteristics, understanding task (Process Activity) characteristics, and understanding Performance (Streamlining) Impact. Moreover, the model aids in illustrating the relationship between these

characteristics, allowing for exploration into how streamlining may occur given interactions and synergies between PropTech and process activities.

Goodhue & Thompson (1995) go further to expand on the utilisation antecedents impacting the utilization variable. The combination of utilisation and fit is outlined below in Figure 2.9. The inclusion of utilization as utilization precursors indicates the awareness of these 2 variables playing a role in the outcome of a task-technology fit in the eventual usage and success (in streamlining) as a result.

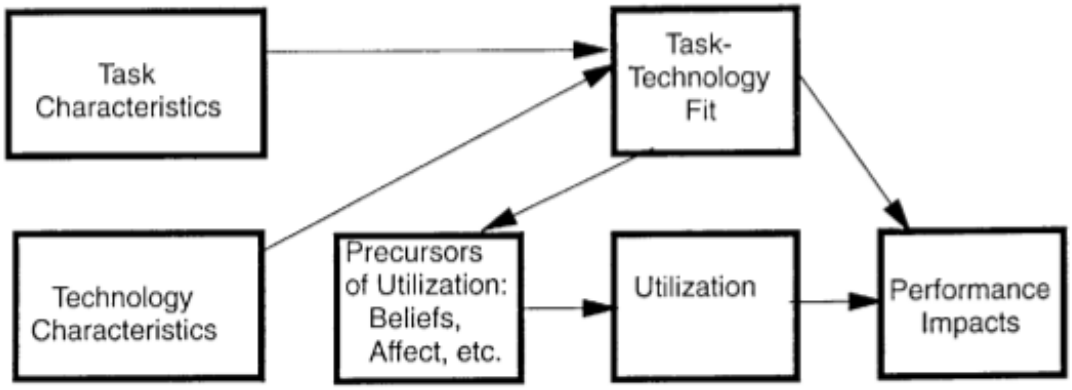

Figure 2.9: Task Technology Fit Model (Combination of Utilization and Fit) (Goodhue & Thompson, 1996)

Essentially, this evolution of the model highlights additional considerations concerning the research aims. While process streamlining is viewed from the perspective of functionality arising from evidence-based components (such as technology and task description), process streamlining may also be viewed from the perspective of usage and effective usage. For this study, the model in Figure 9 provides a foundation for interpreting the nuances that contribute to how parties in the sales process arrive at a decision to use recommended 'fits' – the right technology for the right tasks.

The TTF Model provides an appropriate basis for determining which PropTech solutions may be most suitable for streamlining the residential real estate process, given the characteristics of the task (activities) involved. It highlights the partial contributing perspective in determining which PropTech solutions are most

appropriate. Additionally, including utilization and its precursors led to the 2nd theoretical framework used in the study, which will be discussed below.

b. *Technology Acceptance Model*

The acceptance of technology is a discussion that goes beyond quantitative measures and considers the human aspects and social drivers that influence individuals' relationship with technology. The technology acceptance model (TAM) states that behaviour is preceded by intention to act on the behaviour (Davis & Venkatesh, 1996). Determining the intention to act requires an in-depth exploration into the psyche and influences, which is a critical component of the study's aim.

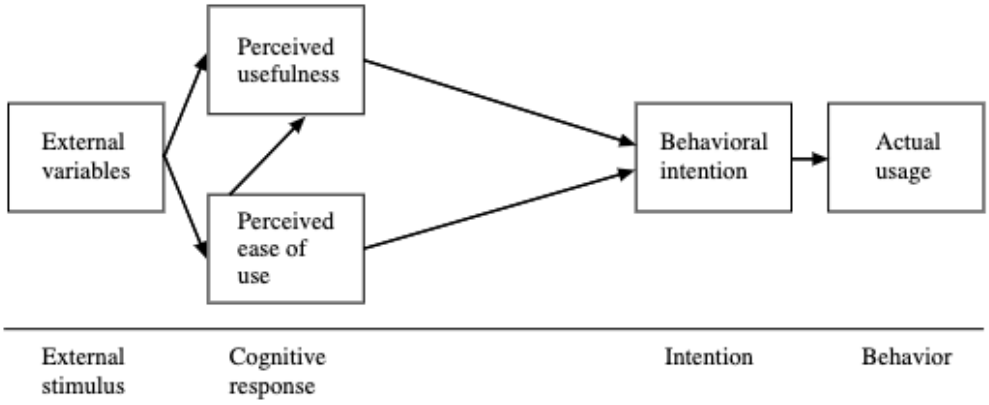

Figure 2.10: Technology Acceptance Model (Davis & Venkatesh, 1996)

Figure 2.10 above shows the model as it was adapted. It suggests that external variables influence the perceived usefulness and the perceived ease of use of a technology, which ultimately influences the behavioural intention to use and the consequent usage of the technology (Davis & Venkatesh, 1996). The behaviour associated with the actual usage of PropTech describes the action needed to achieve a desired impact. Therefore, to derive the outcome of streamlining as explored in the research, the behaviour of individual parties involved in the sales process needs to be understood. Additionally, from understanding the contributing factors that influence the acceptance (use behaviour) of technology, the practical feasibility of implementing the technology can be explored.

c. ***Integrated TAM/TTF Model***

Dishaw & Strong (1999) proposed integrating the TAM and TTF models (Figure 2.11 below) to elaborate on the existing models and draw a relationship between the variables in each model.

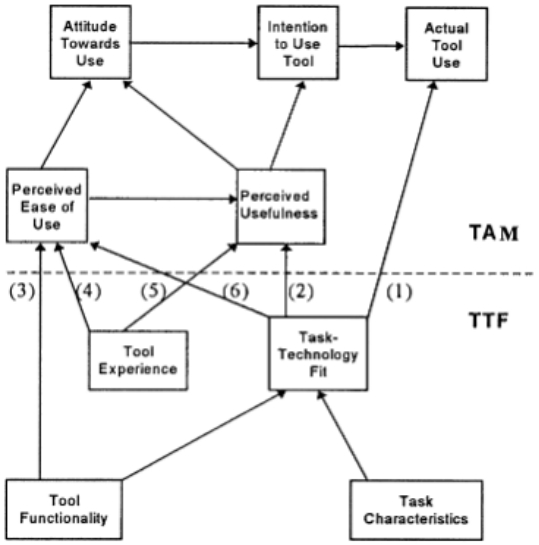

Figure 2.11: Integrated TTF/TAM Model (Dishaw Strong, 1999)

The figure consolidates the 2 models and is appropriate to the study based on the individual evaluation of each model above and its appropriateness and applicability to the study itself. The integrated model provides a holistic foundation to interpret the components explored in the study and how they interact with each other. It also aids in structuring the nuanced relationships that may be present between the individual parties in the real estate sales process, the PropTech solutions available and the key activities that enable or hinder the streamlining of the process.

2.8.2 *Conceptual Framework*

Derived and adapted from the above theoretical framework models, the conceptual model is shown in Figure 2.12 below:

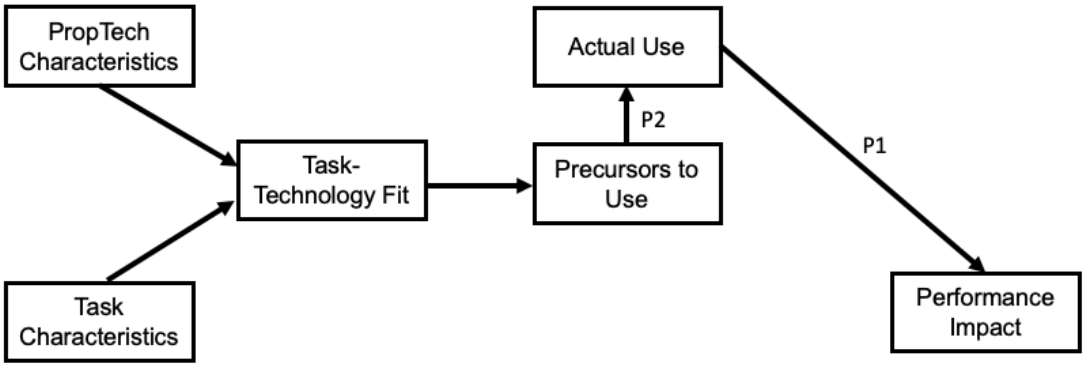

Figure 2.12: Conceptual Model (Mogodi, 2025)

The research aims to explore how streamlining may arise and to deepen the understanding behind drivers of streamlining processes. The model serves as an interpretive structure in understanding and exploring the research aims. The conceptual model provides an initial basis for exploration but does not aim to indicate an exhaustive group of constructs pertaining to the research and its aims. Rather, it aims to provide initial theoretical relationships from which further relationships can be explored and discovered.

2.9 Conclusion of the Literature Review

2.9.1 *Summary of Key Literature Findings*

The literature review aimed to consolidate the existing literature pertaining to relevant topic areas of the research. Literature and findings pertaining to residential real estate and its processes were presented to contextualise the focus of the research and to highlight South African challenges about the sales process.

PropTech was introduced and defined to give an understanding of this technology and its benefits but, moreover, to explore the existing research and findings related to its application and successes. The literature of the PropTech discussed was in relation to the appropriateness and applicability to the residential real estate sales process. While there are global case studies that were discussed, the is minimal literature pertaining to the effectiveness of these PropTech

solutions in the South African context. Moreover, the literature suggests the PropTech solutions and their effectiveness in commercial or developmental real estate contexts, and therefore the study sought to explore the technology effectiveness in the residential context and with the direct end users in mind.

Literature on the acceptance and adoption of technology was presented to provide added considerations, which may be important to tackling the research problems. Finally, the analytical framework was presented to provide theoretical underpinnings to the study and its interpretation.

Below, the research questions are reiterated, and the propositions regarding the research questions are presented.

2.9.2 *Proposition 1*

Primary Research Question:

How can current PropTech solutions be used to streamline the South African residential real estate sales process?

Proposition 1:

A combination of the PropTech solutions that fit the characteristics of tasks undertaken during the residential real estate sales process can streamline the process.

2.9.3 *Proposition 2*

Secondary Research Question:

How can parties in the South African residential real estate sales process be influenced to use available PropTech solutions?

Proposition 2:

External variables such as regulation, cost, access, and perceptions around ease-of-use and degree of personal usefulness can be considered enablers or

inhibitors to the eventual use of available PropTech solutions in South Africa's residential real estate sales process.

2.10 Chapter 3 Outline

The following section outlined the research methodology of the study. The research paradigm and approach were presented. This was followed by the research design and data collection procedure that was used for the research study. The chapter then discussed the population, sampling and research instrument, and then outlined the procedure for data collection and analysis. Finally, the chapter discussed factors related to quality assurance pertaining to the study and discussed ethical considerations of the researcher.

CHAPTER 3. RESEARCH METHODOLOGY

3.1 Research Paradigm

The research paradigm chosen for this study was the interpretivist paradigm. This paradigm encompassed subjectivity in meaning derivation and emphasized understanding individuals (Busetto et al., 2020) and their social context and personal perspectives (Ravitch & Carl, 2021). The ontology of interpretivism assumes the subjectivity of reality, emphasising the individual's experiences and interactions as how reality is constructed (Lewis-Beck et al., 2024). Essentially, multiple realities exist that are dependent on the context of the individual (Lewis-Beck et al., 2024).

The epistemology of interpretivism describes the nature of knowledge that underpins the philosophy (Lewis-Beck et al., 2024). Under this paradigm, interpretation and understanding of social phenomena and context underpin the nature of knowledge. Thus, the purpose of the research was to understand the participants' perspectives on the context and subject matter of the study. Finally, knowledge itself was seen as a co-construction by both the researcher and participants.

The axiology of interpretivism defines how values play a role in research (Lewis-Beck et al., 2024). In this instance, the researcher's values influenced the research process. Therefore, the study and research examined the researcher's biases and assumptions while maintaining reflexivity and transparency in this regard (Busetto et al., 2020).

3.2 Research Approach

The chosen philosophical foundation of the study under the interpretivist paradigm followed phenomenology.

Phenomenology seeks to explore the lived experiences of individuals in the world and particular contexts (Schreier, 2024). This approach enabled a deep exploration of the topic and research questions (Busetto et al., 2020). By seeking to understand the factors that drove usage of technology, as well as factors that may have inhibited usage, an in-depth understanding of the user's experiences as it related to the focus of the study led to significant insights (Schreier, 2024).

3.3 Research Design

Research design refers to how the study approached answering the research question by bridging the theory and concepts discussed in the paradigm and approach with the eventual execution, data collection, and analysis (Ravitch & Carl, 2021). The chosen research design for the study was a general qualitative design branched from a phenomenology approach.

3.4 Data Collection Methods

The primary data collection method was semi-structured interviews via a combination of face-to-face and virtual interviews, depending on participant location. Semi-structured interviews followed a set of predetermined questions but also allowed for the exploration of additional information and discussion related to the study (Lune & Berg, 2017). This allowed for a conversational approach that committed to completing the set of interview questions (Lune & Berg, 2017) while remaining open to additional themes and information. Additionally, with the consent of the participants, the interviews were recorded for analysis purposes.

3.5 Population and sample

The following section defines and describes the populations and samples for the research study. Given the nature of the research, the concepts explored, and the parties involved in context, multiple populations (and their samples) were used.

3.5.1 *Population*

The population of the study was primarily based on the research focus and considered the statistical evidence related to the residential real estate industry in South Africa. The following populations met the criteria for inclusion in the study (Robinson, 2014).

- All South African Registered Property Practitioners who have had previous residential sales experience.
- All past and prospective buyers of residential real estate in South Africa
- All past and prospective sellers of residential real estate in South Africa

Based on the geographical activity of residential real estate sales (See Figure 3.1 below), the population would likely have been from the Gauteng or Western Cape. Finally, the age and race of the population are not explicitly specified, however, the given statistics of South African race (81.4% Black) (Statistics South Africa, 2022), homebuyers and home sellers suggest a population that may be reflective of this ratio.

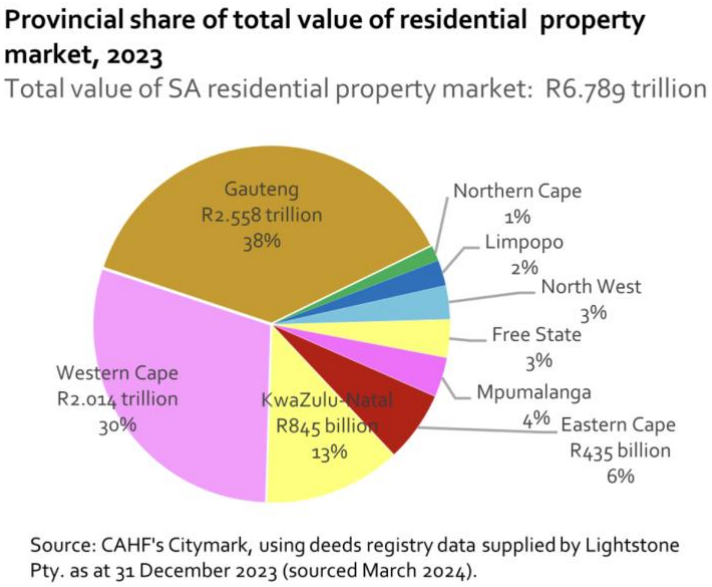

Figure 3.1: 2023 South African Residential Property Market by Province (Tshangana, 2024)

While the residential real estate sales process involves multiple stakeholders (such as attorneys and conveyancers), the primary participants are typically the client and the property practitioner. These parties spend the longest duration in the sales process, are involved at numerous stages, and arguably have the most to gain or lose from the outcome of the process. Therefore, for the study, this population was chosen as the primary focus.

3.5.2 *Sample and sampling method*

The research used non-probability sampling under the qualitative research design (Busetto et al., 2020; Czernek-Marszałek & McCabe, 2024). The sampling method was a combination of convenience and purposive. Selecting participants based on specific criteria related to the research focus (Schreier, 2024) was in line with purposive sampling, as relevant experience was required in the discussion (Czernek-Marszałek & McCabe, 2024). Given geographical and availability considerations, the convenience sampling method was applied based on the available participants. Furthermore, participants were discovered within

the indirect social network of the researcher, where referrals to previously unknown participants were made.

Based on the research aims, the participants were selected primarily based on relevant experience related to the residential real estate sales process. The sample size was 8 participants, aged 20 to 60. The sample size range of 3 to 16 is the accepted size for qualitative research within the phenomenological research approach (Czernek-Marszałek & McCabe, 2024; Robinson, 2014). As the study focused on in-depth exploration rather than attempting to extrapolate findings based on population characteristics (Subedi, 2021), each participant's responses contributed unique perspectives, and the aim was to not dilute their commentary (Robinson, 2014). Approximately 2 participants were buyers, 2 were sellers, 1 was a prospective buyer, 1 was a prospective seller, and between 2 to 4 were property practitioners.

3.6 The Research Instrument

The study used a semi-structured interview guide, which was conducted either face-to-face or virtually. A set of questions had been prepared ahead of the interview; however, additional discussion questions and answers between the researcher and participants were provisioned for (Lune & Berg, 2017). The interview guide, consisting of the questionnaire, interview schedule, and additional documentation, was provided in **Appendix A**.

3.7 Procedure for Data Collection

The procedure for data collection was as follows:

1. An invitation form for interview participation in the study was sent to prospective participants.

2. Invited individuals accessed the invitation form, and if they met the criteria of the sample, they explicitly accepted and shared their contact details for further communication.

3. Once a participant accepted the invitation to participate, a follow-up email or instant communication message was sent. This included a booking link where participants could schedule their preferred date and time from a range of available dates.

4. The researcher then sent a consent form and the interview guide to participants ahead of the scheduled meeting date, allowing participants to reflect on the questions and review the terms of consent.

5. The interviews were conducted with the inclusion of a recording device as well as a notebook.

3.8 Data analysis strategies and interpretation

Qualitative data analysis follows systematic scrutiny and degree of intentionality in data analysis (Busetto et al., 2020; Schreier, 2024). It refers to the processes that the study's researcher uses to interpret the data (Ravitch & Carl, 2021). Given the phenomenology approach applied to the study, the analysis focused on participant experiences and examined common and shared themes amongst them.

The study used a directed content analysis approach to analyse the data collected from the interviews. This strategy reduced the data and applied a flexible but systematic approach to analysis (Schreier, 2014). This approach applied the raw data to relevant categories about the research focus and theoretical and conceptual frameworks (Busetto et al., 2020; Lune & Berg, 2017). While other themes and categories emerged, given the semi-structured nature of the interview, the research questions and constructs were the focus categories (Busetto et al., 2020). The data collected from interviews was first prepared, meaning transcribed, and then a coding frame was built (based on the research focus). Using the computer-assisted analysis software for qualitative data

(NVIVO) (Schreier, 2024), the data was then structured according to the pre-selected categories and emergent categories.

The data was then examined according to each research question, first by determining the secondary research question and then by examining and discussing the data as it related to the study's primary research question. Finally, the findings were discussed, and a conclusion was presented.

3.9 Quality Assurance

The following section discussed the quality assurance of the study as it related to the factors of transferability, dependability, credibility, and confirmability.

The researcher acknowledged that the results of the research study may have had a degree of bias from the researcher, and this will be discussed and considered in conjunction with the final findings of the research (Lune & Berg, 2017). Ultimately, the research did interrogate bias as a factor in the interpretation of results and ultimate conclusions.

3.9.1 *Transferability*

Transferability in qualitative research refers to the contextualisation of the research study (Ravitch & Carl, 2021). In the research, the findings were not generalizable but aimed to provide an in-depth analysis of the topic in the context of geographic and industry-specific boundaries stated in the study (Lune & Berg, 2017). The findings of the study could have applied to the residential real estate sales process in general but moreover addressed the nuances of African developing countries and the specific context of participants and populations thereof. A detailed description of the interviews and schedule was provided. Additionally, the transferability of the conceptual model may have had applications where technology usage and technology fit are researched about performance outcomes in processes (Lune & Berg, 2017).

3.9.2 *Credibility*

Credibility in the context of quality assurance in qualitative research refers to the detailed description of knowledge reflected in the evaluation (Lune & Berg, 2017), findings and outcome of the study (Morse, 2015). This aspect of research validity concerns the research design and research instrument in their ability to measure the focus area of the study (Ravitch & Carl, 2021).

An additional consideration regarding the credibility of the study was triangulation. Triangulation refers to the set of processes followed by the researcher to improve the validity and quality of the study (Morse, 2015). In the discussion of this paper, an in-depth analysis of the various perspectives about the research focus was discussed to find common themes, opinions, and consensus. The sample groups chosen for the study reflected data triangulation (Ravitch & Carl, 2021), where various parties involved in the residential real estate sales process were interviewed to inform the research problem.

3.9.3 *Dependability*

Dependability in the context of qualitative research refers to the validity of the data based on how stable and reliable it is (Ravitch & Carl, 2021). The consistency of the data over time reflects the dependability of the study. Given the changing landscape of digital transformation and PropTech, the study's findings may change and appear inconsistent as the South African real estate landscape evolves. The interview guide, however, referred explicitly to the research questions and conceptual framework and, therefore, was considered dependable (Ravitch & Carl, 2021). Furthermore, the data analysis framework used follows a systematic approach in line with the research paradigm and thus ensures the replicability of the study (Lune & Berg, 2017).

3.10 Ethical considerations

The research study honoured the ethical guidelines of the institution under which the research was conducted. This included obtaining informed written consent and providing participants with a detailed explanation of the study.

Before beginning the data collection and analysis process, the researcher ensured that ethical clearance and certification were received. The questions related to the interview guide did not infringe on personal boundaries. Participants were involved in the study voluntarily and were allowed to withdraw at any point, should they have chosen to do so.

Data handling following the interviews respected the information and consent forms provided by the participants. The data were stored securely, ensuring both safety and confidentiality. Respondents' anonymity was maintained. The recordings of the interviews were transcribed verbatim, ensuring the integrity of the interview process and that the interviewer remained focused on the research objective.

3.11 Chapter 4 Outline

Chapter 4 presented and discussed the findings of the study and interviews with the selected participants. The chapter presented and discussed the findings pertaining to the challenges, issues and inefficiencies of the South African residential real estate sales process. Next, the findings related to the various PropTech discussed in Chapter 2 were presented and discussed. This led to the overall presentation and discussion of the findings related to the primary research proposition.

The chapter then moved on to present and discuss the findings related to the adoption of PropTech solutions, and then presented findings pertaining to the secondary research proposition. Each section’s discussion within Chapter 4 included the applicable literature pertaining to that section in order to compare and contrast the study’s findings.

CHAPTER 4. PRESENTATION AND DISCUSSION OF FINDINGS

4.1 Introduction

The following chapter presents the findings from the interviews conducted for the study. An overview of the interview participants is presented and discussed. This is then followed by a theme-based presentation and discussion of the findings. Finally, the propositions of the study are then presented and discussed in reference to the interview findings.

4.2 Findings and Discussion of Participant Demographics

The study interviewed a total of eight participants. Three Participants were past sellers, two participants were property practitioners (Agents), two participants were past buyers, and one participant was a prospective buyer.

A summary of the participants' ages, areas (lived and worked), occupations, and year of property sale(s) can be found in the table below.

Table 4.1 Research Participant Demographics

Participant	Group	Age (Range)	Occupation	Year of Sale	Areas Resided/Worked In
1	Past Seller	20 - 29	Clinical Psychologist	2022	Gauteng (Centurion, Morningside)

2	Past Buyer	30 - 39	Senior Marketing Manager	2024	Gauteng (Sunninghill)
3	Agent	50 - 60			Cape Town (Northern Suburbs)
4	Prospective Buyer	30 - 39	Head of Social Media	2027*	Johannesburg (Northcliff & Randburg)
5	Past Buyer	50 - 60	Financial Officer	2001, 2007, 2021	Johannesburg West
6	Past Seller	40 - 49	Fleet Manager	2024	Gauteng, Soweto (Ormonde)
7	Past Seller	30 - 39	Risk Mitigation Officer	2019	Gauteng, Soweto
8	Agent	30 – 39			Gauteng, Soweto

4.2.1 *Discussion of Participant Demographics*

The summary of the participant demographics has been presented for transparency. All participants fit the sampling criteria. The majority (7 out of 8) of the participants were based in Gauteng, South Africa, with 1 of the 8 participants being based in Western Cape, South Africa. Additionally, all participants worked

in varying occupations. 6 of the 8 interviews were conducted in person, while 2 were online via video meeting.

Most participants were aged between 30 and 39 across all participant groups. It was notable that the older participants had greater experience in the sales process. Additionally, those aged 40 and above had 1 or more experiences with both buying and selling. This added a layer for discussion during interviews as their opinions of PropTech solutions could consider multiple perspectives from experience.

All the participants of the study were black Africans, and 75% of the participants were female. It can be suggested that the homogeneity of the participants in this regard may have had an impact on the findings of the study. However, given the nature of the research method, the individual voices and experiences are considered as the fundamental basis of the findings. Most participants being female may have affected the findings of the study, as it can be argued that gender roles and expectations have an impact on the findings as it relates to preferences and daily activities.

The experiences of buyer participants were distinctive according to whether they were first-time buyers or had previously bought a residential property in the past. The distinction between these types of buyers was reflected in their knowledge and understanding of the process. With experience, lessons were learned, and the approach was different compared to first-time buyers who expressed a lack of information, which impacted their journey.

4.3 Findings and Discussion of Challenges Faced in the Residential Real Estate Sales Process

4.3.1 *Financial Issues*

While a residential property can be purchased through various financial means, a common method is using bank financing and acquiring a mortgage bond. Participants from interviews highlighted the hurdles regarding the pre-qualification process during the pre-sale phase. A lack of education and

awareness regarding credit profiling and bank statement transactions may leave potential buyers at a disadvantage.

Participant 7 (Past Seller):

"…when you're applying for any finance, you only mention what is on your payslip"

"And people like overspending, people like they gamble with their apps, they do unnecessary things, which at the end of the day, those things, they affect them during the application process."

"In the part of application, because sometimes you apply, you qualify, but because of all these unnecessary things, the up and downs that are happening on your bank statement, you get declined."

Participant 8 (Property Practitioner) commented:

"the step that really makes clients really nervous is the bond."

Ehrs and Lindfors (2018) suggested a similar challenge faced by residential property buyers. Where changes in transaction activities, unbeknownst to prospective buyers, affect their credit profile and consequently their ability to secure bank financing.

It can be suggested that in preparation for purchasing a property, buyers need to be made aware of the pre-qualification requirements and, moreover, what financial activities and transactions may hinder approval. Thus mitigating the risk of rejection and having to revisit the process months later for a chance at approval. An additional financial issue associated with the residential sale process is the additional costs accrued to the buyer during the sale process.

These do not relate to the purchase price of the property but include legal costs associated with the transfer of ownership (Górska et al., 2022; Putatunda, 2019). While the literature suggested the prevalence of this challenge, participants in the

study did not indicate any issues related to this, suggesting that they were properly informed before the sale as to what additional costs may be incurred.

4.3.2 *Length of Activities*

Seller participants shared that, overall, the sales process was fast and efficient for them.

Participant 7 (Past Seller):

“And then within two months, everything was done, honestly”

Participant 6 (Past Seller):

“First viewing and they signed the offer to purchase. Cause it took a week.”

This was attributable to their property practitioner’s involvement in finding the most suitable buyers, suggesting their crucial role in matching a property with the right prospective buyers.

Conversely, the activities involved with viewing properties (both online and physically) are stated as the most time-consuming for buyers.

Participant 5 (Past Buyer):

“I think the most time-consuming now is looking at properties.”

Participant 2 (Past Buyer):

“First of all, looking for properties is time-consuming”

Whether it was looking at properties online or managing personal schedules to physically view the property, the buyer participants stated this area of activity was one of the more time-consuming activities.

Similarly, as stated by Participant 3 (Property Practitioner) below, the communication and categorising of inbound leads once a property is listed is stated as one of the most time-consuming activities during the sales process.

Participant 3 (Property Practitioner):

“The longest step for me is once you have put the property out in the market, you know, then the traffic starts, you know, often, you know, communicating with interested people.”

The activity of browsing for properties can be tiresome to both prospective buyers and the property practitioner. This is mentioned by Lizam (2019) as a notable contributor to the duration of the overall sale. A method for refining the search for buyers could save them time, and a system of categorising enquiries for property practitioners could potentially improve how they prioritize leads. In addition, evidence from a study by Acosta et al., (2024) has shown practical improvement in productivity and speed related to implementing PropTech systems to aid property practitioners in managing their leads.

4.3.3 *Market Conditions*

While market conditions play a role in determining the length of a property sale, the individual circumstances of buyers and sellers (and their property) play a larger role in determining the length of a sale.

Participant 8 (Property Practitioner):

“Each case is unique. There's some properties where it's really quick. You put the property up on the market, people show interest, boom, then it's sold.”

“Some properties stay long on the if you market it really well, you expose it, but obviously that comes in with how the market is, and Obviously, you need to look at factors that are making the property not sell, and then just work on them.”

Participant 1 (Past Seller):

“I think the timelines of the sale that I was in a rush to sell was an impacting factor”

Participant 6 (Past Seller):

“But if I was not in a rush, I was going to wait for the one [offer] that I requested.”

It can be suggested that the disposition of individual sellers, as well as the condition and pricing of the property, plays a role in the speed of a sale. Literature from Floyd and Allen (2011) concur with this statement, adding that urgency to sell related to financial reasons influences the sale speed. Furthermore, the eagerness of a buyer may contribute to the speed of a sale, as stated by Participant 8 below:

Participant 8 (Property Practitioner):

“Even with some buyers, you know, you request certain documents, all of them, they send it immediately, they're able to buy.”

4.3.4 *Appraisal Challenges*

Participants expressed the lack of transparency regarding how a property was priced, leading to scepticism. This was attributable to a lack of educational information available to them, as well as a lack of trust in the systems used for valuation.

Participant 6 (Past Seller):

“I was a bit sceptical at first about the price that, you know, maybe it's too high.”

Participant 1 (Past Seller):

“I think that consistently felt confusing. As well as the valuations actually.

Like you're never really told why the place is valued the way it is. It's kind of like this is the valuation and that's it. I mean outside of the things that are obvious, like the area that it's in, …

But outside of that you're never really explained to about the different things that increase or decrease the value of the place.”

“I think things like that felt confusing. I would have wanted those things, the ‘why's’, to be more clear.”

Participant 7 (Past Seller):

“There is a system that evaluates your house, but apparently that system is not accurate. So either way, they would need to send an evaluator to come and do it physically, you know, because if that is the case, they wouldn't even consider sending that evaluator to come and do it physically.

So, I would prefer somebody to come and evaluate the house because what if the online one is not so...”

The lack of trust is also reflected from the property practitioner's perspective where properties are knowingly overpriced (and hence go longer periods unsold):

Participant 8 (Property Practitioner):

"the stock that I have is overpriced. [Owners say their] property is beautiful.

Obviously, it's [their] house. [they] own it. You have to show [the owner] why that 7 million is too much. obviously, that human touch. They're people. Then you show them other properties that are similar to theirs. So, then they start understanding…"

Often, the value of a property carries sentimental associations, and it is the role of the property practitioner to humanize with their clients while simultaneously guiding them towards understanding and agreeing with the valuation. Nonetheless, scepticism exists regarding PropTech evaluation tools and is reflective of common issues regarding information sourcing accuracy and reliability (Oluwunmi & Agara, 2023).

While various reasons are driving the pricing of a property, all parties may benefit from increased transparency and education from the beginning regarding the factors that determine the valuation of a property. This would reduce the risk of delays in listing the property and even delays further along during negotiation with a buyer.

4.3.5 *Contract Disputes/Issues*

Participants expressed concerns regarding the contractual agreements involved in the property purchase, particularly after the sale is concluded.

Participant 4 (Prospective Buyer):

"Once you've owned the property as yours, you have a certain amount of time to report or complain about anything in the property"

Participant 2 (Past Buyer):

"*when you are signing your offer, making sure that you add in your non - negotiables is like very important*."

Literature suggests the occurrence of contact disputes regarding the a property sale, (Ahearne & Rapp, 2010; Harris & Friedman, 2013), however the disputes are not major determinants in the sale and likely do not result in the cancellation of the sale. The disputes, like those shared by participants, highlight the importance of thoroughly reviewing contractual agreements in an attempt to avoid any major disputes.

4.3.6 *Scheduling*

Participants expressed frustration regarding appointment scheduling during the sale process, particularly before listing, pertaining to viewings as well as meetings with other stakeholders (attorneys).

Participant 6 (Past Seller):

"*That whole process of photos and you have to avail yourself, you are busy, they are not there, somebody is coming to view, like… it was frustrating.*"

Participant 1 (Past Seller):

"*Like having to manage your schedule and having to facilitate all of those appointments and being around while they're viewing the place… sometimes it's at short notice… Your whole day schedule changes.*"

Participant 5 (Past Buyer):

"*Sometimes you are at work, at the office and someone calls you and says, okay, you can come see the house on Wednesday and Wednesday doesn't suit you or you're stuck in traffic and the agent leaves. That's what takes time."*

These comments suggest a clear area of inefficiency and inconvenience during the sales process regarding the coordination of activities requiring clients to be physically present.

4.3.7 *Closing Delays*

Various unexpected delays can arise during the conclusion of a property sale. Documentation errors and lack of clarification were found to cause cause delays relating to closing the sale.

Participant 2 (Past Buyer):

“I think just that back and forth with the agent was very time-consuming.”

Participant 6 (Past Seller):

“Have to fill this paper. Please. It's on PDF. You can't even edit. Now you send a PDF document. I have to print it on paper… And then certain things you don't understand, I need you now to explain…once when I was buying, I had to rectify the amount, because the amount I put was wrong. And then it comes back. [property practitioner says] You forgot to put [something else] like initial page seven…”

Apelqvist and Carlberg (2018) concur with the findings of this study that highlight the improper documentation (errors or incomplete documentation) do cause delays in the closing of a sale. Clarity during communication, as well as digital technology that mitigates human error, could aid in reducing the instances and impact of closing delays.

4.3.8 *Administration*

While some instances of document administration could cause delays, in other cases, they may simply highlight a tension point for parties in the real estate sale process.

Participant 5 (Past Buyer):

“You could have sent it to me. I'm like, why are you giving me paper? If you had sent it to me, I would have looked at it before you came. And I probably would have had questions.”

Participant 2 (Past Buyer):

“We had to physically sign at the lawyers. We had to physically sign at the conveyances. Time waste.”

Participants expressed that if being physically present can be avoided, they would prefer it.

4.3.9 *Challenges that did not emerge in the study:*

While inspection problems cited by Apelqvist and Carlberg (2018) were said to occur during residential sale process inspections, these occurrences were not discovered during interviews and, as such, were not considered in the context of the study.

Similarly, the study did not find evidence or suggestions of title deed issues during their experiences with selling. This may be a common issue, as suggested by Harris and Friedman (2013), but was not relayed by any participants in this study. Often, title deed issues may be preceded by long-term tenancy disputes, deceased estate matters or marital disputes. These circumstances can often cause challenges in verifying the ownership of a property and thus cause delays in attempting to sell the property.

Emotional Factors were initially anticipated as a challenging factor during the residential real estate sales process; however, the study found that the process has influences of emotional and personal factors, but this is not a challenge per se. The purchase or sale of a residential property is a significant change in the client's life. Thus, emotional factors form part of the sentimentality and excitement associated with a large purchase and a large life change.

4.4 Findings and Discussion of PropTech Characteristics

The interview included a discussion on PropTech in general, as well as pre-selected PropTech solutions. The presented findings encapsulated the comments, opinions and experiences on various PropTech solutions concerning the residential real estate sales process.

4.4.1 *Brokerage and Property Practitioner Operations*

PropTech solutions surrounding brokerage and property practitioner operations were a significant discussion point for participants. Opinions and comments highlighted communication experiences, automation preferences, and information transparency regarding the property.

The property practitioner participants expressed awareness and minimal use of customer relationship management tools. Similarly to past studies, traditional digital communication channels are most commonly used (Oluwunmi & Agara, 2023). The findings suggested that personal preference, as well as the needs of their clients, was the primary reason for the use of these channels.

Participant 3 (Property Practitioner):

"*I want to get to that stage. But then, unfortunately for me, I use one cell phone number, you know, for everything*"

"*whatever information that you want to draw out of the system, [the brokerage] manage[s] that…"*

"if it's about day -to -day appointments that I want to make for myself, I use my phone diary."

Participant 8 (Property Practitioner):

"*Yes, technology is there, but the personal touch is still required… I feel doing it over the desktop is not going to be satisfying the seller…this person, the property to them is sentimental."*

"So, if you're just going to do it over the desktop and then just send it to them, then you've detached the emotion. You've detached that, so to them it can be like, this agent doesn't care about my house."

The sentiments expressed are in line with the client participants who disliked automated technology, preferring human contact during their sale process.

Participant 5 (Past Buyer):

"*They've got auto responses sometimes, which is annoying… I don't like chatting to bots… Auto responses are a bit tricky. They need someone that's really going to come back to you... let me get a human response.*"

Participant 4 (Prospective Buyer):

"*I think you can give me an email. Who the hell checks the email and messages? You can send it but follow up with a call. Because I think I'm one of those people that really value human interaction. And this is the problem with technology sometimes is that they put all the responsibility on the technology to*

communicate. I don't want to talk to automated emails. I want to talk to the person because what if I don't understand something? So sometimes the simple version is literally just the human interaction."

While direct human interaction is preferred, in the instances where property practitioners fail to suitably meet the communication needs of their clients, the use of communication tools would likely be required. Furthermore, studies have found significant improvement in communication management with the use of PropTech system solutions (Acosta et al., 2024; Oluwunmi & Agara, 2023). This was suggested by comments made by participants who felt that they did not receive adequate communication from their property practitioner and were left uncertain of the next steps and timelines:

Participant 2 (Past Buyer):

"*Where it's like you've got this system that, let's say, for example, we're speaking about the offer. And then I've taken you through the offer and then I've said to you sign digitally. And then I've said to you, once you've signed, upload the offer onto X platform. Then X platform comes back and says, thank you for the offer. We will get back to you in five days, three days, whatever.*

Yeah. Either it was a counteroffer or something that says your offer has been accepted, then your agent will be in touch with you for next steps… Nothing, it was nothing. I was following up all the time. Hey, what's happening? How long does it take? Hey, why don't we have this list?"

"So, in the space of those [agents] that are not good at it, there could be a system that is created that helps them out"

Participant 6 (Past Seller):

“*Just acknowledge that we are here. This is the next step. That's where the frustration is. Because now, December, it was quiet. I don't know…must I start packing? Must I start packing? Where are we?*”

Additionally, confusion and frustration were expressed regarding scheduling and bookings for sale-related activities:

Participant 6 (Past Seller):

“*…they can always reschedule… But if it had been scheduled prior, it was going to be easier. I was going to avail my time as well.*”

Participant 1 (Past Seller):

“*… negotiating times for viewings felt boring…So almost an automated system, I'm available between these hours and these times when you can book for viewings. That seems so much better.*”

Communication-related PropTech solutions are more practical and applicable in the pre-sale phases; however, as the sale process continues, more direct contact is preferred by clients. Additionally, other operational PropTech solutions (such as automated updates and scheduling systems) could aid in the sale process at critical stages. Ultimately, technology can be used to assist operations related to the residential real estate sale process but not to replace activities entirely.

4.4.2 *Property Listings*

Property listing platforms are the most widely used PropTech solutions, based on the research findings. Literature had also shown property listing PropTech to be the most popular amongst stakeholders in the real estate sales process, with 45% to 53% of users (Ploythanachai et al., 2023) in other All participants commented on using various popular South African Property Listing platforms. Generally, the property practitioner is seen as responsible for listing the property with little involvement of the client. Other notable comments were shared, as shown below:

Participant 5 (Past Buyer):

"*They could put in more info. For instance…Like crime state, power outages…*

Water outages. That would be nice to have. Or some sort of graph to show that these problems are [present around] you can address."

Participant 2 (Past Buyer):

"*Probably they should add a filter. Does this house have a problem or not? What are the problems? That's not how selling works. Everybody wants to show best side.*"

"*I think just like an index directory of some sort that kind of links you.*

So, for example, you've got options when you're buying property of getting a second opinion on the state of the property before you go in and buy."

Participant 4 (Prospective Buyer):

"*I feel like we need different versions of those. I think private property is supposed to be for people doing it by themselves, but I don't feel that way. The property 24 and private property, they feel like the same thing, if we're being honest. So, I don't know…I feel like there should be differences in these platforms…they're all basically the same thing. And what's the point?*

"There should be like another one that focuses on just auction… I just feel like we need variety in this property space."

The past and prospective buyer participants expressed that additional area and property information could be helpful. This information specifically relates to important but adverse/negative feedback that would play a significant role in the attractiveness of the property. Nonetheless, the need for more transparency was highlighted. Interestingly, the prospective buyer participant suggested more niche platforms to cater to specific types of properties, which may present an avenue for future developments in this technology solution.

4.4.3 *Digital Documentation*

Participants expressed having used some level of digital documentation storage and exchange. However, this was mainly through email and instant messaging for exchanging and private, personal digital archives for storage. Generally, participants shared positive remarks regarding this technology and expressed a willingness to have used it in the past and the future:

Participant 5 (Past Buyer):

"It would have been much better, right? Because it gives you time to go through the documents…If it's sent to me, it gives me more time to go through it and raise whatever concerns or questions that I might have. I'd definitely use that one."

Participant 4 (Prospective Buyer):

"…you can take out the redundancy in the mundane stuff and like simplify that, you know."

Participant 1 (Past Seller):

"*So, I think I would have liked to have had access to every single document around the sale. And then, I do think it would have made things again more efficient. Instead of, I guess hard copy paperwork."*

The primary gap noted by participants was the ability to interact with incoming documentation – being able to fill in details and sign. This technology is available but not widely used.

Participant 4 (Prospective Buyer):

"My friend bought a house, and she showed me that it was so simple. Everything was like on this like notepad thing…and then she could sign contracts."

The level of digital document integration varies within the sale process based on the technology used by the property practitioner. Concerns surrounding security were discussed. A critical inhibitor of full integration relates to the regulations of South Africa, where physical signing is still required. It can be said that digital documentation can result in faster time to receive signatures and reduced time in document preparation. These have been found to significantly reduce delays in the sales process (Polovinka, 2024).

4.4.4 *Market Data and Insights*

The effectiveness of PropTech solutions surrounding market data, insights, and analytics is dependent on its applicability in short-term versus long-term activities.

From a strategic long-term perspective, the technology solutions may assist in aggregating information and providing value at an industry and company level. However, in residential real estate sales, on an individual level, personal circumstances are often the drivers of purchases or sales, regardless of

additional market insights. Even from a property practitioner perspective, the focus is on day-to-day operations, as shared by Participant 8:

Participant 8 (Property Practitioner):

"*I don't do that. Okay. My job is to sell regardless of the market my is to go out and get stock.*"

The sentiments expressed by the participants suggest that the PropTech solutions focused on market data, insights, and analytics are more applicable as a real estate investor, as part of a brokerage or larger entities within the real estate industry.

4.4.5 *Virtual Tours*

Overall, virtual tours (including 360-degree tours and video tours) were seen as a favourable technology to incorporate into property listings. The most notable benefit of virtual tours was time-saving and cost-saving.

Participant 5 (Past Buyer):

"*That would help because then you don't waste your time going to view a place*"

Participant 2 (Past Buyer):

"*what I really enjoyed was seeing some people do those virtual tours. Those things help save a lot of time.*

Like, okay, I don't need to go view this property. I've seen the virtual tour. I'm interested. I'm not interested. It doesn't seem like my vibe. I think it saves time for both the potential buyer and the agent. Because to not have to get up, waste your petrol to go and view."

Virtual tours were seen as a measure to enhance the attractiveness of a property listed, more as an “add-on”, but there are limitations regarding costs, the type of property and area, and the personal preference of the seller. Additionally, existing literature suggests its applicability in a post-sale services context for interior design and layout purposes (Ehrs & Lindfors, 2018) , which may extend beyond the scope of the research but suggests potential post-sale services that may be beneficial as inclusive to the residential real estate sales process.

Participant 8 (Property Practitioner):

“*virtual tours are the future, but I think virtual tours depend on what market you work in…”*

“…you need to really have built a good relationship with the seller. Because you must remember the property houses personal.”

Participant 3 (Property Practitioner):

“*the reason why I don't do it doesn't come for free. You need to subscribe*”

4.4.6 *Agent Matching*

The property practitioner participants were open to this technology and could see its benefits for themselves as well as for their clients. However, social media was cited as a competing platform that provided a similar benefit to the property practitioner. Some participants were open to the technology more out of interest than need. Limitations of the technology were shared, as shown below.

Participant 4 (Prospective Buyer):

“*I'd imagine it would only be appealing to property practitioners who are independent, just to get more visibility.*”

Participant 3 (Property Practitioner):

"*I can imagine there'll be more, especially buyers who are relatively young…*"

Ultimately, the applications of agent matching technology are limited as the current existing channels of acquiring a property practitioner (such as social media or word-of-mouth) are sufficient for most.

4.4.7 *Remote Meetings*

While the technology is available, virtual meetings are not always the preferred method. Participants had mixed preferences regarding their experience and willingness to conduct meetings virtually during their sale process. While they were open to using virtual channels for meetings, if it was not necessary, their preference leaned towards in-person meetings.

Participant 7 (Past Seller):

"*I think it will all depend on what my instinct is saying…But still, it's going to be a bit of a problem. Sometimes it's adjusting to change. Maybe I will need to adjust if there's no other option. But personally, not sure. Not really"*

Participant 6 (Past Seller):

"*For the conclusion [of the sale] I prefer in person…To have that one person that is clued up about that thing present. Like say your agent, be present so that even if you are talking you can say, please hold on, I don't understand…*"

Participant 3 (Property Practitioner) stated that apart from the viewing, all other meetings are held virtually. Given the mixed preferences, a flexible approach would be advisable to maintain relationships with a wide range of clients.

For other clients, virtual meetings (wherever possible) were welcomed. This technology was seen as convenient, easier and time-saving.

Participant 5 (Past Buyer):

"*The house I definitely have to touch and feel. Everything else is easy. It's better. Or at your convenience. Because if it's virtual I can do it at my convenience*"

Participant 2 (Past Buyer):

"*I have felt very comfortable if the meetings were online*"

4.5 Discussion Pertaining to Proposition 1

This section presents the findings and discussion pertaining to Proposition 1:

Having looked at the challenges faced during the residential real estate sale process, as well as the comments, opinions and experiences of participants relating to PropTech solutions, a discussion of Proposition 1 was presented.

Proposition 1:

A combination of the PropTech solutions that fit the characteristics of tasks undertaken during the residential real estate sales process can streamline the process.

The findings presented suggested nuances to the application of PropTech solutions during the residential real estate sale process in South Africa. With a primary focus of streamlining the process, there are technology solutions that can be enhanced and others that are not necessarily suitable for the process. Additionally, when and where PropTech solutions are used may have an adverse impact on streamlining the process.

Digital documentation, storage and exchange were cited as a useful solution to streamline the process by eliminating administration delays associated with paperwork and physical travel (Oluwunmi & Agara, 2023). Additionally, virtual meetings in combination with other communication channels were noted as time-saving solutions during the sale process. These findings corresponded similarly to past studies citing similar outcomes pertaining to time delay reductions (Ploythanachai et al., 2023).

Virtual tours were shared as an enhancing technology with the potential of improving the experience and efficiency of pre-sale property searching by cutting potential properties from a prospective buyer's 'short list' and reducing the number of enquiries received by property practitioners.

The PropTech solutions regarding brokerage and property practitioner operations were expressed as bringing minimal improvements for the property practitioners however, greater improvement for clients. These solutions addressed information transparency (and the lack thereof), communication efficiency and the need to optimise scheduling of activities involving more than one party.

4.6 Findings and Discussion of Factors Influencing PropTech Adoption & Use

4.6.1 *Market Demand & Need*

Given the notion that necessity is the mother of invention. Emerging PropTech solutions often arise to address a gap or need in a market. Participants in the study commented on the various demographic, sociographic and psychographic factors that influence the need for PropTech solutions in the current South African landscape. Opinions and speculations were shared, as shown below:

Participant 4 (Prospective Buyer):

"*I think people who are busy and have more money and stuff would prefer more the technological route. But people who maybe are more middle, lower class would do the more traditional route.*"

Participant 3 (Property Practitioner):

"…*people are buying into technology fast and furious. Fast and furious. It looks like every day there's something new.*"

Participant 8 (Property Practitioner):

"*People are using it. Agents out there, they're using it. Buyers out there, they go into those technologies looking for agents that are using it. Yeah. They interact more with agents that are using it.*"

“And especially these technologies, they work best with certain, like I said, markets. The more affluent the market, the more they want [technology integration]. But it's with the lower LSM, they don't really mind.”

Interestingly, the market demand and need did not directly impact the intention to use PropTech. As found in a study by Ploythanachai et al., (2023), the preexistence of widespread adoption and use of technology solutions in the context of residential real estate sales processes was the driving force encouraging the uptake of PropTech. This suggested that as more individuals use PropTech solutions, others become accustomed to using them.

4.6.2 *User Awareness & Education*

While there are learning curves associated with adopting new technology, participants highlighted a lack of awareness that certain PropTech solutions were available. The necessary skills and literacy were found to be significant factors in past literature (Baum et al., 2020), consistent with the findings.

It can be argued that property practitioners have a duty to bring awareness to PropTech solutions and give their clients the choice to use it during their sale process or not. Comments related to a lack of awareness and an expectation from property practitioners to share information are shared below:

Participant 2 (Past Buyer):

“*we knew about it [PropTech solution] because we got in contact with one of the friends who had just recently bought a property… But had I not known, had I not had anyone on my corner that works in the industry, how was I going to know all of that stuff?*”

Participant 1 (Past Seller):

"*It's definitely something I would do. But there's always, I guess, a reservation in my mind in terms of the safety and trustworthiness. So again, I think if it is done via an agent, it would be almost for the agent to assure me of the safety and all of that stuff. But more than anything, make me aware.*"

4.6.3 *Cost Considerations*

Only the property practitioner participants commented on the costs associated with integrating PropTech solutions. Considering that the technology solutions would form part of their service to clients, it was asserted that indeed they would bear the costs of these solutions.

Participant 3 (Property Practitioner):

"…virtual tours. But the reason why I don't do it doesn't come for free. You need to subscribe for this"

Participant 8 (Property Practitioner):

"…these platforms you must pay. They require funds. The only thing that could prevent me is first, the cost."

The resistance to adopt PropTech based on financial commitment is consistent with the literature (Górska et al., 2022). The research suggested that to integrate PropTech solutions into the residential real estate sale process, the property practitioners, brokerages, and other service providers would primarily have the financial means to adopt. This would also be motivated by existing or potential return on their investment in technology.

Ojekunle (2023) discussed how although there are initial costs associated with PropTech adoption by organisations, there are subsequently cost-reduction benefits of the implementation of PropTech solutions in management and

operations. This was similarly found in the 2019 Bangkok study; the associated costs of PropTech integration reduced over time (Ploythanachai et al., 2023). Furthermore, these cost reductions were found to arise indirectly due to reduced labour costs and improved efficiency (Ahearne & Rapp, 2010). Cost reduction from the digitization of documentation is also cited as an example of PropTech adoption benefits (Polovinka, 2024).

4.7 Findings and Discussion on Experiences with Property Practitioners

The involvement of property practitioners during the residential sales process cannot be understated. Given the nature of their involvement and their roles and responsibilities, a theme pertaining to them emerged from interviews.

Participants shared feedback regarding their experiences working with their property practitioner. In some instances, a relationship was established prior to the sale, while for other participant clients, their property practitioner was new to them. Participants shared negative and positive feedback. What was highlighted most was the need for a reliable, honest and trustworthy property practitioner.

Often in times of confusion or nervousness, clients turned to their property practitioner for assistance. Where detailed contractual agreements were made and negotiations took place, the property practitioner was often at the forefront of informing, educating, and assuring their clients.

Thus, it was noted that the influence held by these professionals bore weight in the decision-making of other parties involved. It was, therefore, suggested that the same trust and guidance may be applicable in facilitating the adoption of PropTech solutions (or lack thereof). Moreover, they may play an important role in ensuring efficient usage and integration success of these technology solutions.

4.8 Discussion Pertaining to Proposition 2

Having presented and discussed the study findings related to factors that influence PropTech adoption and integrating these findings with the literature, the findings related to proposition 2 can be presented and discussed.

Proposition 2:

External variables such as regulation, cost, access, and perceptions around ease-of-use and degree of personal usefulness can be considered enablers or inhibitors to the eventual use of available PropTech solutions in South Africa's residential real estate sales process.

The findings captured participants' experiences in the residential real estate sales process. Subjective experiences and beliefs were found to be highly influential in their decisions to adopt PropTech solutions.

In South Africa, there are still regulatory restrictions that require the final offer to purchase to be signed physically and not digitally. Additionally, an attorney is required to be present during the signing. Despite this, participants expressed a willingness to adopt technology that is available and legally provisioned.

Cost considerations were also found to be influential in the adoption of technology. In the case of PropTech, these costs would fall on the brokerage, property practitioner and other entities in the industry. The property practitioner participants expressed an awareness of technology solutions that would enhance their operations, but cost was a primary factor in deciding not to use them.

Informational platforms and reports are available but, depending on the service provider, may be an expense for the seller in the process. Additional information for buyers was found to either be unknown or to be inaccessible and would require individual knowledge on where to source information.

The interviews indicated a lack of awareness and accessibility of existing PropTech solutions. This highlighted the first barrier – awareness. Once the

technology solutions were discussed with participants, lifestyle and personal preferences were the most distinguishing factors regarding a desire for increased technology integration in their sale process.

Participants were generally receptive to technology use in the sale process, but with certain conditions. It was expressed that the integration of PropTech should not replace the human element and responsibilities of the property practitioner. This reinforced the literature findings which had emphasised the face-to-face interactions given the nature of the real estate asset and transaction processes (Asensio-Soto & Navarro-Astor, 2022).

Furthermore, the most effective areas to integrate the technology, as shown similarly in literature (Oluwunmi & Agara, 2023), were found to be during the mundane, repetitive, administrative tasks involved in the residential real estate sales process. Finally, incremental technology integration was suggested over large-scale system changes.

4.9 Chapter 5 Outline

The final chapter of the research study aimed to draw on the literature discussed in the research as well as the presented and discussed findings of the study to provide a conclusion to the study. The conclusions for the primary and secondary research questions were presented. This was followed by an overall conclusion and a discussion of the overall theoretical implications of the study.

Chapter 5 outlined the limitations and challenges of the study from a practical perspective of the researcher and the study itself. Then, recommendations were presented and discussed for all relevant stakeholders in South African Real Estate and the PropTech industry. Finally, suggestions for future research were provided.

CHAPTER 5. CONCLUSIONS & RECOMMENDATIONS

5.1 Introduction

The following chapter described the conclusion and recommendations of the research. The conclusion was presented according to the primary and secondary research questions, finally providing an answer based on the findings, propositions and literature.

5.2 Conclusions Regarding Research Question 1

This section provided a conclusion encompassing the literature, findings and discussion related to proposition 1. The focus consolidated the key terms related to the primary research question of the study:

Research Question 1:

How can current PropTech solutions be used to streamline the South African Residential Real Estate Sales Process?

The purpose of the study was to explore how PropTech solutions could be used to streamline the residential real estate sales process in South Africa. The findings indicated that, indeed, these solutions (when applied appropriately) could streamline the process. However, the effectiveness of implementing these solutions was dependent on the synchronicity of these technologies with the human-led aspects of the process. Additionally, the findings indicated that while many PropTech solutions are available for use in South Africa, their appropriateness, seamless integration and applicability ultimately impact their ability to streamline the process.

While various factors impact the streamlining of a process, the primary focus of the study explored the challenges experienced in the process that adversely affect its efficiency.

5.2.1 *How Brokerage and Property Practitioner Operation PropTech Can Streamline the Process*

The operational PropTech related to real estate brokerages and, more specifically, property practitioners was discussed in the study. The findings highlighted that not all PropTech solutions within this category applied to the process. However, solutions related to Customer Relationship Management Software and Digital Scheduling Systems may be significant in contributing to the streamlining of the process.

These technology solutions would allow clients and property practitioners to communicate more timeously and efficiently (Oluwunmi & Agara, 2023), allowing property practitioners to effectively manage their communication with important stakeholders while providing updates to clients. This communication enabled by these solutions suggested a significant improvement in the experience and satisfaction of stakeholders in the process.

While this may streamline the process, the study also found that the importance of human interaction cannot be understated, and the findings indicated an emphasis to not negate the human interaction in favour of technological convenience, and to only use technology systems as part of logistical and administrative activities but not at critical points in the process (such as signing of sale, or financial transfers for example).

Additionally, the lack of efficiency regarding the coordination of critical activities and meetings during the residential real estate sales process was found to be a significant tension point for participants and often resulted in a mismanagement of time and effort. The study indicated that a collaborative digital platform that provides an overview of parties' schedules and availability could improve the accuracy of relevant scheduling and meetings, avoiding delays, misunderstanding and inconveniences.

5.2.2 *How Property Listing PropTech Can Streamline the Process*

Property Listings were found to be valuable by participants during the residential real estate sales process. The existing functionality of the property listing platforms were found to be sufficient for most participants. However, the findings of the study suggested additional areas for improvement. It was found that a lack of information transparency was a common challenge that inhibited process streamlining.

The study found that integration of additional information related to the property itself or the area could be helping in decision-making and thereby reduce the length of time associated with property searching. This may indicate an area of future research relating to how existing PropTech solutions could be further enhanced to streamline the sales process and improve user satisfaction.

5.2.3 *How Virtual Tours PropTech Can Streamline the Process*

The findings of the study showed that virtual tours may be useful in streamlining the residential real estate sales process. However, multiple pre-requisites were addressed. Virtual tours were found to be limited in their application – being more suited for new developments or high-end/luxury properties (Ehrs & Lindfors, 2018). Based on the varying types of residential properties in South Africa, virtual tours do not provide a widespread solution.

Furthermore, the virtual tours were found to be most applicable in the pre-sale phase of the sales process. In this phase, virtual tours enhance a property listing by enabling property viewing efficiency and enhancing buyer confidence. In addition, this PropTech solution was found to function as a deterrent for prospective buyers, allowing faster decision-making to not continue with a property and not enquire about it. This similarly provides time-saving for property practitioners, who can then refine their pool of interested buyers.

5.2.4 *How Digital Documentation and Remote Meetings PropTech Can Streamline the Process*

One of the most prominent findings of the study related to the PropTech solutions encompassing digital documentation and remote meetings. It was found that the digitisation and dematerialisation characteristics of technology innovation could have a significant impact in streamlining the residential real estate sales process in South Africa. Wherever possible, the findings indicated a high preference for conducting activities online.

Digital documentation (including storage, exchange and signing) and remote meetings were found to improve efficiency and prevent delays in closing. Additionally, improving the functionality of these technology solutions (such as form error codes and instruction/education pop-ups, for example) could further enhance their ability to streamline the process.

While the study initially explored remote closings technology solutions, the findings showed a preference for the physical presence of necessary parties at the closing of a sale. Additionally, the South African legislation (which currently requires physical signing of certain documentation and the presence of registered attorneys) was an inhibiting factor in fully utilising these PropTech solutions in the sales process. However, the use of these PropTech solutions was possible in the residential sales process and was found to still improve efficiency, accuracy and speed and therefore could contribute to streamlining the process.

5.2.5 *Conclusion Regarding Research Question 1*

Ultimately, the use of PropTech solutions was found to have the possibility to effectively streamline the residential real estate sales process in South Africa. This was consistent with the theoretical frameworks presented in chapter 3. The benefits of improved efficiency, accuracy, duration and satisfaction were indicated to be potential outcomes of integrating a distinct combination of PropTech solutions at appropriate and applicable phases during the sales

process. The qualitative nature of the study, in contrast to previous quantitative findings, highlighted how individual preferences and perspectives may show similar findings in theory, but through in-depth discussions, much of what is theoretically presumed to be relevant or influential is diluted by personal experiences.

Finally, the use of these technologies in integration also considered the inclusion of the human-led activities. The human element was emphasised from the findings of the study and played a significant role in exploring how people and technology interact. The research aimed to gain insights directly from the end-users of technology and brought to light the user profiles that may be of important consideration in future PropTech development.

5.3 Conclusions Regarding Research Question 2

The following section provided the conclusions of the study as related to research question 2 (secondary):

How can parties in the South African residential real estate sales process be influenced to use available PropTech solutions?

While the primary focus of the study aimed to explore how PropTech solutions can streamline the residential real estate sales process in South Africa, the secondary research question focused on factors that would impact the eventual usage of these technologies. In some instances, when a new technology innovation is introduced into the market, it may not always be adopted as expected. This is even the case when the innovation does indeed address the challenges at hand or fulfil a particular need. This highlighted the gap between the theoretical impact of a technology, such as the PropTech solutions discussed, versus the practical application and usage of these technologies.

The following section, therefore provided an answer related to the second research question, describing the factors that may influence the adoption of PropTech and subsequently result in the streamlining impacts intended.

5.3.1 *Market Demand and Need*

The findings of the study indicated that as the needs of clients and stakeholders in residential real estate evolved, innovations emerged. The literature suggested an uptake of innovations as a new normal after the majority adopt the technology. In the residential real estate sales process, clients may be encouraged and more likely led to use technologies based on another stakeholder that already use it. Such examples were found to be common in the communication channels of participants in the study.

5.3.2 *User Awareness and Education*

The findings of the study indicated an overall lack of awareness regarding the features and functions of available PropTech solutions. This suggested a critical gap that would otherwise enable the usage of PropTech in the sales process. While many solutions are available, traditional, well-known, and well-established means of progressing through the sales process may be the default unless parties are made aware of other avenues.

It was found that participants would more likely have used certain PropTech solutions had they known of them during the time. This suggests a clear willingness to use but a lack of access (due to a lack of awareness) that prevented the actual use. The findings suggested the importance of an initial awareness of PropTech solutions that would ultimately influence their use and adoption across the sales process.

In addition, while PropTech solutions may be available, the knowledge and perceived ease-of-use were found to play an important role in the level of openness to experiment and use PropTech solutions (Baum et al., 2020). This highlighted an additional barrier to be overcome should PropTech solutions be adopted across the residential real estate sales process. The educational aspect around PropTech solutions may need to be simple and familiar to encourage adoption, as reflected by the findings.

5.3.3 *Cost Considerations and Affordability*

One of the most influential factors in the adoption of a PropTech solution in the residential real estate sales process was found to be the costs associated with buying and using a particular solution. The study found that PropTech solutions were more likely used when no costs were directly associated with them. For property practitioners, various solutions were used and not used depending on if they themselves had to make a financial contribution or not. Similarly, with clients interviewed, it was found that if costs were associated with the technology solution, they would likely choose not to use it. This remained consistent with the literature The resistance to adopt PropTech based on financial commitment is consistent with the literature (Górska et al., 2022).

The study highlighted financial considerations as an important influence on the likelihood of PropTech usage in the sales process. This may further indicate an indirect influence on access to use of these technologies.

5.3.4 *The Role of Property Practitioners in Influencing Adoption*

Property practitioners had been shown to play a significant role in the residential real estate sales process in South Africa. The study's findings highlighted the level of trust involved in the process. As a result, the study's findings may deduce that the adoption and usage of PropTech solutions for buyers and sellers, is largely influenced by the level of adoption and use deployed by their assigned property practitioner in the process.

Furthermore, the property practitioner-client relationship from past experiences of in the sales process, was found to influence the likelihood to use or not use PropTech solutions in the future. Where experiences were inefficient or slow, due to the property practitioner's professionalism and guidance, a higher intention of future PropTech use was indicated. Where past experiences with property

practitioners was efficient, fast, and personable, a low intention of future PropTech adoption was indicated. This suggested that personal preferences and perceptions of what is deemed efficient is often influenced by past experiences, and while theoretically PropTech solutions may provide streamlining benefits it may not always be desired.

Overall, the relationship between property practitioners and parties in the sales process, as well as the individual property practitioners' disposition to adopt and use PropTech solutions, indicated an influential factor in motivating parties to adopt the available PropTech solutions.

5.3.5 *Conclusion regarding Research Question 2.*

Research question was a secondary research question to the study. It sought to delve further into additional factors that may indirectly impact the outcomes of the primary research question. The exploration of the underlying factors that influence the usage, acceptance and adoption of PropTech provided an additional layer of insight into the practical implications of the research. These practical implications were further highlighted through exploring and understanding parties' propensity to use available PropTech, over and above its suggested benefits.

How people interact with technology is a relevant consideration in research that seeks to explore technology benefits when that technology is essentially deployed and utilised by people themselves. The research findings were found to align with the theoretical framework of the technology adoption model (TAM), and moreover the findings of the study was found to be similar to earlier studie. However, the unique South African context was highlighted in a nuanced way.

The socio-cultural context of South Africa (social, economic and technology usage) explored in the research provided additional motivators to PropTech adoption, and hinderances to its use that were not presented in similar studies from different global regions where the residential real estate sales sector may have varying characteristics.

5.4 Theoretical Implications of the Study

The purpose of the study was underpinned by the prevelance of technology in the real estate industry, and aimed to explore its practical application and effectiveness in the South African context. While technology provides solutions to business and everyday problems, the study sought to explore the lack of usage and all the factors preventing PropTech solutions from being applied in the context that they were intended for.

On the primary level, the study aimed to explore the effectiveness of existing PropTech solutions in the residential real estate sales process. The task-technology fit (TTF) model was used as the theoretical foundation related to the primary research question. In theory, those technologies that were appropriate for a particular task or action, when used could effectively streamline and improve that task or action, and thereby improve a process (in this context the process was the residential real estate sales process in South Africa).

However, while this theoretical model addresses an important component of how technology can integrate with people's actions and tasks, human behaviour and decision-making is more complex and influences by a variety of external and internal factors. Thus, in an attempt to contribute to the existing body of literature on PropTehc, the study aimed to provide a practical way forward – translating research findings into actionable steps. The secondary research question was introduced as a result of this.

The technology adoption model (TAM) was used as the theoretical framework to address this additional layer pertaining to human behaviour. While a particular technology can exist and provide a real solution to a problem, there are often various other factors that may inhibit its use. The study indeed found that these factors play a large role in the eventual use of PropTech, and explored solutions to overcome these barriers.

5.5 Limitations and Challenges of the Study

- The qualitative nature of the research was a limitation to the study, additional data collection from quantitative research could have supplemented the research topic and findings.
- The multiple samples used in the study may have diluted the findings and conclusion of the study as it pertained to practical application. The needs of buyers, sellers and property practitioners differ and thus narrowing the focus group sample of the study could have given more refined answers to PropTech solutions that streamline the process.
- The time available to conduct the study was a limitation to how many participants could have been included.
- The researcher's geographical location was a limitation the variety of participants involved in the study. A group of researchers collaborating on the study may have allowed a further reach within South Africa.

5.6 Recommendations

The following are recommendations to stakeholders based on the findings of the research:

- The South African real estate industry contributes significantly to the country's economic standing; however, it remains traditional compared to other industries in the country and compared to other global real estate industries. the industry should place greater emphasis on the integration of large-scale technological innovation to improve efficiency of processes and provide benefits for all stakeholders involved. Becoming a leading voice in technological innovation would drive the attitudes and perceptions of other communities and organisations.
- There are numerous small to large organisations operating within the real estate industry. However, the market remains dominated by the organisations that utilise technology efficiently and prioritise its adoption. Therefore, to remain competitive in the highly saturated real estate market,

companies should create strategies to incrementally integrate PropTech in a feasible manner. Rather than wait for a market threat to disintermediate them, or dilute their share, companies should be proactive in their approach to adopt PropTech

- Brokerages, in addition to the recommendations for the industry organisations, should built cultures that emphasise innovation and education of PropTech solutions. Furthermore, where possible, training programs and resources should be provided to empower their property practitioner's and teams and enable them to improve their performances through PropTech integration.
- In relation to the adoption of PropTech solutions for brokerage operations and property practitioners, PropTech developers and firms should place greater emphasis on collaborating with brokerages in order to contextualise the problems and opportunities of PropTech use, and thereby create more practical and applicable proptech solutions.
- Property Practitioners can greatly benefit from exploring the use of PropTech in their operations. This can provide a unique selling proposition that can distinguish them from other property practitioners in the market. Property practitioners have the potential to improve their productivity and success by leveraging technology.
- Buyers and prospective buyers should empower themselves information and tools that can be enabled with PropTech solutions. These stakeholders have a significant stake in driving sales processes and therefore should begin to ask more from their property practitioners and professional service providers. This will signal to them a willingness to change and adopt PropTech and can drive transformation in the sector.
- Sellers and prospective sellers should explore the options provided by PropTech which may provide greater independence and information transparency. While trust in property practitioners will remain a crucial factor, the responsibility to be informed regarding their property can also be undertaken by themselves and not solely delegated to practitioners.
- Finally, the South African Government and relevant regulatory authorities and policymakers should take note of the benefits of PropTech solutions

and develop policies that align with the needs of all stakeholders within the industry. Reducing barriers to PropTech development and deployment can empower the workforce and stimulate economic activity through entrepreneurial ventures. The PropTech associations and networks require support - whether financial, resources or other. Thus, these authority bodies should take the responsibility to support PropTech development and place greater emphasis on ensuring a stable foundation for growth in the sector.

- To other researchers exploring PropTech in South Africa, continue to contribute to the body of research locally. The collective contribution of findings and research will play an important role in motivating adoption of PropTech by providing evidence to its success. Moreover, the growth in the body of South African PropTech literature may lead to unique PropTech development that address the South African needs and circumstances, thus potentially improving the experiences and satisfaction of South African individuals and households who interact with processes in the industry.

5.7 Suggestions for Further Research

The research focused on a select group of stakeholders within the residential real estate sales process. However, other professional service providers are indeed stakeholders in the process. Therefore, to expand on the findings of the research, additional populations could be included to provide an expanded view of all interactions and activities in the process and potentially bring to light PropTech solutions enhance seamlessness for all stakeholders involved.

Compared to current global PropTech trends, such as blockchain, advances machine learning and IoT solutions, South Africa is arguably in a relative infancy stage of PropTech adoption. Therefore, future research can consider the applications of more advanced PropTech in the context of South Africa’s real estate industry and explore the feasibility of implementation.

Property practitioners were considered as independent parties, however in many cases these professionals work as part of a larger organisation. Therefore, a study that focuses on property practitioners and brokerages and explores the operational PropTech solutions may provide insights into practical managerial opportunities.

The PropTech solutions in the study were explored individually and although multiple solutions can be integrated to streamline the residential real estate sales process, the potential for a single fully integrated system may be a new successful PropTech solution. Therefore, a further study that designs a system which holistically integrates the entire sales process could be explored.

A study expanding on the insights from the interview discussion could be areas of further research. Firstly, niche property listing platforms were mentioned. Listing platforms that cater to unique property requirements could be a potential area for further research. Examples include “owner-only” listing platforms, or auction-only platforms, or investment-focused listing platforms. The feasibility and benefits of these platforms could be explored.

A second insight from interview discussions suggested a study on post-sale services in residential real estate sales process. These services included aspects like moving services, municipality registration services, and even interior designing services. The study could focus on other value-added services that could be integrated into the services provided by property practitioners and brokerages (either as new departments or through partnerships). The feasibility and benefits of these post-sale services could be explored to determine if they would increase customer satisfaction and streamline the process.

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APPENDIX A: Interview Guide (Actual Instrument)

Research Instrument:

Pre-Screening Survey

1. Are you currently a resident of South Africa? (Mark with X)

Yes	
No	

2. Which age range do fall under? (Mark with X)

20 – 29 years	
30 – 39 years	
40 – 49 years	
50 – 60 years	

3. Which of the following best describes you?

Group	Description	Answer (Mark with X)
Property Practitioner	Qualified, registered Property Practitioners in South Africa (either operating solely or through a brokerage) with experience in residential real estate sales.	

Past Buyer	Past Buyers of residential real estate property in South Africa.	
Past Seller	Past sellers of residential real estate property in South Africa.	
Prospective Buyer	First-Time Buyers of residential real estate property in South Africa (currently in the Pre-Sales phases of the sales process).	
Prospective Seller	Interested Sellers of residential real estate property in South Africa (currently in the Pre-Sales phases of the sales process).	
Other		

Interview Guide – Property Practitioners

Part 1: Participant Information

1. How long have you been a registered Residential Sales Property Practitioner in South Africa?
2. Do you currently work independently or with a Real Estate Agency or Brokerage?
3. What is your current age?
4. Which suburbs do you currently operate in?
5. Are you familiar with the term “PropTech”? What does it mean to you?

If the participant is not familiar a basic explanation will be given by the researcher.

Part 2: Understanding the Residential Real Estate Sales Process

6. Please describe your understanding of the typical residential real estate sales process in South Africa.
7. What do you believe your role is in the process?
8. What do you believe the role of the other parties is in the process?
9. What activities of the process are the most time-consuming?
10. What activities of the process are the fastest to complete?
11. What activities in the process are the most complicated for you?
12. What activities in the process are easiest to complete?
13. Overall, what major issues and challenges have you faced during the process?
14. How have you managed addressed these issues?

Part 3: PropTech Solutions: Fit, Acceptance and Use.

15. What digital and technology tools or systems have you used while working as a Property Practitioner?

16. How has the use of these digital technologies benefited you?

17. How do you think Sellers/Buyers/Property Practitioners in South Africa feel about technology in property (PropTech)?

18. What business do you usually conduct in-person with clients?

19. What business do you usually conduct virtually with clients?

20. Would you prefer or not prefer to use technology during the real estate sales process for the following activities:

    a. Communication and Updates

    b. Documentation and Signing

    c. Information Gathering

    d. Viewing and Inspections

    e. Other:

Interviewer will present a list of PropTech solutions and give examples (See List of PropTech Solutions).

21. Out of this list of PropTech solutions, which solutions do you think would be useful during residential real estate sales and why?

22. Out of this list of PropTech solutions, which solutions seem easiest to use and why?

23. Out of this list of PropTech solutions, which solutions would you or have you used?

24. What would prevent you from using PropTech and technology during the residential real estate sales process? (Examples include cost, internet access, personal ability, awareness, client preferences, benefits and support).

Interview Guide – Past Residential Real Estate Buyers

Participation in the study will remain confidential between the researcher and the participant. All information gathered from the interviews will remain anonymous to you as the individual. Only relevant demographic information will be disclosed where it is relevant to the findings of the study.

Part 1: Participant Information

1. What year did you purchase your current residential real estate property?

2. Have you purchased other residential real estate properties in the past? When and for what reasons?

3. Were you the exclusive owner of previously purchase residential real estate property? If not, what was the ownership of your past and current residential real estate property?

4. What is your current occupation?

5. What is your current age?

6. Which suburbs in South Africa have you resided in (while living in owned residential property)?

7. Are you familiar are you with the term “PropTech”? What does it mean to you?

If participant is not familiar a basic explanation will be given by the researcher.

Part 2: Understanding the Residential Real Estate Sales Process

8. Please describe your understanding of the typical residential real estate sales process in South Africa.

9. What do you believe your role was the process?

10. What do you believe the role of the other parties was, during process?

11. What activities of the process were the most time consuming?

12. What activities of the process were the fasted to complete?

13. What activities in the process were the most complicated for you?

14. What activities in the process were easiest to complete?

15. Overall, what were major issues and challenges you had faced during the process?

16. How did you manage addressed these issues?

Part 3: PropTech Solutions: Fit, Acceptance and Use.

17. What digital and technology tools or systems had you used throughout the purchase of your residential property?

18. How had the use of these digital technologies benefited you?

19. How do you think Sellers/Buyers/Property Practitioners in South Africa feel about technology in property (PropTech)?

20. What activities did you conduct in-person with other parties during the purchase of your residential property?

21. What activities did you conduct virtually with other parties during the purchase of your residential property?

22. Would you prefer or not prefer to use technology during the real estate sales process for the following activities:

    a. Communication and Updates

    b. Documentation and Signing

    c. Information Gathering

    d. Viewing and Inspections

    e. Other:

Interviewer will present a list of PropTech solutions and give examples (See List of PropTech Solutions).

23. Out of this list of PropTech solutions, which solutions do you think would have been useful during your residential real estate sales process and why?

24. Out of this list of PropTech solutions, which solutions seem easiest to have used and why?

25. Out of this list of PropTech solutions, which solutions would you have used and why?

26. What would have prevented you from using PropTech and technology during the residential real estate sales process? (Examples include cost, internet access, awareness, ability, benefits and support).

Interview Guide – Past Residential Real Estate Sellers

Participation in the study will remain confidential between the researcher and the participant. All information gathered from the interviews will remain anonymous to you as the individual. Only relevant demographic information will be disclosed where it is relevant to the findings of the study.

Part 1: Participant Information

1. What year did you sell your most recent residential real estate property?

2. Have you sold other residential real estate properties in the prior? When and for what reasons?

3. Were you the exclusive owner of previously sold residential real estate property? If not, what was the ownership of your past and current residential real estate property?

4. What is your current occupation?
5. What is your current age?
6. Which suburbs in South Africa have you resided in (while living in owned residential property)?

7. Are you familiar are you with the term “PropTech”? What does it mean to you?

If participant is not familiar a basic explanation will be given by the researcher.

Part 2: Understanding the Residential Real Estate Sales Process

8. Please describe your understanding of the typical residential real estate sales process in South Africa.
9. What do you believe your role was the process?
10. What do you believe the role of the other parties was, during process?
11. What activities of the process were the most time consuming?
12. What activities of the process were the fasted to complete?
13. What activities in the process were the most complicated for you?
14. What activities in the process were easiest to complete?
15. Overall, what were major issues and challenges you had faced during the process?
16. How did you manage addressed these issues?

Part 3: PropTech Solutions: Fit, Acceptance and Use.

17. What digital and technology tools or systems had you used throughout the sale of your residential property?

18. How had the use of these digital technologies benefited you?

19. How do you think Sellers/Buyers/Property Practitioners in South Africa feel about technology in property (PropTech)?

20. What activities did you conduct in-person with other parties during the sale of your residential property?

21. What activities did you conduct virtually with other parties during the sale of your residential property?

22. Would you prefer or not prefer to use technology during the real estate sales process for the following activities:

    a. Communication and Updates

    b. Documentation and Signing

    c. Information Gathering

    d. Viewing and Inspections

    e. Other:

Interviewer will present a list of PropTech solutions and give examples (See List of PropTech Solutions).

23. Out of this list of PropTech solutions, which solutions do you think would have been useful during your residential real estate sales process and why?

24. Out of this list of PropTech solutions, which solutions seem easiest to have used and why?

25. Out of this list of PropTech solutions, which solutions would you have used and why?

26. What would have prevented you from using PropTech and technology during the residential real estate sales process? (Examples include cost, internet access, awareness, ability, benefits and support).

Interview Guide – Prospective Residential Real Estate Buyers

Participation in the study will remain confidential between the researcher and the participant. All information gathered from the interviews will remain anonymous to you as the individual. Only relevant demographic information will be disclosed where it is relevant to the findings of the study.

Part 1: Participant Information

1. When are you planning to purchase a residential real estate property?

2. What steps have you taken so far towards the purchase of a residential real estate property? (Examples include pre-qualification, viewing and enquiring listings).

3. Will you be the exclusive owner of your purchased residential real estate property? If not, what will the ownership/purchase structure of residential real estate property be?

4. What is your current occupation?

5. What is your current age?

6. Which suburbs in South Africa are you interested in purchasing a residential real estate property?

7. What is your reason for purchasing a residential real estate property?

8. Are you familiar are you with the term “PropTech”? What does it mean to you?

If participant is not familiar a basic explanation will be given by the researcher.

Part 2: Understanding the Residential Real Estate Sales Process

9. Please describe your understanding of the typical residential real estate sales process in South Africa.
10. What do you believe your role would be in the process?
11. What do you believe the role of the other parties should be during process?
12. What activities of the process do you think will be the most time consuming?
13. What activities of the process do you think will be the fasted to complete?
14. What activities in the process do you think will be the most complicated for you?
15. What activities in the process do you think will be easiest to complete?
16. Overall, what are major issues and challenges you believe you may face during the process?
17. How are you planning on addressing these issues?

Part 3: PropTech Solutions: Fit, Acceptance and Use.

18. What digital and technology tools or systems have you used thus far towards purchasing a residential property?
19. How has the use of these digital technologies benefited you so far?

20. What digital and technology tools or systems do you plan to use during the purchase of your residential property?

21. How do you anticipate these digital technologies benefiting you?

22. How do you think Sellers/Buyers/Property Practitioners in South Africa feel about technology in property (PropTech)?

23. What activities have you and would you conduct in-person with other parties during the sale of your residential property?

24. What activities have you and would you conduct virtually with other parties during the sale of your residential property?

25. Would you prefer or not prefer to use technology during the real estate sales process for the following activities:

    a. Communication and Updates

    b. Documentation and Signing

    c. Information Gathering

    d. Viewing and Inspections

    e. Other:

Interviewer will present a list of PropTech solutions and give examples (See List of PropTech Solutions).

26. Out of this list of PropTech solutions, which solutions do you think could be useful during your residential real estate sales process and why?

27. Out of this list of PropTech solutions, which solutions seem easiest to have use and why?

28. Out of this list of PropTech solutions, which solutions would you use and why?

29. What would prevent you from using PropTech and technology during your residential real estate sales process? (Examples include cost, internet access, awareness, ability, benefits and support).

Interview Guide – Prospective Residential Real Estate Sellers

Participation in the study will remain confidential between the researcher and the participant. All information gathered from the interviews will remain anonymous to you as the individual. Only relevant demographic information will be disclosed where it is relevant to the findings of the study.

Part 1: Participant Information

1. When are you planning to sell your current residential real estate property?
2. What steps have you taken so far towards selling your current residential real estate property?
3. Are you the exclusive owner of your current residential real estate property? If not, what is the ownership of current residential real estate property?
4. What is your current occupation?
5. What is your current age?
6. Which suburb in South Africa is your current owned residential real estate property located?
7. What is your reason for selling?
8. Are you familiar are you with the term “PropTech”? What does it mean to you?

If participant is not familiar a basic explanation will be given by the researcher.

Part 2: Understanding the Residential Real Estate Sales Process

9. Please describe your understanding of the typical residential real estate sales process in South Africa.
10. What do you believe your role would be in the process?
11. What do you believe the role of the other parties should be during process?
12. What activities of the process do you think will be the most time consuming?
13. What activities of the process do you think will be the fasted to complete?
14. What activities in the process do you think will be the most complicated for you?
15. What activities in the process do you think will be easiest to complete?
16. Overall, what are major issues and challenges you believe you may face during the process?
17. How are you planning on addressing these issues?

Part 3: PropTech Solutions: Fit, Acceptance and Use.

18. What digital and technology tools or systems have you used thus far towards the sale of your residential property?
19. How has the use of these digital technologies benefited you?
20. What digital and technology tools or systems do you plan to use during the sale of your residential property?
21. How do you anticipate these digital technologies benefiting you?

22. How do you think Sellers/Buyers/Property Practitioners in South Africa feel about technology in property (PropTech)?

23. What activities have you and would you conduct in-person with other parties during the sale of your residential property?

24. What activities have you and would you conduct virtually with other parties during the sale of your residential property?

25. Would you prefer or not prefer to use technology during the real estate sales process for the following activities:

    a. Communication and Updates

    b. Documentation and Signing

    c. Information Gathering

    d. Viewing and Inspections

    e. Other:

Interviewer will present a list of PropTech solutions and give examples (See List of PropTech Solutions).

26. Out of this list of PropTech solutions, which solutions do you think could be useful during your residential real estate sales process and why?

27. Out of this list of PropTech solutions, which solutions seem easiest to have use and why?

28. Out of this list of PropTech solutions, which solutions would you use and why?

29. What would prevent you from using PropTech and technology during your residential real estate sales process? (Examples include cost, internet access, awareness, ability, benefits and support).

List of PropTech Solutions for *Interviews:*

List for Property Practitioner Interviewee

1. Property Listing PropTech (online platforms showcasing properties for sale)
2. Virtual Reality Tours (Virtual Reality of videos showcasing realistic imagery of a property listed for sale)
3. Agent Matching (Platforms providing recommended agents to clients in need)
4. Digital Contracts & Digital Document Exchange (digital tools allowing for uploading, viewing, signing and collaboration of documents)
5. Remote Closings & Consultations (Video meeting platforms facilitating meetings between parties remotely via digital devices)
6. Crowdfunding (platforms educating and connecting individuals who would like to jointly purchase property)
7. Market Data, Insights and Analytics (technology that aggregates data pertaining to pricing, market activity, historical data, geographical information of areas and both seller and buyer statistics to provide valuable insights through analysis)
8. Brokerage/Property Practitioner Operations (CRM tools, Marketing automation tools, property information databases, workflow automation, meeting scheduling automations to facilitate in various activities during the residential sales process)

List for Client Interviewee

1. Property Listing PropTech (online platforms showcasing properties for sale)

2. Virtual Reality Tours (Virtual Reality of videos showcasing realistic imagery of a property listed for sale)

3. Agent Matching (Platforms providing recommended agents to clients in need)

4. Digital Contracts & Digital Document Exchange (digital tools allowing for uploading, viewing, signing and collaboration of documents)

5. Remote Closings & Consultations (Video meeting platforms facilitating meetings between parties remotely via digital devices)

6. Crowdfunding (platforms educating and connecting individuals who would like to jointly purchase property)

APPENDIX B: Participant Information Sheet

MMDB FT 2024 Participant Information Sheet (PIS)

Dear Sir / Madam

My name is Makoba Naomi Mogodi. I am a Masters student in the field of Digital Business at the University of the Witwatersrand Business School, Johannesburg. My supervisor is Dr Ayanda Magida. I am conducting a research study about Property Technology and its use and effectiveness in the South African real estate industry. The study title is "PropTech & The South African Residential Real Estate Sales Process: Exploring Technology-Enabled Streamlining and Technology Usage."

I am inviting you to take part in an interview. If you decide to take part, your participation in this research study will last about 2 hours for the interview and a few days for the overall communication process. The interview will take place during your chosen slot (from the attached booking link), in person or virtually.

With your permission, I would like to audio/video record the interview. This data will be stored in the institution private database, and locally on my laptop computer for 1 year and deleted after a maximum of 2 years. Only the researcher will have access to the data.

During the research activity, I will need to ask for some personal information about you, including your current residential location (suburb, province, country), your age and your ethnicity.

The interview will be confidential and anonymous. When I share the results of the research study, I will not include your name or anything else that could identify you. With your permission, other researchers may use the data collected from this research study, but your name and any personal information will not be used or passed on.

If you decide to take part in the research study, it should be because you want to volunteer. You do not have to take part. You can stop being in the study at any time. You do not have to answer any questions if you do not want to. You will not get any direct benefits if you choose to join the research study. You will not lose any services, benefits or rights you would normally have if you decide not to join. Taking part in the research study will not cost you anything. You will not be paid for being in this research study. Your travel/data costs to attend the interview will be reimbursed to a maximum of R100.

The risks for this research study are no more than what happens in everyday life including activites and your personal opinions. If you need some support or additional information following the interview, these are available free of charge at through the researcher. No sensitive questions or topics will be asked, nor will any privileged and confidential information be required.

This research study will be written up as a research report. The report will be available upon request and not via the institution online. If you would like to receive a summary of this report, I will be happy to send it to you.

If you have any questions during or afterwards about this research study, feel free to contact me or my supervisor on the details listed below. If you have any concerns or complaints about the ethical procedures of this research study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email hrecnon-medical@wits.ac.za

Yours sincerely,

Researcher:
Makoba Naomi Mogodi, 1391005@students.wits.ac.za, 084 955 0262

Supervisor:
Dr Ayanda Magida, ayanda.magida@wits.ac.za, 011 717 3953

APPENDIX C Participant Consent Form

2024 MMDB FT Research Study: Consent Form



Title of project: PropTech & The South African Residential Real Estate Sales Process: Exploring Technology enabled-streamlining and Technology usage

Name of researcher: Makoba Naomi Mogodi

I, …….., agree to participate in this research project.

I agree to the following:

(Please circle the relevant options below)

The research study was explained to me. I understand what this study is about.	YES	NO
I understand that I can volunteer to take part in the study	YES	NO
I agree that the interview/focus group/other activity may be audio or audio-visually recorded	YES	NO
I agree that direct quotations from my interview/focus group/other activity may be used by the researcher in their research report/ manuscript/book chapter	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/manuscript/book chapter)	YES	NO
I agree that other researchers may use the information I provide in my interview/focus group/other activity (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)

…… (signature)
Makoba Naomi Mogodi (name of researcher/person seeking consent)
…… (date)

APPENDIX D Ethics Clearance Certificate

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

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

Ethics Clearance Certificate

Ethics protocol number: WBS/DB1391005/777
This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

Project title	PropTech & the South African residential real estate sales process: exploring technology enabled-streamlining and technology usage
Investigator / Researcher	Ms Makoba Naomi Mogodi
Nature of Project	MM (Digital Business)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed confidentialty.
Issue Date of Certificate	23/10/2024
Expiry date	Date of submission of the project / research report
Chairperson	Dr Ayanda Magida ☎ +27 11 717 3953 ✉ ayanda.magida@wits.ac.za

Declaration by Researcher

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

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

Signature

25/10/2024
Date: