

TOWARDS A FRAMEWORK FOR THE INTEGRATION OF DATA AND DATA
SOURCES IN THE AUTOMATION AND DEMATERIALISATION OF LAND
ADMINISTRATION SYSTEMS

by

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ABSTRACT

The South African property process is cumbersome, tedious, and complex mainly since it is a manual paper-based system that involves numerous activities of many disparate firms and organisations in the private sector as well as business processes of regulatory agencies, public sectors departments and other institutions. Although much effort had been made by private organisations to automate pockets of the process, the integration efforts are still founded in paper documents. The purpose of this study was to investigate the conveyancing end-to-end process in South Africa in order to develop a conceptual framework that could be used to eliminate paper and dematerialise the land registration process. The study was guided by the following research question: How can the end-to-end property transfer process be integrated among the different role players to dematerialise property transfers?

Seated in the interpretative paradigm, an exploratory study was undertaken. The study followed a multidisciplinary approach which incorporated aspects of records management, supply chain management, land administration management, information technology and payment systems. Nineteen in-depth, semi-structured qualitative interviews were conducted with major organisations and societies (i.e. stakeholders) involved in property exchanges in South Africa. These included the South African Reserve Bank, The South African Deeds Registry, National Treasury, The Law Society of South Africa, The Surveyor General and various vendors which operate within the property sphere. These interviews were analysed using content analysis, and documentary evidence were used to triangulate the data collected. The study revealed that private organisations and banks are more ready to embrace dematerialisation than governmental institutions. The main findings of the study were that a need existed for the integration of information and data from the onset of the property application, dematerialisation in addition to digitisation should be incorporated into e-DRS, there is a need for a centralised information sharing capability, same-day, irrevocable

payments must be implemented and biometric information can be used to validate parties involved in each transaction. The findings were used to develop a framework for a dematerialised electronic deeds registration in South Africa, which were further generalised for use in other industries. It is recommended that key supply chain partners are integrated into a land administration system that is hosted by the deeds office. This study is of value to all organisations involved in the property land management administration processes, both in a private and governmental capacity, as well as indigenous tribunals. Recommendations for future studies were made.

Keywords: Conveyancing, supply chain management, land administration, property, registration, cadastre, transfers, information technology, records management, risk, security, payments, cloud technology, block chain technology, distributed ledger, virtual currency

DECLARATION

I, the undersigned, hereby declare that this thesis is my own work, and that all the sources I have cited and used have been duly acknowledged by means of complete references.

Anthea P. Amadi-Echendu

31 May 2016

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LIST OF KEY TERMINOLOGIES

Bitcoin	Bitcoin is a digital, distributed, cryptographic currency developed by an open source community	Moser, Bohme, & Breuker, 2013, p. 2
Block chain	The block chain is a distributed, shared, encrypted database that serves as an irreversible and incorruptible public repository of information	Wright & De Filippi, 2015, p. 1
Cadastre	A methodically arranged public inventory of data concerning properties within a certain country, based on a survey of boundaries	Silva and Stubkjær, 2002, p. 408
Dematerialisation	Replacing paper with electronic recordings	Măgureanu, 2012, p. 77
Distributed ledger	The distributed ledger comprises peer-to-peer technology and has emerged to facilitate the movement of value and capital between parties without using an intermediary	DeCovny, 2015, p. 24
e-conveyancing	e-conveyancing aims to provide an electronic business environment for completing property transactions, including electronic lodgement with Land Registries and the electronic settlement of funds	National e-Conveyancing Development Limited, Australia
Land registration	The process of official recording of rights in land through deeds or as title	Divithure and Tang, 2013, p. 220
Records management	Focuses on creating, storing, retrieving and using business records without the loss of any information	Ndenje-Sichalwe, 2010, p. 14
Title deed	A legal deed or document constituting evidence of a right, especially to ownership of property	Enemark, Williamson, and Wallace, 2005, p. 51

LIST OF ABBREVIATIONS AND ACRONYMS

ABS	-	asset backed security
API	-	application program interface
BPR	-	Business Process Reengineering
CIPC	-	Companies and Intellectual Property Commission
CIS	-	cadastral information system
DEA	-	Document Exchange Association
DG	-	Director- General
DHA	-	Department of Home Affairs
DOTS	-	Deeds Office Tracking System
DRDLR	-	Department of Rural Development and Land Reform
DVP	-	delivery versus payment
ECT Act	-	Electronic Communication and Transactions Act 25 of 2002
e-DRS	-	electronic deeds registration system
EFT	-	electronic funds transfer
FICA	-	Financial Intelligence Centre Act
GDP	-	gross domestic product
GG	-	Government Gazette
GN	-	Gazette Notice
HTML	-	hypertext mark-up language
IaaS	-	infrastructure as a service

ICT	- information communication technology
ID	- identity document
IDX	- Industrial Data Xchange
IT	- information technology
JSE	- Johannesburg Stock Exchange
KYC	- know your client
L@W	- Lawyers Access Internet (now known as e4)
LCC	- life cycle cost
LLB	- Bachelor of Laws degree
MO	- mortgage originator
NASDAQ	- National Association of Securities Dealers Automated Quotations
NECDL	- National e-Conveyancing Development Limited (Australia)
NECS	- National Electronic Conveyancing System
OMC	- operations and management costs
OTP	- offer to purchase
PASA	- Payments Association of South Africa
PAYE	- pay as you earn
PCH	- payment clearing house
PEXA	- Property Exchange Australia
PEXSA	- Property Exchange South Africa
PIN	- personal identification number

PKI	- public/private key infrastructure
PLATO	- Institute of Professional and Technical Surveyors
POPI Act	- Protection of Personal Information Act 4 of 2013
R & D	- research and development
RTC	- real time clearing
SA	- South African
SaaS	- software as a service
SABRIC	- South African Banking Risk Information Centre
SAMOS	- South African Multiple Option Settlement
SARB	- South African Reserve Bank
SARS	- South African Revenue Services
SCI	- supply chain integration
SCM	- supply chain management
SEIA	- socio-economic impact assessment
SEPA	- Single Euro Payments Area
SG	- surveyor-general
SITA	- State Information Technology Agency
SLA	- service level agreement
SWIFT	- Society for Worldwide Interbank Financial Telecommunication
TBVC	- Transkei, Bophuthatswana, Venda, and Ciskei
TIF	- tagged image format

- UN - United Nations
- UNECE - United Nations Economic Commission for Europe
- XHTML - extensible hypertext mark-up language
- XML - extensible mark-up language

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CHAPTER 1

Introduction to the study

1.1 Introduction

The purpose of any legal system is to regulate the relations of its people so that order is maintained within the society concerned and this include the relations amid the government and its people (Rudden, 2014, p. 1) and between individuals and businesses. Furthermore, land tenure is the relationship among people with respect to land (Department of Economic and Social Development, 2014, para 1 under 3.1). Rules of ownership delineate how property rights are to be apportioned within societies (Department of Economic and Social Development, 2014, para 1 under 3.1) with regard to the use, enjoyment, control, and transfer of land. In addition, restraints and responsibilities to land are also highlighted. Without secure land rights, there can be no sustainable developments as people will be reluctant to make long-term investments on land (Akinyemi & Nkubito, 2013, p. 3). External investors often only recognise titled landownership and fail to recognise the wide range of property rights that exist (Bomuhangi, Doss, & Meinzen-Dick, 2011, p. 78). Security of ownership provides a guarantee that the owner's "land rights will be recognised and protected if challenged by others" (Abdulai & Owusu-Ansah, 2014, p. 131). It is in this vein that this study has been undertaken in order to ascertain how property rights may be recorded when property is transferred from one owner to another.

Although conveyancing is a legal term, there are business and process related aspects that applies to conveyancing, which are not legal in nature that will be explored in this study. The recording of land registration creates a property ownership database, which enables

property transfer and title searches to confirm ownership details (Abdulai & Owusu-Ansah, 2014, p. 132). It is therefore crucial that ownership details are recorded correctly. In the narrow sense, *conveyancing* and *transfer* mean the same thing, but in the broader sense, *conveyancing* involves the law, practice and procedures that are concerned with the creation, maintenance, and transference of real rights, of which transfers are just a component (Kilbourn, 2008, p. 1-3). The land parcel (land with clearly demarcated boundaries) as recorded in the cadastre is the basic element of any land administration system (Enemark, Williamson, & Wallace, 2005, p. 54).

In South Africa, the cadastre is known as the surveyor general office. These terms (cadastre and surveyor general) will be used interchangeably throughout the study and mean the same thing. A land administration system consists of two databases, namely a cadastral system of digital maps that is a record of the property boundaries and a land administration system that records ownership information (Bogaerts & Zevenbergen, 2001, p. 331). This means that property boundaries are recorded in the cadastre and ownership information is recorded in the deeds office. These two offices form part of the Department of Rural Development and Land Reform in South Africa, but for the purposes of this study, they will be discussed separately because they use different processes and systems that do not interface with each other at this point. An automated database can prevent discrepancies between the two systems (Bogaerts & Zevenbergen, 2001, p. 328).

A deeds office (also known as a deeds registry) is a recording office of immovable property transactions where ownership information and encumbrances that limits the rights of ownership are recorded so that creditors, subsequent purchasers, and others with an economic interest in a property regarding ownership of and encumbrances against a particular property can be informed of these (Kochan, 2013, p. 273; Radloff, 1996, p. 809). The deeds office keeps original copies of all property-related documents in a secure, non-alterable form, but also provides electronic access to these documents (Goodman, 2013, p.

8). These types of recording instruments operate in a formal system. In contrast, indigenous properties are recorded in an informal way that may not be registered in a deeds office. This has the effect that the land administration system has incomplete information. It is possible to incorporate such informal processes into the formal process. In the absence of a land registration system, legal experts normally trace the root of a title to identify possible encumbrances against a property (Abdulai & Owusu-Ansah, 2014, p. 131). This could be a lengthy and expensive process.

The recording systems are established by state statute (Kochan, 2014, p. 279). There are two types of land registration systems, namely the deed registration system and the title registration system. The deed registration system provides a “register of owners where only the transaction is recorded” (Bogaerts & Zevenbergen, 2001, p. 329). The title registration system provides a way to find where the title itself is recorded and secured (Enemark et al., 2005, p. 54). South Africa uses a title system. With ownership officially documented, the risk of challenges to ownership is reduced. A land title is a mandatory condition for property loans (Abdulai & Owusu-Ansah, 2014, p. 135). This implies that unregistered property, which includes indigenous property, is excluded from obtaining property loans. The land registration title document is a public document in which interests affecting land in a specific country is kept (Tjia & Coetzee, 2014, p. 261).

Under the current land registration system, property documents are executed by a conveyancer in a form and format prescribed by the Deeds Registries Act (No. 47 of 1937 of South Africa (Deeds Registries Act [No. 47 of 1937])). Individuals or agents are therefore not allowed to deal with conveyancing transactions. Technological systems are used for conveyancers to electronically generate documents that are lodged with the deeds office. These documents are reduced to paper that are lodged manually with the appropriate deeds office that has jurisdiction (SITA Tender document, 2008, p. 30). The document receives a seal, barcode after the transaction has been processed, and the deeds office has been updated

with the appropriate entry (Section 2{5} Deeds Registries Act [No 47 of 1937]). A computer program known as the deeds registration system (DRS) is in place to maintain an electronic land register, but information is captured manually into the deeds office database and the cadastre database. Apart from this digitised capturing as well as a scanning process, the preparation, lodgement and the processing of deeds and documents by the Registrar takes place manually (SITA Tender document, 2008, p. 31). Reducing electronic documents to paper documents that are converted into a digital document afterward may not seem like the most effective process.

The upkeep of a cadastral system and property ownership information is a governmental responsibility. Although the cadastral system in the Netherlands was privatised a few years ago (Wakker, van der Molen, & Lemmen, 2003, p. 5), the South African land administration system is manually maintained. In South Africa, the land administration system is the responsibility of government, although security of title is not explicitly guaranteed by statute (Divithure & Tang, 2013, p. 220). Despite the non-guarantee, the South African property recording process is deemed to be one of the safest and most secure systems in the world, but the process is still paper-driven and very manual. This manual interaction contributes to making the current process tedious and cumbersome.

The current manual registration system has several drawbacks, namely low efficiency and ineffectiveness (Amadi-Echendu, 2013, p.170). Incomplete landownership information also negatively affects the land administration system. Trends recognise that manual processes cannot govern land administration systems going forward (Williamson & Ting, 2001, p. 344). There is an increased need for electronic service delivery and therefore an electronic, secure, and integrated deeds registration document management solution has been under investigation in South Africa. Although the go-ahead for an electronic system has been given many years ago, a system has not yet been implemented. Such system is a complex occurrence, which will affect many role players in the property market.

Automation of processes by itself will not suffice. Land administration systems must be re-engineered and evolve to face the growing integration and complexity of property rights and land transactions (Amadi-Echendu, 2013, p. 25). *Dematerialisation* is a financial term that refers to replacing material-intensive physical products with virtual equivalents, and information; and communication technologies (ICTs) are the main drivers of this (Sissa, 2011, p. 67). According to Măgureanu (2012, p. 77), *dematerialisation of title* refers to replacing paper with electronic recordings. This financial term has therefore been extended in this study to property-related transactions, as it represents not only the digitisation of certain aspects of the process. Instead of converting paper-based documents into a scanned image, or manually recapturing information into computer systems, complete electronic processing which includes electronically signatures and the electronic storing of information (Sissa, 2011, p. 67). Paper documents are therefore eliminated from the process. Dematerialisation eliminates certificates or other documents of title representing ownership (Vermaas, 1999, p. 119). The electronic document must be considered as a start in the written evidence (Măgureanu, 2012, p. 77). Dematerialisation would therefore eliminate digitisation activities of paper documents to declutter the current manual process.

In New Zealand and Ontario, Canada, parties to property transactions do not physically sign land documents anymore (Low, 2010, p. 111). Access to electronic registration systems is strictly controlled, and only authorised parties with established credentials may use the system (Low, 2010, p. 110). There are various role players involved in property transactions. Information networks will not replace intermediaries, but will probably enable them to perform their tasks more efficiently (Brousseau, 2002, p. 361). Current software service providers like e4 and Korbitec, two well-known privately owned software companies that operate in the South African property market, may become essential partners in the development of an electronic land administration system but because of the sensitivity and

importance of property information, not necessarily the organisers or owners of such a system.

The layout of the rest of the chapter is as follows: In Section 1.2 the background to the research problem is discussed. Section 1.3 highlights the key concepts used in the study, whereas the research statement and the research objectives are discussed in Section 1.4. Section 1.5 explains the research methodology that was used for the study, while section 1.6 mentions the methods that were used to ensure validity and reliability in the study. Section 1.7 discusses ethical considerations, while section 1.8 highlights the limitations of the study. The significance of the study is explained in section 1.9 and the layout of the chapters are summarised in section 1.10. The chapter concludes with a summary in Section 1.11.

1.2 Background to the research problem

Conveyancing refers to the legal process of preparing the sales deed, mortgage bond and other related documents in order to “create, transfer and manage an interest in land” (Rajasekhar, 2006, p. 1). As transfers take place, various property ownerships are updated constantly. Technological advances and innovations change our way of work continuously. An organisation’s ability to adapt to changing requirements needs a strategy that lets the organisation keep up with environmental fluctuations (Fjeldstad, Snow, Miles, & Lettl, 2012, p. 735). Real estate conveyancing and the speed of recording title changes have not kept pace with the speed of the economy, and the complexity and diversity by which it operates (Sharma, 2013, p. 781). In fact, the South African conveyancing system is only designed and equipped to accept paper documents (Regulation 20 in terms of the Deeds Registries Act 47 of 1937, p. 31). There is a need to upgrade the conveyancing system to cater for the quick and smooth electronic registration of title (Sharma, 2013, p. 782). It may be argued that high market values of immovable property and the subsequent personal effect of a possible fraudulent transaction on the owner of the property, provides for increased risk

(Sandberg, 2010, p. 104). Listed shares that are traded on the stock exchange also underwent a reengineering a few years ago and they currently safely trade sizable amounts in a dematerialised environment. The real estate property market does not have to be an exception.

Although many systems had undergone updates in their computerisation processes, the reengineering attempts mainly focused on the “presentation of manually entered information” rather than the “direct and automatic registration of digital applications” (Sandberg, 2010, p. 101). The foundation of such transactions is consequently still paper based documents. Whitman (1999, p. 233-234) already proposed the introduction of such a system in 1999, when he stated that the advantages of a system that allows for automatic digital registrations are:

- shorter bureaucratic delays;
- enhancement of search capabilities;
- enablement of auto indexing;
- easy full text searches; and
- improvement of the availability and currency of information.

These benefits of digital registrations may substantiate the introduction of an e-conveyancing system.

The intention of e-conveyancing is to implement electronic lodgements and the electronic settlement of funds (NECS, 2013). However, the implementation of a new system introduces new risks. The safe identification and authentication of documents, parties to a transaction and signatures seem to be the biggest hurdle to fully implement e-conveyancing (Sandberg, 2010, p. 103). Property authentication and security of property information that are stored and updated in the property register at the deeds office, is essential in order to maintain the integrity of the property register.

1.3 Key concepts in the study

A *supply chain* is a “network of suppliers and service providers that perform different value-adding activities together, usually in a sequential manner, to produce value for customers” (Du, Lai, Cheung, & Cui, 2012, p. 89). In the conveyancing supply chain, stakeholders include buyers, sellers, estate agents, mortgage originators, conveyancers, municipalities, the master of the High Court and the deeds office. *Supply chain management* (SCM) aids organisations in managing the flow of information, money, and products outside of the organisation (Shih, Hsu, Zhu, & Balasubramanian, 2012, p. 70). Although the major objective of SCM is to use information sharing in order to create cooperation for competitive advantage among supply chain partners (Zeng, Wang, Deng, Cao, & Khundker, 2012, p. 547), the challenge is to establish a trust relationship among the parties (Shih, Hsu, Zhu, & Balasubramanian, 2012, p. 71).

Contracts give legal premise and controls to collaborations (Markovits, 2004, p. 1462). Legislation governs when contracts come into being. Information sharing in the supply chain depends on the type of contracts in operation as well as the mode of competition among the role players in the supply chain (Ha & Tong, 2008, p.702). Inter-organisational collaborations carry the fear that sensitive information may be leaked to competitors in the supply chain (Barkataki & Zeineddine, 2013, p. 1). In order to create a balance between collaboration and security, the term secure collaboration has become a critical issue within SCM. Although this is true, the South African experience indicates that secure collaboration does not widely take place yet.

A more efficient process may lead to better relationship building, which may range from independent partnerships to strategic partnerships. Relationship management places a big emphasis on relationship building to improve partnership performance (Du, Lai, Cheung, & Cui, 2011, p. 90). Different relationships in a supply chain network carries different contexts

and characteristics (Chang, Chiang, & Pai, 2012, p. 1114). Barkataki and Zeineddine (2013, p. 1) propose that “confidentiality, anonymity, privacy, verifiability and non-repudiation” should be used to measure the level of confidentiality among the different role players. The term *e-collaboration* was proposed by Johnson and Whang (2002, p. 3) in order to explain “systems that facilitate Internet-based coordination of decisions across all members of the supply chain.” An e-collaboration approach may enhance knowledge sharing. Information technology (IT) has the capability to drive the efficiency between supply chain partners and the capability to bridge functional silos (Davis-Sremek, Germain, & Iyer, 2010, p. 42). This links to aspects of dematerialisation as previously mentioned.

Risk management in supply chains can reduce the vulnerability of the supply chain as a whole. Uncertainty in the supply chain may be better managed by implementing rules and principles (Shih et al., 2012, p. 70). Proper and solid decision-making requires access to a database (Shih et al., 2012, p. 71) so that risks can be minimised. It therefore becomes crucial for the various stakeholders involved in the property end-to-end process to identify and use opportunities to work together. *Information technology* that is used internally and externally of each of the entity’s business operations may have a significant influence on improving conveyancing supply chain performance in terms of efficiency, cost, flexibility and responsiveness (Gilaninia, Chirani, Ramezani, & Mousavian, 2011, p. 577). However, all parties, including public entities, need to create the capability for IT interventions to be introduced. The development of a shared vision will only be achieved if the outputs of the land information infrastructure are clearly understood by all parties (Marwick, 2013, p. 107). It is incumbent upon the South African government, as the single major beneficiary of national land information, to provide clear specifications of its requirements for an automated digital conveyancing system.

A previous mixed methods research conducted by the researcher (Amadi-Echendu, 2013), focused on the processes that are involved in property transfers. *Land administration* are the

processes involved in determining and recording, land ownership information (United Nations Economic Commission for Europe [UNECE], 1996, p. 3). *Land registration* is the process that is followed for land information to be recorded. Numerous parties form part of the end-to-end property registration process. The various role-players are dependent on each other for various components of the process that needs to take place. In other words, the role-players form a supply chain with regard to the property transactions. It is important to coordinate activities that are executed by the various role players involved in the property process. *Supply chain management* therefore is the coordination of several business partners, processes, and customers within a supply chain (King, Lee, Liang, & Turban, 2012, p. 15).

We live an era where technological advances are rapid and ongoing. Better technologies are constantly evolving to reduce turnaround times and increase security measures in order to reduce fraud. Information technology can reduce the re-entering of information by different role players and organisation (Thomas, 2009, p. 3). The introduction of information technology implies that paper-based title deeds and other documents need to be digitised when created, receive or stored by the various role-players (De Wet & Du Toit, 2000, p. 78; Goodman, 1994, p. 138). Introducing an electronic system to manage property transactions may bring about different types of risks that need to be mitigated (Sandberg, 2010, p. 103). *Risk management* assesses the company's total risk and exposure to avoid financial distress (Pickford, 2001, p. 70). The least step involved in a transaction is the payment of money in exchange for an asset or service received. This is no different for property transactions. '*Payments*' refer to the process whereby buyers, sellers and customers exchange money and payment (Evans & Abrantes-Metz, 2013, p. 52).

Table 1: Key concepts of the study

Key concept	Definition	Author
Supply chain	“Network of suppliers and service providers that perform different value-adding activities together, usually in a sequential manner, to produce value for customers.”	Du, Lai, Cheung, & Cui, 2012, p. 89
Supply chain management	The coordination of several business partners, processes, and customers within a supply chain.	King, Lee, Liang, & Turban, 2012, p. 15
Land administration	The processes involved in determining and recording, land ownership information.	United Nations Economic Commission for Europe [UNECE], 1996, p. 3
Risk management	Risk management assesses the company’s total risk and exposure to avoid financial distress.	Pickford, 2001, p. 70
Payments systems	Systems whereby buyers, sellers and customers exchange money and payment.	Evans & Abrantes-Metz, 2013, p. 52
Information technology	System made up of hardware and software that usually includes a data capturing frontend, a middle-ware for pre-processing the data and a backend for information analysis, exception handling, and decision-making.	Musa Gunasekaran & Yusuf, 2014, p. 180
Records management	Records management is a subdivision of information management, which in turn is the	Makhura & Du Toit, 2005, p. 67

	management of all the information produced within an entity, and the “people, hardware, software and systems” that produce such information.	
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This study follows a multidisciplinary research. In Figure 1.1, land administration is the basis on which this study is built, since the study aims to improve the efficiencies and effectiveness of land registration systems and processes. As previously mentioned, the land administration process comprise of the deeds office for ownership information and the cadastre for land boundary information. Numerous role-players form part of the end-to-end property process and these role players drive economic performance and are referred to as economic agents. These role-players tend to work in silos and this research aims to further promote that a supply chain approach should be followed in the property market (Amadi-Echendu, 2013, p. 35-39). Various documents are exchanged among the role players, as well as the deeds office and surveyor general office (cadastre). Records management principles are therefore important.

Information technology systems are used to capture, store and share information among role players involved in specific transactions. Accordingly, information technology, and the subsequent risk and security measures that come into play become important to monitor and control. Finance is also exchanged among role players in the property supply chain due to commissions, deposits, profit distribution and loan repayments that need to occur upon registration or transfer of the property. As such, payment systems and mechanisms become essential to incorporate. Figure 1.1 is an illustration of how these concepts, as depicted in Table 1, are conceptualised by the researcher with regard to this thesis.

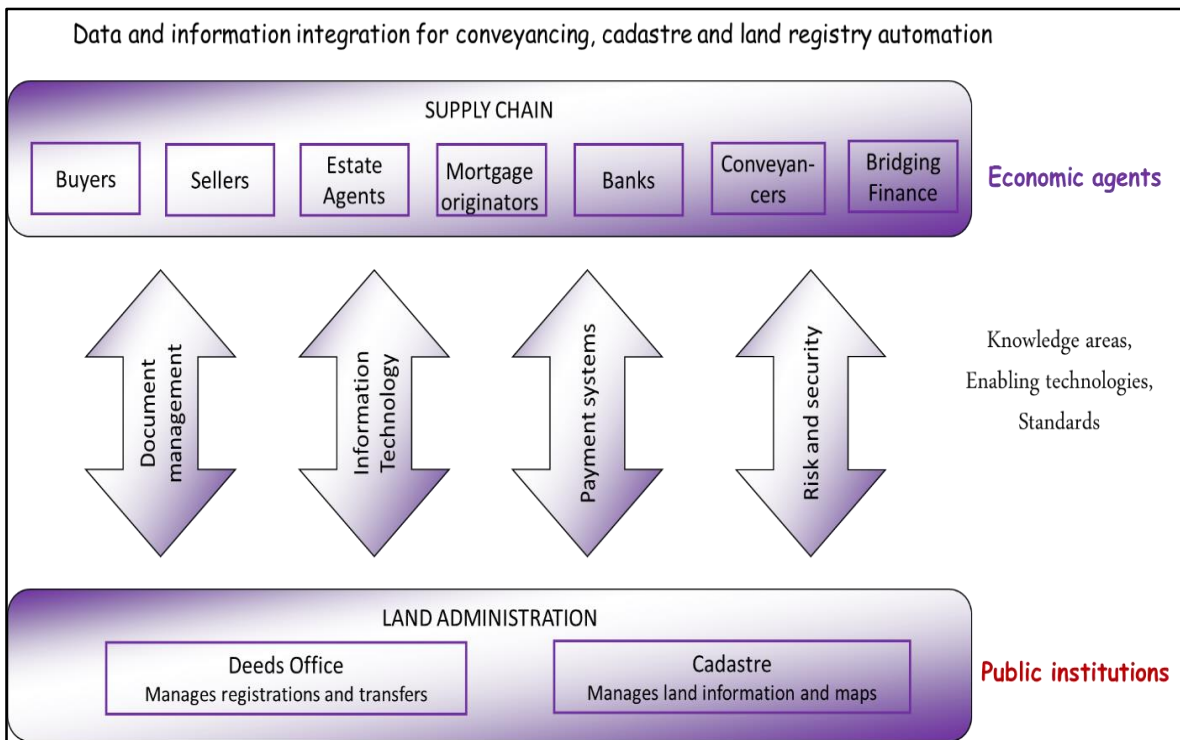


Figure 1.1: Conceptualisation of study

Source: The Author

During this study, the elements and concepts mentioned previously namely *land administration, land registration, supply chain management, risk management and other security aspects, electronic records management, the role of information technology, and payment systems* were incorporated into this thesis. This research comprises a multidisciplinary research, which incorporates these various study fields and disciplines into one study.

1.4 Research problem

Legal systems have been put into place to regulate and maintain order within societies (Rudden, 2014, p. 1). These legal systems aim to protect the rights of people. Rights of tenure regulate how property rights are granted and allocated within societies (Department of Economic and Social Development, 2014, para.1 under 3.6). The government of a country administers property rights. Land administration is the relationship between land and the people of a country (Kihato & Royston, 2013, p. 2). These rights are written down in a title

deed, which in turn is recorded in a deeds office. These recording systems are established by statute (section 1, Deeds Registries Act 47 of 1937, p. 6). Original copies of all property transfers are kept as a security document and proof of ownership (Deeds Registries Act 47 of 1937, p. 18). A conveyancer collates and lodges paper documents with the South African the deeds office for a property transfer to be transferred and registered on the buyer's name (Deeds Registries Act 47 of 1937, p. 20). Paper documents are problematic as they may be misplaced, destroyed or fraudulently copied, not to mention the added costs incurred to store, replace and secure these documents, or the time involved to manually compile, check, file, post and process the paper documents. This all adds to the lack of process efficiency in property transactions. Replacing documents by digitising processes and information can alleviate these problems.

Dematerialisation consists of replacing material-intensive physical products with virtual equivalents, and ICTs are the main drivers of this (Sissa, 2011, p. 67). This leads to the inference that the land registration system in South Africa should be converted to allow electronic lodgements and electronic registration of property transactions. In addition, the efforts and the duplication that occurs within the end-to-end property registration process among different role players involved in the process could be managed better. One view that exists is that inter-organisational linkages facilitate information and data exchanges and reduce conflict among role players in supply chains (Cheng, 2011, p. 374). Information technology (IT) could integrate supply chain information flow (Shih et al., 2012, p. 71) to allow information and data exchange thus providing speed, flexibility and agility benefits (Du et al., 2011, p. 90). Nevertheless, information technology might bring with it a new set of security and risk issues that may need to be identified and mitigated.

The current paper-based systems are outdated, risky, sluggish, cumbersome and costly (Thomas, Griggs, & Low, 2014, p. 2). The fact that "time lapses between the completion of the transaction and its entry onto the land register, as well as the duplication of effort and the

risk of error that flows from the present system”, creates the background to suggest that the current deeds registration system has low efficiency and is ineffective (Amadi-Echendu, 2013, p. 25). Some of the major challenges associated with land property transfers within and between many jurisdictions include, for instance:

- cumbersome and tedious conveyancing processes;
- indeterminate delays during conveyancing, cadastre and registry searches;
- lack of transparency from conveyancing through to the cadastre and registry;
- Fraudulent activities that may occur even after the registration of landed property;
- porous security of confidential data during the conveyancing process; and the
- consequent undermining of clarity with respect to legal rights and privileges associated with and landed properties.

“Conveyancing in South Africa is complex (i.e. made up of many interrelated parts), cumbersome (i.e. difficult to manage because of the complexity and the number of stakeholders involved in the process) and tedious (i.e. it takes very long)” (Amadi-Echendu, 2013, p. 26). Land administration systems may need to be re-engineered and evolve to face the increasing complexity of property rights and land transactions, so that they take a broader and more integrated view. The purpose of the study was to develop a conceptual framework that could be used to integrate the data and the various data sources in order to dematerialise the current end-to-end property registration process.

The research statement of this study was therefore formulated as follows:

The land registration process in South Africa is characterised by manual interlinks and paper-based documents, which makes the current process tedious and cumbersome.

The following research question was therefore asked:

RQ: How can the end-to-end property transfer process be integrated among the different role players to dematerialise property transfers?

1.4.1 Secondary questions

Secondary research questions have been formulated as follows:

- What gaps would need to be addressed before electronic end-to-end registrations can be introduced into the South African environment?
- What measures do supply chain partners perceive should be put into place to enable dematerialisation of the end-to-end property transfer process?

1.4.2 Objectives of the study

The primary research objective of this study was to provide an integrated framework for the dematerialisation of property transfers.

The secondary research objectives were:

- to identify gaps that would need to be addressed before an electronic end-to-end dematerialised registration process could be introduced into the SA environment; and
- to identify the measures that current supply chain partners perceive would enable dematerialisation of the end-to-end property transfer process.

1.5 Research methodology

The present study was a qualitative study to explore how the current property registration process can be made electronic. Although many technological systems have been put into place, these systems work in isolation of each other and in the researcher's view, add to the overall cost of property transfers. The population were entities that were involved in the end-to-end property transfer process, which included estate agents, banks, conveyancers, the

deeds office, municipalities, and the Reserve Bank. As a result, South Africa was used as a case study and the role players that are currently involved in the property process formed part of the study. To obtain a national view, organisations that represent these different entity groups were interviewed and not individual entities themselves. As a result, purposive sampling was used. The sample that was interviewed included the Banking Association, the Law Society of South Africa, the deeds office, South Africa's Central Securities Depository (Strate Ltd), Tshwane Municipal Council, and the Reserve Bank of South Africa. The data were collected in two phases.

1.5.1 Phase 1: Literature study

The objectives of this study necessitated a study on the topic of dematerialisation, supply chain, risk management, payment systems and the land administration and registration processes. Various factors that were identified in a previous study (Amadi-Echendu, 2013) formed part of the literature review. Numerous sources were employed, which included books, the Internet, journal articles, papers delivered at conferences and completed theses that deal with the subject matter. Other sources comprised discussion forums, legal documents as well as talks and consultations with property specialists.

1.5.2 Phase 2: Personal interviews

During phase two, face-to-face interviews were conducted with key entities involved in the land registration process in South Africa. These role players included the Registrar of the Pretoria deeds office, the Law Society of South Africa, the Banking Council, Strate Ltd, the Reserve Bank of South Africa and software companies operating in the conveyancing space. Sabric declined from participating in the study. Information obtained from the literature was verified against primary data collected. The interviews were recorded. Data obtained from the qualitative interviews were transcribed verbatim and analysed by using content analysis.

1.6 Methods to ensure trustworthiness and credibility

During the 1980s, Guba and Lincoln (1989, p. 231-243) in their seminal work, replaced reliability and validity with trustworthiness, which comprise credibility, transferability, dependability and confirmability. Reliability and validity depend on the relationship between the researcher and the research process, as well as between the researcher and the community that was researched (Merrick, 1999, p. 32). In qualitative research, the researcher takes an active role in the collection and interpretation of data (Patton, 2002, p. 14). Reliability is a measurement characteristic that incorporates accuracy, precision, and consistency (Cooper & Schindler, 2006, p. 716). An instrument is valid if it can be shown that it is free from systematic error and therefore measuring what it is supposed to measure (Page & Meyer, 2006, p. 79).

To increase the level of trustworthiness of the study, a recording device was used as a primary tool during the interviews, which provided an unbiased record of each conversation. The researcher was personally responsible for data collection and no other agents or workers were used in this process. During the data collection process, every effort was made to reduce errors and bias. The researcher remained neutral during the entire research process (Arksey & Knight, 1999, p. 175). In addition, the researcher applied a consistent coding method to enhance the reliability of the study. Lincoln and Guba (1989, p. 242) paralleled reliability to dependability. The coding and transcripts were e-mailed to each participant for their perusal and further comment.

Triangulation is a validity procedure where researchers search for convergence among different sources of information in order to form common themes in research (Golafshani, 2003, p. 603). In the present study, additional documentary evidence was gathered to triangulate and corroborate or refute an overall interpretation of the primary data collected (Mays & Pope, 2000, p. 51). Denzin (1978, p. 272) identified four types of triangulation

namely, triangulation across data sources, triangulation of theories, triangulation of methods and triangulation among different investigators. This study used different data sources to triangulate.

1.7 Ethical considerations

Ethics considerations include issues of privacy, harm and confidentiality (Berg & Lune, 2014, p. 5-6). Every effort was made to maintain ethical considerations. All data collection instruments received ethical clearance from the ethical committees at both departmental and faculty levels at the University of Pretoria. Informed consent was obtained from all participants. Participants were given the option to withdraw from the study at any time without any penalties. All procedures were made known to each participant before requesting permission to proceed with the study. All participants had access to the researcher's contact information clarify aspects where they might have experienced uncertainty. All participants were over the age of 18 years and no parental consent was necessary. All data were kept confidential and access to any information was strictly controlled. Any identifiable information was removed. Anonymity of all participants was ensured and all responses were treated with confidence.

1.8 Limitation of the study

This study investigated the property transfer process, and other types of property transactions were excluded from this study.

1.9 Significance of the study and the expected contributions

This research has taken place during an opportune time for various reasons. There is greater recognition that the urban land market is not working for the poorer people who are mostly alienated from it. On an international level, many countries have embarked on initiatives to dematerialise their title deeds. This study is a multi-disciplinary research that combines aspects of land registration, records management, payment systems, supply chain and

information technology. As such, only the components that has bearing on the focus of the study has been incorporated into the study. This thesis can contribute to the existing literature and knowledge in several ways.

Firstly, this thesis pursues the potential role that the qualitative method can have in an exploratory multidisciplinary research. Secondly, this thesis is expected to make a contribution to the methodological development in the disciplines of risk management, records management, supply chain, land registration, information technology and payment systems research by illustrating how different disciplines can be combined and integrated to probe the same phenomenon. Thirdly, the researcher aims to improve the understanding of property registrations in South Africa. Few studies according to the researcher are positioned in the South African property market that focus on business processes and related aspects. This study aims to integrate various disciplines to provide an integrated view of how various aspects influence property transactions in South Africa.

This thesis intends to contribute to the existing knowledge of the elements by investigating how the current property processes can be enhanced to make the end-to-end process more efficient and effective. Furthermore, unlike prior studies on immovable property that mainly focused on the legal perspective, this thesis has interviewed various authoritative bodies involved in property transfers in South Africa and will aim to integrate initiatives across these bodies to form a more integrated approach to property transfers in South Africa.

A detailed examination of factors that influence land registrations in South Africa provided a sound base to streamline the process and thus improve the efficiency and effectiveness of the South African deeds office process in South Africa (Amadi-Echendu, 2013, p. 153), allowing for electronic lodgements for registration of new property titles and the linked electronic disbursement of funds. For example, this study aimed to provide a framework for the registration and cancellation of immovable properties in the deeds office in South Africa

that will allow for the dematerialisation of the title deed. Increasing the efficiencies around property registrations may positively affect investor perceptions regarding the property market in South Africa.

The study aims to show that data and data sources across different disciplines and fields can be integrated to enable better control, security and information capabilities in the property market. E-government and, supply chain management and document management forms the theoretical base that the study is built on. The application of the theoretical base is conveyancing and therefore literature to explain the environment was incorporated into the study.

1.10 Chapter layout

Chapter 1: Introduction

This chapter introduces the research.

Chapter 2: Key issues that affect property registrations in South Africa

These aspects were highlighted in a previous study undertaken by the researcher and include aspects of land administration and land registration, records management and payment systems. This chapter highlights an as-is overview of the deeds office processes with particular emphasis on the process that is followed, the documents that are involved and electronic interventions and capabilities. Furthermore, this chapter looks at management of records and in particular management of electronic records. It further builds on records management by looking at the records that are involved in land transfer transactions and the process involved.

Chapter 3: Supply chain management, the role of information technology and payment systems

This chapter portrays different aspects of supply chain management. It aims to illustrate how the current process may be influenced to change in future. It further depicts technological mechanisms that are available to be used in the land registration process. This chapter also investigates various available payment mechanisms and systems that are already available in the market that can be used for the disbursement of funds after registration of property transfers in South Africa conveyancing process.

Chapter 4: Research methodology

This chapter identifies the research methods and methodologies that were used in this study.

Chapter 5: Data analysis

This chapter presents the data that were collected from the face-to-face interviews.

Chapter 6: Discussion

This chapter discusses the data that was collected and analysed and aims to explain the integration of the various disciplines, as well as concepts highlighted in the literature study. It further presents the findings of the study.

Chapter 7: Conclusion and recommendations

This chapter provides recommendations based on the data that were collected and analysed. It also gives an indication of further studies that may be conducted in the future.

1.11 Summary

This chapter serves as an introduction to the thesis. It presented the background to the study and introduced the research problem, research objectives, research design, and data analysis. It provided a brief overview of ethical considerations, and methods to ensure validity and trustworthiness in the study. Limitations of the study were highlighted and the significance

of the study was outlined. The chapter concluded with a layout of the chapters. The next chapter will focus on the factors that influence property transactions and property registrations in South Africa.

CHAPTER 2

The factors that influence property transactions

2.1 Introduction

In the previous chapter, the study was introduced and aspects relating to the background of the research problem, key concepts that are covered in the study, the research methodology, ethical considerations, the limitations and significance of the study and the chapter layout was discussed. Housing is not only perceived as a basic need but also a right that is enshrined in the Bill of Rights (Ndinda, Uzodike, & Winaar, 2011, p. 761). According to Barry and Roux (2012, p. 303), references to private conveyancing systems can be found in ancient religious texts such as the Old Testament (Jeremiah 32:9-15).

... ⁹so I bought the field at Anathoth from my cousin Hanamel and weighed out for him seventeen shekels of silver. ¹⁰I signed and sealed the deed, had it witnessed, and weighed out the silver on the scales. ¹¹I took the deed of purchase – the sealed copy containing the terms and conditions, as well as the unsealed copy – ... ¹³In their presence I gave Baruch these instructions: ¹⁴“This is what the Lord Almighty, the God of Israel, says: Take these documents, both the sealed and unsealed copies of the deed of purchase, and put them in a clay jar so they will last a long time. ¹⁵For this is what the Lord Almighty, the God of Israel, says: Houses, fields and vineyards will again be bought in this land.

It is clear that a document was signed even then and kept as proof of the transaction that had taken place in order to prove ownership.

Conventional land systems are often evaluated within a country's legal administrative framework. The United Nations estimated that only 30% of land in the developing world is

regulated by a land registration system (UN Habitat, 2012, p. 2). Of the total surface area of South Africa (121 973 200 ha), 7% is currently still unaccounted for (Pienaar, Du Plessis, & Olivier, 2013, p. 425). This may be because of indigenous property. Customary authorities often use community-based conveyancing procedures by using a written note or by means of oral agreements and avoid state administration structures in alienating land (Barry & Danso, 2014, p. 3). As such, these indigenous properties do not have a title deed to prove ownership. The transfer of land is the process whereby ownership is transferred from seller to buyer by means of registration of a deed in a deeds office (Kilbourn, 2008, p. 1-3). A potential buyer can therefore not check whether the property has been sold to anyone else as no proof of recorded ownership exists, which create huge risks.

Barry and Danso (2014, p. 2) on the other hand are of the opinion that registered titles or deeds create access to credit at financial institutions, which may positively influence fiscal growth. This view was supported by De Soto (2000, p. 1) when he stated that the absence of proof of ownership hampers economic growth in a country. In addition, properties may also not be developed and maintained properly in the absence of approved credit, since not many people may have the needed cash to bring about structural changes and developments.

Ownership details must be amended to reflect the new owner/s for property to be transferred from one owner to another. Land registration officially records property rights (Divithure & Tang, 2013, p. 220; Kaufmann & Steudler, 1998, p. 13; Velencoso & Luz, 2013, p. 155), of existing property rights in land (Schage, 2009, p. 5) as well as structures that may have been erected on the land. Land registration creates a property ownership database, which facilitates property transfer and title searches to confirm ownership details (Abdulai & Owusu-Ansah, 2014, p. 132). Recording instruments and notices aims to protect the interests of owners by informing all interested parties of ownership details and encumbrances against a particular property (Kochan, 2013, p. 295). In the absence of a land registration system, legal experts normally trace the root of a title to ensure that there are no encumbrances to

prevent legal transfers of property (Abdulai & Owusu-Ansah, 2014, p.136). This could be a lengthy and expensive process. The focus in South Africa is to reduce the cost of property transactions so that the poor may also take part in economic growth activities. The UN Habitat (2012, p. 15) confirms that a first registration and the introduction of a land registration system is expensive and time-consuming. South Africa is a mixture of first and third world development (Zambri, & Visser, 2009, p. 28). By implication, formal and indigenous processes co-exist.

International drivers, such as “sustainable development, globalisation, urbanisation, economic reform, and technology”, inform land administration policies and models that are adopted by governments; and these drivers are changing the way that people relate to land (Williamson & Ting, 2001, p. 339). The property register is maintained and updated by government. To protect an owner against any threats, which may infringe their rights to the property, they own, the property register must be accurately updated against anything or anyone that may infringe on those property rights. As such, the land records offices should be well embedded in the state system (UN Habitat, 2012, p. 16).

Numerous records are involved in land transfer transactions and the process involve numerous entities. The cadastral component is usually conducted by surveyors while notaries, lawyers or conveyancers (the entity used is dependent on the land administration system used in a particular country) take care of the land registration component (Kaufmann & Steudler, 1998, p. 3). In South Africa, conveyancers are involved in the land transfer and conveyancing processes (section 15, Deeds Registries Act). The basic element of a land administration system is the land plot as recorded in the cadastre (Enemark et al., 2005, p. 54).

Although both the cadastral office and the deeds office form part of the Department of Rural Development and Land Reform (DRDLR) in South Africa, their systems are maintained

separately and the information contained in one system may not be what is reflected in the other system (Tjia & Coetzee, 2014, p. 263-264). This happens since South Africa follows a negative system of property registration. This means that property and ownership details are only updated in the deeds office when a property transaction is lodged in the deeds office by a conveyancer. The cadastre system is updated to reflect subdivisions and other property changes even when there is no exchange of property ownership. There is a need to link cadastral information to registered land information as recorded by the deeds office (Bogaerts & Zevenbergen, 2001, p. 328; Lemmen, Van Oosterom & Bennett, 2015, p. 543).

The division between property maps and property registers was necessary because of the manual paper-based and hand drawn technology that was previously used (Kaufmann & Steudler, 1998, p. 1). The traditional land recording procedures are increasingly computerised and this has revealed increased efficiencies. Traditional cadastral systems consist of well-defined processes, and is viewed as more reliable (Kaufmann & Steudler, 1998, p. 1) when compared to computerised processes. Despite the high security that has been associated with a paper-based system, errors have occurred. Improved technology enables a country to adopt a much computerised land register that contains all relevant legal information about land for land recording purposes (Krelle & Rajabifard, 2010, p. 9). Because of the security aspect, many entities appear to be very reluctant to initiate a large-scale project to update the current land administration processes and systems, and make the existing property transfer and land registration process electronic and no longer paper based.

This chapter reports on the land administration process, as well as the systems and processes involved in land registration. International electronic property registration strategies are also discussed briefly. These international strategies are briefly mentioned in this study. A more detailed study of the processes involved in four countries and South Africa formed part of a previous study (Amadi-Echendu, 2013, p. 59-78) and will therefore not be elaborated on in this study. This section highlights land administration issues that are important for the

purposes of this study. In addition, general aspects relating to records management, records management in land administration and the impact of electronic conveyancing in records management are briefly discussed. Documents, and particularly the title deed that proves ownership, are important from a records management perspective. Knowledge management and the corporate memory of an organisation is acknowledged in this study, but falls outside the scope of this study. The onus of updating and maintaining a property register vests in government. As such, this chapter concludes with a brief overview of e-government and conveyancing initiatives that the South African government has undertaken in the recent past.

2.2 Land administration

Land administration is defined as the processes of “determining, recording, and disseminating information about the ownership, value and use of land” (United Nations Economic Commission for Europe [UNECE], 1996, p. 3). It involves three functions, namely juridical (for land tenure, i.e. the way in which rights in land are held), regulatory (for land use), and fiscal (for land value), and land information systems are integral to all three functions (Dale & McLaughlin, 1999, p. 169). Various countries apply different land administration systems. In South Africa, the ¹Department of Rural Development and Land Reform (DRDLR) manages the cadastre and deeds information that are updated separately in different systems.

Land administration should comprise the creation of a land information system for the community and the local authority to access records (Magigi, 2013, p. 156). All land information records are public records, which can be accessed by any interested party at a cost. These parties, for instance, buyers and sellers, creditors and financial institutions that

¹ Although the deeds office and surveyor-general office (also known as cadastre) are both part of the same Department, they are discussed separately for the purposes of this study.

provide capital to prospective property owners, all request a recording system that can adequately identify the ownership interests associated with the particular property. This includes determining whether and to which extent a mortgage bond (Kochan, 2013, p. 275) encumbers the property or any other form of encumbrance that diminishes property rights (Tjia & Coetzee, 2014, p. 269). For example, a right of way that had been registered provides access across the specified land by third parties that do not necessarily own the land. These encumbrances provide recourse against the immovable property or land for a claim to pay a sum of money and the holder of the limited real right has preference over other lenders (Wessels, Tinnemans, & Van Drunen, 2012, p. 7). Proper land management should therefore make provision for the adequate and real time capturing of all relevant information that pertains to or may infringe on property rights.

Land management includes all activities that relate to the administration of land as an asset (Enemark, 2004, p. 10). Land management structures differ among countries, and sometimes even between regions of the same country (Enemark, 2004, p. 11). This is no different in South Africa where the ten deeds registries that have been established to register changes in ownership of properties, have different formats and requirements for conveyancers to follow. Recording systems should have characteristics of transparency, accuracy, completeness, and authoritativeness, and the system should have effective measures in place to ensure that all records contain current information (Patel & Chotai, 2011, p. 140). This is achieved by effectively managing and controlling all property-recording requirements (Kochan, 2013, p. 314) and by ensuring that property records are not tampered with, and remain secure and up-to-date. Incorrect land records may result in ownership challenges that would need to be proven in a court of law. Not much literature has been published pertaining land administration in South Africa.

According to Schulte, Rottke, and Pitschke (2005, p. 91), there should be as much information as possible available at any point in time for property markets to be transparent.

In contrast, Lindqvist (2012, p. 103) claims that no clear definition and measurement of transparency in the real estate context exist. This may be the case where different entities involved in the property process work in isolation, and information with regard to current transactions that are in the process of being sold, is not readily available. It may become necessary to manually follow up a transaction with the different parties involved in a particular transaction. The challenge with a manual follow-up is that the information supplied cannot be verified to be correct and this may undermine the trust and confidence in the property process. The land registration process ensues next.

2.2.1 The land registration process

The correct recording of ownership information will eventually lower property costs and provide sufficient protection of land rights (Pienaar, 2009, p. 22). The entire registration process is highly procedure-bound, conventional and rigid (Satyanarayana, 2000, p. 51). The many procedures that need to be carried out by authorised persons, in addition to the high costs associated with property transfers, is in the researcher's view, why the vast majority of property owners do not update ownership on previously registered properties. Someone selling land has to use various government offices (e.g. the South African Revenue Services [SARS] and the deeds office) and private organisations (e.g. conveyancers and estate agents) that deliver different services across the property supply chain. This adds to the time and cost of each transaction. These costs often cause property transactions to be too highly priced and accordingly unaffordable for many individuals of the population (Muller, 2015, p. 1). In contrast, indigenous property is secured by a note or oral agreement among community leaders (Barry & Danso, 2014, p. 3) and do not follow the formal procedure-bound processes.

Most property registration processes are currently paper-based (Jazayeri, Rajabifard, & Kalantari, 2014, p. 220). This certainly holds true for South Africa where paper documents

are still lodged with the deeds office for registrations. Although various electronic technological systems are in place to communicate among the different entities involved in the process and to draft the necessary documentation, these drafted documents need to be printed, signed manually and delivered in person to a deeds office for registration in favour of the new owner (Amadi-Echendu, 2013). It is also the researcher's view that the various technological systems that have been introduced by private organisations in South Africa to link various entities and decrease the use of paper have increased the cost of property transactions. The incredible volume of transfers may hamper the ability of the mortgage industry to use the traditional paper recording methods effectively, which may lead to documents either not being recorded or recorded incompletely (Kochan, 2013, p. 306) or incorrectly. Incorrect recorded information relating to property rights may reduce the security of property titles. In the researcher's opinion, land registration should provide a secure form of collateral for mortgage purposes without additional title insurances that will further increase the costs associated with property transfers and property ownership.

In addition to providing accommodation, a property is also a capital asset, and increased house prices relate to a growth in housing wealth; but increased house prices may similarly increase the threshold for first-time homebuyers (Gulbrandsen & Sandlie, 2015, p. 76). It is therefore crucial that the correct property information, owner details, rights, and encumbrances are captured and recorded correctly. Due to technological systems that are not interfaced across the different entities, or even across different government departments in South Africa, these checks are done manually. This may inevitably result in the risk of certain encumbrances not being detected by the deeds office before a registration takes place, which place owners at risk. According to UN Habitat (2012, p. 5), land registration or recordation has the following benefits:

- it provides evidence of land rights;

- an index is linked to the names of the parties, which facilitates access to the information;
- it makes it easier for government to organise other land management activities;
- the geometrical directory links the land documents to the actual land; and
- land registration or recordation provides a notice to the public of encumbrances and rights attached to land parcels.

A secure land registration system is therefore crucial to protect the rights of owners of immovable property.

Two categories of land registration systems exist, namely the deeds registration system and the title registration system (Enemark, 2004, p. 5). In a deeds registration system ownership is recorded by means of the transaction itself ('who owns what') and with a title registration system the title itself is recorded ('what is owned by whom') (Enemark, 2004, p. 5). The current deeds registration system has several drawbacks, such as low efficiency and ineffectiveness, while the cadastral surveying system may fail because of incomplete land information (Divithure & Tang, 2013, p. 220). Inconsistencies and incorrect information will diminish the reliability of the property register. Due to the lack of certainty of the deeds system in some countries, title insurance is often contracted to provide insurance holders with protection should their title be challenged (Velencoso & Luz, 2013, p. 173). Simply recording information at face value may improve the time associated with registrations, but may compromise the security of the right in immovable property.

Different types of expenses and benefits are attached to the two registration systems (Velencoso & Luz, 2013, p. 175; Chirisa, Kawadza & Bandaiko, 2014, p. 7). The registration of titles system involves a preceding examination by a public official to verify the legality of the rights to be conferred. In the absence of a land registration system, legal experts are often commissioned to conduct searches to trace the root of the title in landed

property transactions in order to verify that the property is not subject to any undisclosed obligations. This is often a long, expensive, and time-consuming process (Abdulai & Owusu-Ansah, 2014, p. 136). South Africa uses the registration of title system and title deeds are issued as proof of ownership. This may explain the lengthy turnaround time associated with property transfers in South Africa.

Formal land registration systems fall short of addressing informal and indigenous rights (Enemark, 2004, p. 5; UN Habitat, 2012, p. 12) which has been a growing concern since the latter part of the 1990s (Williamson, 2001, p. 300). In terms of indigenous law, the head of a family is regarded as the custodian of the group's assets and has the power to dispose of such assets (Barry & Danso, 2014, p. 1). General property belongs to the household as a whole, but is controlled by the family head. The head is not the personal owner of the property, and each member of the household owns shares in the property according to his or her status in the group. This contrasts formal land registration systems where properties are registered in individual, or a specific entity's name.

With indigenous properties, the family head exercises control on behalf of and in the interest of the family group; and succession takes place on the death of the family head (Barry & Danso, 2014, p. 1). The indigenous laws therefore operate on norms, which the whole community regards as binding (Barry & Danso, 2014, p. 1). Registering a property in an individual's name may cause family land to be alienated without the consent of the group, which in itself will cause conflict. The process of indigenous succession and customs falls outside the scope of this study and will not be discussed in detail, but it is an important difference that should be catered for nonetheless. Chirisa, Kawadza and Bandaiko (2014, p. 7) also stressed the need for a national electronic deeds registration system (e-DRS) that should also cater for the registration of indigenous property rights. This inclusion will ensure that all groups within a population are represented and as such can participate in economic growth activities.

Land administration structures are often outdated and insufficient to serve an integrated, electronic environment (Williamson, 2001, p. 298). In South Africa, land valuations that reflect the market value of property, determine property taxes that are payable (Demir, Uzun, & Çoruhlu, 2015, p. 9). In South Africa, the local municipality uses these amounts to determine the monthly property rates that are billed. The Property Valuation Bill, 2013 was published as GN [Gazette Notice] 504 in *Government Gazette* (GG) 36478 of 2013–05–23, and defines *market value* as “the estimated amount for which the property should exchange between a willing buyer and a willing seller who acts with due knowledge and without compulsion after proper marketing” (Pienaar et al., 2013, p. 441). These valuation amounts are also useful for estate agents who need to assist sellers with a market-related price that can be obtained for the properties that sellers wish to trade.

Land use is regulated by the town planning ordinance of 1986 [Town Planning Ordinance 15 of 1986], which makes provision for how land should be used. A residential property is classified as such. A change in land use will result in a change in market value of the property and ultimately a change in property tax revenue (Tjia & Coetzee, 2014, p. 270). Where a residential property becomes the primary trading place of a business, the property needs to be reclassified as a commercial property and this will affect the rates and taxes payable for the property. These types of information are recorded in the cadastre.

2.2.2 The cadastre

The cadastre is the central point of a land administration system (Williamson, 2001, p. 298). It is a systematic, methodically arranged land information system and public inventory of land rights, responsibilities and restrictions as well as land data that are based on a survey of property boundaries within a certain country (Divithure & Tang, 2013, p. 220; Enemark, 2004, p. 3; Kaufmann & Steudler, 1998, p. 13; Silva & Stubkjær, 2002, p. 408; Williamson, 2001, p. 54). In contrast with the deeds office that records ownership information, the

cadastre holds an up-to-date spatial and written record of land parcels, boundaries, interests and transactions (McDougall et al., 2013, p. 32), which comprise records on the attributes of each land parcel and a large-scale map with information on parcel boundaries (Divithure & Tang, 2013, p. 220; Silva & Stubkjær, 2002, p. 408). Some properties may have been subdivided, and this will be clearly indicated on property diagrams. Each subdivided portion may be individually sold. The cadastre records define the legal and spatial position of property, as well as the association between a person and a particular parcel of land (Demir et al., 2015, p. 5).

Figure 2.1 illustrates how conveyancing systems are put together. Data such as customer name, street name and bank account number are put together to form information that relates to property-, financial-, and biographical information. Information in turn are combined into an application to become a transaction. The transaction is handled by different entities who fulfils various tasks relating to the transaction. An estate agent would complete an offer to purchase that forms the legal basis of a property transfer. Banks for example would assess the customer information to approve a loan for a property purchase. Numerous parties fulfil different processes that may all relate to the same transaction. The numerous processes make up a system. There are two major property systems: a positive system, whereby the state guarantees the correctness of title and updates property and ownership information as it changes; and a negative system, whereby the state do not guarantee the correctness of title and property and ownership information is only updated when a new transaction is lodged with the deeds registry. As mentioned before, South Africa follows a negative system.

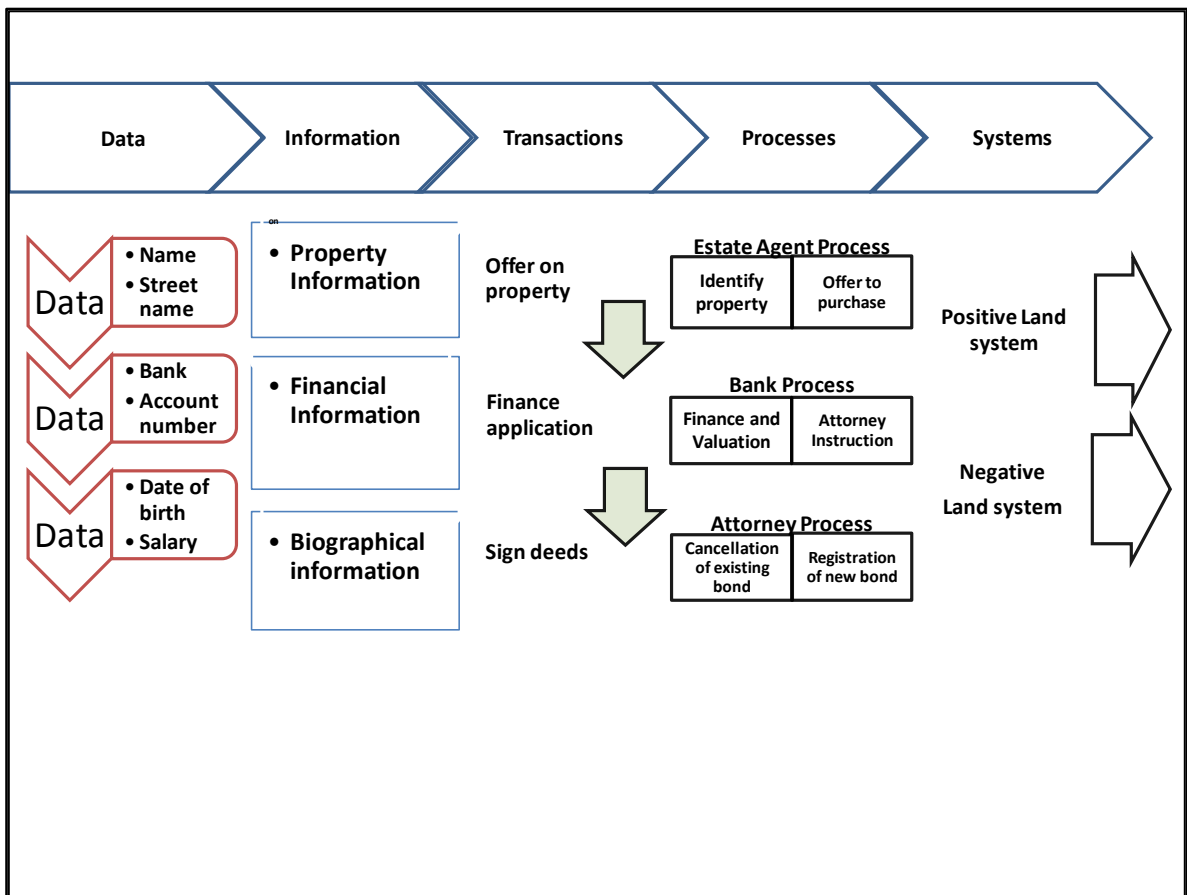


Figure 2.1: Conceptual mapping of conveyancing processes

It should be noted that information in the cadastre might be different from information that is registered in the deeds office. This may happen where a subdivision may have been registered with the cadastral offices, but a transfer of ownership has not taken place. As a result, the deeds office has not been updated to reflect the subdivision (Tjia & Coetzee, 2014, p. 263-264). South Africa follows a negative registration system and do not guarantee the correctness of title. Updates to ownership information in the deeds office only take place when a conveyancer lodges such transaction with the deeds office. There is a need for an integrated view between the deeds office and cadastre, but the unification of certain types of information would need to occur before an integration of the two systems can take place. Markets depend on certainty and correct information of recording systems and registries of property rights, as they are enablers of progress and economic development (Kochan, 2013, p. 296). Each country manages its own cadastral system and there is no universally accepted

cadastral system in the world (Divithure & Tang, 2013, p. 221). There are also no internationally connected cadastres (McDougall et al., 2013, p. 31).

2.2.3 International electronic conveyancing

The land registration processes of various countries were researched and mapped in a previous study (Amadi-Echendu, 2013, p.59-78). Table 2.1 is a summary of the common areas of the various conveyancing processes of different countries that was mapped as part of the study. The steps are indicated with an “X” to show the common steps that occur in the processes for the five countries, namely Barbados, The Netherlands, Australia, Taiwan and South Africa.

Table 2.1: Summary of the conveyancing processes of different countries

	Barbados	The Netherlands	Australia	Taiwan	South Africa
Sale agreement completed and signed	X	X	X	X	X
10% deposit paid by buyer	X		X	X	X
Full purchase price is paid to notary		X			
Buyer pays a third of the purchase price at the bank				X	
Buyer pays estate agent and tisu fees into separate savings account				X	
Buyer applies to financial institution for a loan	X		X	X	X
Bank requests property valuation	X	X	X	X	X
Investigation of title by attorneys	X	X	X	X	X
Buyer pays transaction tax as soon as bank approves loan				X	

	Barbados	The Netherlands	Australia	Taiwan	South Africa
Conveyance prepared by attorneys/ notary/ tisu	X	X	X	X	X
Original title deed supplied	X				X
Notice published in Gazette	X				
Buyer and seller signs deed	X	X	X	X	X
Buyer pays another third of property price				X	
Payment of purchase price	X	X	X		
Land Office does final checks		X	X	X	X
Conveyance recorded at Land Office & evidence of the record provided	X	X	X	X	X
Deed is kept with the bank until the loan is repaid			X		X
Buyer does final property check & pays balance of the property price				X	
Buyer starts to repay loan	X		X	X	X

Source: Amadi-Echendu, 2013, p.59-78

Table 2.1 was developed after a previous study was conducted that compared the conveyancing processes of Barbados, The Netherlands, Australia, Taiwan and South Africa. This study builds on the previous study and as such, no further comparisons of processes formed part of this study.

In recent years, Australia has embarked on an electronic registration system and much literature is available. On 26 February 2013, the Electronic Conveyancing Act 2013 was passed in Victoria, Australia, which aimed to unify legal issues around electronic property transactions (Maddocks, 2013, p. 1). In Australia, the National e-Conveyancing Development Limited (NECDL) was formed in 2010, and its mandate is to provide a

countrywide electronic conveyancing system for Australia (Sheeran, 2013, p. 1). The key function of the NECDL is to “remove the manual processes and paperwork associated with the exchange of property, by allowing land registries, financial institutions and practitioners to transact together online” (Sheeran, 2013, p. 1). Australian legal practitioners, conveyancers, banks, and mortgage processors access the National Electronic Conveyancing System (NECS) via a system-to-system service or an Internet browser, while some legal and conveyancing practices use Internet services to integrate their in-house management services with NECS (National E-Conveyancing Development Ltd, 2013). This enables these legal and conveyancing practices to collect transaction information and complete settlement and lodgement within their in-house systems.

Buyers use a conveyancer or lawyer to assist with the transaction so that due diligence and other requirements are met (National E-Conveyancing Development Ltd, 2013). The conveyancer verifies the identity of the buyer and creates a “shared electronic workspace” within NECS system so that buyers can monitor the progress of their transaction (National E-Conveyancing Development Ltd, 2013). The conveyancer still plays an integral role in the conveyancing process in Australia, despite the fact that the conveyancing process takes place on an electronic platform. There is therefore no need for a similar scenario to remain in South Africa when electronic property transactions are embarked upon. The State and Revenue Offices electronically receive duty and tax payments via settlement disbursements via NECS (National E-Conveyancing Development Ltd, 2013). In contrast, tax payments in South Africa are made upfront before the property has been registered.

The different stakeholders involved in a property transaction established property Exchange Australia (PEXA) to provide a secure platform that is accessible to affect same-day payments. It is a pay-as-you-go system and does not charge subscription fees (Sheeran, 2013, p. 1). A per transaction business model may be perceived as a more affordable system. Banks, financial institutions, and property lawyers use the PEXA system to do settlements

of property transactions online, thereby eliminating bank cheques and other forms of payment (Buying and selling moves online with PEXA, 2015, p. 16). A law practice that becomes a subscriber should obtain a digital certificate (Swan, 2015, p. 92). This digital certificate will ensure that the law firm and its users are authenticated before transactions are authorised. By May 2015, more than 17,000 property transactions had been completed through the PEXA system (Buying and selling moves online with PEXA, 2015, p. 16). A stakeholder who has used this system in Australia explains that it is not a difficult system to learn, that processes are all very similar, although much quicker than paper, and that the process is seamless from the client's perspective (Property: E-conveyancing – the verdict, 2015, p. 92).

According to Sheeran (2013, p. 1), the following transpires in the settlement process in Australia:

- a lawyer digitally signs the transfer and releases settlement funds based on a pre-signed client authorisation form;
- the lawyer takes reasonable steps to verify his or her client's identity;
- PEXA enables the settlement of electronic conveyancing transactions, "subject to regulatory oversight by the Reserve Bank and/or the Australian Securities and Investments Commission";
- an electronic certificate of title is issued as proof of ownership because there will no longer be hard copy certificates of title in existence in certain circumstances; and
- although conveyancing practice has changed in light of the electronic interventions, the fundamental principles of the Torrens system (Thomas et al., 2014, p. 6) remains.

The steps outlined by Sheeran (2013) have bearing on an electronic settlement process that is followed in Australia. It is interesting to note that an external organisation and not banks administer this function.

In Ontario, Canada, the registration system generates standardised documents with details that are generated automatically into the property documents from the attorney's desktop, and each party electronically signs the document when duly completed (Sandberg, 2010, p. 107-108). In contrast, the documents that are automatically populated with details in South Africa are printed and the paper documents signed in ink by all role players. Datawitness Online Ltd in Canada advanced into a digital archive where all digital document copies are archived onto microfilm in the background for clients to access via an Internet portal (Datawitness Online, 2010, p. 1). However, despite electronic registration systems incorporated in British Columbia, Ontario as well as New Zealand, lawyers in each jurisdiction are still required to retain paper records that support and evidence the registration of immovable property (Christensen, 2004, p. 2). According to Bramante and Jones (2006, p. 17-19), three unique models of electronic recording systems have been detected in the United States of America, namely a model that is based on:

- “the electronic registration of scanned paper-based documents and registration based on visual inspection by an officer;
- a document image that is wrapped in an extensible marked-up language (XML) wrapper containing standard and important data. Registration is partially automated but still requires visual inspection and approval of the recorder;
- the registration of documents that have been generated originally by the vendor in extensive hyper-text mark-up language (XHTML) format. The data is automatically checked and accepted or rejected.”

Biometric identification has become an important technology that has been introduced to verify the identity of parties to a transaction. In California, the introduction of a thumbprint as a requirement to obtain a notarised transaction has significantly reduced land fraud (Thomas et al., 2014, p. 6). Malaysia and India have also introduced a biometric link between

ownership of land and an individual (Thomas et al., 2014, p. 6). The Israeli electronic conveyancing, despite being in operation for more than ten years, remains a paper-based process due to paper-based lodgements (Sandberg, 2010, p. 110). A draft bill to establish a biometric data bank of fingerprints and facial features of all Israeli citizens and residents was passed in October 2008 in order to reduce identity theft and other identification risks (The Israeli biometric database bill). Germany has very little identity theft, and this is attributed to the use of a national identity card (Thomas et al., 2014, p. 6). In Merrimack County (in the American state of New Hampshire), deeds of new property sales are scanned with scanners, and archive writers then transfer the scanned images onto microfilm (Brown et al., 2012, p. 75). The electronic document is written onto 16mm microfilm and used for administration and distribution over the long term (Forbiztech, 2015, p.1).

Different countries have different processes due to unique legislation, technologies and role players that are involved in property transactions. It will be very difficult to copy or transfer a successful component of a process from one country to another. Although it is easy to assemble a computer programme, a particular strategy should be planned over the long term as professional development of surveyors and other professionals need to be factored into university programmes and educational programmes for the chosen strategy to be supported (Stuedler, Williamson, Kaufmann, & Grant, 1997, p. 10). There is a requirement to develop a registration system that fulfils all legal requirements while upholding the user confidence (Sandberg, 2010, p. 111) and maintains the integrity of the property register of each country. These are important lessons that South Africa should learn from other countries. In conclusion, the main benefits of other countries are summarised in Table 2.2.

Table 2.2: Summary of benefits of other countries

Australia	Canada	United States of America	Malaysia, India, Israel, Germany
Unification of legal issues	System generates standard documents	Paper documents generated with visual inspection	Biometric identification , e.g. thumbprint
Removal of manual processes and paper	Details automatically uploaded	Document images generated with visual inspection	National ID card
Conveyancers use in-house system	Attorney desktop used	Documents generated by vendor with automatic finalisation	
Duties and taxes are paid via settlement disbursements	Electronic signatures	Biometric thumbprint verification in California	
Same day payments	Digital copies archived onto microfilm		
Pay-as-you-go system			
No subscription fees			
Quicker process			
Similar and seamless processes			
Electronic signatures			

Table 2.2 aims to provide a summary of the literature information that were discussed in section 2.2.3 for Australia, Canada, the United States of America (as developed countries), while Malaysia, India and Israel (less developed countries) are reflected as a group. It appears as though more developed countries have implemented more electronic initiatives.

2.3 Records management

Records management is a subdivision of information management, which in turn is the management of all the information produced within an entity, and the “people, hardware, software and systems” that produce such information (Makhura & Du Toit, 2005, p. 67). Saffady (2016, p. 49) states that there is a difference in keeping and managing records. Records management concentrates on “creating, storing, retrieving, and using business records without the loss of any information” (Ndenje-Sichalwe, 2010, p. 14), whether they were created digitally or in a paper format (Hsu, Lin, Fang, Chiu & Chen, 2014, p. 176). The aforementioned refers to the full cycle of a document and covers all aspects of documents involved in an entire process. Records management provides the proof that an organisation is fulfilling its mandate and provides the justification (Chinyemba & Ngulube, 2005, p. 7; Chachage, Ngulube, & Stilwell, 2006, p. 2) in how it coordinates the flow of records through an organisation to warrant accessibility (De Wet & Du Toit, 2000, p. 75). For property transactions, the title deed is the record that provides evidence of ownership.

Sound records management also facilitate quicker decision-making, sustainability and competitiveness of an organisation (Makhura & Du Toit, 2005, p. 80). Governments need to consult with numerous parties as part of pre-defined steps, including government officials, interest groups and citizens, to reduce risk and build up proper evidence in the consultation process (Kim, Trimi & Chung, 2014, p. 79). As such, ‘quicker’ is not a term that can be attached to government decision-making capabilities. Although government data are structured, the lack of integrated and standardised software and solutions prevents multiple channel access and distribution of beneficial information (Kim, Trimi & Chung, 2014, p. 80).

Documents can be stored and registered, signed, countersigned, filled in, stamped, copied, amended, revised, transferred, inspected, delivered, vetoed, archived, falsified, displayed,

registered, drafted, destroyed, tabled, validated and witnessed (Smith, 2014, p. 24). In this study, records management is important in lieu of the drafting and storing of security documents that was collected and drafted by financial institutions and conveyancers with respect to the acquisition or alienation of immovable property. It is also important in terms of title deeds that prove ownership of property. Financial institutions keep these title deeds until a mortgage loan has been settled and the mortgage bond has been cancelled by bondholders, or mortgagees, or by the legal and registered owner. Although the capability exists for electronic records management, the property process is currently paper-based and manually processed in South Africa.

Documents are used, developed, changed, or destroyed during business processes (Gröger, Decker, & Schumann, 2014, p. 2). Records that were created during the acquisition stage of the property must be provided in a court of law to either prove or disprove ownership where a dispute arises. As such, recordkeeping ensures legal and operational compliance which protects all stakeholder rights (Chachage & Ngulube, 2006, p. 2). In property transactions, documents have been used as an audit trail to prove ownership. This was confirmed by Ndenje-Sichalwe (2010, p. 13) who wrote that business records serve as the ²corporate memory of an organisation, which allows for organisational accountability. Records should therefore be “complete, accurate and reliable evidence of the transactions conducted” (Chinyemba & Ngulube, 2005, p. 7). The deeds office and cadastre are public institutions. Public institutions have always had to manage a large amount of documents and records (Gröger et al., 2014, p. 1). Documents may increase by using appendices or by means of incorporating other real or virtual documents through document artefacts such as cross-references, footnotes, and citations (Smith, 2014, p. 24). Documents can be stored and

² The corporate memory was mentioned here to acknowledge its existence, but the corporate memory, together with knowledge management) falls outside the scope of this study.

registered, therefore giving rise to a history of possibility for changes both in the document itself and in the social reality that falls within and under its influence.

Records experience different life cycle phases including an active (current) phase, a semi-active (semi-current) state, and a non-active (non-current) stage (Chachage & Ngulube, 2006, p. 3). Figure 2.1 illustrates the various stages of an asset. Semi-active and inactive records are stored as they are not used as often anymore, but may still be needed by the entity (Chinyemba & Ngulube, 2005, p. 12). “Active” records need to be protected to defend the organisation against risks and losses currently and going forward (Goodman, 1994, p. 138). Risk management therefore becomes part of records management in terms of keeping records safe as evidence and risk mitigation (Saffady, 2016, p. 51). Owners may for example request an additional loan, and existing documents and the title deed becomes important again. In light of the systems thinking theory (Checkland, 1999, p. 3), everything is connected to something else. The actions and documents compiled by supply chain partners influence each other. However, the focus should be on the entire system instead of on the individual stages, as an essential component of systems thinking is to view the system as holistic which makes the whole better than its subcomponents (Senge, 1990, p. 42). The aim of this study is also to view e-conveyancing as an integrated system that comprise aspects including information technology, risk and security, and document management with no single focus on any one aspect, element or organisation.

In Figure 2.2, the various stages of an asset’s life cycle are illustrated. Documents would form part of all of the different life cycle stages of the asset. For example, if someone builds a new immovable property, a building loan may be used to finance the building of the property and application forms with supporting documentation will be used to acquire the loan and/or the property (if purchased in cash). Also, the approved building plans will be a document that would need to be in place, although it was drafted by a separate entity. If this property is sold to a subsequent owner, a new set of documents will be put into place – an

offer to purchase which contains the conditions of sale would be completed and signed. During the subsistence of the loan or the life of the property, maintenance activities would need to take place. For example, interest rates may be fixed, the term of the loan could be extended or reduced, the loan amount could be increased, or the property may be subdivided or the building enlarged. For each transaction type, a different set of documents would be completed and signed in order to alter the initial agreement that was entered into at the onset of the loan agreement, or cash property purchase. At some point, the building may need to be demolished and a different set of documents will be drafted to govern that part of the process.

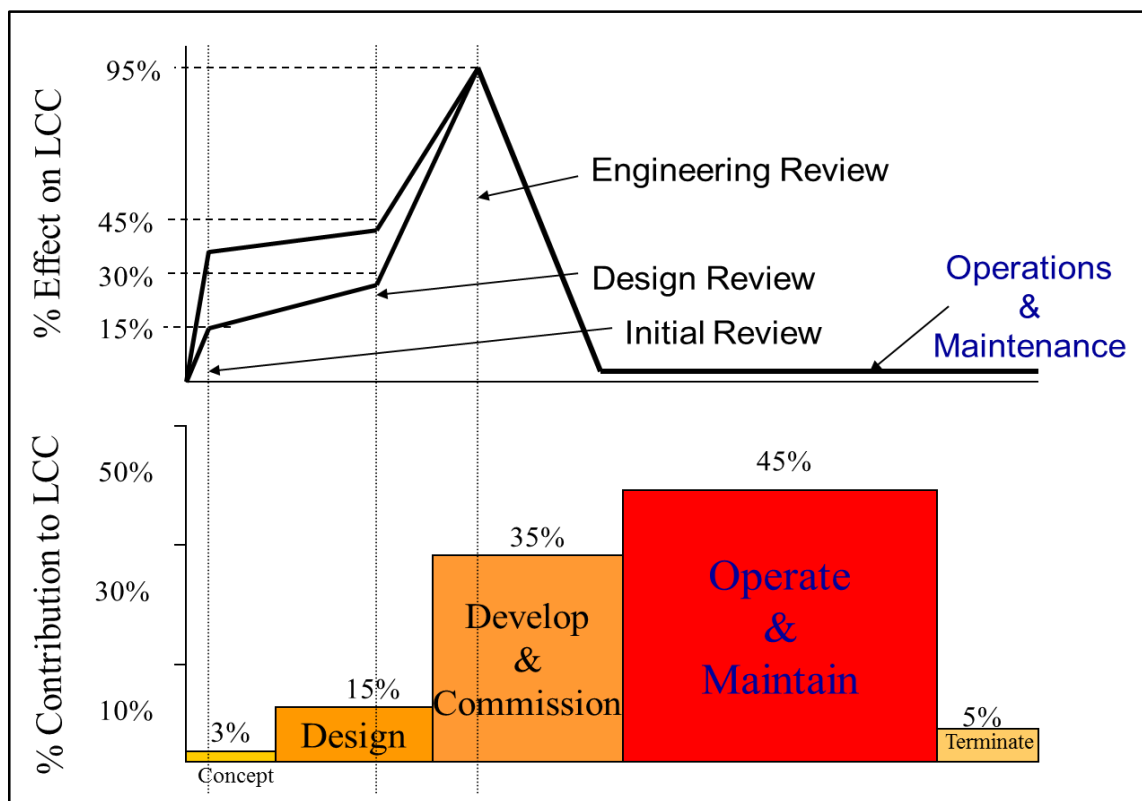


Figure 2.2: Life cycle phases of an asset

Source: Amadi-Echendu and Amadi-Echendu (2015)

Figure 2.2 aims to illustrate the life cycle phases and how it is influenced by life cycle cost (LCC) and operation and maintenance costs (OMC). Various documents will be generated and destroyed during the life cycle process of an asset. It is therefore important for entities

to implement a systematic approach to the drafting, management and storage of documents, and this process should ideally form part of a broader records management policy. Records management programmes operate within a framework of policies, rules, and procedures that provide guidelines for implementation (Chinyemba & Ngulube, 2005, p. 10).

2.3.1 Electronic records management

Records management has developed from a paper-based activity to also include the management of electronic records that were created or received by an organisation which also follow a life cycle path until their eventual destruction (De Wet & Du Toit, 2000, p. 78; Goodman, 1994, p. 138). Aaber et al. (2014, p. 1057) concurred that electronic documents are an essential component of records management for the handling and exchange of information in both corporate and private environments. Records are controlled through various processes of “registration, classification, selection, access rules, authorising use, disposition, transfer, removing, destruction and administration” (Asma’Mokhtar, Yusof, Ahmad & Jambari, 2016, p. 626). Developments in IT have created both challenges and opportunities for records management, as organisations are increasingly replacing their paper files with electronic records to save space (Makhura & Du Toit, 2005, p. 67). A pertinent limitation listed by Ngoepe (2016, p. 346) is that people assigned to control record management in South Africa is not at a senior enough level. This may have the effect that staff and other role players do not afford records management the necessary authority and capacity to enforce proper policies and guidelines that pertains to the management of documents. In addition, staff in the public sector may be reluctant to destroy documents, thus creating a large volume of documents that need to be stored and managed on site in most of the cases (Ngoepe, 2016, p. 347).

The challenge is to maintain authentic, reliable, usable, and trustworthy records as envisaged in the ISO15489 guidelines (Chachage & Ngulube, 2006, p. 8; Hsu, Lin, Fang, Chiu & Chen,

2014, p. 178; Saffady, 2016, p. 53). Trustworthy and accessible documents enhance the credibility and authority of government and other organisations (Ismail & Jamaludin, 2009, p. 135). Hsu, et al. (2014, p. 178) explain the meaning of various types of records:

- An authentic record is one that can be confirmed to be what it signifies to be;
- A reliable record is a complete and truthful representation of the particulars, dealings or events to which they attest;
- The integrity of a record refers to it being complete and unchanged; and
- A useable record is one that can be retrieved, accessed and interpreted.

To convert paper records to digital records, thousands of original records in paper format are scanned and converted into computer files for storage (Steukel, 2000, p. 52). After conversion, paper records may be destroyed, as they would be redundant, and the information may be accessed from the electronic records management system (Chachage et al., 2006, p. 13). The challenge with scanning and other forms of conversions is that the foundation of the document is still in a paper-based format. Many documents are drafted in an electronic format and very often need to be reduced to a paper format, which is later again converted to a digital format. In addition to the time wasted with these processes, it also creates huge inefficiencies and opportunities for fraud and unauthorised changes to be made to records. The process described is how the title deed in the property market is currently managed in South Africa.

Other problems typically associated with paper filing systems are that records are removed from storage files and not replaced, misfiled records, time wasted in manually searching for a particular file, and only one person being able to work with a paper document at a particular time (De Wet & Du Toit, 2000, p. 78). In addition, huge costs are incurred to store paper documents in a fireproof facility. Much time and costs are wasted to replace lost title deeds. The intention is not to remove records from the records management system, but to convert

paper-based records to a format that occupies less space, is less costly, and can be easily accessed (Robek, Brown, & Stephens, 1996, p. 63) by multiple parties at the same time. An increased number of paper records leads to an increased burden to retrieve, re-file, deliver, and protect documents from unauthorised access (Saffady, 2016, p. 54).

Information technology (IT) may assist to make documents more accessible to many users at the same time, as well as track changes that had been made to documents by specific individuals. IT creates security features for records such as back up and disaster recovery capabilities, data protection, confidentiality and disclosure to manage an entity's assets in a cost-effective way (Saffady, 2016, p. 51). Cloud computing allows access to IT facilities without large investments, thus creating cost saving and a reduction in the cost of ownership, while providing a record management solution (Bayramusta & Nasir, 2016, p. 635; Chen, Jagadish, Jiang, Maier, Ooi, Tan & Tan, 2014, p. 1). A new technology that is growing in acceptance that can be used as a system to record a trusted digital record is the block chain technology (Lemieux, & Lemieux, 2016, p. 11). The block chain is a distributed transaction database held in different computers that work as a system to encrypt transaction records in a trustworthy public ledger for the long-term preservation of records (Lemieux, & Lemieux, 2016, p. 118). The block chain will be further discussed in chapter three.

Centralised version control will ensure that each person accesses and uses the most recent version of a particular document. Also, layout and changes can immediately be disseminated to various users simultaneously by means of IT systems and software. Converting paper-based records management systems that had evolved over centuries to electronic processes is quite complex (Rajashekhar, 2006, p. 1). These documents need to be converted into a format that can be retrieved easily, preserved over time, and be legally sound to be used during court cases.

Microfilm serves as a firm conduit technology in digitisation paper-based documents, which facilitate electronic access without subjecting original documents to possible harmful handling (Brown et al., 2012, p. 65). The Department of Land Affairs (the deeds office and the office of the surveyor-general) in South Africa keeps land records of all property in the Republic and uses 16mm microfilm dating since the 1970s. A light source and magnification is necessary in order to read microfilm. Microfilm also does not depend on electricity, therefore making it more usable even in places where electricity may be problematic and it is very difficult to change records undetected. This contributes to the safeguarding of integrity of stored data in a repository environment (Brown et al., 2012, p. 66). Integrity pertains to the content, context and structure of a document (Ismail & Jamaludin, 2009, p. 135).

In South Africa, land records are currently scanned to convert paper documents to a digital format that is stored with The Department of Land Reform and Rural Development in an electronic document management system where the microfilm technology can last for up to 500 years (Brown et al., 2012, p. 74). It is important to preserve records, but technological systems may use different software languages that may cause records to become inaccessible over time. The Department of Land Reform and Rural Development has now bought archive writers for each of the major cities in South Africa (Department of Land Affairs Annual Report, 2010). Scanning of title deed documents previously delayed the deeds office process substantially; however original title deeds can now be given back to titleholders much sooner. A number of paper-based title deeds that need to be converted into a digital format still exist.

Record managers need to manage legal, technological and organisational matters. It is therefore necessary to use information technology professionals when managing and understanding complex information systems (Rogers, 2015, p. 9). Technologically, electronic records need to be machine readable, although the durability of the hardware and

software is not guaranteed (Chachage & Ngulube, 2006, p. 9). Electronic records introduce new challenges that were not experienced with paper-based records (Chinyemba & Ngulube, 2005, p. 14). Electronic records need to be migrated to new hardware and software platforms constantly for them to remain readable and accessible over time. This affects the existing paper environment processes and procedures when compared to electronic records (Makhura & Du Toit, 2005, p. 67). The value of organisational records can only be extracted if those who need to use them (Chinyemba & Ngulube, 2005, p. 14) can access them. Electronic access overcomes geographical boundaries. Access also involves compliance with access requirements both inside and outside the organisation (Chinyemba & Ngulube, 2005, p. 14). Various compliance rules must comply with providing access to documents.

Compliance in highly regulated industries can be a big hindrance in accessing data sets (Kim, Trimi & Chung, 2014, p. 79). Violations of compliance rules and policies will present corrective action that needs to be implemented (Saffady, 2016, p. 51). Meta data may provide legal proof of the integrity of an electronic document and may assist with the compliance of statutory regulations (Chachage & Ngulube, 2006, p. 9). Compliance largely relates to “information integrity, privacy, and records retention” (Marobella, 2005, p. 19). Complying with legislation and standards affects the capturing, creation, transmission, usage, storage, indexing, retrieval, control, retaining and preservation of information (Chachage & Ngulube, 2006, p. 9). The production of electronic records therefore presents a unique challenge for the development and adoption of integrated institution-wide records management databases (Makhura & Du Toit, 2005, p. 19). As mentioned, this study purports that integration should also occur across supply chain partners. This implies that documents need to be shared across different organisations that form part of the supply chain. The Electronic Communications and Transactions Act 25 of 2002 (ECT Act), which was enacted in 2002, provides for the enablement and regulation of electronic communications and transactions (Electronic

Communications Act, 2002, p. 1). Electronic communication reduces paperwork and increases control over staff members (Marinc, 2013, p. 92).

Managing records after they have been created is as important as capturing the correct records (Chinyemba & Ngulube, 2005, p. 11). Proper controls should accompany each life cycle stage of documents, to ensure that records maintain their authenticity, to avoid unnecessary costs, and to prevent system malfunction by creating physical and intellectual rights over records that enters the records system by means of registering, classifying and indexing each record for easy tracking and retrieval of the record (Chinyemba & Ngulube, 2005, p. 12).

Paper documents can easily be manipulated, signatures forged or documents removed from files to be destroyed. Hence, information technology may assist to provide better controls for electronic documents, as mechanisms can be pre-programmed to raise alerts when certain documents are accessed or changed. Furthermore, an audit trail is recorded of all changes made to electronic documents as well as who the changes were made by. These aspects will be explored further in the following chapter.

The effectiveness of an office system to reduce costs relies on the availability of the information recorded, the ability of an organisation to store the correct information securely, and on the possibility of easily retrieving such information when necessary (Castellano, 2015, p. 636; Saffady, 2016, p. 55). Technology is crucial in helping to achieve this goal. The leakage of records is a continuous threat that all organisations face everywhere (Aaber et al., 2014, p. 1057). Ultimately, records are protected from alteration and unlawful access throughout their life cycle phases (Aaber et al., 2014, p. 1058). Consequently, proper controls and access control mechanisms should be put into place to keep land records secure and ultimately maintain the integrity of the South African property register.

2.3.2 Land data management

A land parcel is the smallest plot with distinct ownership (Williamson, 1985, p. 15). The document of interest in property-related transactions is the title deed. Deeds are formal and legally valid documents with specified information and declarations of transactions between two parties that are duly registered with a local land records office (Divithure & Tang, 2013, p. 221; Velencoso & Luz, 2013, p. 169). The title deed furnishes information or evidence and creates rights and obligations that survive even the death of the author of the document involved (Smith, 2014, p. 21). For example, testamentary regulations may dictate how property should devolve for several generations. The deeds office allocates unique title deed numbers or lodgement codes based on the type of right, which is embedded in the prefix and/or suffix of the TITLE_DEED_NO, attribute (Tjia & Coetzee, 2014, p. 269). These unique numbers are tracked by barcodes in the deeds office. The current deeds office process is illustrated in Figure 2.3.

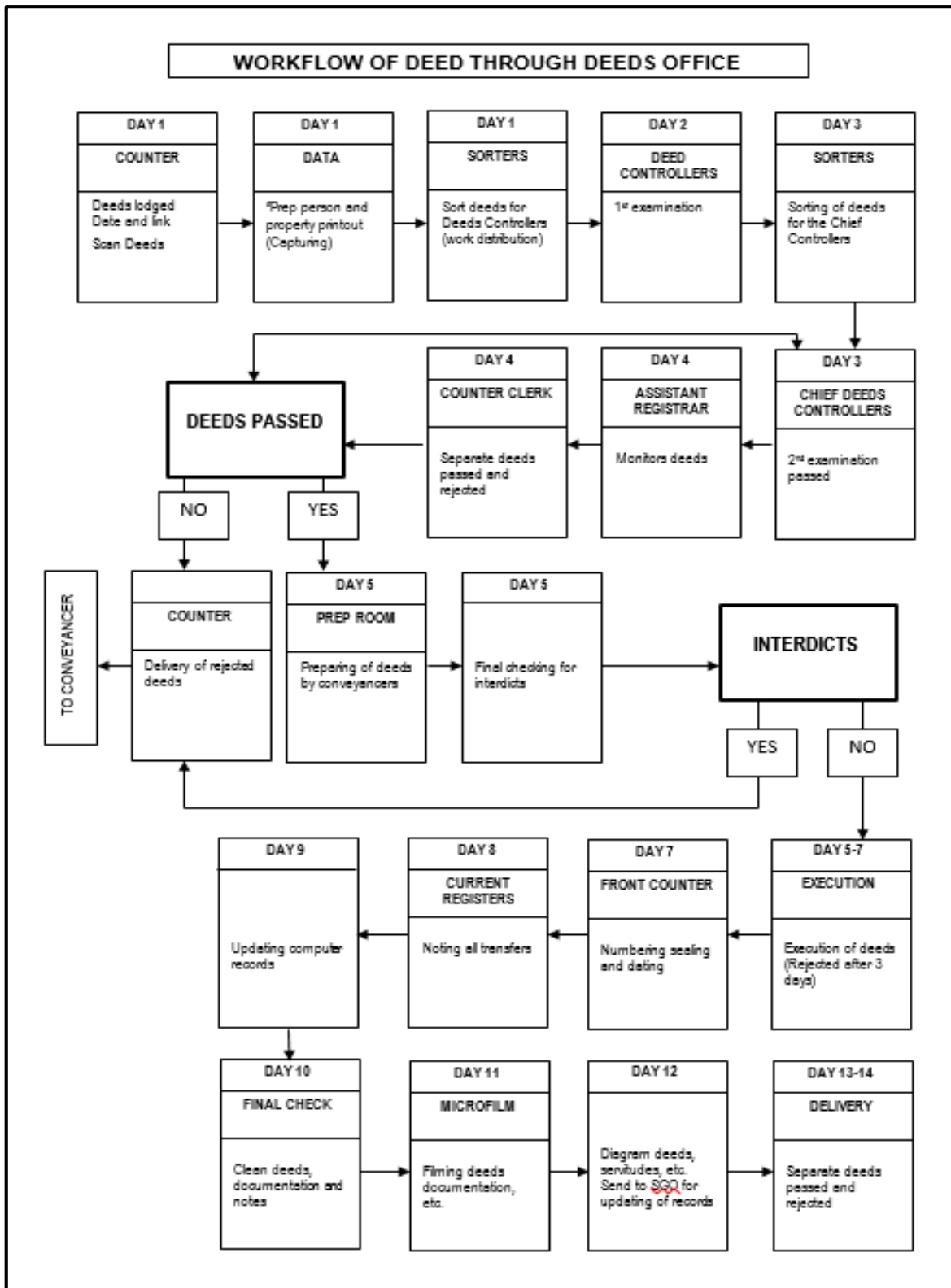


Figure 2.3: Workflow of deeds through the deeds office

Source: The Deeds Office (2007)

Figure 2.3 illustrates the current process that is followed in the deeds office after a deed had been lodged by a conveyancer for registration. Paper documents are currently manually

examined and signed by the deeds office staff and registrars. This process may take up to 14 days, provided that no additional errors and issues are encountered during the examination process, as these may delay the time associated with the process.

Property recording systems play a pivotal role in informing all relevant role players engaged in property transactions with regard to the true nature of ownership of immovable property (Kochan, 2013, p. 306). The identification of the title is critical in any property transaction as it identifies who has authority to use and enjoy the property, who is excluded and who can exchange the property (Kochan, 2013, p. 272). The existing procedure implies that a high degree of accuracy of registration data can be guaranteed (Pienaar, 1986, p. 236; Divithure & Tang, 2013, p. 220). Although a high degree of trustworthiness of deeds registration is ensured in South Africa through a process of thorough investigation of documents as illustrated in Figure 2.3, errors do occur (Pienaar, 1986, p. 239; Divithure & Tang, 2013, p. 220).

According to Satyanarayana (2000, p. 53), the objectives of an electronic delivery platform for the registration of immovable property include:

- a transparent system for property valuation that are retrievable by citizens;
- a modern system that uses imaging technology instead of the current manual system of “copying and filing of documents”;
- electronic document writing;
- an improved stakeholder interface;
- bringing in speed, efficiency, consistency and reliability; and
- protecting the integrity of and guarding against unauthorised alterations to property data, which affect the rights and liabilities of citizens.

The ten deeds offices in South Africa serve as repositories for information on title and transfers of property within a jurisdiction (Kochan, 2013, p. 272-273). Property recording systems offer information to a number of constituencies such as owners or sellers, lenders, buyers, taxing authorities, etc. who may need to interact with the property. Recording allows all of the market and legal participants to connect (Kochan, 2013, p. 275) which may assist to manage the land administration process as a supply chain. Cadastre records that were generated by private and public organisations alike are stored as officially registered records in the deeds office archives (Demir et al., 2015, p. 8). Williamson (1985, p. 15) defines cadastre as “a complete and up-to-date official register or inventory of land parcels in any state or jurisdiction containing information about the parcels regarding ownership, valuation, location, area, land use and any buildings or structures thereon”. However, in South Africa, the cadastre only stores maps and land information, while ownership information is recorded in the deeds office.

The SA deeds office do not guarantee the validity of the information contained in the deed (Divithure & Tang, 2013, p. 220). The state is responsible for title registers, and government employees are vigilant in accepting input documents for these registers, thus increasing processing times through extensive examination, versus a registration of deeds system that concludes its examination at face value within minutes (Bogaerts & Zevenbergen, 2001, p. 329). This situation was highlighted in 2001 and still seems to be a current situation in South Africa (Amadi-Echendu, 2013, p. 37; 50). Processes are however highlighted for information purposes in order to illustrate how data sources may integrate, rather than investigating the processes themselves. Table 2.3 outlines the various documents that need to be drafted by conveyancers for the different entities in whose name a property may be purchased.

Table 2.3: Typical documents to be drafted by conveyancers

List of documents	Natural person	Company	Close Corporations*	Trusts
Power of attorney	√	√	√	√
Mortgage bond	√	√	√	√
Personal affidavit to confirm marital status, identity and solvency	√			
Affidavit confirming FICA information	√			
Loan agreement	√	√	√	√
Authority to pay	√	√	√	√
Debit order authority	√	√	√	√
Cession of home owner's insurance policy if freehold property	√	√	√	√
Insurance certificate if sectional title	√	√	√	√
Marital status declaration	√			
Pro forma statement of account		√	√	√
Resolution authorising transaction and appointing member/director/trustee to sign documents		√	√	√
Certificate by auditor/accounting officer		√	√	√
General affidavit by director/member/trustee		√	√	√
Solvency affidavit concerning the entity by director/member/trustee		√	√	√
FICA affidavit regarding entity		√	√	√
FICA affidavit for each director/member/trustee		√	√	√
FICA affidavit for every shareholder that holds 25% or more shares in the entity		√	√	√
FICA affidavit for the manager of the entity		√	√	√
Guarantees if requested	√	√	√	√

Source: Adapted from Kilbourn (2008, p. 40-2)

In addition to the documents in Table 2.3 that the conveyancers draft, Table 2.4 summarises the documents that should be furnished by the purchaser to the conveyancer in respect of a property that is being purchased:

Table 2.4: Documents to be furnished by borrowers

Natural persons	Companies	Close corporations	Trusts
Identity document	Memorandum and articles of association	CK1, Founding statement for CC. CK2, Amended founding statement if applicable	Trust deed
Marriage certificate if married in community of property	Certificate of incorporation and certificate to commence business		Letters of authority issued by the master of the High Court, reflecting the trustees
Marriage certificate and ante nuptial contract if married out of community of property	Resolution by directors authorising transaction and appointing director to sign	Resolution by members authorising transaction and appointing member to sign	Resolution by trustees authorising transaction and appointing trustee to sign, or powers of attorney by other trustees
If divorced, copy of divorce decree or settlement agreement of divorce	Auditor's certificate and affidavit by a director confirming various facts	Certificate by accounting officer and/or affidavit by member confirming various facts	Auditor's certificate and affidavit by a trustee confirming various facts
Any other documents specifically required by the bank	Any other documents specifically required by the bank	Any other documents specifically required by the bank	Any other documents specifically required by the bank

* CK1 and CK2 = Founding and amendment closed corporation documents

Source: Adapted from Kilbourn (2008, p39-9)

The land recording system was designed and equipped to accept paper documents (Gaudio, 2002, p. 274). In a paper system, the deeds office staff manually check instruments that have been lodged for registration before the register is updated, whereas land title instruments (the documents that are lodged with the deeds office) are prepared electronically (Regulation 20 of the Deeds Registries Act 47 of 1937, p. 31). This implies that the electronic documents

that have been prepared by conveyancers and other parties are printed to convert them to manual documents for deeds office staff to manually examine. This decreases efficiency in the property process. From a security perspective, an alteration to a paper instrument may leave a physical mark, whereas no physical evidence is left on an electronic alteration. However, the physical mark alteration on the paper document would still need to be noticed by the examining officer; therefore, the effectiveness of this safety measure depends on the attentiveness of the examining staff member (Low, 2010, p. 15). Technological systems may be programmed to inform parties of changes made to an electronic document. In addition, an audit trail can indicate which authorised persons made the alterations. The admissibility of evidence by electronic recording deals with aspects related to the authentication and integrity of the recording (Măgureanu, 2012, p. 76).

Words may appear on a computer screen to reflect a contract, but it is merely “a representation of the information stored by the computer in electronic form which does not consist of words but of strings of numbers and symbols and therefore doubt arises as to whether it is in written form” (Christensen, Duncan, & Low, 2003, p. 2). Due to legislation in the form of the Land Act 1994 of Queensland, Australia (Christensen et al., 2003, p. 9), an electronic document is deemed to be in writing “if the document states the date and time that it takes effect, contains the electronic signature of both parties and each electronic signature is certified” (Christensen et al., 2003, p. 9). The Deeds Registries Act (No. 47 of 1937) of South Africa has recently (2015) been rewritten and has been circulated for comment in South Africa (Department of Rural Development and Land Reform, 2016, p. 1). The changes effected will allow for the electronic registration of immovable property to take place in South Africa (Department of Rural Development and Land Reform, 2016, p. 2), and will allow for electronic documents with electronic signatures. This will enable electronic lodgement of documents with the various deeds offices, which will replace the physical delivery of paper documents to the respective deeds office.

2.3.3 Electronic conveyancing in South Africa

In the conveyancing supply chain, the role players include mortgage originators, estate agents, banks, buyers, sellers, and conveyancers. *Conveyancing* is the term generally used to describe the preparation of the deed of sale, registration of a mortgage bond, and compiling documents that create, transfer, and regulate property rights (Rajashekhar, 2006, p. 1). The intention of *e-conveyancing* is to provide an electronic business environment for property transactions including the electronic lodgement with Land Registries (ozconveyancers.com). This implies that documents are created, submitted, registered and maintained in electronic form. Such a system would reduce administrative delays, staff and time; improve the currency of registered data; enhance searches; activate automatic indexing and improve the recording and registration process (Whitman, 1999, p. 250). No collective conveyancing process exist, but many countries follow similar steps although the order of these steps may vary (Amadi-Echendu, 2016, p. 76; Brennan, 2015, p. 51).

These steps include completing an offer to purchase, obtaining a loan from a financial institution, conducting a valuation to derive a market-related value for the property, searching property registers, compiling and completing mortgage documentation, registration, and transfer of property to buyers, and disbursements of funds to relevant role players (Brennan, 2015, p. 51). The similarity in certain tasks were confirmed in a previous study as reflected Table 2.1 in section 2.2.3. The parallel execution of tasks can decrease the turnaround time for transactions to be completed.

As previously mentioned, the documents that are lodged for registration are extensively scrutinised by deeds office personnel, and registration only takes place when all the documents are correct and comply with the requirements set out in the Deeds Act (No. 37 of 1947). In terms of section 3(1) (b) of the Deeds Office Act (No. 34 of 1937), “the Registrar of Deeds has a duty to examine all deeds and other documents lodged for execution or

registration, and to reject them if they do not conform to the relevant laws, practices, and procedures” (West, 2006, p. 1). Section 15A of the Deeds Registries Act was enacted in 1984, which placed certain responsibilities on the conveyancer as preparer of title deeds and documents, and these responsibilities are duplicated in regulation 44A of the Deeds Registries Act (West, 2006, p. 1). According to West (2006, p. 2), the responsibilities of the preparer of deeds and documents and the Registrar of Deeds overlap, and this duplication of responsibilities contributes to a very secure registration system in South Africa. Although this increases the cost of the transaction, Velencoso and Luz (2013, p. 176) agreed that the increased costs are offset by the greater security that the system provides. Money saved through economical record storage by converting paper documents to electronic document, can be redirected to other business activities in the organisation (Saffady, 2016, p. 55). However, security should not be cumbersome and should not reduce usability and scalability (Rajashekhar, 2006, p. 7). In fact, not only are costs increased by increasing manual steps of security, but it also takes longer.

The question arising is whether these usages and intense examinations are necessary to ensure the accuracy of the registers and documents, or whether some are not merely applied from force of habit and could possibly be discharged without detrimental consequences. In contrast to West (2006, p. 2), Whittle (2014, p. 1) is of the view that the South African deeds offices’ concern should be limited to the validity of the title, not the validity of the underlying agreement. He is of the view that a single national deeds office and not provincial designations is preferred as future technology developments could be enabled in an electronic environment, without having to go to Parliament for approval for further developments (Whittle, 2014, p. 1). The reduction in the number of deeds offices may lead to a decrease in the number of jobs and thus be perceived as a challenge in South Africa, given that the National Development Plan is aimed at creating jobs. Consequently, careful planning and sufficient stakeholder management is crucial in this regard.

The Chief Registrar sanctioned the Policy Document on the Electronic Deeds Registration System (e-DRS) for South Africa on 12 June 2009 (Geldenhuys, 2009, p. 6) already and the Electronic Deeds (Department of Rural Development and Land Reform, 2016, p. 2). To date, this system has not yet been developed and implemented in South Africa. Also, the Deeds Registration Bill has been rewritten and circulated for comment in South Africa (Department of Rural Development and Land Reform, 2016, p. 1). The proposed legislation will “allow for the current paper-based system for lodgement and registration of deeds, which requires the conveyancer to appear in front of the Registrar of deeds, to lodge electronically” (Garvie, 2014, p. 1). Although no electronic deeds registration system has been put into place yet, many role players have debated functionalities that may be considered for such a system, and, where feasible, private organisations have put various workarounds into place to overcome gaps identified in the end-to-end property process. In fact, these workarounds have become a major source of income for certain private organisations.

Măgureanu (2012, p. 80) stated that the law should be further enhanced and harmonised regarding the making and maintenance of electronic recordings, with minimal risk to the infringement of legal rights. To facilitate authentication and routine activities of users in an electronic environment, any changes made to an existing transaction by an authorised person may be recorded. There should be some form of document management system in place to ensure that the latest version of the contract is made available and the most recent changes should be highlighted (Boettiger, 2015, p. 75) in an audit trail to identify the parties that had made the changes.

The heart of all the processes and product activity of a centralised system will be the data centre, which will be the repository for all metadata, imagery, and products (Kanagasabapathi & Balaji, 2013, p. 419). Metadata are data that are electronically recorded to identify the identity, authenticity, structure, and content of a document (Ismail & Jamaludin, 2009, p. 138). Image processing is a records management solution that converts

paper and analogue records into digital images ([www. metrofile.co.za](http://www.metrofile.co.za)). Storage solutions are made easier as less space is required for electronic storage (Brown et al., 2012, p. 65-66). Although digital storage is less expensive than storing paper documents, the cost of digital preservation is composite and difficult to measure (Rusbridge, 2006, p. 7). The establishment and management of the data centre may be a costly exercise (Hamilton, 2010, p. 1). Software licencing and maintenance, uninterrupted power supply and alternate power source generators, air conditioners to keep all electric equipment in the datacentre cool, are required, as well as a team of IT specialists who should be contracted to maintain the system are important factors to consider (Duesimi, 2015, p. 3). According to Muir (2007, p. 6), the database should be protected by a suite of security measures including firewalls and intrusion detection systems.

Different role players have debated various options for e-DRS. According to Radloff (2006, p. 22) the following possibilities may be considered:

- “The deeds office assumes full responsibility for the legal validity of deeds.
 - This option would result in a substantial expansion of the examination function of the deeds office to ensure the legal validity of every registration.
 - This option would lead to a massive increase in supporting documents that should be checked by the deeds office to ensure the validity of every transaction.
 - This problem could be compounded if persons other than qualified conveyancers lodge and register deeds electronically because the deeds office assumes full responsibility for the validity of the registration, which in turn will frustrate the objective of handling more volumes with existing deeds office staff.

- In addition, records are not accessed for information purposes but to record new registrations. Hackers could gain access and create havoc, which will jeopardise the integrity of the system.
- The legal profession assumes full responsibility for the legal correctness of deeds. This would result in the abdication of the deeds office's examination function as the function shifts from checking as opposed to examination.
 - Errors may occur which may lead to the introduction of title insurance, which in turn will escalate costs for the general public."

Although each option has benefits and disadvantages, each option need to be carefully considered and a full impact study on each option should be executed and assessed.

"A number of permutations between options could also be considered where:

- The deeds office merely records and registers as the examination function is delegated to the private sector.
- Section 3(1) (b) of the Deeds Registries Act (No. 47 of 1937) will need to be amended to provide for the delegation of the examination function to the private sector.
- Examiners will have to be trained and employed by the private sector.
- This would imply that in the new system, the private sector would interact with themselves, i.e. the conveyancers on the one hand and the examination entity on the other."

Different options may change the interaction and dynamics of the role players who are involved in the conveyancing process. Although certain options may incur certain types of benefits such as decreased turnaround times of registrations, a full risk assessment may indicate other detrimental effects that may be to the detriment of land administration in general.

“The status quo could remain unaltered except for certain consequential adaptations (Radloff, 2006, p. 22) necessitated by an electronic as opposed to a paper process:

- Experience has shown that delays in property transfers are caused by the requirement that municipal clearance certificates and transfer duty receipts have to be lodged. This burden could be shifted to conveyancers.
- The existing cumbersome lodgement of the necessary documents on behalf of a rural conveyancer should no longer be necessary because it will be done electronically.
- Legislation will need to be adapted to make provision for the introduction of electronic land registration.
- Electronic registration of a particular property can only be effected once the title deed and mortgage bond have been captured on the system in electronic format. This would imply that the present paper-based system would need to run concurrently with an electronic system for a particular period.
- The status quo remains unaltered in essence but with a number of cardinal adjustments to facilitate the process, alleviate the burden of the deeds office and render a better service to the public.
- The role and function of the deeds office as the ultimate watchdog of the registration system of the country will not diminish, but the process should become less cumbersome and easier to manage.
- The updating of the deeds office records should occur instantaneously with the registration of each transaction resulting in more accurate and up-to-date records.
- Cumbersome procedures relating to the examination process should be simplified.”

According to Radloff (2006) therefore, there may be certain functions that form part of the current process that could be changed to reduce the cumbersomeness of the process.

A digital certificate should be obtained for each person who needs to gain access to the system, and the process of issuing digital certificates should be tightly controlled and should include measures to identify the identity of the applicant (Muir, 2007, p. 6). The use of encryption and digital certificates allows the content of the transaction and the identity of the conveyancer who certified it to be conclusively established (Muir, 2007, p. 7). Unsuitable institutional measures and governmental structures are often the largest restriction in implementing land administration reform (Williamson, 2001, p. 304). Effective stakeholder management is a crucial element that must be observed in order to obtain buy-in and support for land reform initiatives. The responsibility of the land register is that of government, as such, government institutions should also incorporate electronic platforms into their environments.

2.3.4 E-government

E-government entails the strategic use of information and communication technology in order to strengthen public service delivery by ensuring participatory democracy for citizens regarding governmental decision-making, reducing the cost of public service delivery and ensuring access of government information to citizens and businesses (Bwalya, Du Plessis, & Rensleigh, 2014, p. 105; Gröger et al., 2014, p. 1). Property, birth, court and other records that are managed by government need to be accessible as and when required (Saffady, 2016, p. 54). Ngulube (2007, p. 1) is of the view that government information is generally not properly organised. Challenges in the delivery of basic and core services by spheres of government may result in protests by citizens who complains about the poor quality of services. There are numerous challenges that face records management in South Africa (Ngoepe & van der Walt, 2009, p. 131) which in turn results in poor service delivery, the mismanagement of records and inability to provide government departments with the necessary information and records (Ngoepe, 2016, p. 340). The success of e-government

depends on the quality and user-friendliness of services offered to citizens. Low quality wastes efforts, reduces production capacity, and causes reworking, which decreases productivity and increases costs (Alenezi, Tarhini & Masa'deh, 2015, p. 35).

Technological systems can facilitate access to government information, regardless of geographical distances. E-government may provide a platform where the different departments involved in land processes can provide an integrated and seamless database system to process applications and increase access (Bwalya et al., 2014, p. 104). By implication, buyers, sellers, banks, estate agents and conveyancers may be integrated into a platform. Tseng, Yen, Hung and Wang (2008, p. 755) argue that e-government benefits are optimised by enabling inter- and intra-organisational communication, combining institutional competences, endorsing knowledge management, and structure government processes by means of IT. This integration of data, data sources and systems form the core argument of this study.

All governmental departments are obliged by legislation to provide for the proper care of documents and to ensure that documents are preserved as official government records (Makhura & Du Toit, 2005, p. 78). The deeds office and cadastre must, as the government offices responsible for land administration in South Africa, ensure that they record and store accurate records regarding property ownership in South Africa. E-government principles are based on the assumption that government departments are willing to cooperate with each other.

Ngoepe and van der Walt (2009, p. 131) recorded that directorates in South African government departments work in silos with not much support from top management for recordkeeping activities. In short, silos do not promote transparency and, which results in much duplication in the recapturing of similar information into different technological systems in the absence of technological integration. Weerakkody, Irani, Lee, Osman and

Hindi (2015, p. 901) listed prominent risk factors for e-government: “limited implementation time, poor information management systems architecture, inadequate funds, lack of managerial support, and staff conflicts.” Overall, effective planning and project management becomes imperative to successful implementation of e-government initiatives.

Government can act and make proper decisions when information is readily available. Online services are more cost effective and quicker than face-to-face services (Alenezi, Tarhini & Masa'deh, 2015, p. 44). The South African government comprises four spheres namely national and provincial departments, local authorities and statutory bodies (Ngoepe & van der Walt, 2009, p. 121). This study focuses predominantly on national governmental departments. E-government incorporates the quality of information recorded, technological infrastructure, the legal and regulatory environment, economic and social contexts, as well as the adoption and use by citizens (Zhao, Wallis & Singh, 2015, p. 741). Hence, various governmental departments would need to collaborate in a single initiative.

New technology does not initiate organisational changes, nor does digitisation by itself lead to the adoption of e-government by citizens and business institutions (Zhao et al., 2015, p. 752). Metadata information, which could be embedded or attached to the electronic record, are added to the record when it is captured (Chachage et al., 2006, p. 12). Meta data may provide legal proof of the integrity of an electronic record, and may assist in managing records for compliance with statutory regulations (Chachage & Ngulube, 2006, p. 9). The metadata should record all essential information including the author, date of creation, and other relevant information according to institutional policy (Chachage et al., 2006, p. 12). The integration of the different government processes can be achieved from the core of metadata describing electronic resources, records and document management, information discovery and document preservation prior to their use (Park, Lamontagne, Perez, Melikhova, & Bartlett, 2009, p. 146).

Preservation actions should keep the record's integrity intact, while ensuring that data remain "authentic, reliable, and usable" (Brown et al., 2012, p. 69). There are a number of challenges to digital preservation: "technological obsolescence, lack of awareness, financial sustainability, policies, legislation, politics, security and privacy" (Adu & Ngulube, 2016, p. 3). To preserve records for the long-term, acceptable metadata should be captured when electronic documents are recorded in the electronic records management system (Yang & China, 2015, p. 2). The trustworthiness of an e-record must record an audit trail of who did what at what time to prove authenticity as well as secure storage of the official government records (Makhura & Du Toit, 2005, p. 78). The full impact of any resolution is only apparent over time (Mcleod, 2014, p. 2).

Cadastral systems need considerable investment (Kaufmann & Steudler, 1998, p. 5) however, the maintenance and storage of cadastral systems and property-related data remains a governmental responsibility (Bogaerts & Zevenbergen, 2001, p. 333). In South Africa, private organisations in industry have taken the lead in converting paper-based processes into electronic processes. Government has seemed to lag behind in this regard, particularly with regard to property transfers and registrations. The South African government has established various statutory bodies to implement e-government projects and in this regard, the State Information Technology Agency (SITA) is responsible for the "acquisition, installation, implementation and maintenance of information technology" in the South Africa public sector (Ngoepe & Saurombe, 2016, p. 34). In addition, the Electronic Communications and Transactions Act of 2002 backs the use of electronic records as evidence in the judicial system in South Africa (Ngoepe & Saurombe, 2016, p. 34). Governments may also suffer loss of income if taxing authorities (for example municipalities for rates taxes and SARS for capital gains tax) are unable to identify ownership interests clearly or do not know who to tax (Kochan, 2013, p. 295). Legal issues relate to protection of data and confidentiality, digital signatures and security to keep the electronic record

integrity intact (Ngulube, 2007, p. 3). As the property register custodian, government need to ensure that legal and security issues are complied with. We can however not wait to convert paper records to digital records indefinitely, as some of the records may become unreadable (Ngoepe & Saurombe, 2016, p. 34).

2.4 Discussion

The setting of this study is poised within the property market and the data collection process has its foundation in this market. As such, the literature review ensues with land administration to provide the context and background of this study. Land administration is crucial to the wellbeing and growth of any country because it firstly, provides an up-to-date record of a land parcel coordinates. Secondly, it provides a complete record of ownership information. Thirdly, it provides a record of all land interests in the form of rights, responsibilities and encumbrances. Fourthly, correctly recorded property information affords owners access to credit, which in turn contributes to a country's economy.

It is important to note that spatial information and ownership information are captured in separate systems and originate from different professionals with unique expertise and qualifications that do not overlap. It is widely accepted that this is an unhealthy state of affairs and that integration of the two databases are long overdue. For example, land could be subdivided and spatial records would be updated in the cadastre but not in the deeds office, unless a conveyancer lodges a separate application with the deeds office for the title deed to be updated accordingly. A subdivision affects property sizes that in turn affect the value of the property. Property values are used to determine the rates and taxes that are payable to municipalities for the maintenance of infrastructure. If these values are not properly updated, incorrect revenues will be collected. Accordingly, it affects the integrity of the property register, which could in turn affect foreign investment into South Africa either as foreigners may not have confidence to invest in property in the country, or from

foreign businesses wanting to acquire land to build infrastructure for their business ventures, which could create employment.

However, land administration is a governmental responsibility and, although this integration and the migration to an electronic platform has been approved in 2009, nothing has been implemented to date, despite two failed tenders that has been awarded for an e-conveyancing system to be designed and built. In fact, not even the new bill that will enable electronic property transactions have been promulgated by Parliament. All the effort has been put in by the private sector, but there are limits to what the private sector can do. These private sector developments have occurred at a premium that has significantly increased the cost associated with property transactions. The ownership of land in South Africa is reflected in a title deed, which in essence forms a record that needs to be managed. It is in this regard that records management formed the second part of this chapter.

E-conveyancing initiatives have been explored in various other countries over the last few years. Certain of the elements have been introduced in other countries already. Due to the complexities and customisation of legislation and processes, it would be impossible to copy an existing system or process and introduce it into another country without tailor-making it to suit the country's individual needs. South Africa has a unique system that evolved from colonial systems. As such, an e-conveyancing system would need to be uniquely designed from scratch. Given that generic aspects exist, such as digital signatures, encryption, and the records management of ownership, which could be used in any system and process, it follows that these generic aspects can be included in a South African e-conveyancing system.

Records management on the other hand, has been linked to various elements that also form part of this study: Firstly, it has been linked to risk management (Ngoepe, 2014; Saffady, 2016) and compliance (Chachage & Ngulube, 2006; Saffady, 2016). Secondly, it has been linked to corporate governance (Ngoepe, & Ngulube, 2013). Thirdly, it has also been linked

to information science (Saffady, 2016). Deployment strategies include public cloud, private cloud and hybrid cloud options (Bayramusta & Nasir, 2016). Cost efficiency of using these options should be evaluated against both the short- and long-term in order to assess viability of introducing such systems into a business environment. Fourthly, it has been linked to the “value-chain” (Saffady, 2016). One can assume that various entities form part of a value chain whereby each of these entities produce some form of value to the overall process or supply chain. A supply chain also consists of numerous entities and each supply chain member contributes a part of the end-to-end process value for the end user or client. In this context, a value chain may be likened to a supply chain for the purposes of this study. Fifthly, records management has been linked to block chain technologies, and this technology has been linked to payment systems (Lemieux, & Lemieux, 2016). Lastly, records management has also been linked to other financial strategies including auditing (Ngoepe, & Ngulube, 2016).

Ngoepe (2014, p. 341) identifies different models that can be applied to record management as firstly, centralised versus decentralised models, and secondly, devolved versus a combination of other models. Certain functionalities are centralised within the property end-to-end process (such as the registration of title deeds within a jurisdiction; and the disbursements of funds by banks, conveyancers and estate agents), while some are decentralised (such as conveyancing processes that are managed by conveyancing offices across the country, even though they may be outside the jurisdiction of the property). However, an electronic registration process may enable a national centralisation capability, not the current centralisation according to jurisdictions.

Figure 2.4 illustrates the factors that influence property transactions. Records management is at the centre of land administration, because records (in particular the title deed) help to prove ownership rights and encumbrances. The stakeholders that form part of the process and electronic records management capabilities influence the way in which conveyancing is

executed in South Africa. E-government initiatives aim to incorporate electronic records into their environment. Administrative and governing bodies control the management of data and records, often as part of a government function. These entities and processes remain similar for other industries and disciplines and are not unique to land administration.

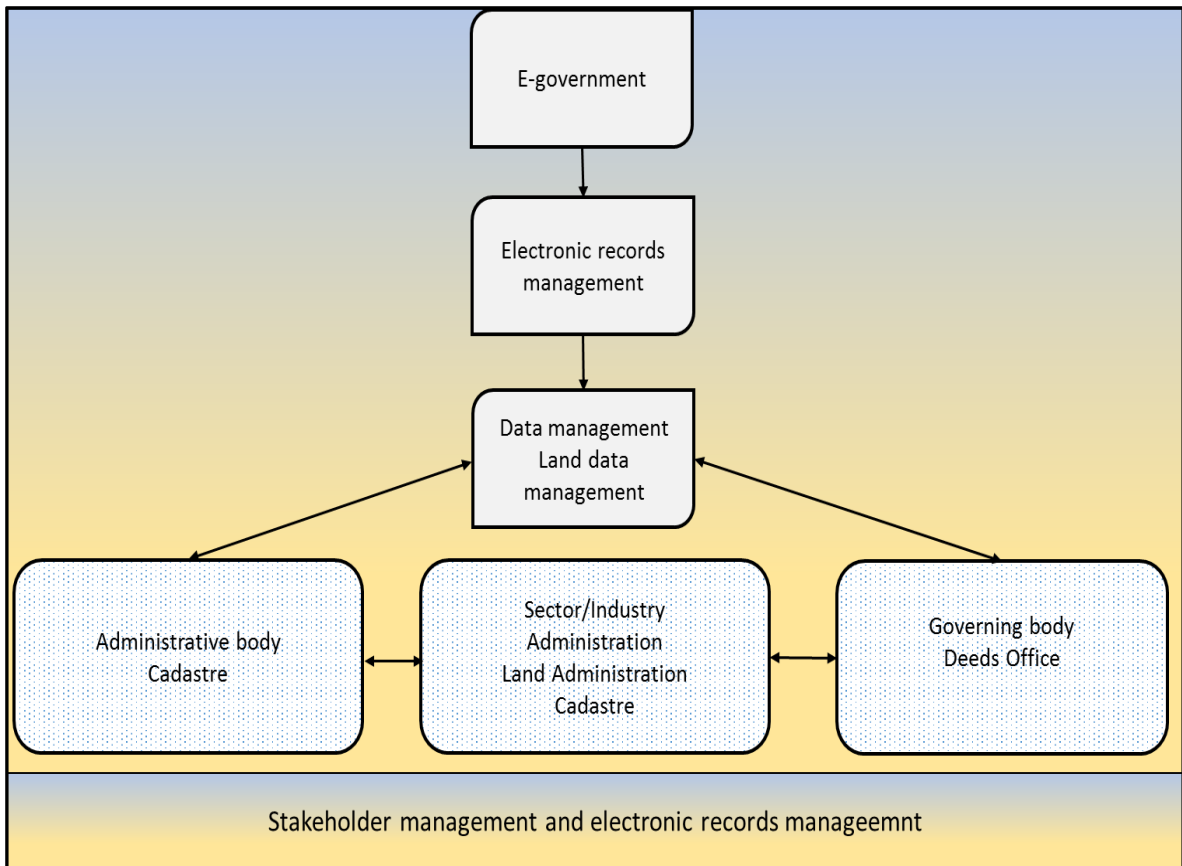


Figure 2.4: Illustration of factors that influence property transactions

All of these elements (land administration, records management, supply chain management, payment systems, security and risk management aspects, and information technology) form a golden thread throughout this study. In turn, each element may run across the other elements too as per the example of records management mentioned earlier. Record management is also not uniquely applied within land administration. It is in this context that this study may apply to other industries and focus areas as well.

2.5 Summary

This chapter covered land registration and land administration in general. The chapter further reviewed the role of a cadastre in land administration systems and briefly looked at electronic conveyancing initiatives in other countries. While many countries have embarked on various initiatives over a number of years, the process to become fully electronic is still ongoing in many countries. It is evident from the literature that these systems are very complex and involve a variety of role players. Although different countries have endeavoured to build land administrative systems, there is not a single system that may be implemented in exactly the same way in another country because different legal and land administration systems are used. Some countries register titles, while others register title deeds. Some countries guarantee the correctness of title, while others do not. There are however, certain components that may be used in various countries. These aspects include security features, components of technological systems and the integration of data among various role players involved in land administration processes.

This chapter also reviewed and discussed electronic records management and how this translates to the deed - a document that is necessary in property transactions to prove ownership and rights that pertain to a particular land parcel. Although there may be other factors that pertain to records management, the relevant factors that have bearing on land administration, which forms the context of this study, were highlighted. In addition, the chapter discussed e-government and electronic initiatives that government would need to undertake to maintain the integrity of electronic documents for e-conveyancing to be implemented successfully in South Africa.

The next chapter will review the role that the different role players play in the property exchange process. It is put forward that these role players should be managed as a supply chain in order to improve the end-to-end property process.

CHAPTER 3

Supply chain management

3.1 Introduction

In the previous chapter the land administration process were explained which showed that the land registration and the cadastre are two separate components in South Africa. Various e-conveyancing strategies that were introduced in various countries were mentioned. Electronic records management and e-government strategies particularly in the context of land data management were highlighted. The transfer of landed property from a seller to a buyer involves numerous activities of many disparate entities in the private sector, as well as business processes of regulatory agencies, public sectors, departments, and institutions. The organisational structure of a bank or financial institution is different from that of an estate agency or conveyancing firm. Regulatory agencies and municipalities are neither organised in the same way as estate agencies and conveyancing firms, nor do they operate like banks and other financial institutions.

Each agent, organisation, or institution involved in the transfer of a landed property naturally generates data and information relevant to its business mandate. The amount, content, format, and structure of data and information can be very different among the various entities involved in conveyancing processes. Similarly, the protocols used to protect and secure data and information may be vastly different among the different entities involved in the value chain that links conveyancing processes to the cadastre and deeds office. A buyer or seller may be required to provide his or her biographical data and information in a format preferred by an estate agent. The same biographical data and information may be provided to a conveyancing firm, and a bank in their respectively preferred formats. In fact, the same biographical data and information may have to be provided to all the private and public

sector entities that will be involved in the legal transfer of a landed property between the seller and the buyer. In addition to biographical data, each entity may collect the same documentation in order to perform the tasks associated with their respective roles in the conveyancing processes.

Some of the major challenges associated with landed property transfers (Amadi-Echendu, 2013, p. 145) within and between many jurisdictions are:

- cumbersome and tedious conveyancing processes;
- indeterminate delays during conveyancing;
- cadastre and office searches;
- a lack of transparency from conveyancing through to the cadastre and deeds office;
- fraudulent activities that may occur even after the registration of landed property;
- porous security of confidential data during the conveyancing process; and
- the consequent undermining of clarity with respect to legal rights and privileges associated with landed properties.

These issues seem to be evident in different countries in varying degrees, although each jurisdiction would customise an approach that is suitable for their legislative and other needs and requirements.

With the ubiquitous and pervading nature of ICTs, it is conceivable that generating and conveying data and information pertaining to landed property transfers could be automated by integration and interconnection among and across all the entities involved (Gunasekaran & Ngai, 2004, p. 269). In an ideal scenario, an uninterrupted set of secure, integrated, and interconnected systems should especially mitigate the risk of fraudulent financial transactions whilst concurrently assuring clarity in terms of the legal rights, duties, and responsibilities associated with ownership and title of landed properties.

Land is classified as immovable property in terms of South African patrimonial law (Immovable Property (Removal or Modification of Restrictions) Act 94 of 1965). Therefore, the transfer of landed property from a seller to a buyer and the registration thereof involves the exchange of pertinent data, information, and money between the conveying entities in a manner that replicates a typical supply chain arrangement. For a single landed property transfer to take effect, the end-to-end conveyancing requires that a buyer link to some or all of the entities. The same may apply to the seller, and the respective entities may link to each other, either directly or indirectly. This chapter outlines a number of supply chain activities, namely supply chain management (see section 3.2), supply chain visibility, and transparency (see section 3.3), supply chain integration (see 3.4), supply chain networks (see section 3.5), supply chain sustainability (see section 3.6) and supply chain innovation (see section 3.7). The purpose of this chapter is to reflect insights into how various organisations, as a supply chain, positively influence business processes and performance.

Entities that are reliant on data need to have the assurance that the data are valid and that the data integrity has remained intact (Peters & Panayi, 2015, p. 10). Corruption of data integrity can occur at various instances, such as human error, hacking, viruses, compromised hardware, cyber threats, and various types of fraud (Peters & Panayi, 2015, p. 10). As a result, this chapter further reports on the role that IT plays in supply chain management and land administration systems. It provides a discussion of the option of cloud computing, and concludes with security aspects that influence the application of IT systems, as well as payment options that may become relevant in property transactions.

“Banking is essential, banks are not,” is what Bill Gates said twenty years ago (Gates, 2007, p. 1). Although conventional banks have established reputations and experience in dealing with customers, they are subject to practical, consumer protection, and anti-money-laundering laws (Allen, 2015, p. 93). The settlement of financial effects has been disadvantaged by inefficiencies of conventional processes (Peters & Panayi, 2015, p. 26).

Settlement delays causes various risks (Soramäki & Cook, 2013, p. 2). Payments underpin financial transactions, enabling commerce, and the transfer of value among entities, customers, and financial institutions (Allen, 2015, p. 34). A broad view is that money should support three purposes: it should be accepted as firstly, a medium of exchange; secondly, a unit of account for cost analysis of goods and services; and thirdly, a stable store value (Allen, 2015; Peters, Panayi, & Chapelle, 2015, p. 12). Instruments other than conventional currencies can also operate as ‘money’ (Allen, 2015, p. 13). This chapter furthermore considers payment systems and mechanisms, and explores options of virtual currencies for the property market.

3.2 Supply chain management

The main purpose of a supply chain is to please customer demand (Heckmann, Comes, & Nickel, 2015, p. 3) and often one entity cannot by itself fulfil all customer expectations. A supply chain characterises a network of entities that are involved in distinct processes and activities through upstream and downstream connections, to produce products and services for customers (Christopher, 2005, p. 17). In the property supply chain these organisations may include banks, conveyancers, municipalities, revenue services, estate agents and mortgage originators. Many different entities may therefore work together to fulfil a common customer need (Wu et al., 2014, p. 130). Supply chain management (SCM) evolved from the need to coordinate several entities, processes, and multiple customers across the supply chain (King, Lee, Liang, & Turban, 2012, p. 15).

SCM is the act of sharing material, information and financial resources within organisational units (Koçoğlu, İmamoğlu, İnce, & Keskin, 2011, p. 1631; Stadtler, Kilger & Meyr, 2015, p. 11) as well as beyond the physical boundaries of the organisation (Shih et al., 2012, p. 71). It integrates key business processes from suppliers to the end user (Lambert, Cooper, & Pagh, 1998, p. 9) in order to produce products and services. Business processes describe how

organisations function and operate and how they influence organisational performance (Van Looy, De Backer, Poels, & Snoeck, 2013, p. 466). A process is a collection of activities or reasonably connected tasks that should be executed to accomplish a particular business objective (Guha, Kettinger. & Teng, 1993, p. 15). SCM starts at product design and integrates all activities up to the delivery of the end value to the customer (Gunasekaran & Ngai, 2004, p. 269). The efficient flow of information and materials helps organisations to track market needs so that the entity can rearrange its resources responsively (Ngai, Chau, & Chan, 2011, p. 235). Mentzer, Dewitt, Keebler, Min, Nix, Smith, and Zacharia (2001, p. 7) contend that successful SCM is necessary to enhance long-term entity and supply chain performance. To put it briefly, various organisations may work together to exchange information, finances, services, technological systems and data in order to provide a service to the end user and this end-to-end process should be managed in a coordinated and integrated way.

The stakeholders involved in property transfers in South Africa include estate agents, mortgage originators, Comcorp [a vendor that provides software packages to estate agents and banks], property assessors, banks, bridging finance houses, the Master of the High Court, the Department of Home Affairs (DHA), bridging finance companies, conveyancers, e4, Korbitec [e4 and Korbitec are vendors that provide software packages to banks and conveyancers], revenue services, municipalities, the surveyor-general and the deeds office. The deeds office and the surveyor-general office (also called the cadastre) both form part of the Department of Rural Development and Land Reform, but they are run as separate offices with different processes and systems. Although they form part of one department these two offices perform different functions and has been discussed separately in terms of their different functions for the purposes of this study.

An estate agent may be appointed by a seller to find a suitable buyer for the property he or she wishes to sell. The same estate agent or a different one may introduce a suitable buyer to a property that is for sale, and this agent will draft an offer to purchase (OTP), which becomes the first legal document that forms the basis of the agreement between the buyer and the seller (Amadi-Echendu & Kruger, 2016, p. 2). The offer to purchase contains all the information that pertains to the property in question including the details of the parties to the agreement, selling price and any special conditions that were agreed upon between the parties. Mortgage originators assist buyers to apply for finance at different banks and to obtain the best interest rate with the highest loan-to-value amount. Banks provide loans for buyers to purchase property and register a bond over the property as security until the loan has been repaid. Comcorp, Korbitec and e4 have each developed different platforms, which electronically link different entities for data and document exchanges. In addition, Korbitec and e4 own and resell the use of software and data that enable conveyancers to compile the relevant documents electronically and intelligently for property exchanges to take place (Amadi-Echendu, 2013, p. 54). These entities in the property supply chain can be illustrated as reflected in Figure 3.1.

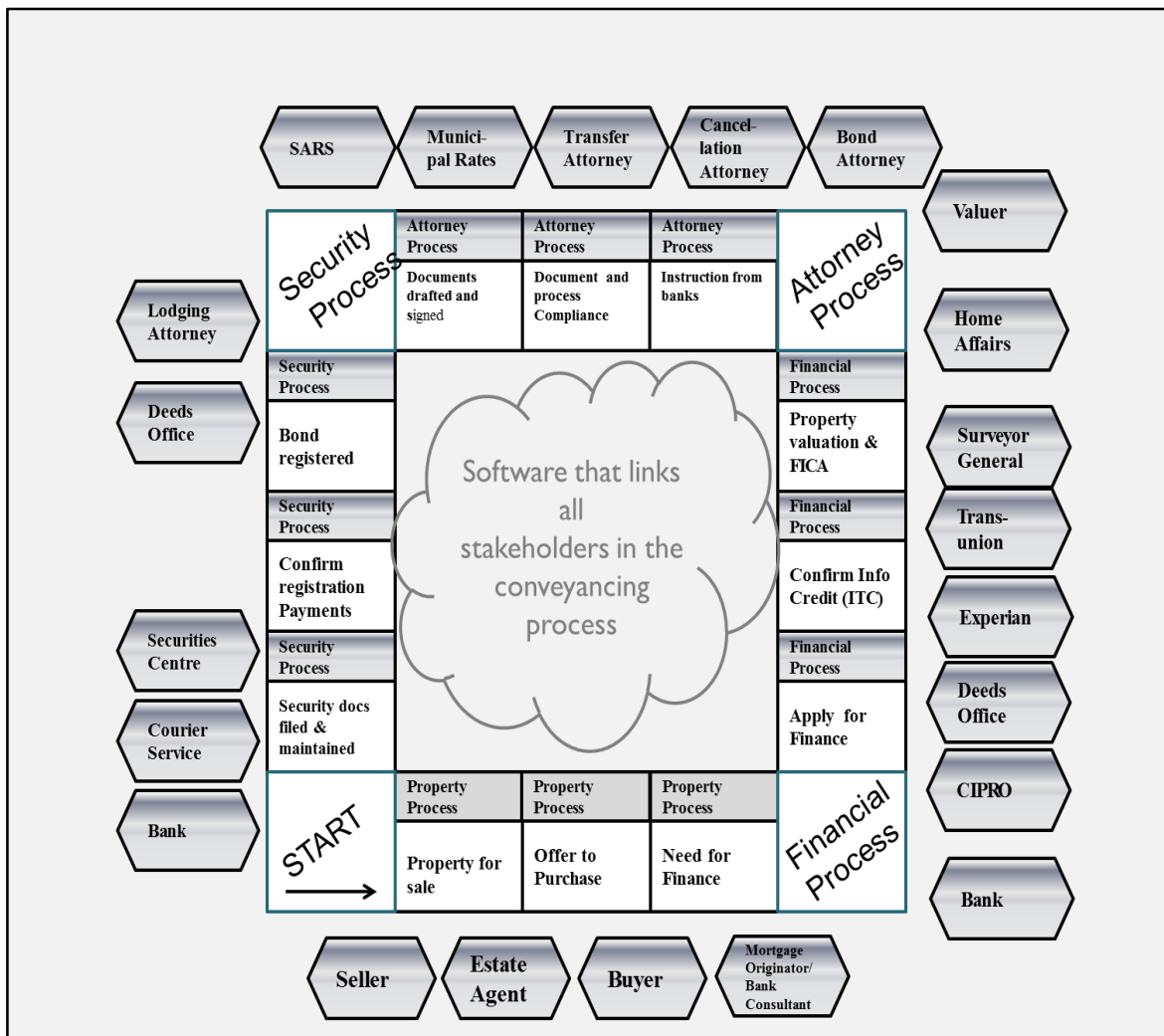


Figure 3.1: The property supply chain

Source: Amadi-Echendu and Pellissier (2013, p. 6)

As previously explained, Figure 3.1 aims to illustrate the deeds registration process in South Africa from a role player and high-level process perspective. It is imperative for entities to adopt a supply chain design and strategy to cope better with increasing levels of complexity, regulatory compliance issues, multifarious products and services and technology updates (Gunasekaran, Hong, & Fujimoto, 2014, p. 189) and this is no different for the property market. In reality, the various organisations involved in property transactions in South Africa work in silos. The skill with which complexity is controlled is a core competitive capability that can be exploited to improve the efficiency and effectiveness of a supply chain (Cheng, Chen, & Chen, 2014, p. 2329).

The major objective of SCM is to generate collaborations for competitive advantage among supply chain partners due to information sharing (Sukati, Hamid, Baharun, & Yusoff, 2012, p. 226-231; Williams, Roh, Tokar, & Swink, 2013, p. 167; Zeng et al., 2012, p. 547). All information needed for the efficient operation of the supply chain should be shared voluntarily and spontaneously at the right place at the right time (Shih et al., 2012, p. 71; Du et al., 2011, p. 90). The willingness to share information will affect the quality of the information shared (accuracy, timeliness, completeness, adequacy and reliability of the information), which in turn will affect the decisions made by an entity, through coordination, trust, high communication, and joint problem solving (Du et al., 2011, p. 89). Problem solving initiatives need not be on elements that affect competition between the entities, but rather affect bigger industry-related issues that may negatively affect the end user.

Inter-organisational relationships are formed, sustained, and enriched to achieve business goals and to enhance the competitiveness of the supply chain, which might be difficult to achieve by individual entities (Cheng, 2011, p. 374). Improved efficiency and effectiveness among the inter-organisational members can enable a quicker response and innovative solutions to the changing needs of customers (Cheng, 2011, p. 374; Panayides & Lun (2009, p. 36). SCM business partnerships can be created (Lotfi, Mukhtar, Sahran, & Zadeh, 2013). For example, banks and attorneys may agree to reward their clients with lower costs for participation in specific pre-approved campaigns. Only participating conveyancers should therefore receive registration instructions for campaign-related transactions, and the banks are able to attract more clients because of the cost saving offered by the conveyancing firm.

Information regarding significant operational and performance must be monitored (Qrunfleh & Tarafdar, 2012, p. 341). Monitoring practices focus on assessing actual performance, such as measuring outputs against particular performance criteria (Klassen & Vereecke, 2012, p. 105) and the processes; leading up to the output must be measured to identify bottlenecks (Varma, Wadhwa, & Deshmukh, 2008, p. 345). In the property arena, output is translated as

registrations of new transfers or further mortgage bonds registered for further loans that were approved by financial institutions. However, many different private and public organisations are involved in the processes that lead to this output. How adequately an entity can fulfil end-user requirements, as well as operational efficiencies are used to measure overall performance of an entity (Barnes & Liao, 2012, p. 891; Shafiee et al., 2014, p. 3).

In the property market, performance is registered against how long it takes for the registration of the property to take place. Tables 3.1 to 3.3 are an illustration of property transfer figures for the month of March 2016. Various types of property transactions are recorded in the tables, which include sectional title, and full title transfers. The tables provide a breakdown in terms of the five most active suburbs (see Table 3.2) as well as the number and values of transactions per province (see Table 3.3).

Table 3.1: Property transfer figures per deeds office

Property Transfers for 2016-03-01 to 2016-03-31										
Date	Up to 1 mil (,000)		1 to 2 mil (,000)		2 mil + (,000)		Count	Avg Amt	Bond	Transfer
	Cnt	Amount	Cnt	Amt	Cnt	Amt			Value ,000	Total ,000
2016-3	19,292	6,677,046	4,486	6,428,416	3,061	24,013,809	31,461	1,179,850	41,263,791	37,119,271

Source South African Property Transfer Guide (SAPTG, 2016)

Table 3.2: Top 5 deeds office suburbs with the highest transfer counts

Province	Suburb	Full title	Sec. title	Non res	Transfer count
Gauteng	Soshanguve South Ext 6	2,123	0	0	2,123
Limpopo	Vaalwater Ext 4	381	0	0	381
Free State	Thembalihle Ext 4	379	0	0	379
Western Cape	Milnerton	144	157	0	301
Gauteng	Hammanskraal West	295	0	0	295

Table 3.3: Top 10 deeds office suburbs with the highest transfer amounts

Province	Count	Full title	Sec. title	Non-res	Transfer amount	Bond value
KwaZulu-Natal	55	0	28,442,998	2,988,019,765	3,016,462,763	18,276,287
KwaZulu-Natal	123	0	87,543,833	2,490,116,325	2,577,660,158	387,151,528
Limpopo	49	0	0	648,028,792	648,028,792	1,070,000
Gauteng	180	0	49,284,000	566,168,740	615,452,740	397,791,155
KwaZulu-Natal	14	0	0	463,606,000	463,606,000	0
Western Cape	301	273,490,497	155,557,682	0	429,048,179	286,583,060
KwaZulu-Natal	12	0	0	387,568,000	387,568,000	0
Gauteng	3	375,000,000	1,224,999	0	376,224,999	0
KwaZulu-Natal	51	318,326,891	13,164,999	0	331,491,890	344,900,400
Gauteng	3	296,400,000	0	0	296,400,000	1,800,000

SCM can help to achieve higher profits, lower costs and improved sustainability (Giunipero, Hooker, & Denslow, 2012, p. 260) as well as customer satisfaction; (Shafiee, Lotfi, & Saleh, 2014, p. 1) improved utilisation of facilities and cash flow (Chengalur-Smith, Duchessi, & Gil-Garcia, 2012, p. 58), and improved competitive advantage in the marketplace (Trkman, McCormack, De Oliveira, & Ladeira, 2010, p. 318). Under certain circumstances, services and systems may be shared among supply chain partners to maximise economies of scale and achieve better return on investments.

Overall performance also assesses the effectiveness and efficiency with which targets are achieved (Barnes & Liao, 2012, p. 891). *Effectiveness* means that predefined goals can be achieved even in the face of adversity, while *efficiency* refers to spending minimal resources to attain such target (Heckmann et al., 2015, p. 6-7). Barnes and Liao (2012, p. 891) explains that effectiveness has an external outlook in assessing customer satisfaction and that efficiency on reflects internally as to resource usage versus the output achieved. According to Shafiee et al. (2014, p. 3), efficiency measurements for different purposes need to be implemented to identify bottlenecks, wastages and opportunities for improvement, and the corresponding control measures to ensure that planned improvements were carried out. As previously mentioned, the sharing of resources and information among supply chain members can improve the attainment of goals and targets with reduced spending; thus increasing the effectiveness and efficiency of the supply chain, and not only individual organisations.

Efficient supply chains emphasise unique technical competences that drive predetermined operational objectives, such as cost savings and capacity optimisation, continuous improvement of skills and improved resource utilisation (Parmigiani, Klassen, & Russo, 2011, p. 214). These enhancements can be achieved through continuous improvements to the status quo. *Continuous improvement* refers to a status in which the organisation is continuously analysing the way in which it carries out its business to find improvement

opportunities for the performance of the organisation (Delgado, Internet, Ruiz, De Guzmán, & Piattini, 2014, p. 135) and the entire supply chain. Continuous improvement can be achieved through visibility and transparency in the supply chain.

3.2.1 Supply chain visibility and transparency

Supply chain visibility relates to the ability of the focal organisation to access or share relevant operational and strategic information of supply chain partners (Caridi, Moretto, Perego, & Tumino, 2014, p. 2) to reduce uncertainty within business environments (Williams, Roh, Tokar, & Swink, 2013, p. 543). Visibility provides benefits in terms of operational efficiency and planning effectiveness (Caridi, Crippa, Perego, Sianesi, & Tumino, 2010, p. 372). For example, conveyancers may be able to plan better for increased volumes if they are made aware of planned campaigns that may occur. Entities in a supply network can engage as either competitors (for example competition in terms of technology, access to resources or information) or cooperatives (for example in relation to industry initiatives) (Pathak, Wu, & Johnston, 2014, p. 255). Estate agents, mortgage originators and bank staff may compete with each other to submit an application for finance to the different banks. The more reputed the entity is, the more amenable it becomes to customer pressure, which directly affects the entity's earnings.

Deciding which information to share with other organisations in a supply chain may be a difficult task due to the establishment of trust relationships among all parties (Shih et al., 2012, p. 71). This creates a better working environment regarding the reliability of contracts, provision of incentives for co-operation, and the reduction of risk and uncertainty (Wu, Chuang, & Hsu, 2014, p. 124). It will ensure that information is not abused and is not used to the advantage of one organisation and to the detriment of another. Other challenges include the confidentiality of shared information, which in South Africa is protected by the Protection of Personal Information Act (POPI Act), 2013 (No. 4 of 2013) (Protection of

Personal Information Act, 2013). Confidentiality is the “ability to restrict and/or control access to certain information to authorised users only” by means of the upfront authentication of users, proper access control, and encrypting of (Aaber, Crowder, Chang, Fadhel, & Wills, 2014, p. 1057). IT can assist to achieve much of the aforementioned.

The reliability and cost of IT, accuracy of information and integration capabilities can enable shared information databases (Lotfi, Mukhtar, Sahran, & Zadeh, 2013, p. 302) in order to manage collaboration, coordination, and knowledge transfer across the supply chain (Parmigiani et al., 2011, p. 221). Additional IT may become necessary when additional security measures have been introduced, and these are normally funded by the organisations that need to use it. As a result, the increased cost of acquiring new technologies and increased security measures may deter entities from procuring such.

Visibility is a complex task because data and information are often spread across entities, regions, and information systems (Musa, Gunasekaran, & Yusuf, 2014, p. 177). For example, a buyer may buy a property in a different province to where he or she is living and working. The new property will need to be registered in the deeds office that has jurisdiction over that property (Property Power, 2015, para. 3). As a result, a different and additional conveyancer who resides in that jurisdiction will physically have to lodge the paper documents for registration on behalf of the authorised conveyancer under the current paper-based property registration system.

The current property process involves private and public organisations and agencies that tend to work in silos. Although integration exists in the form of linkages that make provision for electronic instructions and milestone updates among these entities, each entity largely works in its own technological system independent from the other (Amadi-Echendu and Amadi-Echendu, 2016, p. 1). If the respective systems are not adequately updated for predetermined milestone, updates to be forwarded to other role players, individual role

players would need to follow up manually for progress updates. Much can be done to make the property supply chain more visible and more transparent to the members of the property supply chain.

Transparency refers to the degree to which information is available informed decision-making (Lindqvist, 2012, p. 102), more equal participation around controversies and enhanced accountability (Mol, 2013, p. 1) but may also incur costs (Aaber et al., 2014, p. 1057). These costs comprise the costs of collecting, formatting, recording, preserving and communicating the information as well as the installation and running costs of the IT systems (Sivadasan, Smart, Huatuco, & Calinescu, 2013, p. 254). There is a growing importance and call for transparency in supply chains (Mol, 2013, p. 2). Different organisations need to share information to ensure sufficient collaboration across the supply chain (Badea, Prosteau, Goncalves, & Allaoui, 2014, p. 117). Transparency in transactions can be associated with openness about risks and costs of transactions (Nijhof, Graafland, & De Kuijer, 2009, p. 251). All supply chain members can therefore plan better around the costs, risks and market changes as information are shared among themselves.

The receiver of information should decide whether and how to respond to it and accommodate any changes that may need to be done. At the same time, an organisation may need to reorganise its operations to cater for requests made after assessing the effect of any changes on the organisation or its operations (Sivadasan et al., 2013, p. 255). Overall, there are many considerations, and effective management becomes necessary in order to sustain continued growth and profit. This gap may be bridged by allowing for more integration to occur between supply chain partners.

3.2.2 Supply chain integration

Providing great customer value with the lowest budget is dependent on the performance of the entire supply chain and not just one entity (Koçoğlu et al., 2011, p. 1631). Internal

integration focuses on integration of cross-functional activities within an organisation and is the degree to which functions in an organisation collaborate and work together (Danese et al., 2013, p. 126; Flynn et al., 2010, p. 59; Williams et al., 2013, p. 545). Internal integration may result in process improvement or new product development (Zhao et al., 2008, p. 19). Integration may enable cost reductions, increased customer value, and more flexibility (Zhao, Huo, Sun, & Zhao, 2013, p. 120) because the supply chain will operate as a single entity (Farhoomand, 2005, p. 26; Palma-Mendoza, Neailey, & Roy, 2014, p. 167) as opposed to different organisations responding to customer needs individually. As such, much duplication and additional spending of various organisations may be reduced in contrast to each organisation performing similar functions in parallel.

Fisher (1997, p. 106) states that most concepts of supply chain integration explicitly recognise the existence of a flow of goods (products and services), and a flow of information, but Flynn, Huo, and Zhao (2010, p. 59) added finance as another flow. SCI includes collaboratively managing intra- and inter-organisational processes (Ngai et al., 2011, p. 237; Yu, Jacobs, Salisbury, & Enns, 2013, p. 347). Chengalur-Smith et al. (2012, p. 60) and Katunzi (2011, p. 106) emphasised the importance of coordination information and resource sharing. In the property market, this may imply that the industry needs to consult and decide on the best IT to deploy for the industry, or the format and content of information and data that will be shared among supply chain partners.

Integration with both customers and suppliers as strategic alliances or collaborative relationships is commonly referred to as external integration (Danese, Romano, & Formentini, 2013, p. 126; Flynn et al., 2010, p. 59; Zhao, Huo, Flynn, & Yeung, 2008, p. 19). It can assist to increase visibility (Williams et al., 2013, p. 546), to optimise core competencies and reduce transactional cost (Danese et al., 2013, p. 126; Zhao et al., 2008, p. 19). Integration with the entire supply chain involves the “coordination of operational, logistical, and planning data” (Li, Yang, Sun, & Sohal, 2009, p. 126). Entities use the

information they acquire to personalise their services, optimise decision-making, and improve forecasting (Peters & Panayi, 2015, p. 9). The commitment for external integration is reflected by the organisation's level of internal integration and its relationship commitment to its partners (Zhao et al., 2008, p. 19). In summary, organisations that have created information sharing capabilities across internal departments are more likely willing to share information across the supply chain. Information must also be contextualised and intelligently used to achieve more efficient decision-making and overall optimisation.

The integration of “front end activities (marketing and sales, customer service) and back end activities (operations, technology development)” (Tan, Pan, & Zuo, 2014, p. 780), makes the supply chain more robust and resilient (Tseng, Wu, & Nguyen, 2011, p. 258). Managers and researchers should treat internal and external integration in a holistic way to manage supply chain integration better (Wong, Wong, & Boon-itt, 2013, p. 572). A healthy supply chain relationship can result in operational efficiency, cost reduction, flexibility to adapt to ever-changing demands (Cheng et al., 2014, p. 2328) and technological innovations (Gopalakrishnan, Yusuf, Musa, Abubakar, & Ambursa, 2012, p. 195; Tseng et al., 2011, p. 259). Given these facts, the integration of internal and external activities, resources and communication can create synergies that enable supply chains to be more responsive to changing environments and customer needs. Through effective collaboration, information from outside an organisation can be contextualised (Yu et al., 2013, p. 348).

Supply chain integration requires active communication among supply chain members (Sukati et al., 2012, p. 227). To achieve effective supply chain integration, organisations need to implement different levels of technology integration (Qrunfleh & Tarafdar, 2012, p. 342) across the organisations in the supply chain (Sukati et al., 2012, p. 226) to provide a clear picture of the supply chain status (Ngai et al., 2011, p. 237; Tseng et al., 2011, p. 260). In summary, effective supply chain communication and collaboration will enable contextualised information sharing and increased competitiveness by maximising core

strengths through inter-organisational redesign of processes and products for more effective integration of information, resources and finance.

3.2.3 Supply chain networks

The biggest difference between SCM and traditional operations management is how partnerships are managed (Li, 2012, p. 60). By expanding the traditional concept, a supply chain is no longer a single chain but is intertwined with a few supply chains, called a supply chain network (Fasli & Kovalchuk, 2011, p. 3411; Lin & Wang, 2011, p. 1162; Mizgier, Wagner, & Holyst, 2012, p. 15). Resources cannot be controlled by any one party, which necessitates strategic interaction (Frostenson & Prenekert, 2014, p. 8). Supply networks are complex, flexible, and dynamic systems (Pathak et al., 2014, p. 256). In the network, all the participants play different roles and their relationships are complicated (Long, 2014, p. 4094) which requires intellectual and suitable information processing (Qrunfleh & Tarafdar, 2012, p. 341). The elements that determine the complexity of a supply chain include system size, connection level, the degree of predictability and uncertainty in the system (Cheng et al., 2014, p. 2330). Overall, it is important to note that various supply chains may develop dependencies on each other, which create further complexities in terms of supply chain management. If these supply networks can be managed efficiently, it can significantly benefit a particular industry.

Simultaneous competition or co-opetition (a situation where competitors simultaneously cooperate and compete with each other [Bengtsson & Kock, 2015, p. 38]) and co-operation are present in supply networks (Pathak et al., 2014, p. 259). Uncertainty develops from customer demand, product and process design, production, delivery and undue delays (Hwang & Yuan, 2014, p. 566). Therefore, entities need to adopt information systems to manage the various processes for goals to be attained (Qrunfleh & Tarafdar, 2012, p. 342). Largely, supply chains would need to assess the type of information sharing that they need to embark

on within the larger supply network in order to protect their competitive advantage, but alleviate some of the uncertainty that could hamper optimisation of processes and service delivery, as well as render the supply network sustainable.

3.2.4 Supply chain sustainability

Sustainability is generally seen as the ability of an entity to maintain itself profitably in the long run (Ageron, Gunasekaran, & Spalanzani, 2012, p. 169; Farahani, Rezapour, Drezner, & Fallah, 2014, p. 100). Martínez-Jurado and Moyano-Fuentes (2014, p. 5) define sustainability at business level as “meeting the needs of an organisation’s direct and indirect stakeholders, without compromising the ability of the organisation to meet the needs of future stakeholders.” In recent years, sustainability has also been linked to environmental factors. Numerous principles, tools and reporting formats have emerged to assist entities in meeting their sustainability commitments (Beloff, Tanzil, & Lines, 2004, p. 271). In this regard, entities need to ensure that they do not strive to be profitable to the detriment of the environment.

Sustainability in an organisation is driven by various factors, including legislative enactment, organisational commitment, and customer pressures (Gopalakrishnan et al., 2012, p. 195). To this end, organisations need to ensure that they comply with legislation and policies. *Supply chain sustainability* refers to the ability of a supply chain to function without restrictions in facility, capacity, and resource capabilities (Speier, Whipple, Closs, & Voss, 2011, p. 722). An integrated supply chain, as opposed to single organisations, that optimally use inter-relationships between the supply chain members, resources, activities and interfaces can address and overcome customer pressures that relates to sustainability (Gopalakrishnan et al., 2012, p. 195). Whereas traditional SCM focuses on managing the flow of material, information and finances in the supply chain only, sustainable SCM emphasises the role of economic, environmental, and social objectives of stakeholders in the

wider context (Büyüközkan & Berkol, 2011, p. 13731; Frostenson & Prenkert, 2014, p. 1). The sustainability initiatives of an organisation and its corporate strategy should be closely interwoven (Ageron et al., 2012, p. 170). In summary, an integrated supply chain effort can maximise sustainability by making use of their interrelationships to approach strategic issues of the economy, environment and society, instead of just focusing on operational issues relating to resource, financial and information sharing.

Sustainability and the growth of the supply chain network rely heavily on financing (Longinidis & Georgiadis, 2014, p. 73). The complexity of supply chains can be characterised by quite a few interrelated aspects of the networked system, which include product structure, number of subsystems, the degree of interaction, as well as the connectivity between the elements, subsystems and the environment (Modrak & Semanco, 2012, p. 228). As noted earlier, a supply network is more complex to manage, but if managed well, the network can increase supply chain sustainability quite substantially. IT has a role to play in this regard, but other innovative solutions may also be explored.

3.2.5 Supply chain innovation

Porter (1980, p. 150) proposes that the “competitiveness of nations depends on the ability of an industry to innovate and improve, and that companies achieve competitive advantage through innovation.” The purpose of innovation is to find better ways to create additional value within organisations (Pitt, 2008, p. 165) and innovation is a result of human creativity to fulfil a need (Lee, Olson, & Trimi, 2012, p. 822) whether it pertains to a device, system, process, policy, programme, product or service (Panayides & Lun, 2009, p. 37). Jin & Li (2007, p. 540) defined *innovation* as “the core capability of organisations to master and maintain holistic value-creating dynamics in which the opportunities of change are exploited and new ideas are generated, translated and implemented into practice.” Andersson, Lindgren, and Henfridsson (2008, p. 21) were more specific and held that *innovation* refers

to new applications of knowledge, concepts, approaches and abilities (Hurmelinna-Laukkanen, Sainio, & Jauhiainen, 2008, p. 278) that can produce exclusive proficiencies and enhance organisational competitiveness. Cao & Zhang (2011, p. 175) relayed innovation in a supply chain as the extent of supply chain participation in hosting new processes, products or services.

Innovation plays a role in providing distinctive products and services by creating bigger value not documented before (Montes, Moreno, & Morales, 2005, p. 1159). Managing supply chain complexity demands innovative solutions by approaching aspects from an intelligent but different angle (Gunasekaran et al., 2014, p. 195). This implies that innovative and fresh approaches may produce different results in a supply chain context. *Absorptive capacity* is the capability of an organisation to recognise and commercialise fresh, external information (Cohen & Levinthal, 1990, p. 129). To this end, external integration with supply chain partners can provide new and creative ideas of improving processes (Danese et al., 2013, p. 126) and learning from customers can enhance the speed of innovation (Bierly & Daly, 2007, p. 45), therefore increasing the absorptive capacity of the supply chain.

Supply chain partners would need to actively work together to advance progress that would be mutually beneficial. At an operational level, new ideas must be developed into tangible new products and this often includes inter-organisational problem solving (Wong et al., 2013, p. 568). Larger organisations can compel the participation of smaller organisations (Tether, 2002, p. 955). Innovation-driven collaboration ranges from informal arrangements to formal long-standing strategic alliances (Sammorra & Biggiero, 2008, p. 801) that extend beyond mere formal contracts. IT can be used to coordinate innovation initiatives of the supply network.

3.3 Role of information technology in supply chain management and the land administration process

Modern era information and communications technology systems feature capabilities like capturing, recording, storage, retrieval and transmission of data. These capabilities can facilitate data, information integration and interconnectivity that are necessary to align conveyancing processes to both the cadastre and deeds registry, as well as improve communication and the sharing of data and information between supply chain partners. It is in this context that the role of information technology is discussed in this section.

3.3.1 Role of IT in the land administration process

Entities rely on the accuracy and correctness of information in land administration systems. Kson, 2002The land registration system of South Africa was not developed from scratch, but evolved from existing European cosmopolitan practices (Jackson, 2002, p. 6). At present, a mortgage bond in South Africa is executed by a conveyancer before a Registrar of Deeds as opposed to a transfer, which is registered by the Registrar of Deeds, but not executed before the Registrar of Deeds (Whittle, 2010, p. 1). Traditionally, the property sale process, the mortgage origination process, and the settlement process have been considered to be three entirely separate functions (Kilbourn, 2008, p. 1-3). Typically, staff dealing with these functions all work from different offices and each uses different technology to assist them in their respective activities (Thomas, 2009, p. 2). As a result, users need to re-enter information into separate programmes (Thomas, 2009, p. 3), which may result in transcription errors. Integrate these technologies is very complex, because larger organisations may struggle with legacy systems that is costly and time consuming to replace. However, many vendors operating in the property space have attempted to ‘push’ information between role players operating in the property space. Technology can assist to automate the entire property process in South Africa across various role players into one

programme (Thomas, 2009, p. 5). While some efforts have been made to use technology to make recording systems more search friendly and useful, there is still a great deal of modernisation and innovation needed to update the recording process and to increase compliance (Kochan, 2013, p. 276).

In this vein, e-commerce, interactive Internet applications, cloud computing and digital technology have created new business model prospects (Sako, 2012, p. 22). Although information is maintained in a computer database, conveyancing and the speed of the recording of title and searches thereof, have not kept pace with the speed of the economy and the complexity and diversity by which it operates (Gaudio, 2002, p. 273). Without interoperability of systems, the full benefit of e-commerce is difficult to achieve. *Interoperability* refers to the ability of e-commerce applications to integrate seamlessly with the existing systems of the organisation as well as the systems of business partners (Ranganathan, Teo, & Dhaliwal, 2011, p. 536). Interoperability is more difficult to achieve in supply chain re-engineering that involves multiple supply chain partners, than business process re-engineering (BPR) of internal business processes (Ranganathan et al., 2011, p. 536) which will enable competent and efficient organisations (Wong, 2013, p. 720), enhance business processes and business performance (Trkman, McCormack, De Oliveira, & Ladeira, 2010, p. 320). The same holds true for land registration systems and, as such, the property transfer process. It would be more difficult to improve the end-to-end property transfer process that stretches across many governmental and private institutions.

Stand-alone and manual approaches to land administration and cadastral systems, as well as traditional structures valuations and land titling were traditionally maintained separately. This situation is not sustainable and structures should be integrated (Mooney & Grant, 1997, p. 188; Williamson & Ting, 2001, p. 344). Land systems have to govern property rights, encumbrances, and responsibilities, which requires a broad and integrated approach (Williamson, 2001, p. 300). It is necessary to reengineer the land administration system to

cope with increasing complexity (Williamson & Ting, 2001, p. 357). Hammer and Champy (1993, p. 32) define re-engineering as the “fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed.” Given these facts, it has become necessary to integrate land administration systems that incorporates all elements of land administration, including the registration of indigenous property.

3.3.2 Role of IT in supply chain collaboration

The traditional domain of the information systems strategy is to improve the efficiency and effectiveness of organisations (Sukati et al., 2012, p. 226) by streamlining business processes and interactions. *IT implementation* refers to the technical capability and use of systems to obtain process and convey the information required for operative decision-making (Li et al., 2008, p. 126). Information and computer technology has emerged as a vital tool to manage business-to-business relationships (Rajaguru & Matanda, 2012, p. 620; Ye & Wang, 2013, p. 371). It plays a pertinent role in financial entities that handle paper and electronic bulk information (Gonzalez, Llopis, & Gasco, 2013, p. 912). IT also plays a huge role in the property market where different organisations are involved in different processes for property to transfer from one owner to the next. Although many organisations have been linked in the industry in order for information and documents to move from one organisation to another, no single connection point is available to follow up on transactions that are in the process of being approved or registered.

IT is comparable to a nervous system for SCM (Gunasekaran & Ngai, 2004, p. 270). IT facilitates widespread access to information, updated communication and coordination (Marinč, 2013, p. 78) across geographical boundaries (Cheng, Law, Bjornsson, Jones, & Sriram, 2010, p. 247). In the property market, the property being purchased needs to be lodged in the jurisdiction where the property is situated (Property Power, 2015, para. 3). In

such instances, a conveyancer who operates in a different province needs to make use of a corresponding attorney who operates in the jurisdiction of the property to lodge such transactions with the correct deeds office. The originally signed documents and supporting documentation have to be couriered to corresponding conveyancers for a manual lodgement of the paper documents as only paper documents may be lodged at a deeds office under the current system (section 10, Deeds Registry Act 47 of 1947, p. 22). Obviously, the property market is not leveraging the available IT capabilities.

A strong IT infrastructure enabled with supply chain integration (SCI) may reduce communication cost while at the same time decreasing information uncertainty (Li, Yang, Sun, & Sohal, 2009, p. 127; Williams, Roh, Tokar, & Swink, 2013, p. 544). Undoubtedly, IT creates business efficiencies in terms of communication, information and document sharing, reduced cost, integration and transparency across geographical boundaries and supply chain partners. Information systems help to identify potential problems and ensuing solutions early (Speier et al., 2011, p. 726) across the supply chain (Soliman & Janz, 2004, p. 698), therefore making the supply chain more responsive and risk averse (Li & Lin, 2006, p. 1645). In fact, IT has the capability to enhance security measures quite significantly by means of pre-approved and pre-programmed rules.

IT alignment among supply chain partners is beneficial to improve supply chain capability (Ye & Wang, 2013, p. 371). It is crucial to help minimise delays that result from data conversion among various technological platforms (Kim, Cavusgil, & Cavusgil, 2013, p. 882). IT further enables the entire supply chain to have a better understanding of the market, internal production processes, and other relevant information (Davis-Sremek et al., 2010, p. 42). For example, banks could promote certain products and experience an increase in the number of transactions that will be sent through to conveyancers for subsequent registration. If banks inform conveyancers upfront, these conveyancing firms could prepare themselves to better manage the increased volumes. However, resistance to change occurs

in most organisations (Ageron et al., 2012, p. 172) and this is also true for the property market. Despite the benefits of inter-organisational information systems, the uptake of inter-organisational information systems has been very low (Rajaguru & Matanda, 2012, p. 621). As a matter of fact, conveyancers in South Africa only use the technology that are enforced by banks to prevent them from being taken off the approved list of conveyancers.

Responsiveness to customer requests is a significant competitive feature in the business environment (Danese, Romano, & Formentini, 2013, p. 127). Communications across the Internet are instantaneous (Murray, 2012, p. 2); therefore, organisations use the Internet and e-business technologies (Chen & Holsapple, 2012, p. 3; Wiengarten, Humphreys, McKittrick, & Fynes, 2013, p. 25) to provide customers with access to predefined information (Devaraj et al., 2007, p. 1201). In property-related transactions, standard update messages are sent to specific supply chain partners when certain milestones had been reached. Buyers need to follow up on the progress of their transactions manually. The capability already exists for buyers to gain access to IT platforms to gauge and manage the progress of their transactions electronically (Ghostconvey, 2016, para. 1), but this functionality is not extended to all buyers and sellers at this point and is also only available through one vendor package at the moment.

Various authors support the view that e-business technologies create seamless integration, the correct and opportune sharing of information, and the coordination of actions between downstream and upstream partners in the supply chain (Devaraj et al., 2007, p. 1199; Ngai et al., 2011, p. 237; Shih et al., 2012, p. 71; Zhao et al., 2008, p. 19). This requires that organisations restructure their organisation (Baskerville, Cavallari, Hjort-Madsen, Pries-Heje, Sorrentino, & Virili, 2009, p. 33) to interact with business partners (Chen & Ching, 2002, p. 377; Gunasekaran & Ngai, 2004, p. 271; Palma-Mendoza, 2014, p. 534; Xue, Hitt, & Chen, 2011, p. 294). It is necessary to make organisational and technological changes together with a co-alignment in structure, management processes, strategy, technology, and

individual roles for successful e-business adoption (Chen & Ching, 2002, p. 378). The solution lies in redesigning processes in such a way that unnecessary activities are removed and replaced by “parallel processing” (Guha et al., 1993, p. 14).

Timely information sharing may enhance decision-making and reduce turnaround times (Cachon & Fisher, 2000, p. 1033). The role of IT varies from the simple automation of processes to an enabler of integration through information sharing (Chen & Ching, 2002, p. 378). Supply chain members however need to be willing to participate in information sharing activities (Lotfi et al., 2013, p. 301). It is clear that entities need to reorganise their business processes in order to integrate with other organisations in order to bank the efficiencies that IT offers. Certain organisations have created businesses around IT integration, although the perception exists that costs are increased as a result.

Figure 3.2 depicts the primary requirements for automation, such as capturing, recording, and transferring data and information during conveyancing; storing and retrieval of data and information in both the cadastre and deeds office; integrating and securing data and information across the systems deployed by disparate entities, and seamlessly interfacing with the cadastre and deeds office.

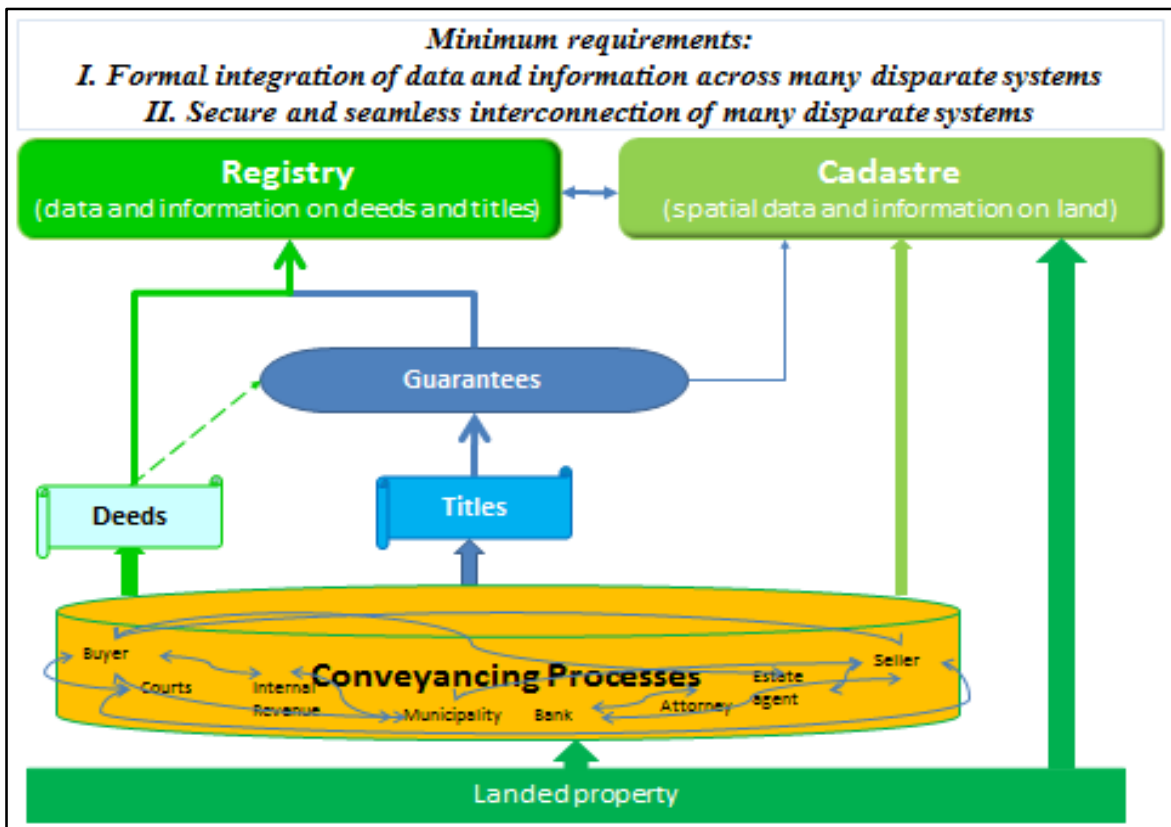


Figure 3.2: Linkages between conveyancing processes, cadastre and landed property registration systems

Source: Amadi-Echendu and Amadi-Echendu (2016)

As ageing manual processes were automated, there was an impression that some degree of improvement occurred as well, but automation only masks the problem by increasing processing speed (Groznič & Maslaric, 2012, p. 133). Instead, this type of automation creates extremely complex processes that contribute little to the overall effectiveness of organisations (Guha et al., 1993, p. 18). In addition, technologies cannot simply be replaced due to this complexity and furthermore, there are costs involved. Many organisations battle with legacy systems that are extremely interconnected (Matthiesen & Bjørn, 2015, p. 882). Banks use credit-scoring models to assess and approve loans for mortgages, credit cards, and vehicles automatically (Marinč, 2013, p. 74; Safari & Khalaf, 2013, p. 4). *Credit scoring*, a “technique that helps credit providers decide whether to grant credit to consumers or customers” (Koh, 2015, p. 96), normally combine owner information, commercial data and

credit bureau information (Safari & Khalaf, 2013, p. 4). Organisations require large investments to redesign internal processes, change traditional distribution channels for their products, update procedures, and train their staff so that the integration of the supply chain can be achieved (Gunasekaran & Ngai, 2004, p. 271). As a result, the adoption rate of e-business is still not as high as expected, especially in developing countries (Wei, Osman, Zakaria, & Bo, 2010, p. 141). Although high costs for IT adoption and automation is true, the costs can be shared among supply chain partners if a supply chain approach is adopted.

Combined business applications in an integrated, electronic environment cater for bigger volumes and applications (Chengalur-Smith et al., 2012, p. 60) instead of allowing islands of automation with limited scope and economies of scale (Chengalur-Smith et al., 2012, p. 60). In the property market, each entity works in individual technological systems, and service level agreements (SLAs) are used to regulate service delivery and the nature of certain relationships. Increased information-processing capability and greater inter-organisational co-operation may lead to greater innovation (Szuster & Szymczak, 2016, p. 34). Inter-organisational linkages facilitate information and data exchanges and reduce conflicts in supply chains (Cheng, 2011, p. 375). Indeed, islands of information exist within the property market and greater inter-organisational participation may be helpful to regulate service delivery.

An organisation should therefore invest in developing strong information-processing capabilities to reduce uncertainty and ambiguity (Williams et al., 2013, p. 551). In the property market, property forums and discussion groups may assist to identify trends and challenges to innovatively manage the industry. These discussions are not aimed at reducing the competitive advantage of individual entities or supply chain members, but at collectively addressing and managing issues that may affect the industry in its totality (Qrunfleh & Tarafdar, 2012, p. 342). Cloud computing is discussed next as one such enabling IT platform.

3.3.3 Cloud computing

The 'cloud' is defined as an architecture that allows an individual or organisation to use tools, platforms and infrastructures over a computer network remotely, which allows for incorporation into individual business processes (Von Suchodoletz, Rechert, & Valizada, 2013, p. 135). *Architecture* here refers to the "concept of creating an actual or apparent plan of a complex system, which describes a subjective mapping of the elements or components of the system, and the relationships among the components are also considered" (Holweg & Helo, 2014, p. 231). Cloud computing works with the Internet and central remote servers to preserve data and applications, so that consumers can access these and their personal files from any computer that has Internet connection without installing servers and the like (Ul Haq Quddusi, 2014, p. 102). It can best be described as a highly automated technology with unlimited processing and storage that can perform tasks of any size (Kanagasabapathi & Balaji, 2013, p. 418). Accordingly, cloud computing offers a more affordable option to IT usage with unlimited access to files and documents via the Internet which could provide a superior solution for supply chain information sharing and integration options.

The cloud computing business model offers innovative storage and software services that can be used on demand (Goyal, 2013, p. 880) without any upfront investment, as the infrastructure is owned by an independent third party (Chengappa, Shashidhara, & Pandurangan, 2013, p. 3; Nandgaonkar & Raut, 2014, p. 734). This implies that the upkeep and maintenance responsibility also form part of the third parties' duties namely administration of servers, automatic updates of software, assurance of compatibility with other software, and global accessibility of all platforms or devices (Brown & Bielskus-Barone, 2013, p. 3837). The cloud minimises business costs as they access software and services on a subscription basis via the Internet rather than purchasing multiple licenses directly (Brown & Bielskus-Barone, 2013, p. 3837). Small entities like sole proprietor estate agents and conveyancers who do not have their own scalable may benefit from such a

solution (Von Suchodoletz et al., 2013, p. 140). Consequently, entities can proceed with their usual business without the huge upfront cost layout and challenges around legacy systems that may be in use.

Cloud computing enables worldwide, on request system access to a shared pool of adaptable computing resources (Nandgaonkar & Raut, 2014, p. 734) that can be accessed with minimal management or service provider dealings (Farah, 2013; Mell & Grance, 2011, p. 2). The cloud allows a user to upload data to various hubs, synchronise to multiple devices simultaneously and provides access to shared information (Brown & Bielskus-Barone, 2013, p. 3837), which makes it an ideal solution for supply chain integration. The data are mobile, transferable, easily accessible, and ready to use (Tadjir, 2010, p. 1).

Documents are shared with pre-set users and only one copy of a document is viewed and updated, although changes can be made by multiple users simultaneously which are immediately available to all users (Kanagasabapathi & Balaji, 2013, p. 419; Ul Haq Quddusi, 2014, p. 103). This could be very useful in the property market where updates to software and documents can be made available to all users as soon as they sign into a centralised network. This will ensure that all users will increase uniformity and coordinate changes across the supply chain by using the latest documents, templates and information. The cloud distributes information and services seamlessly through the Internet, allowing the user to manipulate, store, share and collaborate using a variety of devices at any given time (Brown & Bielskus-Barone, 2013, p. 3836).

Cloud computing acts as a transporter between the end user and the service provider and is fully reliant on Internet access and related performances (Nandgaonkar & Raut, 2014, p. 737). Dedicated private communication lines are generally preferred over public networks (Lampe, Wenge, Müller, & Schaarschmidt, 2013, p. 5). Data and applications as well as the IT assets, are hosted with the service provider (Kanagasabapathi & Balaji, 2013, p. 419).

This can simplify IT functions and reduce the total IT infrastructure costs (Lampe et al., 2013, p. 1) by translating huge upfront capital outlays to pay-as-you-use arrangements (Kanagasabapathi & Balaji, 2013, p. 420). Overall, cloud technologies are already widely used globally, but its full benefit may not yet be realised.

Cloud technology will allow a user to move away from capital expenditure to operational expenditure. Instead of purchasing machines, storage devices and software, and employing staff to maintain these resources, an organisation could choose to pay another organisation only for resources that it actually used (Leymann, 2009, p. 2). Financial institutions can achieve a sufficient level of data protection, disaster recovery and short development cycles for new products, which should yield an efficient response time to the needs of banking clients (Kanagasabapathi & Balaji, 2013, p. 420).

The literature typically defines three distinguished levels that form a layered system structure of cloud technology, namely Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS) (Chengappa et al., 2013, p. 3; Vaquero, Rodero-Merino, Caceres, & Lindner, 2008, p. 51; Zhu, Zhang, & Ye, 2014, p. 363). The provision of virtualised, standardised service resources such as “computing, storage and communication on demand”, is branded as Infrastructure as a Service (IaaS) (Zhu, Zhang, & Ye, 2014, p. 363) (Chengappa et al., 2013, p. 2). The end user is able to set up and run private software, which could include operating systems and applications (Mell & Grance, 2011, p. 2). There is value in achieving long-term benefits by standardising communication (Hall, Hamilton, Payne, & Veale, 2000, p. 11).

The cloud is easily programmable and developers can create and destroy applications of any size in a layer known as Platform as a Service (PaaS) (Zhu, Zhang, & Ye, 2014, p. 363) which provides services for “developing, testing, deploying, hosting, and maintaining applications in the integrated development environment” (Xu, 2015, p. 3). Word processing

and spreadsheets can be accessed through an Internet browser or a program interface through Software as a Service (SaaS) (Zhu, Zhang, & Ye, 2014, p. 363). The uncertainty regarding the physical location of data is one of the main differences between traditional IT outsourcing and cloud computing and this can be problematic (Lampe et al., 2013, p. 6). It is important to note that this uncertainty of where the information resides may also have legal implications, which should be considered. These three levels are illustrated in Figure 3.3:

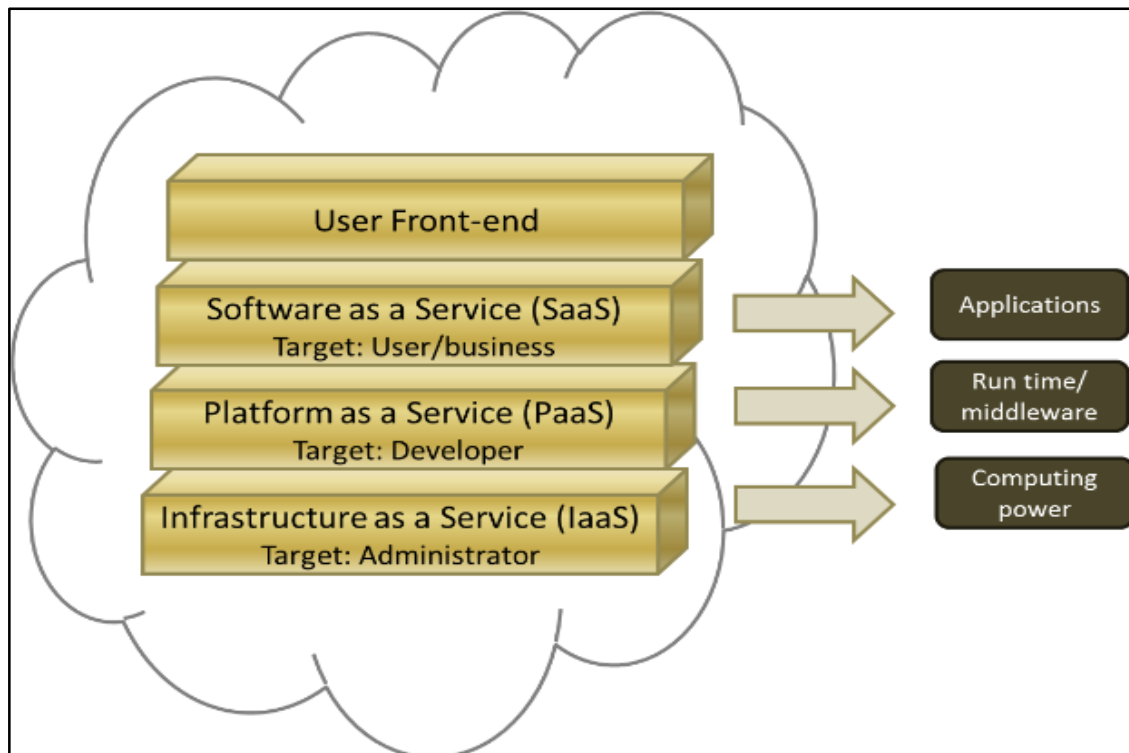


Figure 3.3: Cloud computing as a service

Source: Xu (2013, p. 4)

Centralised hosting of software applications allows instantaneous backup of data, and the ability to edit and collaborate in real time (Brown & Bielskus-Barone, 2013, p. 3837). Furthermore, there is the matter of dependency resulting from a lack of compatibility between cloud systems (Opara-Martins, Sahandi & Tian, 2016, p. 3-5). However, an entity has little to no visibility of the storage- and back-up facilities of their documents that are stored on the cloud (Brender & Markov, 2013, p. 731). Generally, it is a requirement that sufficient back-up services and disaster recovery systems are in place (Cunningham, 2009,

p. 1) to ensure the continuity of knowledge management and to record evidence in the event of lawsuits and disputes, known as discovery (Hughes, Stander & Hooper, 2015, p. 59).

When using cloud-based software services, security concerns are privacy, security, data integrity and intellectual property management (EDUCAUSE, 2009, p. 2) as well as confidentiality, auditability, availability of service and data lock-in (Brender & Markov, 2013; Goyal, 2013, p. 728). There is a concern that confidential information can be leaked because data are stored externally. Concerns also arise around the possible ill use of customer data, data protection and privacy issues of payment arrangements with mobile operators and social media (Fung, Molico, & Stuber, 2014, p. 18).

Abuse or theft of user accounts and abuse of administrative rights (Lampe et al., 2013, p. 6), as well as the hijacking of accounts by means of methods like phishing, fraud, and exploitation of software vulnerabilities (Hubbard & Sutton, 2010, p. 2) are real risks in cloud computing. Mitigation factors include a robust authentication process and a suitable comprehension of the contracts, policies and SLAs (Brender & Markov, 2013, p. 731). Security remains a risk in this technological era and users should remain vigilant, protect their user information and maintain confidentiality as far as possible. Moreover, private clouds can assist organisations to provide a more secure technological environment.

Private clouds mitigate security concerns as the customer owns the equipment powering the cloud environment and exercises full control over the IT resources and data (Kanagasabapathi & Balaji, 2013, p. 419). Preservation and access services might be run in the private cloud, although the same entity may provide validation services to third parties (Von Suchodoletz et al., 2013, p. 140). Private clouds also allow for customisation and control (Brown & Bielskus-Barone, 2013, p. 3839). Notably, programmes may be customised and personalised in the more secure and controlled environment.

Cloud-based solutions allow for integrated processes in a collaborative setting that provides increased agility and transparency (Xu, 2013, p. 4) that in turn will positively influence quality assurance, contracting capabilities, and supply chain dependence (Shipley, 2010, p. 1). Silos create inconsistencies as the different functional units (Kenett & Raanan, 2011, p. 11) not to mention wasted, duplicate and uncoordinated endeavours within the entity that may lead to financial and other losses (Kenett & Raanan, 2011, p. 10) may interpret information differently. Cloud computing has the ability to create a single hub (Kanagasabapathi & Balaji, 2013, p. 419), increase efficiency and reduce functional silos in supply chains (Davis-Sremek et al., 2010, p. 42). Removing silos in supply chains is crucial when considering particular industry initiatives, as well as communication and transparency issues.

With weakening global trade agreements, cost savings is at the order of the day. Cloud computing “shifts the location of resources to the cloud to reduce the costs associated with over-provisioning (having too many resources), under-utilisation (not using the resources effectively) and under-provisioning (having too few resources)” (Nandgaonkar & Raut, 2014, p. 736). The same resources can be shared among different users, thus increasing the utilisation of each resource, which drives down cost (Leymann, 2009, p. 8; Xu, 2013, p. 3). The benefits of implementing the technology would need to be assessed and can be used to offset implementation costs.

Given that the financial sector is heavily regulated and deals with sensitive information, security concerns may inhibit the adoption of cloud technology (Lampe et al., 2013, p. 6). Lampe et al. (2013, p. 7) concluded that financial institutions will continue to provide large parts of their required IT capacities in-house rather than purchase them from external cloud providers. However, a hybrid model of cloud computing allows an entity to take advantage of unlimited scalability, while gaining private cloud advantages (Kanagasabapathi & Balaji,

2013, p. 419) by privately using some dedicated resources (Nandgaonkar & Raut, 2014, p. 736). A hybrid solution may therefore be more suitable for banks to implement.

Legacy systems contributes to increased risk (Kenett & Raanan, 2011, p. 13). Each entity is aware of weaknesses in their own systems, but may not offer this information to the rest of the supply chain. Either entities need to design a new system from scratch that encompasses everything they require, or they should set up a system that caters for common processes and reporting and allow each entity to use specialised functionalities that would suit individual needs (Kenett & Raanan, 2011, p. 91). Hosted solutions also need to be designed with all the security and privacy controls that are expected from on-premises deployment (Potter, 2013, para. 3). A hybrid cloud platform may be the solution to creating a property market solution, which could assist the entire supply chain to access the necessary information regarding transactions in which they are involved any particular point in time (Kanagasabapathi & Balaji, 2013, p. 419). Various security issues are further explored in the next section.

3.3.4 Security issues

The Internet can be accessed very easily by anyone and there are numerous security concerns that should be addressed. The relatively high property values, which create a lucrative market for thieves and fraudsters (Sandberg, 2010, p. 104). Security measures differ and include “cryptography, particular public key infrastructure (PKI), use of multiple cloud providers, standardisation of application program interfaces (API), improving virtual machine support, and legal support” (Nandgaonkar & Raut, 2014, p. 737). Public key cryptography allows users to connect securely by means of a “public key (which is usually distributed widely) and a private key (which is usually kept secret)” (Rajashekhar, 2006, p. 8) via a public key infrastructure (PKI) system (Low, 2010, p. 9) which requires personal identification number (PIN) or password (Rajashekhar, 2006, p. 9). The public key is assigned in the form of a

public key certificate that uses algorithms to validate the digital signatures and encrypt data (Chengappa et al., 2013, p. 2).

Digital signatures create inviolable proof of 'who did what to whom' (Wilson, 2008, p. 8) and is used to endorse a document without reducing the document to paper. The author would open the document that needs to be signed on the computer screen, scan to ensure whether it is correct before digitally signing it. Digital signature cyphers are unique to the author and each contract, and remain valid indefinitely (Wilson, 2008, p. 8). The digital signature is time stamped and encrypted (Chengappa et al., 2013, p. 2). *Encryption* is the process of disguising data to make it incomprehensible (Rajashekhar, 2006, p. 10). To verify the signature, the message should be decrypted by using the public key of the signature. These technologies have already been widely implemented in various industries. The process of verifying credentials and currency of digital certificates is crucial to evaluate the authenticity and validity of estate agent and conveyancer credentials and accreditation with regard to property-related transactions (Brender & Markov, 2013, p. 731).

Careful consideration and rigid authentication must ensure that only authorised persons receive access to particular digital certificates. Digital certificates carry control information like "credentials, licences and affiliations", and the digital signature links this control information to the data content. In this manner, it becomes easy to track the credentials of conveyancers who signed documents in an electronic land transaction as the digital signature assists to verify the conveyancer's credentials, which confirms the digital signature, regardless of how old the transaction is (Wilson, 2008, p. 7).

Access to electronic systems is usually controlled and only those with established credentials may use the system (Rajashekhar, 2006, p. 8). The method of controlling access consists of a registration or identification process and an authentication process (Low, 2010, p. 4). Restricted access potentially reduces fraud. According to Low (2010, p. 4), authentication

techniques are classified into various categories, firstly, token-based (for example a card), secondly, knowledge-based (for example a PIN or password), and thirdly, biometrics-based (for example a facial image, fingerprint or retinal scan). A combination of these authentication techniques are preferred.

Multilevel security may process information at various security levels (Peters & Panayi, 2015, p. 12). This may imply a combination of the authentication techniques as highlighted by Low (2010, p. 4) to overcome potential security breaches. Highly sensitive data cannot be outsourced; therefore, retaining control of the encryption keys may provide a viable solution (Lampe et al., 2013, p. 5). However, passwords, PINs, and cryptographic keys may be divulged (Smith, 1999, p. 156). Multifactor security means that an outsider would need to gain access to a token and guess the correct password before gaining access to the system. In addition, each user's identity should be verified independently (Low, 2010, p. 5). It is therefore worthwhile to make use of a combination of digital preservation strategies within and between organisations.

3.3.5 Risk management considerations

Entities who ignore technological risks proactively will cause their supply chains to underperform and be less competing (Grant, 2013, p. 2). The introduction of electronic systems bring about new risks regarding the "identification of parties to the transaction and the authentication of documents" (Sandberg, 2010, p. 103). These risks range from access to information leakages to hacking possibilities. Risk management is the process of identifying and managing total risk (Pickford, 2001, p. 70) in a supply chain so that supply chain vulnerability is lessened (Zeng et al., 2012, p. 551). Aggregation of risks will partially or completely offset each other. The net exposures and not individual risks should be considered, which would also reduce costs and improve the efficiency of risk management

(Pickford, 2001, p. 70). In other words, the net effect of supply chain risks should be considered when managing risks and when putting mitigating factors into place.

Vulnerability is determined by a supply chain's sensitivity (Vilko & Hallikas, 2012, p. 587) and can be reduced through mitigating risk of the supply chain as a whole. Jüttner et al. (2003, p. 198) explains vulnerability to be the "exposure to serious disturbance, arising from risks both within and external to the supply chain." Therefore, effective risk management may reduce the vulnerabilities identified across various organisations in order for organisations (individually and collectively) to fulfil customer requirements.

Entities use responsible supply chain practices as a way of reducing and mitigating risks (Tate, Ellram, & Kirchoff, 2010, p. 19). Different and conflicting objectives and diverse managerial backgrounds, which may obstruct teamwork in mitigating risks (Shih et al., 2012, p. 71). As a result, entities need to find common ground in order to collaboratively mitigate risks to remain a sustainable supply chain (Closs, Speier, & Meacham, 2011, p. 112). Zeng et al. (2012, p. 549) present the following solutions and methods to secure collaboration: "computer security and privacy technologies, information partitioning, contract management and partnership management." Partner groupings could affect apparent risks (Dekker & Van den Abbeele, 2010, p. 1235) but it is not always possible to choose partners.

Contracts provide the legal foundation of relationships (Markovits, 2004, p. 1462) which also determine information sharing and the type of competition among the role players in the supply chain (Ha & Tong, 2008, p. 702). A contract is formed when parties reach consensus and when the offer that was proposed is accepted unconditionally, either tacitly or expressly, and such acceptance is communicated to the offeror, either orally or in writing (Murray, 2012, p. 3). Electronic communication may however pose challenges to the wording "in writing" and "physical signature."

Electronic communication opens up new challenges with regard to the conclusion of contracts. The primary methods for electronic contract creation are e-mail and click wrap agreements (where a message is presented to the user on his or her computer screen that requires the user to assent to the terms of the agreement through the act of clicking an icon by using the link between the server and the client's machine {Johansson, 2015, p. 4}) (Murray, 2012, p. 2). In particular, applications offered via cloud technology usually make use of click wrap agreements. As discussed previously, electronic signatures may also remove the need to reduce an electronic signature to a paper document for a physical signature to be added to a written document.

Pickford (2001, p. 120) classifies risks as business risks and non-business risks. Non-business risks are further classified as event risks and financial risks. Business risks are those that the entity willingly takes in order to create a competitive advantage and to add value to shareholders (Kramer & Colin Walter, 2015, 34). This is illustrated in Figure 3.4.

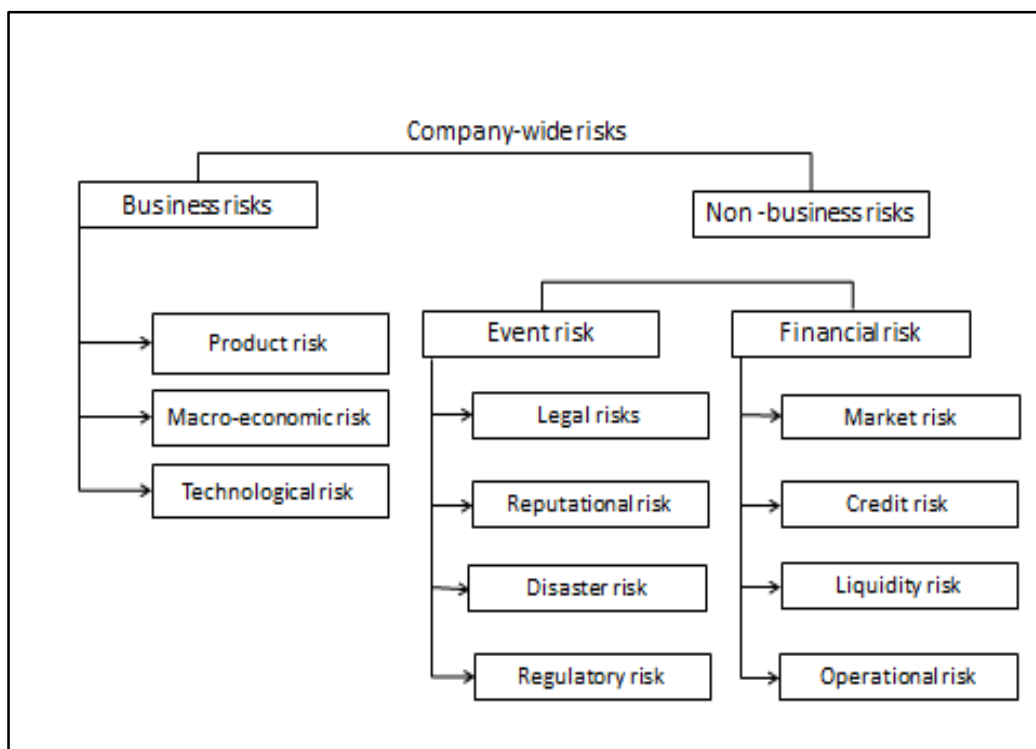


Figure 3.4: Company-wide risks

Source: Pickford, 2001, p. 120

The creation of anything new involves risk and the possibility of failure (Pitt, 2008, p. 165). What would the risk of fraud be when automating the registration process? The lapse of time between authorisation, registration and subsequent payments may create opportunities for misconduct (Castellano, 2015, p. 635). In the researcher's view, the separation of registrations and payments create huge opportunities for fraud. The general definition of risk is the probability of damage or loss or the occurrence of any negative events (Farahani et al., 2014, p. 101). Little (2013, p. 53) defines risk as the "combination of the probability of the occurrence of harm and the severity of that harm." In the property market, this could be interpreted to mean the risk of losses incurred as a result of fraudulent activities, or the alienation of property where encumbrances prevented such transfer.

The adoption of responsible practices and processes raises regulatory and compliance concerns (Low, 2010, p. 18). Lack of compliance with contracts is a risk that negatively affects client needs, or priorities may be incorrectly established due to misunderstandings (Gonzalez et al., 2013, p. 917; Malhotra & Lumineau, 2011, p. 983). The level of integration determines the risks involved in supply chains (Gunasekaran et al., 2014, p. 196). Ideally, integration that occurs behind an organisation's firewalls are deemed safer. However, some companies integrate their information outside of their organisations' firewalls, which creates opportunities for the information to be manipulated and changed.

A supply chain risk management system consists of several stages, namely risk identification, risk assessment, risk management and risk monitoring (Hoffmann et al., 2013, p. 199; Little, 2013, p. 53). Risk identification should be recurrent (Kenett & Raanan, 2011, p. 23). Increased visibility and collaboration in the supply chain may increase the risks identified (Vilko & Hallikas, 2012, p. 587). Every time a change event is being recommended or a method or process is being developed or amended, a risk assessment should be initiated (Little, 2013, p. 53) across the entire supply chain.

Risks are often interconnected (Badea et al., 2014, p. 118) because of the reticulated flows of materials, information and finances in supply networks (Bode & Wagner, 2015, p. 216). Managing supply chain disruptions involves more than just preventing disruptions from occurring at individual entities. It also requires a broader understanding of the overall structure of the supply network (Kim et al., 2015, p. 33). Sources of collaborative supply chain disruption are for instance labour strikes, inconsistency of technology, problems of supply and demand, (Lin & Wang, 2011, p. 1163) or natural disasters, accidents, theft, sabotage or a terrorist attack (Speier et al., 2011, p. 724). These disruptions cannot be planned for, but mitigating actions can be put into place to better cope with the effects of these disruptions. In the researcher's view, technology can also be used to manage and mitigate transactional risk, by programming activities across a supply chain to flag activities that falls outside the norm of trading. However, these flagged incidents would need to be investigated and promptly acted upon.

Reputational risk arises from adverse stakeholder viewpoints, which can unfavourably affect an entity's capability to maintain or forge new industry relations (Fiordelisi, Soana, & Schwizer, 2013, p. 1359). Attention is increasingly paid to reputational risk in the financial sector due to pertinent in-house fraudulent incidents that had occurred (Dyck, Morse, & Zingales, 2010, p. 2218). The risk of opportunism may be decreased by means of contract structures, the alignment of incentives and proper governance structures (Kim et al., 2012, p. 39).

The risk of challenges to ownership is minimised when ownership is formally recorded and certified. Consequently, investments in property are boosted (Feder & Nishio, 1998, p. 27). Confidence and certainty in ownership are essential for the efficient use of property, as individuals will not otherwise invest in their own properties (Kochan, 2013, p. 303). The property process in South Africa is viewed as a very secure system, even though the correctness of title is not guaranteed by state. Incorrect ownership information and transfers

will dilute the safety and security of the property register, which could affect property owners negatively. In addition, governments may also suffer a loss of income if taxing authorities are unable to identify ownership interests clearly or know whom to tax (Kochan, 2013, p. 295).

Many organisations that form part of a supply chain may have been linked by means of contracts and service level agreements only. A supply chain redesign could yield fundamental improvements, but could bring about increased risk if proper processes and controls are not implemented (Palma-Mendoza, 2014, p. 634). Inter-entity knowledge exchange may also be risky because the entity sharing the information may lose control over the use and subsequent sharing of that knowledge (Kim et al., 2012, p. 36). Explicit governance rules, and particularly network governance among the various supply chain partners, can monitor and manage the knowledge sharing process (Provan & Kennis, 2008, p. 232). Different forms of governance are deployed to manage different tasks and network objectives (Kilduff & Tsai, 2003, p. 23). Governance, risk management and compliance are the three pillars that support strategy, performance and the capabilities of organisations.

Linkages between supply chain partners and customers have created a new set of risks, namely inter-organisational risk (Sutton, Smedley, & Arnold, 2008, p. 2). Internally, most companies are organised with staff, in-house processes, and physical infrastructure to produce a product or service. Collectively, suppliers, companies and their customers are subject to the risk associated with the business environment (Raimbault & Barr, 2012, p. 149). In short, collective risk assessments may avert supply chain risks more effectively.

Another risk is the service provider's inability to adapt to new technologies, or the entity's inability to stay up-to-date with the latest technological advances (Gonzalez et al., 2013, p. 918). This is especially true where services are outsourced and new knowledge that are acquired remains in the provider's hands and the base entity loses its understanding of the

service over time (Gonzalez et al., 2013, p. 918). Reducing contract terms and reconsidering outsourcing contracts can force contractors to remain conversant within their fields (Pickford, 2001, p. 140). This method helps the base entity to stay in touch with changing requirements and developments, both inside the outsourced organisation and within the bigger market. However, outsourcing contractors may reveal sensitive information, or go out of business (Alenezi, Tarhini & Masa'deh, 2015). Strategies for preventing potential risk factors in collaborative supply chains enable better cooperation and therefore better results and performances (Badea et al., 2014, p. 119). Under certain circumstance, it may be to the advantage for the supply chain to conclude shorter term contracts that are regularly reviewed in order to stay in touch with changing circumstances and be in a position to adapt the contract accordingly, as well as protecting sensitive information.

Payment systems can also create security vulnerabilities (Smith, 1999, p. 155). The vulnerabilities relate to accounts that were opened with false identification, counterfeiting, or alteration of payment instruments (Smith, 1999, p. 156). Financial instructions are given to financial institutions to debit or credit bank accounts regarding trading that had taken place. According to Ásgeirsson (2002, p. 66), the risks in securities settlements are:

- “credit risk – the risk that a counterparty will not settle an obligation in full value, either when it is due or any time thereafter;
- legal risk – if the application of laws and regulations are unclear;
- operational risk – the risk that deficiencies in information systems or internal controls, human errors or management failures will result in unexpected loss;
- pre-settlement risk – the risk that a counterparty to a transaction will default before final settlement;
- principal risk – the risk that the seller delivers but does not receive payment, or the buyer makes payment but does not receive delivery;

- settlement risk – the risk that settlement will not take place as expected; and
- systemic risk – the risk that the inability of one institution to meet its obligations when due will cause other institutions to be unable to meet their obligations when due.”

Although the risks indicated by Ásgeirsson (2002) have bearing in the payments sphere, these risks may affect areas of the conveyancing process. The impact of these risks should be assessed in terms of the entire conveyancing process, and not only for individual organisations that form part of the supply chain. The same holds true for any other industry.

Operational risk refers to the likelihood of unforeseen happenings that occur because of changes to the routine operations (Bolancé, Guillén, Gustafsson, & Nielsen, 2012, p. 1). The Basel II Committee defines operational risk as the “risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events” (Basel Committee on Banking Supervision [BCBS], 2004, p. 144). Heckmann et al. (2015, p. 6) is of the view that operational risk provides a more appropriate theoretical basis for supply chain risk than financial risk does. IT systems can sometimes cause huge disruptions that result in high losses when these systems fail (De Jongh et al., 2013, p. 368). Operational risk measures may stem from:

- “transaction and execution errors;
- internal and external fraud;
- improper business practices;
- product flaws;
- technology and/or equipment failures;
- employment discrimination;
- natural disasters;
- terrorism;

- losses due to ineffective management processes;
- employee errors; and
- IT system disruptions" (Cruz, 2002, p. 14; De Jongh et al., 2013, p. 264).

Principal agent risk occurs because of agents who represent their entities but who may not always uphold the best interests of the stakeholders. Proper monitoring of legislation, regulations and other measures may thwart the abuse of principals by agents (De Jongh, De Jongh, De Jongh, & van Vuuren, 2013, p. 368). In the property market, conveyancers act as agents on behalf of banks. In this regard, banks depend on conveyancers to ensure the correctness of the documents, fulfilment of all conditions of the loan, that the Financial Intelligence Centre Act (FICA) and other legislation requirements are met and the correct amounts are transferred to the correct parties.

Settlement risk pertains to uncertainty regarding receipt of funds that needs to offset other payments and settlements (Mills & Nesmith, 2008, p. 543). Banks may go into overdraft of their central bank accounts at a premium. An account is in overdraft standing when it has a negative account balance, which is serviced by a predetermined interest rate until the nil balance is, attained again (Mills & Nesmith, 2008, p. 546). When property transactions take longer than anticipated, interest that becomes payable on outstanding amounts may also cause for shortages in settlement of accounts after the registration of the property has been finalised. This may result in certain organisations not receiving their proceeds from the transaction.

Systemic risk is the “risk that a significant portion of the financial system fails to function properly, and this failure results in the failure of intermediation markets that are essential for the broader economy” (King, Liechty, Rossi, & Taylor, 2014, p. 17). IT systems in an entity and that of the industry may be interfaced and thus support each other and any modifications to any part of the IT system may result in systemic risk (Marinč, 2013, p. 87). Systemic risk

may result in the collapse of an entire financial system or an entire market and should therefore be monitored very carefully.

Most payment systems have switched from net settlement to real-time settlement, thereby transforming credit risk into liquidity risk (Soramäki & Cook, 2013, p. 5). In the researcher's opinion, real-time settlements are preferred as they are deemed to be safer. Neglecting to do procedural risk assessments may put the entity and its customers at risk; and all and sundry must uphold their responsibilities in preventing security breaches and nondisclosures of privileged information (Kanagasabapathi & Balaji, 2013, p. 420). Security breaches could occur at consumer, dealer, or issuer level, therefore, monitoring and control measures are important at each of these contact points to avoid unmerited financial gain or system disruptions (Fung et al., 2014, p. 18).

As computer hackers become increasingly well informed, and inflict more unsettling actions, computer software programs should be reinforced to avert such actions (Speier et al., 2011, p. 727). In November 2015, a phishing attack robbed a man of R900 000 after breaching an estate agent's e-mail account in South Africa (Writer, 2015, p. 2). This was one of eleven cases that were under investigation where the same modus operandi was used (Writer, 2015, p. 2). Buyers can suffer from insecure dealings and fraud (McDougall et al., 2013, p. 32). The South African Banking Risk Information Centre (SABRIC) which was formed by the bigger banks in South Africa investigates these types of fraud.

The leading form of fraud is forgery of a signature, succeeded by impersonation or identity fraud, and deceiving someone into signing certain documents (Low, 2010, p. 2). Identity theft occurs when someone's identity is stolen in the form of personal information that is misused to purchase goods or open fraudulent accounts, (Roy & Venkateswaran, 2014, p. 1). Risks pertaining to impersonation, counterfeiting and theft can be controlled by technology (Wilson, 2008, p. 12). Registration processes for an entity to issue digital certificates,

barcodes should be robust and tough to undermine (Yanushkevich, Samoil, Shmerko, Manderson & Drahanaky, 2015, p. 39), and this will assist in reducing various types of fraud. Biometric identification may also assist to reduce identity theft.

Forgery, identity fraud, fraudulent alterations, and fraudulent misrepresentations are common types of fraud that may occur (Mac, 2016). Staff members may also collude with fraudsters and controlled access may reduce such initiatives (Low, 2010, p. 14). Fraud prevention demands that the instructions given by customers, dealers, and banks should be tamper resistant (Smith, 1999, p. 156). Obviously, proper controls and audit trails may assist to prevent fraud on many levels.

3.4 Payment systems

Payment is the process of transferring money from payer to payee, which involves physical payment mechanisms (Kokkola, 2010, p. 28) and it cannot be separated from the interaction between buyers and sellers (Milkau & Bott, 2015, p. 336). ‘Payments’ refer to the method by which consumers and businesses exchange money and payment consequently connects senders and receivers of money (Evans & Abrantes-Metz, 2013, p. 52). The time delay associated with sending bills and receiving payments via conventional mailing deprives organisations of time and of the value of money and therefore creates additional transactional cost (Sharma, 2013, p. 781). As such, electronic measures are used. Payments are vulnerable to security breaches but security measures may minimise any possible risk (Fung et al., 2014, p. 18). Current and future payment systems will be discussed in the next sections.

3.4.1 Current payment systems

Payments involve the process of transferring a real value to a creditor by a debtor (Milkau & Bott, 2015, p. 323). Banks provide a stable, secure, and interoperable system for the processing of payments and industry specialists like SWIFT (Society for Worldwide Interbank Financial Telecommunication) and SEPA (Single Euro Payments Area) can assist

to effect payments (Milkau & Bott, 2015, p. 328). Business platforms like Amazon, Google and PayPal, to mention but a few, provide efficiency, integration and convenience to consumers at a higher premium. These platforms use bank accounts to provide an interface for settlements between consumer accounts (Milkau & Bott, 2015, p. 329). Banks hold the digital records of conventional bank deposits (Ali, Barrdear, Clews, & Southgate, 2014a, p. 277). In short, numerous payment platforms are currently being used for money to be transferred between different entities. Some of these transfers are electronic payments, which exist in the form of digital records only.

There are three payment systems that may be used in the property market: “paper-based payment systems, direct debit electronic transfer systems and systems which make use of electronic cash” (Smith, 1999, p. 155). Data are encoded with algorithms and can only be decoded by means of encryption keys (Smith, 1999, p. 157). Digital signatures validate the participants to the transaction. Electronic payments (e-payments) are automated payment systems (Fung et al., 2014, p. 4) that provide an auditable log of all transactions (Evans & Abrantes-Metz, 2013, p. 17). These systems include automated teller machines, point of sale devices, preauthorised payments and electronic payments (Lassila et al., 2014, p. 1). E-money and e-payments reduces the risk of cash and payments can be traced.

Interbank payment systems provide the backbone for all financial transactions (Soramäki & Cook, 2013, p. 2). Banks have obligations to make their payments on time and face consequences if they fail to do so (Soramäki & Cook, 2013, p. 11). Banks may rely on intermediaries for a variety of functions, but may also be intermediaries for non-banks by acting as their depositors (Craig & Von Peter, 2014, p. 4). There are interdependencies between banks because they borrow from each other (Evans & Abrantes-Metz, 2013, p. 52).

Internet banking has been successful in reducing operational expenses because banking customers can transact without going into a branch (Agnihotri, 2015, p. 69). The National

Payment System Act (No. 78 of 1998) provides for the “management, administration, operation, regulation, and supervision of the payment, as well as clearing and settlement systems in South Africa” (Malan & Pretorius, 2001, p. 163). A clearinghouse is a facility that clears and settles trade in securities and derivatives (Hall et al., 2000, p. 5) and should operate at world standards (Hall, Hamilton, Payne & Veale, 2000, p. 1). Bankserv is a national electronic funds transfer (EFT) system that offers interbank clearances and information interchanges among financial partners (Mamun, 2013, p. 9). EFT is an electronic, inter-account money transfer system (Agnihotri, 2015, p. 69). Payment systems should build consumer assurance, lessen their doubts and assuage apparent risks to increase its usage (Xin, Techatassanasoontorn, & Tan, 2013, p. 3). Undoubtedly, clearing houses should enforce compliance around security aspects to secure interbank payments.

E-payment systems build a log that can prove amounts payable for taxes and assist to combat money laundering and other illegal activities (Evans & Abrantes-Metz, 2013, p. 17; Shields, 2014, p. 15). *Money laundering* refers to the process whereby criminals seek to mask the illegal nature of their money by presenting such monies into legitimate trade (Shields, 2014, p. 17). The purchasing of properties may be a mechanism that can be used for money laundering to occur. As such, it becomes crucial to trace the proceeds of funds to ensure that money used for property transactions has not been acquired by means of illegal activities.

In an online funds transfer system, the buyer provides his or her account details along with the payment, which are sent to the bank for the verification of the buyer’s credentials (Tiwari & Gupta, 2014, p. 63). The approved amount is transferred from the payer’s account to the payee’s account, but the physical money remains in the bank both before and after the payment (Tiwari & Gupta, 2014, p. 63) until the amounts are cleared and processed by the respective banks. The problem with this payment system is two-fold. Firstly, the bank is required to supply an online verification at the time of purchase and cannot do so if a connection with their server cannot be established, and secondly, banks keep track of all

payment details, such as the amount of payment, and buyer and seller details, and this information may be compromised (Tiwari & Gupta, 2014, p. 63). In short, there are opportunities for fraud to take place in this process.

A property loan, which is mostly used to fund property purchases, is linked to an interest rate, instalment and loan term (Ito et al., 2014, p. 636). These are generally negotiated upfront, but may be altered during the course of the loan term. In South Africa, credit bureaus such as Experian, helps to minimise loan defaults by providing upfront payment history information of borrowers (Marinč, 2013, p. 75) when lenders conduct inquiries into the borrower's financial position and conduct (Castellano, 2015, p. 618). In order to minimise the risk, lenders try to keep the loan-to-value amount as low as possible (Ito et al., 2014, p. 647). In brief, banks try to minimise their exposure by requiring deposits from buyers, or by accepting security in the form of investments or guarantees (secured loans), which can be exchanged for money if buyers default on their loans (Conklin, Diop & Qiu, 2016, p. 6). Lenders register a mortgage bond and obtain a priority right, which is enforceable against unsecured creditors (Castellano, 2015, p. 611).

Central banks oversee large-value payment systems closely in order to minimise liquidity risks and congestions (Galbiati, Delpini, & Battiston, 2013, p. 2). In South Africa, the Reserve Bank has accountability of implementing policy and for the stability of the financial system (South African Reserve Bank, 2016). The central bank plays two major roles in payments, namely regulation of the payment industry, and issuer of bank notes and coins (South African Reserve Bank, 2016). As payments regulator, the South African Reserve Bank (SARB) prescribes guidelines and functional procedures for interbank settlements and overseas retail payment systems. The Reserve Bank, as issuer of bank notes and coins, produces cash, fulfils treasury tasks (deposits, withdrawals and exchanges by banks), destroys banknotes and deals with counterfeit inquiries (Evans & Abrantes-Metz, 2013, p. 20). The processing systems of entities must be in line with clearing and settlement

guidelines (Exchange & House, 2000, p. 7) which can be quite expensive to maintain (Evans & Abrantes-Metz, 2013, p. 5). Centralised settlement functions are even more costly (Hall et al., 2000, p. 7).

Concerning listed shares, *dematerialisation* is the process by which an investor's share certificate is converted to an electronic format (Mistry, 2013, p. 1) without investors receiving share certificates (Currie, 1994, p. 21). Dematerialised trading eliminates the need to transfer paper share certificates from seller to buyer, but the buyer's account is debited and the seller's account is credited in a centralised depository (Aney & Banerji, 2015, p. 1). Mistry (2013, p. 2) goes on to explain that dematerialisation holds many benefits such as reduced risk of delayed settlement, enhanced profit, time and money savings for not dealing in paper, higher liquidity due to an automated process, less brokerage fees and interest on loans. Aney and Banerji (2015, p. 2) add that, through dematerialisation, the circulation of forged paper share certificates is reduced, the possibility of theft and loss of paper share certificates are eliminated, and the process time is reduced from at least three to six months for endorsement and delivery, to an instantaneous endorsement that does not have to be verified. This capability has already been in use successfully in South Africa for a number of years, but has been limited to the shares environment (Mistry, 2013, p. 1).

There have been calls from the private sector for dematerialisation to be introduced into the property sector as well. Essentially, the mechanism is suitable for any asset that needs to be traded. Although an initiative to remove paper from the property end-to-end process has been approved in Parliament in 2009, the architecture for electronic conveyancing has not yet been finalised and implemented in South Africa. According to Rajashekhar (2006, p. 13), an e-conveyancing service should be able to handle a variety of payments among multiple users. Legislation needs to be updated to keep up to date with recent technological advancements (Ooi, 2003, p. 2). These changes will need to make provision for electronic signatures, electronic communication and security aspects, to mention but a few.

New forms of digital interaction, infrastructures and connectivity give rise to opportunities to perform financial transactions in different ways (Ferreira and Perry, 2014, p. 1). Changing a complex monetary system can have unpredictable and unintentional consequences and these risks should be factored into cost calculations (Evans & Abrantes-Metz, 2013, p. 53). Admittedly, other forms of payment systems may be considered.

3.4.2 Virtual currency – the future of payment systems?

Money is used in most economic transactions, but what the payment consists of has changed over time (Ali, Barrdear, Clews, & Southgate, 2014a, p. 277). Most financial effects today are mere digital records (Rosov, 2015, p. 37) in the form of a ledger that indicates how much a person owns (El Defrawy & Lampkins, 2014, p. 1). Digitisation is described as a blended approach of using “mobile devices, Internet-based technologies, and data analytics” (Milkau & Bott, 2015, p. 322). Technological developments have converted paper records to an electronic format (Ali, Barrdear, Clews, & Southgate, 2014b, p. 265).

The block chain is a “distributed, shared, encrypted database that serves as an irreversible public repository of information” (Wright & De Filippi, 2015, p. 1). The block chain technology was introduced in the 1960s and the late 1970s and is an absolute record of title of any type of asset (DeCovny, 2015, p. 24) where the value was exchanged over a network (Twesige, 2015, p. 1). Block chain technology is fast, cheap, easily accessible, open source, transparent and public, and uses a distributed network (Twesige, 2015, p. 1; Yermack, 2015, p. 20). Block chain technology may revolutionise contract law and traditional processing capabilities as no human intervention is necessary (Peters & Panayi, 2015, p. 2). One would therefore need to understand both legal and technological aspects to be able to introduce and use this technology in an environment.

Block chain records are visible to all, even as a viewing function only, hence it is known as a ‘shared’ or ‘distributed’ ledger (Yermack, 2015, p. 6). Block chain records are

decentralised, and thus not under the control of any central authority (Peters et al., 2015, p. 5). The distributed ledger comprises peer-to-peer technology and requires no intermediaries (DeCovny, 2015, p. 24). In fact, no reserve bank or central bank is necessary to govern interbank settlements and transfers. In fact, banks do not even have to be involved as an intermediary for the payments to occur via block chain technology, unless the technology is adopted by banks.

After verification has taken place on the distributed ledger, processing takes ten minutes, even if the transaction occurred between people from different countries. Once the transaction is approved, the ledger is updated in real time to reflect the transaction (Allen, 2015, p. 36). Financial institutions could provide trusted and secure wallet services as the next generation deposit accounts that are denominated in fiat currency, the currency that a government has declared as legal tender (Perkins, 1994, p. 3) to be transmitted on the distributed ledger (Allen, 2015, p. 54). The European Central Bank authority (Peters et al., 2015, p. 7) defines fiat currency as “any legal tender designated and issued by a central authority that people is willing to accept in exchange for goods and services because the currency is backed by regulation by a trusted central authority” (Peters et al., 2015, p. 7).

When a stock is traded, it may take up to three days to settle the trade even though the stock itself was traded in seconds (Casarilla, 2015, p. 19; Yermack, 2015, p. 14). As a result, huge systemic risk is built up, which normally results in high capital reserves. This in turn creates an inefficient system (Casarilla, 2015, p. 21). In contrast, a sale of shares on the block chain would be settled instantaneously without intermediaries (Yermack, 2015, p. 12). This will improve liquidity. Figure 3.5 is aimed at illustrating the differences between a centralised and decentralised ledger.

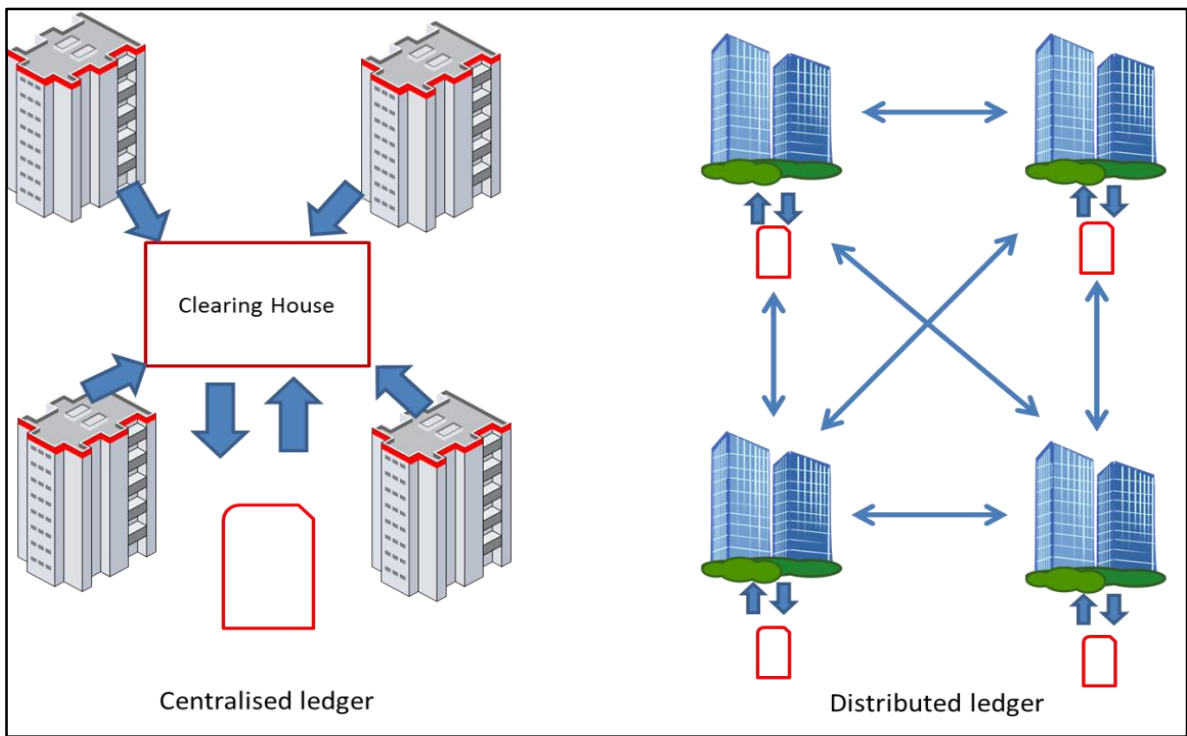


Figure 3.5: Clearing in a centralised and decentralised ledger

Source: Peters and Panayi (2015, p. 29)

Figure 3.5 clearly shows that a centralised ledger system forms the central point of all transactions that occur within a particular jurisdiction. As such, this centralised ledger-clearing house can control and report on all transactions that occurred. A distributed ledger may have transactions occurring directly between various parties without a central clearinghouse to clear such transactions. Records are kept for the individual transactions that occur without a central body interface.

An alternative to fiat currencies is the innovation of decentralised digital currencies in a distributed ledger that can operate without intermediaries like banks (Milkau & Bott, 2015, p. 330). Cryptocurrencies (McBride, 2015, p. 1) are virtual payment systems that do not rely on a central authority to generate currency supply or to verify, track and record transactions, but rely on a distributed ledger to determine, verify, and track ownership of monetary units without the need for a central clearing entity (Rosov, 2015, p. 37). Financial innovation seems to be running ahead of regulation (Peters et al., 2015, p. 6) as the law is likely to be

limited in its ability to contain decentralised virtual currencies (Allen, 2015, p. 11). Although fiat currencies may be traded electronically, they are different from cryptocurrencies and therefore cryptocurrencies cannot be traded on the open market. Cryptocurrencies would need to be converted to fiat currency before trade can occur.

Unlike cash, virtual currencies can be sent across borders in large sums in a secure manner without formal exchange control clearances. Standard cryptographic techniques (McBride, 2015, p. 5) enable participants to authenticate that the trade is valid (Ali et al., 2014a, p. 277). The encryption keys allow participants to encrypt transmission data for the receiving party to determine that the message is tamper free (Peters & Panayi, 2015, p. 4). Only a properly documented transaction in the public block chain with all participant addresses, is binding (Moser, Bohme, & Breuker, 2013, p. 4). Governance of a block chain amounts to possessing authorisation to alter code (Yermack, 2015, p. 4). By contract, the ledger containing the record of digital currency records is publically available for all to see (Ali et al., 2014a, p. 277). More than 590 cryptocurrencies with a total market value of \$4.5 billion exist (Peters et al., 2015, p. 15, p. 15).

One such cryptocurrency is Bitcoin (Moser et al., 2013, p. 2) which was created in 2009 to serve as a virtual currency system in an open network outside of governmental or central bank control (Allen, 2015, p. 3; DeCovny, 2015, p. 24). There is a difference between the terms 'Bitcoin', which refers to the entire system itself and 'bitcoin', which refers to the actual currency (Kumar, 2013, p. 1). Replication errors are avoided because all transactions are recorded on one distributed ledger, and verification is quicker than if all transactions were queued on separately administered ledgers that needed to be reconciled before the transaction could be verified (Allen, 2015, p. 6). Bitcoin requires no financial intermediaries and does not belong to a particular country (Peters et al., 2015, p. 10).

Just as the Internet changed the way that information was distributed, bitcoin could change the way that information is authenticated, as no authentication is necessary with bitcoin (Casarilla, 2015, p. 19) and no single user controls the network (Peters et al., 2015, p. 11). The mathematical rules governing the bitcoin mining process are designed to mimic gold (White, 2012, p. 414) because supply cannot be adjusted (Kiviat, 2015, p. 583). Only 21 million bitcoins will be issued (Kiran & Stannett, 2014, p. 6) therefore ensuring that bitcoins are not susceptible to the type of monetary policy intervention that central banks set up (Allen, 2015, p. 15). Because the number of bitcoins is strictly limited, it can be argued that the currency would become subject to severe deflation and subsequent value increase if it became widely used (Kiran & Stannett, 2014, p. 7).

Bitcoins are bought and sold at a bitcoin exchange against fiat currency (Milkau & Bott, 2015, p. 334). The Bitcoin currency also does not operate in real time, but as batches that are processed or 'mined' in blocks every ten minutes (Milkau & Bott, 2015, p. 332). Each block contains a record of recent transactions and a reference to the preceding block and these interlinked blocks form a block chain (Kiran & Stannett, 2014, p. 5; Peters & Panayi, 2015, p. 3). Each block records about 500 transactions (Kiran & Stannett, 2014, p. 9). Miners, people who manufacture (mint) the currency (Maurer, Nelms & Swartz, 2013, p. 2) in the Bitcoin system, validate new transactions, add them into blocks, and therefore provide a clearing function for which the miners are rewarded with new bitcoins and transaction fees that are paid voluntarily by the users (Milkau & Bott, 2015, p. 332). As mentioned before, no central bank interaction is required.

Several companies already receive payments for goods and services in bitcoin as bitcoin offers low processing costs and can easily be used in cross-border transactions (DeCovny, 2015, p. 24; Twesige, 2015, p. 2). The New York State Department of Financial Services is issuing BitLicences, a licence to trade in bitcoins, to regulate entities operating by means of virtual currency (DeCovny, 2015, p. 25; Kiviat, 2015, p. 597). As a result, many major banks

abroad have launched digital currency and block chain technology to replace inefficient, costly legacy databases and storage systems (DeCovny, 2015, p. 25). In Australia, the government has embraced the existence of Bitcoin by issuing tax guidelines that relate to the currency (Australian Tax Office, 2014, p. 1). Russia, on the other hand, has passed a law banning both the mining and exchange of bitcoins into real money (Reuters, 2014, p. 1).

The anonymity associated with bitcoin has helped to make the currency popular, but poses risks of money laundering, security risks (fake transactions attacking the integrity of the block chain), legal risk (bitcoins are assets associated with ownership), technology risk (reliance on Internet network speed and usage) and financial risk (the person who takes responsibility for errors and the value of the asset) (Kiran & Stannett, 2014, p. 7). Conventional payment systems rely on known identities but Bitcoin is designed with pseudonymous identities (Moser et al., 2013, p. 1). If Know your client (KYC) principles (providing proofs of identity and residential address) can be enforced when bitcoins are traded for fiat currencies and other assets, it would be possible to detect doubtful activities (Moser et al., 2013, p. 2). KYC rules require that banks compile in depth customer profiles and trace the source of monies (Shields, 2014, p. 19). However, it appears unlikely that KYC principles can be enforced in the Bitcoin system (Peters et al., 2015, p. 12).

Many believe that Bitcoin, block chain and distributed ledger technology will be the financial operating system of the payments future, as it offers a different way of engaging in commerce and could reinvent the way that value and risk are shared between parties (DeCovny, 2015, p. 26). Financiers are actively exploring the aptness of recording assets transfers by means of block chains (Yermack, 2015, p. 3). Ponzi schemes and other types of fraud (Allen, 2015, p. 30; Carpio, 2011, p. 1) could damage confidence in virtual currencies. The distributed ledger is a technology uniquely capable of performing key components of a transaction, namely recordkeeping, monitoring, asset custody, auditing as well as facilitating

trade between parties (Kiviat, 2015, p. 585). Benefits of digital currencies include lower costs, availability of around-the-clock processing across borders, and speed (Peters et al., 2015, p. 38). Risks include limited control over transactions, inability of authorities to restrict remittances and irrevocability of transactions (Peters et al., 2015, p. 38). If virtual currency were to be admitted as viable tender for tax payments, the standard monetary controls might be diminished, as the creation of money will no longer be the government's sole mandate (Peters et al., 2015, p. 36). There may also be tax implications if transactions can be traded across borders without known financial intermediaries or central banks. As a result, bitcoin and other virtual currencies may have a negative impact on a country's economy. Equally important, is that the block chain technology and distributed ledger can be adopted without using virtual currencies. By doing this, banks and central banks can retain their involvement and control in financial transactions and also capitalise on the benefits associated with these technologies.

3.5 Discussion

Various entities (private organisations and government departments) are involved in satisfying customer needs of property buyers (Christopher, 2005; Heckmann et al., 2015). There is a need to share information and coordinate activities across these entities. For example, estate agents, conveyancers and banks all collect and validate the same information and documents. Each entity captures the same information in different technological systems, and this all translates into much duplication. Supply chain integration may assist for the non-competitive information (buyer and seller personal information [names, addresses, and contact information], identity documents, property description, deed of sale, proof of income, and loan amount approved) to be made available in a secure manner to other parties who are involved in a property transaction (Farhoomand, 2005; Palma-Mendoza et al., 2014). This will increase visibility (Caridi et al, 2014), create transparency across the entities (Aaber et al., 2014), thus making the supply chain sustainable in the long-

term (Ageron et al., 2012). There are numerous benefits to migrate to a supply chain approach: firstly, greater control can be exercised (Cheng et al 2014). Secondly, turnaround and processing times can be improved (Cachon & Fisher, 2000). Thirdly, duplication can be reduced, if not eliminated (Zhao et al., 2014). Thirdly, supply chains become more visible (Williams et al., 2013).

Supply chain integration involves the integration of technological systems, processes, planning and execution of activities, not simply forwarding of information via email or by using push technologies on an ad hoc basis. Seeing that supply chain integration affects all the entities that are linked to the supply chain, a complete reengineering of processes and technological systems architecture may become necessary. Insofar as integration efforts goes, information technology can assist to provide a seamless integration across the entities in a supply chain. Tight coupling of systems will enable a culture of innovation – striving to improve processes continually, service and working relations - as opposed to reactively addressing concerns and challenges.

Cloud computing has already been widely accepted and can provide a single centre of activity from an operations perspective (Kanagasabapathi & Balaji, 2013). Hybrid models can assist to overcome security concerns that has been raised around the public cloud (Lampe et al., 2013). The same resources can be shared among different users, thus increasing the utilisation of each resource, which drives down cost (Leymann, 2009, p. 8; Xu, 2013, p. 3) and less capital outlay is required.

Electronic systems bring with it a series of security issues that would need to be implemented. Access control would need to be strictly controlled (Low, 2010); encryption keys and certificates, digital signatures and identification measures would need to be firmly managed in order to protect the integrity of records, privacy and systems access. Given that

property is a huge contributor to economic success of a country, the correctness and security of the property register must be protected.

Numerous risks (credit, legal, operational, settlement, principal, systemic) and risk types (business versus non-business) should be mitigated to make the property supply chain and market less vulnerable (Vilko & Hallikas, 2012). Proper records management play a crucial role in exercising proper control with regard to risk management ((Ngoepe, 2014). Technology can assist to reduce fraud and misrepresentation incidents (Low, 2010; Wilson, 2008).

Block chain technologies will influence how contracts are drafted (Lemieux & Lemieux, 2016). The block chain and distributed ledger has the potential to revolutionise the payment industry. Although it had been linked to cryptocurrencies, fiat currencies may also be coupled with the technology to provide an accessible history of ownership of specific assets.

3.6 Summary

This chapter considered supply chain concepts including supply chain visibility and transparency; supply chain integration; supply chain networks; supply chain sustainability; and supply chain innovation. Organisations cannot exist in isolation. Technology can assist to integrate supply chain members to operate as a single unit for better coordination of materials, information, and money flowing between various organisations that comprise a supply chain, which can improve communication and service, as well as influence the innovation of products and processes. In the business environment, various supply chains can work together as a network. When working together as a coherent whole, the end user can benefit, despite the fact that different organisations in the supply network compete with each other. Also, individual organisations may share their costs and focus on their core competencies for the supply chain to benefit in terms of competitive advantage which increase organisation-specific skills and realise economies of scale to enhance supply chain

competitiveness (Park, Mezias, & Song, 2004, p. 10). To achieve this, supply chains need to build trust among supply chain partners to become transparent, share non-competitive information, which need to be contextualised for more effective decision-making and end user service.

Information technology plays a big role in land administration processes in South Africa, as well as supply chain management. IT can assist to create supply chain synergies by enabling effective knowledge and information transfer. It can assist to make the supply chain more transparent and, as such, supply chain risks could be identified much earlier. Cloud technology creates a centralised repository for document and information sharing capabilities. With Internet access, entities could use cloud technology as and when required, which can significantly reduce the costs associated with IT. In addition, upgrades and updates are done by a third party, which contributes to further savings. Security may be a concern in this regard as the server, which stores the data, belongs to a third party as well. Where sensitive data and information are involved, a private or hybrid model may be adopted which could provide increased security.

Other security measures that could be introduced are public and private keys, security certificates, digital signatures, passwords and PINs, as well as biometric identification. A combination of any two of these measures will enhance security features significantly and will allow for access control that will verify user credentials and the level of access required. IT could also assist to create an audit trail of who was involved with which transaction and at what time, as well as which changes had been effected by specific individuals. Various risks have been identified, which should be mitigated as far as possible. These risks are transactional risk, operational risk, reputational risk, and systemic risk.

Payment systems and the stakeholders that are involved in payment systems in South Africa were highlighted. In addition, the chapter explored block chain technology and the

distributed ledger as technologies that can be used to track the ownership of assets. In South Africa, banks have piloted and successfully swapped an asset by using the block chain and distributed ledger technologies. Virtual currencies have been introduced globally and the Bitcoin virtual currency was explored as a digital currency that is already accepted as payment in other countries. The block chain technology and distributed ledger may be used independently from cryptocurrencies.

In the next chapter, the research methodology that was used in this study will be discussed. These aspects include the philosophical foundation that underpins this study, the research design, the trustworthiness of the study, the researcher positionality, limitations and delimitations of the study and the research ethics that pertains to the study.

CHAPTER 4

Research methodology

4.1 Introduction

In the previous chapter aspects pertaining to supply chain management were discussed. These aspects include supply chain visibility, integration, networks, sustainability, and innovation. The role of information technology was explored, particularly in relation to land administration and supply chain management. The functioning of cloud computing was introduced and security and risks that may influence property related transactions were reviewed. Current and possible future payment systems were explored thereafter. Qualitative research is particularly useful in uncovering the meaning that people attach to their experiences (Denzin & Lincoln, 2000, p. 19; Yilmaz, 2013, p. 312). The primary research objective of this study was to develop a conceptual framework that can be used to dematerialise the current end-to-end property registration process (see section 1.5). Consequently, a qualitative method could best assist with such an exploration.

Qualitative research is also the best method that can be used to study phenomena in their natural settings (Denzin & Lincoln, 2000, p. 632; Yilmaz, 2013, p. 314). The current study focused on how the property transfer process could be improved by incorporating an electronic system for the registration of property transfers (see section 1.4) and the subsequent payments that are related to these transfers (see section 1.5). Qualitative methods also emphasise the role of the researcher as an engaged contributor in the research (Creswell, 2005, p. 11). In the present study, the researcher was the prime channel through which data was collected and interpreted as outlined by Stake, (1995, p. 8). A continuing interpretive stance is indicative of a researcher in qualitative studies (Chan, Fung, & Chien, 2013, p. 5; Strauss, 1987, p. 17-20).

The qualitative methods applied in this research were purposive sampling, semi-structured interviews, and content analysis (Glaser & Strauss, 1967, p. 104-105; McIntosh & Morse, 2015, p. 8). Content analysis involves the analysis of transcriptions of interviews, the identification of themes and subthemes and linking these themes to the text (Burnard, Gill, Stewart, Treasure, & Chadwick, 2008, p. 430). Others who work with the same data (Seale & Silverman, 1997, p. 379; Stemler, 2015, p. 3) should identify the same categories.

This chapter explains the research paradigm, the qualitative data collection and data analysis methods that were employed. This study is a continuation of a Masters study where individual buyers, sellers, conveyancers, banks, estate agents, and mortgage originators participated in the study. The interviewees for this study comprised governing and authoritative bodies that are involved in property transfers. The researcher assumed that the authoritative bodies are representative of the population for this study and that the data collected from these bodies would be significantly valid for the study. The fieldwork was undertaken between November 2015 and April 2016. Ultimately, 19 face-to-face, telephonic and Skype interviews were conducted, which were audio recorded by way of the consent of interviewees, and thereafter transcribed for further data analysis.

In Chapter 1 of this study, it was clear that legal systems have been put into place to regulate and maintain order within societies (Rudden, 2014, p. 1) (see section 1.1). Rights are codified in a title deed, which is recorded in a deeds office. There is a time lapse between the completion of the transaction and its entry on the land register and replacing the paper title deed with a secure electronic interface is a major driving force (see section 1.2). The research statement of this study has therefore been formulated as follows:

The land registration process in South Africa is characterised by manual interlinks and paper-based documents which makes the current process tedious and cumbersome.

Without a research question, empirical studies would be merely a report of observations. The research question motivates and structure data and the collection of data, the process of analysing data, the creation of theories to make sense of the data and composing the storyline that brings it all together (Scott & Garner, 2013, p. 38). The study the following research question (RQ) was asked (see 1.4):

RQ: How can the end-to-end property transfer process be integrated among the different role players to dematerialise property transfers?

Secondary research questions have been formulated as follow:

- What gaps would need to be addressed before electronic end-to-end registrations can be introduced into the South African environment?
- What measures do supply chain partners perceive should be put into place to enable dematerialisation of the end-to-end property transfer process?

The research objectives are the goals to be achieved by conducting the study (Zikmund, Babin, Carr, & Griffin, 2012, p. 4). The primary research objective of this study was to develop an integrated framework for the dematerialisation of property transfers (see section 1.5).

The secondary research objectives were to (see section 1.5):

- identify gaps that would need to be addressed before an electronic end-to-end registration process could be introduced into the SA environment; and
- identify the measures that current supply chain partners perceive would enable dematerialisation of the end-to-end property transfer process.

4.2 Philosophical foundation

Research philosophies and paradigms help to clarify the research design and the choice of an appropriate and effective methodology to collecting data (Merriam, 2002, p. 7-11). A research paradigm is a “viewpoint that is based on a set of shared assumptions, values, concepts, and practices” (Johnson & Christensen, 2008, p. 31). A paradigm portrays the researcher’s view of the reality, the connection between the researcher and participant, the researcher’s position on objectivity and subjectivity, the process and procedures of the research, and the articulation of the research process and findings (Ponterotto, 2005, p. 127).

Guba and Lincoln (1994, p. 80-82) classify paradigms into three facets. Firstly, they have an ontology, which is a surmise about the ‘nature of reality’. These are the interpretations that scientists embrace about the world and people, which together provide the basis of building social theory to embody different epistemological and methodological standpoints (Morgan & Smircich, 1980, p. 492-493; Yilmaz, 2013, p. 316). The researcher should find an answer to the question about what the nature of reality is (Creswell, 2007, p. 20). The essential argument is the question of whether reality is objective and whether people are the result of the exterior reality, or whether reality is subjective and people are able to configure the world as per their own encounters and knowledge (Morgan & Smircich, 1980, p. 496).

In this study, the researcher accepted the view that human beings are social actors (Morgan & Smircich, 1980, p. 497; Pfeffer, 2016, p. 3). The researcher have confidence that people have the ability to use vocabulary, markers, and other actions to interpret and modify their surroundings, and therefore contribute to the enactment of reality. In exploring the phenomena of this study, namely a new electronic, dematerialised and interfaced property supply chain framework, the researcher concentrated mainly on exploring how people who are related to this phenomenon observe, construe, and represent knowledge.

Secondly, each paradigm contains an epistemology, which is a set of suppositions regarding the association between the ‘knower’ and the ‘known’. For example, must the knower remain objective without influencing the result, or does the knower dynamically co-design knowledge? Epistemology asks what the relationship is between the researcher and the researched (Creswell, 2007, p. 20). Epistemology argues about what can be received as knowledge (Collis & Hussey, 2003, p. 59), how knowledge is created, which knowledge is accessible, and the restrictions that exist for the knowledge (Eriksson & Kovalainen, 2008, p. 13-14).

In this study, the researcher believed that knowledge can be added by comprehending the role that people play within their social reality (Morgan & Smircich, 1980, p. 497), rather than splitting the ‘known’ and the ‘knower’. The epistemology framing this qualitative study is constructivism (Duffy & Jonassen, 2013, p. 1). Constructivism or interpretivism developed during 1970–1987 (Denzin & Lincoln, 1994, p. 9) encapsulating views of “pluralistic, interpretive, open-ended, and contextualised perspectives toward reality” (Creswell & Miller, 2000, p. 2). Constructivism sees knowledge as ‘socially constructed’ (Andrews, 2012, p. 39), which is situational. Constructivism is “the view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context” (Creswell & Miller, 2000, p. 2; Crotty, 1998:42). Constructivism values pluralistic realities that exist in people’s minds (Golafshani, 2003, p. 604).

Finally, each paradigm includes assumptions regarding data collection and data analysis (Vasilachis de Gialdino, 2011, p. 3). *Methodology* refers to the justification of the methods used in the research process (Tholo, 2007, p. 105). Using the subjective ontological orientation and the constructivist epistemological orientation, a qualitative method was used in this study. Qualitative research usually generates new theories with an inductive approach,

which consist of an analysis of data with limited theory or structure, by using the data collected to develop a structural analysis (Burnard et al., 2008, p. 431). Not much literature has been published about conveyancing from a business perspective in South Africa and qualitative research was thus more apt. Qualitative research is best for expounding and grasping phenomena and circumstances when relevant variables cannot be established in advance, discovering new advances to over-familiar problems, and building theory, hypothesis or generalisations (Merriam, 1995, p. 52). This method is characterised by smaller sample sizes, and subjective but rich data (Collis & Hussey, 2003, p. 62).

The researcher believed that participants could incorporate subjective meanings to explicate and connect with the everyday world, which can be examined from a ‘third-person’ perspective (Chisholm, Chapman, Amm, Bischof, Smilek, & Kingstone, 2014, p. 2; Schwandt, 1996, p. 65). This method is comprehensive, onerous, and most appropriate where limited knowledge exists regarding the research phenomenon (Burnard et al., 2008, p. 429). A researcher’s paradigm assumptions also shape the selection or procedures that will be used for the research (Guba & Lincoln, 1994, p. 10; Yilmaz, 2013, p. 312).

4.3 Research design

Creswell and Plano Clark (2007, p. 104) define research design as the procedure of “collecting, analysing, interpreting and reporting data in research studies”. Yin (2003, p. 19) adds further that “colloquially a research design is an action plan for getting from here to there, where ‘here’ may be defined as the initial set of questions to be answered and ‘there’ is some set of (conclusions) answers”. A research strategy defines the type of research conducted and the purpose for conducting the research (Page & Meyer, 2006, p. 19).

Page and Meyer (2006, p. 19) explains that research design generally comprise of the following stages:

- “translation of the research question into research variables;
- choosing an appropriate sampling and data collection method;
- choosing appropriate analysis methods; and
- deciding on a time frame and budget.”

The research design therefore provides a framework to address the research problem, research questions and research objectives of a research (Blumberg, Cooper, & Schindler, 2008, p. 69).

Qualitative and quantitative paradigmatic methods are identified (Blumberg et al., 2008, p. 191). *Qualitative research* refers to the meanings, concepts and descriptions of things and words, and images and descriptions are used to assess the quality of things. *Quantitative research* uses numbers to refer to counts and measures of things concerning the subject matter (Berg & Lune, 2014, p. 4). Researchers using qualitative methods study how people assimilate knowledge of themselves and others (Berg & Lune, 2014, p. 3). The researcher takes an active role in the collection and interpretation of data in qualitative research (Onwuegbuzie, & Byers, 2014, p. 223; Patton, 2002, p. 14). Researchers should not be narrow-minded and should make an effort to learn and know their research well, and by doing so, not impose their own assumptions (Stake, 1990, p. 32).

The present study used a qualitative method. Denzin and Lincoln (1994, p. 14) define qualitative research as “multi-method in focus, involving an interpretive, naturalistic approach to its subject matter.” Consequently, qualitative researchers study phenomena in their natural settings and try to construe the meanings people attach to them. Qualitative research uses empirical resources including a case study, personal experiences, observations, historic accounts, and interactions to depict meaning to individual encounters. Creswell

(2007, p. 300) defines qualitative research as: “an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem.” The researcher uses word and report analysis, rich descriptions and conduct of participants to build a complex, all-inclusive depiction of participants in their natural setting.

The nature of this study was exploratory and many different sources across various disciplines were consulted. Knowledge from other related disciplines can enrich a study by providing multiple perspectives (Singhal & Singhal, 2012b, p. 247). This multidisciplinary research cut across many different subject areas. In lieu of this, a literature review was conducted, primarily through journals in the areas of operations management; supply chain, land administration, document management, payment systems and information systems (see Figure 1.1). Furthermore, publicly available documents were consulted such as Internet sites of organisations involved in the property market in South Africa, legislation, company brochures and White Papers. A literature review incorporates the present study into the existing body of knowledge (Blumberg et al., 2008, p. 107). The literature highlighted aspects relating to SCM and integration, which linked to the research question of this study.

Research generally uncovers answers to questions by means of methodical procedures (Berg & Lune, 2014, p. 8). Interviews, observations, and documents constitute three major data sources for qualitative research (Brooks, & Normore, 2015, p. 800; Polkinghorne, 2005, p. 141). Interviews are first-person accounts of the experience being investigated; observations are recorded based on what the researcher detects during the interview; and memos of a researcher’s encounters with participants and other documents are written sources about an experience (Polkinghorne, 2005, p. 141). Potter (1996, p. 96) defines interviewing as a “technique of gathering data from humans by asking interviewees questions and getting them to react verbally.” Stability of the study can be improved by asking similar questions at different times, which produces consistent answers (Garcia, & Zazueta, 2015, p. 40; Long & Johnson, 2000, p. 30). During an interview, the researcher

pursues the topic strands and directs the discussion to achieve a rich description of the phenomena being researched (Doody, & Noonan, 2013, p. 32; Polkinghorne, 2005, p. 142). As such, a semi-structured interview process was followed whereby the researcher could further clarify aspects as they emerged during the interviews.

A qualitative case study method was used as the main design for this study. This study further builds on a previous international comparative study that was completed among five different countries that were used as case studies. Data that are collected ought to be construed rather than measured, and understanding must be applied to the context (Johnson & Waterfield, 2004, p. 123). The lens used by qualitative researchers is not based on totals, tools, or research designs, but uses the views and expressions of participants, researchers and reviewers of studies (Creswell & Miller, 2000, p. 2). The evidence or data collected in qualitative research is in the form of explanations and insights of participants regarding the phenomena being researched, which forms the foundations of the findings (Polkinghorne, 2005, p. 138). People who were used in this study are all senior managers who are experts in their respective fields that included public and private institutions.

Qualitative research is appropriate for exploring matters about which little is known (Strauss & Corbin, 1998, p. 56). Denzin & Lincoln, 1994, p. 8) who stated that the emphasis, in qualitative research, is placed on the connotation and occurrences, the connection between the researcher and the studied phenomena, and the social construction of reality confirmed this view. Limited literature has been published about conveyancing in the South African context, specifically which relates to the business components that form part of this phenomena.

4.3.1 Case study

The case study method is a strategy of inquiry whereby the researcher reconnoitres an activity, event, process, or individual(s) (Page, & Meyer, 2006, p. 22; Stake, 1995, p. 163).

It is a robust means to investigate a complex phenomenon where limited theories exist (Dul & Hak, 2008, p. 24). The property transfer process in South Africa is very complex as it encompasses an interrelated end-to-end process that stretches across public and private entities. Although much effort has been made in South Africa for limited integration to occur among a few of the entities, each entity still operates in isolation, mirroring the silo effect. There are many well-known case study researchers but the more prominent researchers are Yin (2013), Stake (1995) and Merriam (2002), and these authors' descriptions were mainly used in this research. The phenomenon that was investigated in this research was how to make the property transfer process in South Africa more efficient by enabling IT to do away with paper in this environment, thus effectively integrating data and data sources within the property market.

Case study research is a method in which the researcher explores a ring-fenced system by collecting in-depth data from multiple sources of information through interviews, observations, and documents (Creswell, Hanson, Plano Clark, & Morales, 2007, p. 245). In this study, a previous tender document for the building of an architecture for e-conveyancing and a socio-economic impact assessment document were acquired and analysed to confirm or disprove the data that was collected during the interviews. Yin (2013, p. 129) recommends six types of case study practices of multiple information sources, namely "documents, archival records, interviews, direct observations, participant observations and physical artefacts." As mentioned, this study made use of interview data and documents, in addition to the extensive literature review that was completed. It is important to connect sources of data, a process that is known as triangulation (Golafshani, 2003, p. 603; Hussein, 2015, p. 66). Triangulation is the process of using multiple research methods to obtain concurrent evidence (Page & Meyer, 2006, p. 44). Triangulation will be discussed further in section 4.4.5.

Flyvbjerg (2006, p. 221) cautions against common misunderstandings of case study research, namely:

- “theoretical knowledge is more valuable than practical knowledge;
- one cannot generalise from a single case, and a single case cannot contribute to scientific development;
- the case study is most useful in generating hypotheses;
- the case study contains a bias toward verification; and
- it is often challenging to summarise specific case studies.”

Although this study followed the case study method, insights acquired from a previous study (e.g. Table 2.1) as well as literature reviewed from additional countries, were used to draw insights from other countries into the South African context. These insights also contributed to the building and sharpening of the framework that was produced (see section 6.6). Some of these countries follow the same common law rules that are applied in South Africa. A single case can contribute to scientific discourse because it brings another dimension of insights. Although the new insight cannot become a rule, it provides a persuasive argument.

Yin (2009, p. 29) names five elements of constructive case study research design, namely sufficient research questions, propositions or the purpose of the study, units of analysis, reason that links the data to propositions raised, and principles for interpreting findings. Firstly, typical qualitative research questions are ‘how’ or ‘why’ questions. The question in this research study were:

How can the end-to-end property transfer process be integrated among the different role players to dematerialise property transfers?

Secondly, the purpose of the study must be stated clearly. The purpose of this study was to investigate factors that influence the property transfer process in order to develop an integrated framework for the dematerialisation of property transfers.

Thirdly, the unit of analysis must be evident. Yin (2009, p. 13) describes the unit of analysis as the focus area of a case study analysis, which is directly related to the research questions of a study. An appropriate unit of analysis is found where primary research is accurately specified and the unit of analysis is linked to the research question of the study. The unit of analysis in the present study was organisations involved in property transfers in South Africa, and the data that are generated by these respective entities.

Fourthly, the connection between data and propositions must be apparent. The connection occurs when themes are identified, as the data are analysed (Aronson, 1995, p. 4; Georgiades, & Georgiades, 2014, p. 222). Patterns are identified, and the data are linked to theoretical propositions of the case study. Content analysis was used to analyse the data that were collected from various interviews conducted. The themes identified in the present study answered the research question that was outlined in Chapter 1 (see section 1.4), but no propositions were raised for this study.

Fifthly, the criteria for the interpretation of findings must be established. Data are coded prior to identification (Yin, 2009, p. 38). Meaning is then constructed from the findings and recommendations for future research and use in practise are concluded (Damschroder, Aron, Keith, Kirsh, Alexander & Lowery, 2009, p. 8). In the present research, the researcher read through the transcripts to obtain a general impression of the data. Notes were made with a second read. Open coding was used to identify keywords where after meaning was attached to the identified keywords that were allocated. Thereafter groups of codes were identified which translated into themes. After themes had been developed, the researcher extracted meanings from the findings to make recommendations for future research and industry.

Given the interpretive position adopted in this study, the case study was considered the most appropriate methodology. Moreover, it provides diverse participant perspectives from

multiple sources of data to provide an in-depth understanding of how to integrate role-players in the property market for dematerialised title deeds to become a reality.

A case may be purposefully selected to acquire rich and thick descriptions and information (Sparks, 2014, p. 5; Stake 1995, Patton 1990) which may lead to the generalisation of the findings (Johansson, 2003, p. 8; Tsang, 2014, p. 5). Countries have particular legislation that allows for sovereignty and jurisdiction within a particular country. As such, it is difficult for other countries to adopt an exact duplication of processes and systems. A previous mixed method study by the researcher considered various case studies in different countries, which included Australia, The Netherlands, Taiwan and Barbados, in addition to South Africa (Amadi-Echendu, 2013). Face-to-face and telephonic interviews were conducted with key role players in the different countries and quantitative surveys were distributed to six respondent groups in South Africa to gather data with regard to the processes that are followed in the countries listed and South Africa.

In this study, South Africa was used at the case study environment and the phenomena explored was how to make the property transfer process more efficient by removing paper from the process in order to dematerialise the title deed. Limited research has been published regarding dematerialisation of the title deed in conveyancing globally and especially in South Africa. In principle, this study is a continuation of the previous study that was conducted. This study looked more in-depth at how the South African conveyancing system is structured, in addition to the different data sources from the different role players involved and various aspects that influence the conveyancing system in South Africa. Although the entire case study cannot be generalised to other parts of the world as a whole, certain aspects of the study, which relate to the integration of data can certainly be generalised to other jurisdictions and countries. Generalisation is discussed further in section 4.4.5.

Given the interpretive stance assumed in this research and taking the nature of the research question into account, the researcher believes that case study is the most appropriate research strategy for this study because of its ability to provide the unique perceptions and concerns of individual participants in a real-world situation. The case study method is particularly well suited to situations where it is very difficult to separate the variables of a phenomenon from its context (Yin, 2003, p. 47). In this study, South Africa was used at the case study environment and the phenomena explored was how to make the property transfer process more efficient by removing paper from the process in order to dematerialise the title deed.

4.3.2 Participants

Finding participants to interview involves not only identifying those who may be interviewed, but also locating willing interviewees (Polkinghorne, 2005, p. 141). Sampling means selecting a part of the research population in order to gather data (Page & Meyer, 2006, p. 98). A sample of subjects allows inferences to be made about the larger population, depending on how representative the sample was of the population (Berg & Lune, 2014, p. 50). However, instead of statistical representativeness, the sampling strategy in qualitative research aims to pursue the diversity that exists within the population (Popay, Rogers, & Williams, 1998, p. 344; Zúñiga, O'Donoghue, & Clarke, 2015, p. 56). Samples may be designed in different ways but it is essential that the data collected represent the research population reliably (Kotrlik & Higgins, 2001, p. 43; Palinkas, Horwitz, Green, Wisdom, Duan, & Hoagwood, 2015, p. 2).

Ensuring that the sample includes diversity of viewpoints will result in diverse perspectives, and rich data (Polkinghorne, 2005, p. 141; Williams & Morrow, 2009, p. 578). Diverse sources can “provide rich data, encourage reflexivity, and help to increase the comprehensive understanding of phenomena” (Mays & Pope, 2000, p. 51; Ritchie, Lewis, & Elam, 2013, p. 112).

The choice of the participants for the present study was based on purposeful sampling (Berg & Lune, 2014, p. 52). Purposeful sampling is a “selection strategy in which particular settings, persons, groups of people or activities are selected intentionally to provide information that may not be available from other sources” (Maxwell, 2005, p. 97). Purposive sampling occurs when sample members are chosen to achieve results for the research aims (Blumberg et al., 2008, p. 253; Patton, 1999, p. 1197). Purposive sampling can firstly, be used to attain representativeness of the locations, persons, or activities selected; and secondly, purposive sampling can be used to sufficiently identify the diversity in the population (Maxwell, 2008, p. 235). A small sample that reflects the diversity may invoke confidence and the conclusions may more effectively represent the normal members of the population (Maxwell, 2008, p. 235).

A suitable sample size satisfactorily answers the research question (Lewis, 2015, p. 474; Marshall, 1996, p. 523) but does not indicate the quantity of data gathered or the number of sources the data were collected from (Polkinghorne, 2005, p. 141). It may be beneficial to include a wide variety of participants who can provide specific, special or random experiences and expertise (Marshall, 1996, p. 523; Shannonhouse, Barden, & Mobley, 2015, p. 308). For the present study, the researcher purposively and intentionally chose a sample that included representation from different organisations that in some way are interwoven with the property process in South Africa. This strategy used multiple sources of data collection (i.e. literature, interviews and documents) to confirm findings (Merriam, 2002, p. 25); therefore, the trustworthiness of the study was strengthened. The overall study intended to explore how current processes would need to change to accommodate an electronic interface among role players involved in property transfers in order to remove paper form the property transfer process.

The population of this study were role players who are involved in property transfers in South Africa. The Department of Home Affairs (DHA) was included as a participant of the

study although they are currently not directly involved in the property transfer process. The DHA has made available biometric identification to verify the identity of people who has recorded a fingerprint in their database. The researcher included DHA in light of the aforementioned biometric security feature that DHA could bring into the current end-to-end property process, and whether the incorporation of this verification was considered to be feasible by the participants. Locating the ‘right’ individual to interview is a vital feature in qualitative research, which will directly influence the type and quality of the data that will be collected from each interview (Baker & Edwards, 2012, p. 16).

The participants being interviewed should be experienced and knowledgeable with regard to the phenomenon being researched, and should provide useful information (Rubin & Rubin, 2011, p. 77). Experienced participants can make the interview results more convincing (Rubin & Rubin, 2011, p. 77). In addition, interviewing participants from a variety of perspectives may enhance the credibility of findings (Rubin & Rubin, 2011, p. 38). Credibility speaks to the correctness between participants’ observations and the researcher’s depiction (Guba & Lincoln, 1989, p. 237; Tobin & Begley, 2004, p. 391). For this reason, participants that work from both regional and national perspectives were selected. The participants in this study are employed as senior managers and shared the organisational views during the interviews. Individual views were clearly indicated during the interview and were not incorporated into this study. For example, information that was shared to market organisational capabilities and personal, unsubstantiated opinions regarding the quality of information from different entities were not mentioned in the study. The participants were chosen as representatives of their organisations and personal opinions were therefore not included in the study.

Representative and governing organisations involved in property transfers were identified, and representatives who are employed in a managerial capacity in these organisations were

interviewed. These organisations were identified by reviewing property websites, company brochures, White papers, publically available documents, and previous research. They are:

- the Law Society, which represents conveyancers nationally;
- the South African Reserve Bank (the central bank in South Africa);
- the National Treasury (manages national economic policy, is responsible for managing South Africa's national government finances and preparing the annual national budget);
- Strate Ltd (this organisation has experience of dematerialising listed shares in South Africa);
- three software companies (Comcorp, Korbitec and e4) who are vendors that provide intelligent software packages to the property market;
- the South African Deeds Office (who is the custodian of the property register in South Africa);
- the City of Tshwane Municipality;
- the DHA who has implemented a biometric system to curb identity theft (the stealing of someone's identity in the form of personal information and misuse of that information for making purchases and/or opening bank accounts [Roy & Venkateswaran, 2014, p. 1]);
- the master of the High Court who deals with deceased estates;
- the Property Exchange of South Africa (PEXSA) who has developed a payment system for the property market;
- the Surveyor-General's Office, which is responsible for approval and storage of maps and related property information; and
- Lightstone who provides intelligent property information for assessors to do desktop valuations.

It was important for various points of view regarding the property market to be put forward for the study. Therefore, a vast array of stakeholders that are part of the property supply chain (even if only in an indirect form) were considered to be part of the participants. The various entities stretching across private and public institutions, represented different sources of data, which also assisted to confirm or discredit issues, raised, thus enabling another type of triangulation to occur. These participants are outlined in Table 4.1 that also shows the number of interviews that were conducted per entity:

Table 4.1: Participants of the study

Organisation	Government or Private institution	Number of interviews
City of Tshwane Municipality	Government	1
Comcorp	Private	1
Department of Home Affairs (DHA)	Government	1
e4	Private	1
Korbitec	Private	1
Master of the High Court (deceased estates)	Government	1
National Treasury	Government	1
PEXSA	Private	1
Pretoria deeds office (Dept. of Rural Development and Land Reform)	Government	1
Reserve Bank of South Africa (SARB)	Government	1
The Law Society of South Africa	Private	1
Strate Ltd	Private	1
The Surveyor-General's Office / Cadastre (Dept. of Rural Development and Land Reform)	Government	2

Organisation	Government or Private institution	Number of interviews
[1 interview at national level and 1 interview at regional level]		
Property consultant at a prominent law firm	Private	1
SA Banking Association	Private	1
Dept. of Rural Development and Land Reform [1 interview with the project leader (business viewpoint) and 1 interview with the head architect (IT viewpoint)]	Government	2
Lightstone	Private	1

*The deeds office and surveyor general office is reflected separately in the diagram, although they form part of the Department of Rural Development and Land Reform in order to indicate the specific focus areas that were all covered by the study. The researcher conducted 19 interviews with representatives of 17 organisations who were involved in the property and financial services sector in South Africa at the time of the research.

4.3.3 Data collection method

As primary data source, the researcher selected the instrument of personal interviews with domain experts. Berg and Lune (2014, p. 105) define an interview as a conversation with a purpose. Face-to-face interviews is a method that allows extensive dialogue to elucidate significant aspects relating to the study (Yin, 2013, p. 12) and it is apt for exploratory research. As a rule, interviews in case study research should be conducted carefully to ensure trustworthiness (called reliability in quantitative studies). It is therefore important to consider an appropriate sample size and the correct individuals to interview carefully. Interviews are typically a conversation where the interviewer asks a number of questions which the interviewee answers accordingly (Doody, & Noonan, 2013, p. 28; Esterberg, 2002, p. 85).

Interview questions are structured, semi-structured or unstructured or (Bryman, 2012, p. 473). This study used semi-structured questions which allowed for “cross-case comparability” (Bryman, 2012, p. 472) with the different participant organisations that were interviewed. As a structural guideline for the interviews, an interview guide consisting of five questions was compiled for all participants, but four different questions were compiled for the DHA, which was not part of the property transfer process at the time of the research (i.e. December 2015). The semi-structured interview structure was used (Merriam, 2002, p. 69) (see Appendix A) which allowed the researcher to explore new matters raised during the interview process. The interview guide functioned as a structure to ensure that all relevant matters were covered during the interview. The researcher could choose to change the order of the questions or pass over some of the questions depending on the response that was received from a specific participant. The questions were sent to each participant in advance to eliminate the element of surprise and allow them to organise himself or herself. At the beginning of the interviews, the interviewees were promised anonymity, and permission to record the interviews was solicited. The researcher tried to build trust and create a relaxed environment during the interview. The researcher demarcated the extent and purpose of the study, as well as how the data being collected would be used.

Throughout the interview, main, follow-up and probing questions were asked (Bryman, 2012, p. 472; Rubin & Rubin, 2011, p. 123). Probing and follow-up questions were asked to retrieve richer explanations from participants where necessary, or to clarify certain information and responses shared (Denzin & Lincoln, 2000, p. 419). Questions were rephrased during the interview to ensure that consistent answers were given. The additional questions clarified aspects and enabled a comprehensive explanation of the interviewees’ experiences. The recording of interviews allows the researcher to focus on the conversation and further clarify unclear issues. It is also an impartial record of the interview, which increases the trustworthiness of the research.

The researcher conducted 19 interviews with representatives of 17 organisations who were involved in the property and financial services sector in South Africa at the time of the research. The majority of the organisations were headquartered in Gauteng. The interviewees worked in managerial positions and managed regional and national areas of property transfers, or related information and services, and were therefore all regarded as subject experts with adequate property experience and knowledge. Each interview lasted approximately one hour and took place from November 2015 to April 2016. The interviews were conducted at the participants' offices, except for two interviews, which took place via Skype and another that was conducted telephonically and via e-mail. Each participant consented for the interviews to be recorded digitally and these were subsequently transcribed into written text. The transcribing commenced as soon as the first interview was completed. The researcher identified key themes that were discussed at each subsequent interview. The process involved to identify the themes are further discussed in section 4.3.5. Themes identified from previous interviews and the interview questions were conversed at length. The interviewees described their own and their organisation's activities for the researcher to obtain a broad view. The aim was to concentrate on how the processes to establish influences and risks on various levels and stages of the process. This method enabled a good understanding of the property transfer supply chain, and the possible risks and consequences that may be associated with different parts and role players of the property transfer process. An external transcriber was used to transcribe the recordings and the researcher listened to each taped interview to confirm the correctness of each transcript so that the accuracy of the transcript could be improved if necessary. The researcher read each transcript and made notes comprising words and short phrases to summarise the content (open coding [Strauss & Corbin, 1990, p. 195]). Thereafter the categories were further refined and condensed by combining them into groups.

As categories were integrated, no new categories emerged as data were collected and saturation was reached (Strauss & Corbin, 1990, p. 325), and data collection ceased. Theoretical saturation is described by Glaser and Strauss (1967, p. 60) as “a process in which the researcher continues to sample relevant cases until no new theoretical insights are being gathered from the data.” This also means that the researcher will not know from the onset how many interviews need to be conducted. The purpose of the research will dictate how many interviews should be conducted (Baker & Edwards, 2012, p. 5).

4.3.4 Document review

Although interviews were the primary method of collecting data in this research study, documents were also acquired from the participants and which were studied. Document review was used to confirm some of the statements made by some of the participants (Glaser & Strauss, 1967, p. 53, 162, 183). It also assisted to provide a dense description (Merriam, 2002, p. 15) of the transfer process. The following documents were reviewed:

- tender document issued by the deeds office in 2010 for the building of an electronic deeds office platform;
- electronic deeds registration report outlining the socio-economic impact assessment (SEIA) of the Deeds Registries Amendment Bill; and
- the Deeds Registries Amendment Bill, 2016 and the Explanatory Memorandum, which were circulated for public comment via the *Government Gazette* on 9 March 2016.

These documents were obtained from participants who participated in the study and were used to confirm and back up information that were obtained during qualitative interviews that were conducted.

4.3.5 Data analysis

Analysis begins immediately after the first interview (Burnard et al., 2008, p. 430; Maxwell, 2008, p. 430, p. 236) for the analysis to guide subsequent interviews (Corbin & Strauss, 1990, p. 419; Thorne, 2000, p. 68). Results must be interpreted carefully to eliminate bias (Yin, 1999, p. 1216). Bias denotes distortions of the data because of researcher influence (Maxwell, 2008, p. 124). The researcher must be transparent regarding data collection, data analysis and the way in which the data is displayed (Cronin, 2014, p. 21; Popay et al., 1998, p. 348). The researcher started to analyse the data as the interviews were conducted. To assist in overcoming bias, the coded information were sent to each interviewee to confirm the researcher's interpretations in order to remove bias and ensure that the views of each interviewee were correctly construed.

Qualitative research comprises a close relationship between data collection and data analysis (Strauss & Corbin, 1994, p. 275). In this process, the researcher revisits the data 'over and over to see if the constructs, categories, explanations, and interpretations make sense' (Patton, 1980, p. 224). There should be a satisfactory equilibrium between participant statements and researcher interpretation (Williams & Morrow, 2009, p. 579). This balance depends greatly on both subjectivity and reflexivity (Williams & Morrow, 2009, p. 579). Reflexivity refers to a self-awareness for the researcher to remain objective enough to separate participant statements from researcher interpretations (Collins, & Cooper, 2014, p. 91; Rennie, 2004, p. 183). Journaling can help the researcher bracket (Tufford & Newman, 2012, p. 81) his or her own perspectives, which will enable the researcher to separate his or her own experiences from those of the participants (Williams & Morrow, 2009, p. 579). In accordance with Doody and Noonan, (2013, p. 31), supplemental handwritten notes were taken during the interview process to document statements of special interest. These were compared to the recorded interviews. This helped the researcher to code the transcriptions more accurately. The researcher continually reflected upon the interviews and notes, as she

was able to secure sufficient time and space from work in order to submerge herself into her research.

An external person transcribed the interviews verbatim and content analysis was used to analyse the data. The researcher listened to each recording and checked the correctness of each transcript. Thereafter the researcher read through the transcripts individually to obtain a general and overall impression. Notes were made when the researcher read the transcripts for a third, and sometimes a fourth time. Open coding was then used to identify significant words and to label the data with initial codes. Groups of codes were then identified that was translated into themes (see Table 4.2). Patterns and trends in the themes were then identified and exceptions were highlighted. The analysis took place immediately after each interview and the themes and exceptions that were identified in a previous analysis could be discussed and interrogated in subsequent interviews. Constant comparison of the themes to subsequent analysis were done for core categories to emerge and these are presented in section 5.2 of the study.

While performing the data analysis, unique aspects were separated from common issues identified across all participants (Polit & Beck, 2010, p. 1453). For this reason, transcription of the initial interviews took place from the onset. Data analysis is creative and not a mechanical process (Denzin & Lincoln, 2000, p. 14). The present study mirrored the data analysis and coding measures proposed by Creswell (2009, p. 2) and Esterberg (2002), and outlined six steps that are explained in a systematic sequence but in practice, the steps are interactive and not static and linear.

Step 1: Organise and prepare the data for analysis. During this step, the audio tapes of the qualitative interviews that were recorded are reviewed and transcribed verbatim into Word documents.

Step 2: Read through the data. This step entailed reading through the transcribed data as well as the additional notes made during each interview. Although an external person was used to transcribe the interviews, the researcher spent adequate time listening to each interview, and reviewing the transcribed notes and supplementary notes written down during each interview.

Step 3: Begin detailed analysis with the coding process. The material was organised into various divisions by taking the text data and organising the sentences into categories. These categories were labelled with terms used by the participants.

Step 4: Use the coding system to generate a description of the setting or people, as well as categories for analysis. This process was used to create codes for the descriptions, which were then categorised into themes. These themes were then used to form an overall description to eventually develop into theory (Corbin & Strauss, 1990, p. 420).

Step 5: Advance how the description of themes will be represented in the qualitative narrative. The emergent themes were merged into narrative passages for findings to emerge from the participants' responses.

Step 6: Interpret the meaning of the data. Creswell and Plano Clark (2007, p. 12) recognise that a researcher's own background influences the process of constructing meaning from the data.

In the present study, the understanding in the researcher's own interpretation process was informed by years of work in banking and particularly in various property-related positions for many years. However, to portray the participants' experiences accurately, the researcher focused on what the participants had said. The process of "making meaning" and providing analytic generalisations is dependent on the researcher's full comprehension of and involvement with the data (Polit & Beck, 2010, p. 1456). Independent researchers may arrive at disparate conclusions when interrogating the same data, which will not invalidate the

research but rather enhance considerations of multifaceted phenomena (Malterud, 2001).

Table 4.2 is an example of the coding and themes that had emerged.

Table 4.2: Example of coding of interviews

Category	Subcategory	Excerpt
Supply chain management	Stakeholders	We've engaged the banks, SA Home loans, the attorneys, the bridging houses, and vendors.
	Functions and roles	The correctness of the information is the responsibility of the conveyancer in terms of the information.
	Stakeholder management	Obviously the buyer and the seller should get the property but sometimes there are more than one party involved in how the funds are distributed ... make sure that the whole process is done as one logical unit.
Process	Digitisation	Deeds registry has been working on a project for a number of years now on what they call their electronic registry, which was, and probably is, um, really just scanning your paper document into a PDF format type thing. That is not an electronic registry upfront. What they talking about is not changing the way things work.
		There's digitisation of the ... of ... of something and dematerialisation. It's not the same thing. What they doing currently is digitisation. So transferring information that's on paper into digital format. It doesn't do away with the paper.
	Dematerialisation	So it would be a totally, totally different format. It would not be a scan of the current title deeds which actually doesn't take away the legal basis for that ... title deed ... but what we want to do is take away the legal basis for the title deed ... and replace it with electronic form.
	Integration	When you're capturing an ID number into a system why does every single player in the chain have to capture that ID number themselves? Can you ... not have it pulling through day one ... validating day one against ... a Home Affairs database? And ... you know that who you dealing with is ... the same person.

	Gaps	The Deeds Registries Act does not allow you to lodge that electronic format in the deeds office.
		The delivery of the property happens on registration payment actually happens two or three days later. Um that's little gap that can still be closed out.
Security	Fraud	What's interesting is we still get fraudulent matters in our office despite the fact that we are linked with DHA.
	Risk	People lodge information with us saying that they are the executors and somebody can go in and change that information and appoint somebody else which is a risk.
	Mitigation	The encryption that SWIFT does is normally on proprietary boxes and things like that and that gives us a level of ... of assurance that ... that the transaction is duly signed, digitally signed.
	Compliance	As you meet all the conditions it will go green.

Although an external person transcribed the interviews, the researcher confirmed the correctness of each transcribed interview by listening to each interview and comparing the transcriptions a few times. Subthemes were identified which were clustered into bigger themes that emerged over time. Table 4.2 is an example of how these themes emerged. To protect the confidentiality of the participants, the transcriptions were not included as addendums to this thesis. The evidence is not the words itself that are analysed by counting the number of times certain words appear, but the meanings represented by the texts and words used by the participants, which can illuminate meanings that are attached to the words (Polkinghorne, 2005, p. 138).

The following research steps were followed in this research:

1. Participants were requested to participate in the research and were informed of the risks involved.

2. In-depth semi-structured interviews were conducted with participants at their work places.
3. Interviews were audio recorded and transcribed.
4. Each participant received his or her transcript for member checking and verification of the content.
5. The researcher revised the data.
6. The researcher coded the data for emergent themes.
7. The audit trail was documented to ensure verifiable research steps throughout the process (see Appendix D).

4.4 Trustworthiness of the study

Without rigour (Mays & Pope, 1995, p. 109), research does not mean much. During the 1980s, Guba and Lincoln (1989, p. 233-236) in their seminal work (Fourth Generation Evaluation), replaced reliability and validity with the notion of “trustworthiness” (Guba & Lincoln, 1989, p. 231-243) which contains four aspects, namely credibility, transferability, dependability and confirmability. Trustworthiness has to do with how one approaches, collects, analyses, interprets and reports data. Audits enhance the trustworthiness of a study (Johnson & Waterfield, 2004, p. 127). Williams and Morrow (2009, p. 579) suggest that trustworthiness comprise “integrity of the data, a balance between reflexivity and subjectivity, and clear communication of the findings.” Researcher reflexivity requires of researchers to disclose and bracket their assumptions and biases. Patterns and disparities should be reported (Corbin & Strauss, 1990, p. 421).

To increase the level of trustworthiness of the study, the interviews were recorded which provided an unbiased record of each conversation. According to Onwuegbuzie and Leech (2007b, p. 236), researcher bias occurs when the researcher has personal biases that he or she is unable to bracket, and these may be subconsciously transferred to the participants,

which may inadvertently affect the quality of the data collected. Researcher bias is a very real threat in constructivist research as the researcher collects the data him/herself (Onwuegbuzie and Leech, 2007b, p. 236). The researcher was personally responsible for data collection and no other agents or workers were used in this process. During the data collection process, every effort was made to reduce errors and bias. The researcher remained neutral during the entire research process (Arksey & Knight, 1999, p. 175) by being conscious of the possibilities for multiple interpretations of reality. In addition, the researcher consistently applied the same coding method. Participants also had the opportunity to review their transcripts and the coding to clarify any misrepresentations that may have occurred.

4.4.1 Credibility

Guba and Lincoln (1989, p. 236-237) adopted the term “credibility” to replace validity. Merrick (1999, p. 27) also confirmed this term. Hall and Stevens (1991, p. 19) construe credibility as a truthful interpretation of the experiences of participants that they can identify as their own. The researcher cautiously surveys the interpretations made from the data (Onwuegbuzie & Leech, 2007b, p. 244; Yin, 2006, p. 45). Member checking increases credibility (Lincoln and Guba, 1985, p. 314).

Prolonged engagement in the field aims to build trust with participants to solidify evidence in the field. An audit trail (Lincoln & Guba, 1985, p. 210) provides clear records of all research activities, which are chronologically recorded through journaling and memoing (Birks, Chapman & Francis, 2008, p. 68). Thick and rich descriptions aim to describe the location, participants and themes in ample detail. Peer debriefing concerns a peer reviewer providing support, challenging assumptions and asking questions with regard to the methods used and the interpretations (member checking). In this study, each coded document was

sent back the interviewee. Colleagues were also asked to read through and comment on the coding and study document (peer debriefing).

In the present study, specific methodological strategies emerged to demonstrate qualitative rigour, namely “an audit trail, coding member checks, peer debriefing, and negative case analysis” (Corbin & Strauss, 1990, p. 69), structural corroboration (Onwuegbuzie & Leech, 2007b, p. 240), and referential material adequacy (Lincoln & Guba, 1985, 248; Guba & Lincoln, 1989, p. 231-243; Merriam, 1995, p. 56; Onwuegbuzie & Leech, 2007b, p. 240).

4.4.2 Transferability

Guba and Lincoln (1989, p. 238) refer to “transferability” and not “generalisability” in qualitative research. Research findings are transferable when they fit into external contexts also. According to Seale (1999), transferability should replace external validity, which emphasises the generalisability of the research findings in qualitative research (Merrick, 1999, p. 27). The subjectivity of the researcher, who is the key data collection instrument, negatively affects transferability. The reduced transferability perception can be eased by fully stating the contexts, research methods, and assumptions. In this study, the organisations that represented role players who were identified in a previous research as participants in the property market were elected as participants. This ensured that knowledge was obtained from the most suitable participants. In many instances, small samples used in qualitative research makes generalisation difficult.

Previously coined by Geertz (1973), Merriam (2002, p. 15) also described the strategy of using rich and thick descriptions as “providing enough description to contextualise the study such that readers will be able to determine the extent to which their situation matches the research context”. *Thick description* refers to full, detailed descriptions about the research location, participants and processes, that helps the readers relate to the study context (Polit

& Beck, 2010, p. 1453) New insights that are described enrich the data and should be further explored and analysed (Polkinghorne, 2005, p.140).

Case study research has been criticised for not representing the population and thus lacking statistical generalisability. The presumption is that a single case study does not provide enough sources of data for any generalisation. Denzin and Lincoln (2000, p. 193) and Bryman (1988, p. 130) argue that case studies can be generalised, arguing that “looking at multiple actors in multiple settings enhances generalisability.” These authors are regarded as authoritative authors with regard to qualitative studies.

The researcher investigated different types of organisations and multiple actors in this study, which represented multiple sources. For example, the Law Society of South Africa represented conveyancers nationally, and the Reserve Bank is the gatekeeper of financial transaction in South Africa. Similarly, Yin (2003) argues that the researcher’s aim is to “generalise a particular set of results to some broader theoretical propositions.” In other words, the results provide a general insight into the general discourse. Where a case study environment provides multiple sources from multiple actors, the statement by Yin states that there are so many more insights about a particular discourse that can be gained. When those insights are tending towards a central theme, this points to an exception of generalisation that Yin and Denzin and Lincoln as authoritative sources points out.

It should however be noted that different countries have different jurisdictions which operate with different legislation, processes and systems. For instance, some countries register a title as proof of ownership, while others use a registration of deeds. In addition, some countries may guarantee the ownership title, while others do not. Some countries (like the Netherlands) use notaries, while other countries may allow the buyers and sellers to attend to their own registrations (Amadi-Echendu, 2013, p. 62). In South Africa, legislation compels only conveyancers to attend to registration matters of immovable property (Deeds Registries Act

47 of 1937). Therefore, applying insights and outcomes as-is in certain countries may be a challenge. The aim of the researcher was therefore not be able to generalise the study in its entirety. Certain aspects (such as security aspects, supply chain partners and activities, risk mitigation) may be generalisable, as the information would need to be contextualised per country and jurisdiction.

This study does not adopt a single case study approach per se, but uses South Africa as a case study environment, which provides insights from multiple sources of data from multiple actors. The study builds on a previous international comparative study of conveyancing processes in the respective countries (see Table 2.1). Insights were acquired from countries that built into the South African context that was studied. Some of these countries follow the same common law rules as South Africa. These insights acquired from other countries also contributed towards sharpening the frameworks that were introduced in section 6.6. This means that high-level aspects of this study could be applied to other contexts outside of the property industry.

4.4.3 Dependability

Lincoln and Guba (1989, p. 242) paralleled reliability to dependability which was confirmed by Merrick (1999, p. 27). In the present study, the researcher began to analyse information after the first interview to facilitate subsequent data collection, as suggested by Strauss and Corbin (1998, p. 145). This constant monitoring and confirmation of the research process as a verification strategy helped to ensure rigour. Others reviewing the researcher's recording of data, methods, and findings (Tobin & Begley, 2004, p. 392) achieve dependability.

After transcribing and coding of the interviews, the transcripts and coding were forwarded to the participants for them to verify the content and interpretations that subsequently emerged. During member checking (Burnard et al., 2008, p. 431), data and interpretations are sent back to participants for confirmation of the information (Cho & Trent, 2006, p. 322;

Johnson & Waterfield, 2004, p. 125; Lincoln & Guba, 1985, p. 219). Member checking needs to take place soon after data collection as participants may change their perceptions and views and may want to modify their opinion on the presentation of the data (Burnard et al., 2008, p. 431). Member checking also establishes the dependability of the data, as well as the credibility of the findings; but it also may collect extra original data, which should be further analysed (Mays & Pope, 2000, p. 51). Dependability is parallel to reliability that refers to the long-term stability of data (Guba & Lincoln, 1989, p. 242). Member checking transfers the dependability of the study from the researcher to the participants in the research study. Opening one's analysis for others to scrutinise helps to guard against bias and may lead to fresh insights (Corbin & Strauss, 1990, p. 422).

4.4.4 Confirmability of the findings

Lincoln and Guba (1989, p. 243) identified the concept "objectivity" as parallel to "confirmability" and this was confirmed by Merrick (1999, p 26). Confirmability is the extent to which the research findings can be confirmed by third parties. Seale (1999, p. 45) contends that the researcher could make the data collection, coding and analysis available for an audit.

Data analysis can be verified by member checking whereby the researcher asks participants to validate the analysis, or by means of peer review or member checking whereby another qualitative researcher analysis the data independently (Burnard et al., 2008, p. 431). Cho and Trent (2006, p. 322) advise that member checks should take place throughout the research and not only at the end of the research. The analysis of qualitative data involves interpreting the study findings (Burnard et al., 2008, p. 431) among others. By continually verifying data, errors can be corrected before they disrupt the analysis (Creswell, 2007, p. 163). This enables the researcher to stop, modify or continue with the research process in order to ensure rigour

and therefore achieve trustworthiness and credibility. In this study, the researcher used both member checking and peer reviews to strengthen the verification of the data analysis.

Peer reviewers test the vigour and extensiveness of the themes, and thus assists in validating the findings (Johnson & Waterfield, 2004, p. 127). Peer review may also encourage a search for inconsistent data and different interpretations (Barbour, 2001). To increase the rigour of the present research, an audit trail of the research activities were recorded. In addition, transcripts of each interview and interpretation were sent back to each participant for checking and verification (member checks), and the study was given to peers who had no direct knowledge of the study, for peer debriefing and negative case analysis.

4.4.5 Triangulation

Triangulation implies that researchers use different sources of information to search for convergence of the data to form themes in research. Disconfirming evidence is related to triangulation where researchers identify themes and look for evidence in the data to disconfirm those themes. It uses multiple data sources and methods to collect multiple viewpoints on the same subject for a more in-depth grasp of the phenomena being studied. The “use of results from one set of data to corroborate those from another type of data is also known as triangulation” (Brannen, 2004, p. 314). Patton (2002, p. 268) advocates the use of triangulation to strengthen studies, as credibility is enhanced when triangulated data concur (Long & Johnson, 2000, p. 32). The purpose for which triangulation was used in this study was to look for corroboration of the findings of the study by looking for evidence to verify or contradict a general interpretation (Mays & Pope, 2000, p. 51).

Various forms of triangulation are demarcated in the literature, namely:

- data triangulation (Johnson, 1997, p. 283);
- investigator triangulation (Denzin, 1978, p. 310);
- theoretical triangulation (Maxwell, 1992, p. 173);

- methodological triangulation (Denzin, 1989, p. 101; Duffy, 1987, p. 131; Mitchell, 1986, p. 19; Sohier, 1988, p. 735);
- unit of analysis triangulation (Kimchi, Polivka, & Stevenson, 1991, p. 364);
- interdisciplinary triangulation (Janesick, 1994, p215);
- triangulation of communication skills (Begley, 1996, p. 690);
- conceptual triangulation (Foster, 1997, p. 1); and
- collaborative triangulation (Tobin & Begley, 2002, p. 8).

Denzin (1978, p. 300) identifies four forms of triangulation, namely across data sources triangulation, theories triangulation, methods triangulation and triangulation among different investigators. *Data sources* do not indicate using diverse methods, e.g. conducting many interviews provide multiple data sources through only one method (Johnson, 1997, p. 282). Multiple data collection methods can be triangulated, but data sources, theory, or investigators could be triangulated too. Richie and Lewis (2003, p. 44) state that “the ‘security’ that triangulation provides is through giving a fuller picture of phenomena, not necessarily a more certain one”.

For data triangulation, data are collected at different intervals, areas, and persons. Multiple participants develop the perception of the investigated practice (Polkinghorne, 2005, p. 140).

In this study, South Africa was used as the case study environment. The interviewees and their organisations can be viewed as sub-units within the bigger case study. The ability to look at sub-units that are situated within a larger case is powerful when you consider that data can be analysed within the subunits separately (within case analysis), between the different subunits (between case analysis), or across all of the subunits (cross-case analysis). The ability to engage in such rich analysis only serves to illuminate the case. The present study collected qualitative data from different data sources, namely the Law Society, the SARB, the National Treasury, PEXSA, Korbitec, e4, Comcorp, the Banking Association,

the City of Tshwane Municipality, the DHA, the Department of Rural Development and Land Reform, Strate Ltd, Lightstone, the Pretoria deeds office, the Surveyor-General's Office in Pretoria and the master of the High Court. This constitutes triangulation across data sources. In addition, different methods of conforming data were also used, namely interviews, an extensive literature review and document analysis.

4.5 Researcher positionality

The researcher plays a central and very crucial role in qualitative research to the extent that the researcher is the main instrument for data collection and analysis. It is important for the researcher to acknowledge him/herself as a human instrument, and as such, to consider his or her own biases, limitations, and views that may affect the study throughout the research process. In the interest of full disclosure as well as to guard against unintentional and unethical influences, the discussion that follows outlines the researcher's personal experiences connected with this study.

The researcher worked in a prominent bank for twelve years, during which time she managed a department that processed home loan applications and instructed conveyancers for the registration of property for three provinces in South Africa. Thereafter the researcher accepted a position to manage certain components of the property process from a national perspective for the same bank. After leaving the bank, the researcher joined an IT company that builds software for banks and conveyancers to communicate with one another in a secure environment, as well as software for conveyancers to compile the documents that are lodged with the deeds office for the registration and transfer of immovable property in South Africa. These experiences have given the researcher a broad scope and understanding of the property process. The researcher therefore understands the challenges that are faced in the property market and the operational procedures that are involved.

The researcher was also involved in a project team that was appointed by the deeds office to conduct a socio-economic impact assessment of an e-DRS in South Africa during 2015. Interviews for the project were conducted with three of the role players that formed part of this study. The advantage derived was that the participants had built up trust and was able to share information more freely. Interview information from the project could not be used in this research, as the objectives that needed to be covered for the project were different to what this study needed to achieve. As such, this study was conducted independently from the project. The researcher obtained permission from DRDLR to use the document that was compiled during this project simply to verify and corroborate information, which may have overlapped with this research.

4.6 Limitations and delimitations

Although representatives from organisations that are nationally involved in the property process in South Africa were interviewed, the interviewees were mostly from Gauteng, a province in South Africa. Three of the participants were from the Cape Province. While it is true that the headquarters of many of the organisations are situated in Gauteng, some of the provinces may encounter different issues and as a result operate under different procedures and processes. It may therefore be difficult to apply some of the results from the study in those regions.

Another limitation pertained to the data collection process. Information acquired during the interviews were reliant on what the participants were able and prepared to share. In addition, the information shared were restricted to the participants' individual perspectives and involvement. However, triangulation of the data from the study contributed to verify the findings and helped to support the correctness of the themes that emerged from the interview transcriptions.

There were also delimitations in the study, which are features that the researcher does not incorporate into the research (Leedy & Ormrod, 2013, p. 43), or it could refer to the way the study was narrowed in scope (Creswell, 2007, p. 273). Aspects not included in this study relate to land reform and other forms of property ownership-related aspects, such as creating servitudes, creating townships, creating sectional title schemes and cancellation of mortgage bonds. Although subdivisions are mentioned in the study as part of the cadastre processes, the subdivision of land is not a detailed part of the study.

This multi-disciplinary study focused on specific areas that were highlighted during a Masters study that the researcher undertook in 2013. Although certain fields of study may have a larger scope, only the aspects that the researcher viewed to be more pertinent to this research were included to create focus and to prevent the study from becoming too bulky.

4.7 Research ethics

Concerns around ethics concern issues of “harm, privacy, and confidentiality of data” (Berg & Lune, 2014, p. 61). Every effort was made to adhere to ethical principles and norms. All data collection instruments were subjected to ethical clearance from the ethical committees at both departmental and faculty level at the University of Pretoria. All procedures were made known to each participant before asking for consent to continue with the study. Informed consent was obtained from all participants and permission was obtained from the relevant organisations for the individuals to take part in the study. Informed consent is the voluntary participation of participants (Berg & Lune, 2014, p. 87). Participants were given the option to withdraw from the study whenever they wanted to without any penalties. None of the interviewees were compensated for their participation.

All questions and information about the study were e-mailed to all participants before the interviews commenced. As an entry level in the interviews, all participants were reminded that their participation was voluntary and that they could withdraw from the study at any

point. They were assured that their confidentiality would remain intact and that they would remain anonymous. Confidentiality comprises the protection of data from unsanctioned release (Peters & Panayi, 2015, p. 9). All participants could access the researcher via email or telephone to enquire about unclear aspects. All participants were over the age of 18 years and no parental consent was necessary.

All data were kept confidential and access to any information was strictly controlled. Any identifiable details were removed. In qualitative studies, the researcher identified the participants, and anonymity is practically non-existent. For this reason, all participants received pseudonyms that are used when the data that were gathered are discussed. The transcripts are also not published as part of this study, but extracts of the transcripts are included in the chapter five as part of the evidence. The extracts were emailed to all participants and they were made aware of which aspects of the interview would be included in the study. The decision of those who declined to take part in the study was respected.

4.8 Summary

This chapter outlined the research design that was used in this study. The philosophical dimensions were discussed (see section 7.2) and the qualitative method was used. Semi-structured interviews were conducted with various organisations involved in the property transfer process in South Africa. The interviews were recorded and transcribed verbatim, after which content analysis was used to develop themes and constructs. Various documents were also analysed as part of the study. The chapter further explained the researcher's positionality, issues of reliability and validity, limitations, delimitations, and ethical considerations that were applied and adhered to in this study.

Figure 4.1 provides an illustration of the research methodology that was followed in this study. Experiential knowledge provided the preliminary indication of the study focus. An extensive literature review was conducted and a conceptual model was developed (see

Figure 1.1) that framed the focus areas for this study. Semi-structured interviews were conducted and documentary evidence were collected as part of the data collection process. The data were analysed whilst synthesis of the data took place. The data that was analysed were sent to the respondents of the study to confirm the content, a process that is known as member checking. Findings were identified and two frameworks (see Figures 6.1 and 6.2) were developed. The final report was written.

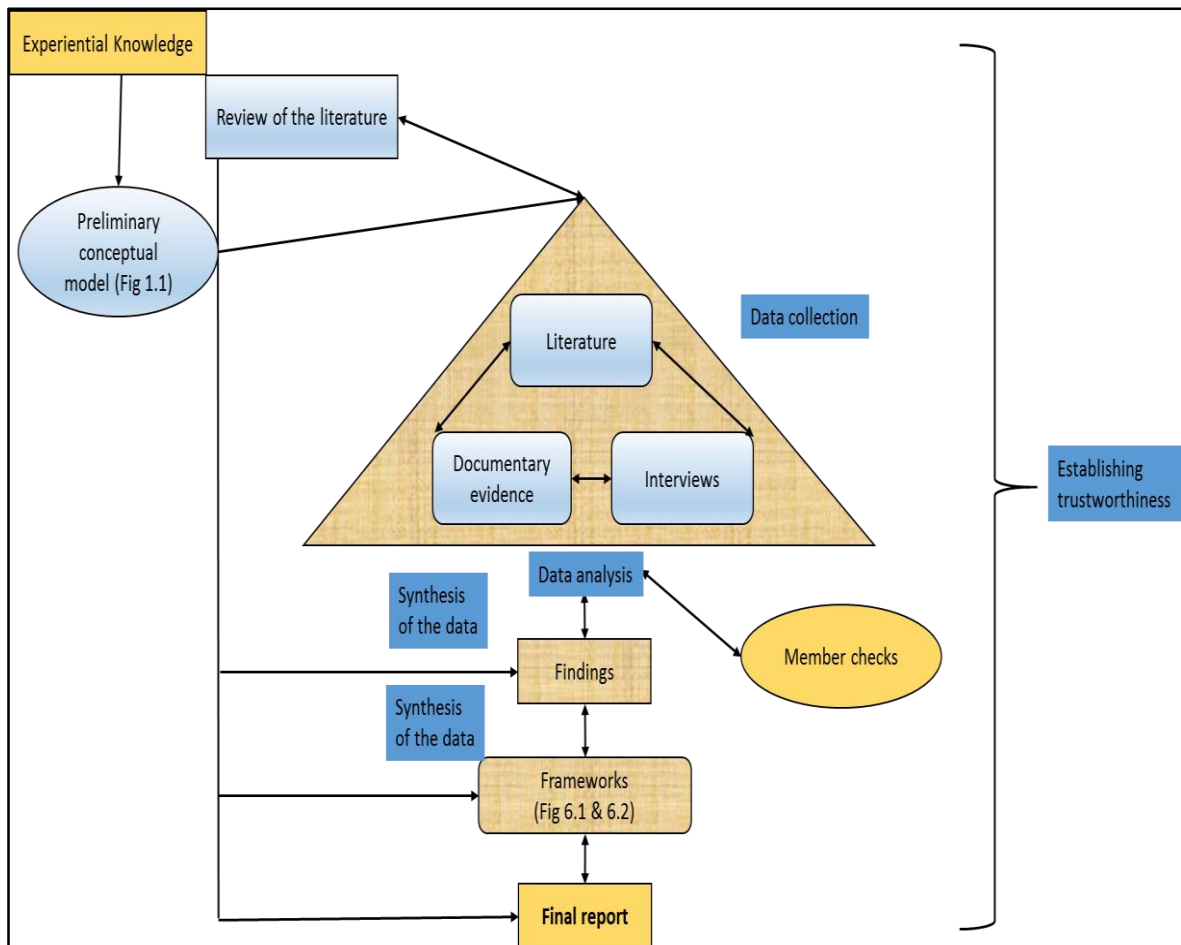


Figure 4.1: Overview of the research methodology

In the next chapter, the data that were collected will be presented. The transcriptions are not included as addendums to the thesis. As such, the next chapter contains the most relevant direct quotes that has bearing on the study to provide the reader with as much of the actual data collected as possible.

CHAPTER 5

Presentation of empirical research³

5.1 Background

In the previous chapter the research methodology was reported, which included the philosophical position in which the study was conducted, the research design, trustworthiness of the study, researcher positionality, limitations and delimitation, and research ethics that was applied in this study. The purpose of this research was to investigate various factors that may influence the incorporation of e-DRS in South Africa. The following research question informed this study:

How can the end-to-end property transfer process be integrated among the different role players to dematerialise property transfers?

During in-depth interviews of ten government entities and none private organisations, participants put forward their views in terms of the existing end-to-end property process and an envisaged electronic system in the deeds office. The research findings that this chapter reports are based on the semi-structured interviews, the new e-DRS bill that has been circulated for comment by affected parties, the previous tender document that was issued for the building of the envisaged e-DRS technological platform and the researcher's own observations during the interviews. By watching the interviewees in their work environments, the researcher could explore how the interviewees interpreted and made sense of their environment, how they interpreted information and how they engaged with other role players within their environments. It has a disadvantage in that the interviewees may

³ This chapter aimed to provide as much of the direct quotes of the data collected. The researcher did not receive permission from all the participants to attach the transcripts to this study. The quotes are organised according to the central themes that were identified during the analysis phase.

change their behaviour when they know that they are being observed. However, it was noted that during the course of the interviews, the interviewees began to feel at ease with the researcher.

The participants of this study comprised organisations and societies that form part of the current end-to-end property exchange process in South Africa. These organisations represent individuals and smaller firms that are involved in the property process, for example, the Law Society is representative of conveyancers and lawyers in South Africa. Participants from these organisations were all in a management capacity within these organisations and societies. Each participant was given a pseudonym to protect the identities of the participants. Each participant contributed varying degrees of information to the themes identified that will be presented in this chapter. Some participants talked at length on certain aspects of the themes identified, while others may have contributed to each of the themes identified. All of the participants' views and voices are represented in this study and all responses are quoted verbatim. These verbatim quotes form part of the evidence presented in this study.

5.2 Presentation of the empirical data

The property market is very important and contributes significantly to the economy of South Africa. Raymond, one of the participants, summarised this very well when he expressed:

This industry contributed close to 8 to 9% of our GDP [gross domestic product] ... each registration equates to about five to six payments per transaction which is then giving you about five to six thousand payments per day of an average value of a million rand ... per transaction ... The residential market is close to about three trillion [...] commercial about eight trillion ... the retail office and industrial hospitality makes up the balance but you can see that the majority is actually within residential and commercial ... there's more cash flow in the

economy and if there's earlier cash flow, people invest sooner, the banks receive their interest sooner, and it improves the whole economy ... with a five trillion rand market there will definitely be an impact.

This summary underlines the importance of the present study, and the effect that increased efficiencies may have on this process should not be underestimated. The interviews were transcribed and the researcher confirmed the transcriptions by listening to each interview and checking the typed version of the interview. Content analysis was used to analyse the data that was collected. The researcher proceeded to read through the transcripts a number of times, during which notes were made, and keywords were identified through a process of open coding. Meaning were then attached to the keywords and codes and categories were identified as per the matching groups of codes. These categories were translated into themes. The themes and subthemes were emailed to each participant for them to confirm that the interpretations derived were correct. Three main themes emerged from the data, namely: the supply chain management, process, and security [see Table 4.1]. While these themes are reported as being distinct, there is considerable overlap among them. In those instances, the information is discussed where the participant statements appear to fit most logically.

5.2.1 Theme 1: Supply chain management

This theme comprises two categories, namely stakeholders; and their functions and roles as identified by the participants. These sub-categories are not discussed separately but as a whole, although the two categories can be distinguished clearly. The direct words of the various participants are used as evidence of the roles and functions perceived by them.

Various stakeholders are involved in the end-to-end property transfer process. Michael summarised that the end-to-end property process can be divided into three distinct phases:

When we started looking at it we recognised that there're largely three areas...the trading space, you've got the transfer space, and you've got the post-environment...

here in terms of the registration of the ... of the transaction and the production of the title deeds, the couriering of that title deed to the bank that's got the bond ... there's that pre-space and that pre-space is serviced by multiple vendors ... the pre-space involves...the estate agent, it involves the buyer, the seller, it involves the mortgage originators, it involves the banks, it involves to some extent [...] the attorneys...You go through this process to satisfy yourself that everything is in place in order to register.

To this, Lester commented that “banks are conservative” while Paul stated, “everything starts with ... with the estate agent”.

The vast array of stakeholders was described by Barry:

include people that are dealing in the property market be it [...] the estate agents and...developers...The banking sector [...] for their own purposes of processing bond applications...the taxation organisation ... the link to Home Affairs...it bridges that gap of [...] not knowing exactly who this person is [...] who has an interest in this particular land parcel.

These three participants therefore agree that there are definite stages or parts to the property process and that certain role players participate in different parts of the process. The process usually begins when the seller instructs an estate agent to find a buyer (See figure 3.1 for an illustration of the process).

George outlined:

One of the [...] responsibilities of the Reserve Bank is making sure that there's an effective and efficient payment system and [...] in the Reserve Bank that responsibility is delegated to the National Payment Systems Department. The leg that the Reserve Bank then provides is making sure that the payments between the two banks involved can happen in real time and that it is final and irrevocable. We are not involved in the rest of the transaction because it's the bank and its customer [...] it could be the attorney and its customer...and we don't check that.

In contrast to some of the other role-players, this confirms that, although the Reserve Bank is not directly involved in a prominent role the property process, the organisation still plays a crucial role in the property process. It is also clear that the reserve bank does not police the roles of other organisations and expect for certain checks and balances to have been put into place and been adhered to.

Wendy further explained the payments and settlement of transactions that pertains to the National Treasury environment:

Payments and settlements is when you move into the National Treasury domain...would prefer to make that as efficient and cheap as possible...role is one of [...] coordination, making sure that the right areas are addressed, making sure that there's acceptance as far as possible through the actions of others [...] of this [...] improvement in financial capability and then [...] hopefully see that there's some monitoring of that taking place...The work that a conveyancer does [...] is massive...lodge papers with the title [...] at the deeds office, make sure the money flows, get the money, put it in a trust account where a lot of fraud happens as well.

Discussions that had been taking place across the property supply chain and National Treasury in order to look at the dematerialisation of the title deed. Their view is that the dematerialisation process will revolutionise and completely change the way that the current property processes take place. As a result, the tasks currently being performed by individual role players such as conveyancers will be substantially different. The researcher observed that the participants were very comfortable talking about the subject and also were able to engage in a conversation as to what had taken place in other countries with regard to the dematerialisation process in the property sector. This clearly confirmed that they had taken part in prior discussions regarding this subject. However, the researcher also observed that much uncertainty existed around what the concept “dematerialisation” actually means and would translate to once it is implemented within the property market.

Vincent also outlined various stakeholders:

We have service providers out there already...At this point in time, I can use L@w or I can use [...] GhostConvey. I've got a choice. The other role players that we have in our land registration system: SARS. The master's office unfortunately [...] is not there yet, they're still far behind. We got participants sitting in Messina, but they're registering property in the Pretoria deeds office. The conveyancer is not physically preparing the documents. It is the conveyancing paralegals, it is the conveyancing typists that are preparing the documents.

Vincent also alluded to the Master of Court office that was still working in a very manual way with regard to their tasks and processes. It is also interesting to note that Vincent mentions that paralegals physically prepare the documents that are lodged with the deeds office. The conveyancers therefore do not physically work through every step of their process themselves. However, Lester explains that conveyancers check all the documents and take full responsibility of these processes and documents. This issue was highlighted by a few participants and begs the question as to whether conveyancers are necessary in the property process. This matter will be touched on later in the study as well.

Vincent further explained, “The Registrar of Deeds is a creature of statute and he [she] can only do what is set out in section three of the Deeds Registries Act. His duty's in section three and his powers in section four.” As such, the registrars can only fulfil the responsibilities as set out by written law. Any additional tasks for Registrars to execute would need to be incorporated into legislation first. Wendy (representative of the master of the High Court) expressed, “We're government. So we work together with the deeds office. You have a number of people in this value chain. It really goes back to when you wanna start advertising.”

These stakeholders have separate and distinct roles. Some of the roles are directly related to the registration and transfer process, while other roles are of an enabling nature, for example,

Vincent indicated that conveyancers use service providers “to prepare all our deeds and documents. We will still be using them.” These service providers therefore have an enabling role, which help conveyancers perform their functions. Ashley confirmed this enabling functionality:

We're an enabler [...] that enables attorneys and actually we try and be to all the stakeholders in the property transaction. We're actually trying to remove the paper from the system ... because it would be much more efficient to not have paper all the way through [...] to enable them to be more efficient [...] and we do so through [...] interlinking electronic systems which [...] streamlines the process.

Although enablers has done much to take paper out of the system, a lot of paper remains in the process. Many participants clarified that electronic documents are reduced to paper that is lodged with the deeds office. This therefore posits that the deeds office needs to first remove paper out of their environment. Also, this shows that the different people involved in the property process in South Africa functions in silos. To this end, George (Reserve Bank) challenges that entities should work together as a cohesive whole:

It's not only one person paying funds from one to another, there is [...] many other role players involved in a property transaction and they need to actually protect that unit of work then make sure that the whole process is one logical unit and all the payments are actually initiated by this one settlement. Obviously, the buyer and the seller must get the property but sometimes there are more than one party involved in how that funds are distributed.

Michael concurred, “You still need to be connected to this rather large community.” This is important because individual organisations cannot operate in isolation. Both statements from George and Michael underline the importance and focus of this study in that the role players involved in the property end-to-end process should be operate, and be managed as a supply chain. Perhaps, George’s statement is more profound because he includes the payment and

settlements in the end-to-end process. This seems to be different from many of the other participants who view the actual registration process, i.e. the transfer of the ownership of the property from seller to buyer, as the final point of the process.

Lester explained the function of the Law Society:

...are not like a bank or a big organisation. It's a professional society of equals. The members are asked or selected for whatever, pushed or prodded to ... to stand and be available, but [...] it's seldom that a member stands for any particular view and it's purely on the basis of experience and perceived skill in the field ... and we often differ.

Lester further outlined the conveyancer's role:

The conveyancer is the party who signs, who accepts responsibility and who's liable afterwards...some compliance aspect, anything from FICA to electrical certificates to conditions in the contract that the parties may have written but not quite understood...conveyancer basically carries the transaction in his [her] two hands and then all the other role players around even if we see it's wrong, the deeds office will never change it. They're not allowed to. The conveyancer must change it... [the] conveyancer is the responsible party whose neck is on the line...even if the deeds office makes a fault, even if the bank in their documents, and that's in the service level agreement, if they make an error in their own documentation that you compelled to us it's still the conveyancer's function to read it and tell the bank, sorry, your documentation is wrong.

The conveyancer has a lot of responsibility in terms of regulation 43 and 44 of the Deeds Act [No. 47 of 1937] for the correctness of the information submitted to the deeds office. Conveyancers therefore take out huge insurances to cover their firms against liabilities that may arise from mistakes.

According to Paul certain organisations “has a frontend where mortgage originators submit electronic home loan applications into banks” and they are also “not really involved in the

finances of each transaction, it's more the data side.” This organisation therefore has a limited scope in terms of the role they play with regard to property registrations. Other organisations, on the other hand, have a much larger role that cuts across many different role players as outlined by Ashley, “our scope is, is really end to end as well”. He added that, in addition to providing software to conveyancers to compile documents, “we engage with the consumer to keep them up to date with where things are in the process all along” and “we engage with estate agents [...] to provide electronic links to all their stakeholders.”

Peter explained:

[The] Banking Association is a trade association for all commercial banks in South Africa. We've got 32 member banks in terms of the mortgage, residential mortgages [...] between our biggest players as a sector we probably do about 92, 93% of the title mortgages in the country. We deal with non-competitive matters. We look to promote the best interest to the banking sector and to make sure that if there are any impediments, and challenges that they face, that we unblock those to make them sustainable institutions.

Although the Banking Association looks to promote the best interest to the banking sector, their focus is predominantly that of the consumer and ironically not as much that of the banks. This was confirmed in the socio-economic impact study that was conducted prior to this study, which the researcher formed part of. The Banking Association may be able to bring the banking sector together to discuss e-DRS initiatives, but may have limited influence in the bigger property sector.

Barry also explained that many professionals have a professional body that looks after the professionals:

Valuers have got their own council, Council for Valuers, that registers valuers and give them their title of a valuer just like land surveyors have got a council that gives them, just like planners, town planners, they've got their same plan. Architects, engineers with

ECSA and so on. The lawyers, they're the ones who don't have a council but they are known through the law societies. A council protects the public against malpractice by its own ... by its members. A society is not such a [...] organisation.

This statement by Barry also underpins the importance of professional bodies that not only represent their members, but also can act in a protective and authoritative manner with respect to its members. It appears as if the Law Society also by themselves may not have adequate influence to bring the industry together for an e-DRS initiative.

Jan confirmed the importance of professional bodies and mentioned how these bodies regulate that legislative prohibitions and rulings are executed by land surveyors:

The documentation submitted to us is prepared and surveyed by external professional land surveyors, registered professional land surveyors. They [...] register with our [...] Institute of Professional and Technical Surveyors otherwise known as PLATO. Their registration involves a university degree, four-year [...] degree, and [...] a number of years of article training and then also a final examination written on the Land Survey Act 8 of 1997. [...] they also write on the [...] PLATO Act [Professional and Technical Surveyors' Act, 1984] which is act 4 of 1980 ... 40 of 1984 and all the other acts pertaining to land subdivision, setting out of land, and so forth. I refer to there the Prescriptions Act [68 of 1969] where you take prescript ... take ownership of land per prescription, which is a thirty-year use of land without any interference, the Seashores Act [sic] [No. 21 of 1935], the Mining Act [No. 15 of 1958] [...] the various land ordinances defining the allowable subdivision of land, consolidation of land, and so forth and so forth. Subject to them passing those exams the application is then done to PLATO for final registration and then they can [...] survey work [...] being cadastral work [...] and submit to this office for our approval.

Moreover, educational qualifications and formal registrations also are important factors to consider when looking at professional bodies from an industry perspective. The individual and professional qualifications are important, but these professionals need to be collectively

managed by an entity in order to uphold industry standards and norms. The Estate Agency Affairs Board aims to do a similar service for estate agents and have in recent years introduced a formal and accredited estate agent qualification. These bodies keep a record of registered professionals and the deeds office and cadastre (surveyor-general's office) need to be able to check that the professionals that they accept transactions from are in fact registered with these professional bodies.

A common explanation given during the interviews was that municipalities need to issue a municipal rates clearance certificate for each property before ownership is transferred from one owner to another. A previous study conducted by the researcher (Amadi-Echendu, 2013), listed this process as a major bottleneck in the end-to-end property process. Jan emphasised that technological systems are used by municipalities to manage land parcels in terms of service delivery, and rates and taxes that are payable on the property by articulating:

The municipal interaction is also gonna be huge because bearing in mind that they have got [...] a computer-generated [...] system of their land parcels that they administer...However they [the municipalities] lag behind technologically, which adds to the delays experienced in the process.

This was confirmed by Freddie who reported “You’ve got, like, 284 local authorities. Each one of their systems are not on par because of their budgeting.” Gregory (representative from the Tshwane Council) explained that in addition to issuing rates clearance certificates before property transfers can take place, municipalities also need to ensure that they update the information of the new owner/s in order for the billing of rates and services to be debited to the correct entities. The municipalities receive this information in the form of documentation that is sent through from land surveyors as well as from deeds office registration information, which is purchased by the various councils.

Jerry informed that the DHA has implemented biometric identification as a security measure in the issuance of identity and travel documents. When accessing the building to conduct the interview with the DHA, the researcher also needed to go through increased security measures and staff members used biometric identification tokens to provide access for the researcher to conduct the interview. The functionality of identifying people by means of their fingerprint that has been stored in the DHA database, has been made available to banks whereby banks are able to identify their clients by electronically sending a current fingerprint to Home Affairs from the branch, which is then validated against the fingerprints in the Home Affairs database. In the light of biometric identification, Jerry was of the opinion that:

The biometrics should be right at the start wherein you will then be certain with whom you are dealing When the person want to buy a property and he [she] approaches the [...] agent.

This is an important argument. If biometric identification takes place from the onset, the buyer and seller would already be identified from the start, which could curb identity theft and save valuable time in the entire process. Identity theft has been explained by Roy and Venkateswaran (2014, p. 1) as the stealing of someone's identity in the form of personal information to misuse that information by making purchases and/or opening bank accounts. Upfront biometric identification however, would only work in a closed system that provides for transparent information and processes. Transparency refers to the degree to which information is available allowing for informed decision-making (Lindqvist, 2012, p. 102), more equal participation around controversies and enhanced accountability (Mol, 2013, p. 1). A closed supply chain that can verify the identity of customers would therefore allow for greater transparency and security.

According to Nandgaonkar and Raut (2014, p. 737), solutions to various security issues vary and include cryptography, particular public key infrastructure (PKI), use of multiple cloud providers, standardisation of application program interfaces (API), improving virtual

machine support and legal support. Jerry also identified other types of security that have been investigated at DHA:

We are also looking at [...] the iris but it's just that it is expensive. The iris has the same feature and characteristics like the fingerprints. It's expensive so that's why we focus mainly on [...] the fingerprints for now but that doesn't mean we might not move towards the iris...the photo does change.

In order for this verification link to be built with Home Affairs, an organisation needs to build this capability technologically. The South African Banking Risk Information Centre (SABRIC) is the organisation that has built the link on behalf of the banks. Paul asserted, "SABRIC [...] they look after fraud in terms of banks." Jerry explained:

People should come and say as a group like the bank are using SABRIC. For us to manage, we can't really have individual banks. They will have to come through the Law Society because we must write MoUs [memoranda of understanding] with the [...] organisation and make some agreements and declaration.

In addition to the building of the interface, not much other investment is required as Jerry outlined, "the bank just had to interface with us, with our [...] database. The scanners that they use, we were not prescriptive." In other words, the financial layout required for biometric identification is limited for its individual users. The biggest financial expenditure would be in the form of building the link with DHA.

The master of the High Court has also been linked electronically with the DHA in order to verify the identity and status of people involved in the deceased estates with which they work. In this regard, Gail said:

Right now we are linked with DHA, Department of Home Affairs. With the link with DHA means the minute that I put the deceased person's ID number in it actually pulls through for me full names, date of death, is there any spouse or children registered on [...] his or her name. What would be nice is if we had the same ... a similar link with

DHA to confirm whether there's actually immovable property. Many cases the family doesn't know because it's person that lived alone so they don't know if the house is registered on his [her] name or not.

In terms of the end-to-end property transfer process, the various stakeholders seem to operate in silos. Even government departments are not linked to each other to confirm certain information. Silos tend to lead to inconsistency as the same information may be interpreted in different ways by different risk teams failing to recognise potential correlations between various risks (Kenett & Raanan, 2011, p. 11). There seems to be a need to manage this process as a supply chain. Effective complexity control is a core competitive capability that can be exploited to improve the efficiency and effectiveness of a supply chain (Cheng, Chen, & Chen, 2014, p. 2329) in order to create synergies for competitive advantage among supply chain partners through information sharing (Sukati, Hamid, Baharun, & Yusoff, 2012, p. 226-231; Zeng et al., 2012, p. 547). Paul argued, “the bigger players that wants to control the market ... they've suggested ways of doing it but they're not the right people. It needs the independent arm [...] to cater for it.” It is therefore important to guard against monopolies.

The master of the High Court is involved in the transfer of immovable property in deceased estates. Gail mentioned:

In the past, there used to be almost no interaction between the master's office and the deeds office. Things are beginning to change. We would like to work more closely with the deeds office because we never knew whether a caveat was registered or not. We would send the notification through to the deeds office but we never received something back to say that it has been registered. For about the last six months we are now in direct contact with one of the deeds office.

George elucidated, “the process must be managed through the whole process, make sure that the whole process is done as one logical unit, manage that whole process of the de-transfer

as one logical unit of work”. The necessity to coordinate several business partners, business processes, and diverse customers across the supply chain gave rise to the field of supply chain management (SCM) (King, Lee, Liang, & Turban, 2012, p. 15). SCM is the act of sharing material, information and financial resources within organisational units (Koçoğlu, İmamoğlu, İnce, & Keskin, 2011, p. 1631; Stadtler, Kilger & Meyr, 2015, p. 11) as well as beyond the physical boundaries of the organisation (Shih et al., 2012, p. 71) to integrate key business processes from suppliers to the end user (Lambert, Cooper, & Pagh, 1998, p. 9) in order to produce products and services. Undoubtedly, SCM can also be very effective in managing processes across the various organisations involved in the property market. Michael also shared this view and speculated as to the party who needed to take up a coordinating role with regard to managing the entire process as a single supply chain process, but went further to indicate that a party who does not have a vested interest should be appointed to manage the entire end-to-end process:

You need that independent party who's got no vested interested...there's no ways that a bank could play that role because that bank is vouching for itself and to a market...Yes, they've got a vested interest in ensuring the transaction settles because they earn a fee out of settling that transaction.

On the whole, Michael was of the opinion that only the deeds office would be an impartial party that could potentially take charge in managing the organisations involved as a supply chain. At the same time, the deeds office is currently (2016) focused on their own role as set out by statute as Michael explains, “some people in the deeds office they've got this mindset which says, well, we've transferred ownership in the deeds office so as far as we're concerned this property now belongs to Joe Soap. The fact that there's a whole host of other things that have to happen to give full effect to this transaction is completely oblivious to them.” This poses a real threat in terms of settlements and the completion of the property transfer process. This will be touched on again later in the study.

On closer investigation, it appeared as if the private sector is in favour of managing the property market as a supply chain. In fact, many initiatives have been undertaken by the private sector to technologically link various entities involved in the property market. Government department seem content with managing individual organisations. Furthermore, technological systems of governmental organisations seem to be lagging behind, while private organisations have invested into upgrading to newer technology.

5.2.2 Theme 2: Process

Synthesis of participants' perceptions resulted in a number of sub-categories. These subsections are the focus of the next few sections of this narrative, and will be discussed in separate sub-sections. There is however considerable overlap among them. The data appear where they appear to be more logical.

The end-to-end property transfer process is a complex and cumbersome process, which is characterised by many manual interlinks between a vast arrays of stakeholders that ranges from private entities to state entities. Many individual entities have embarked on initiatives to automate certain components of the end-to-end process. Charlie surmised, "if you look from A to Z, it's a cumbersome, complicated process with a lot of variables, a lot of things that can go wrong, a lot of data that can get lost, etcetera. We're [...] in the middle portion it's been highly automated now and the data's all available." In spite of all the progress made, there are components of the process that are completely excluded from the process. One such area is indigenous property. Gail confirmed that the current property transfer process does not make provision for indigenous or family property:

That's a big problem that we're facing at this stage because the concept of a family home which isn't part of our law but is part of some of the cultures and it doesn't exist in our law. So, I can't work if somebody tells me, ja, but it was a family home, we don't wanna transfer it. You have to transfer it. It has to go to a beneficiary or a group of

beneficiaries or you have to sell it to somebody but you can't ... have to take it off the deceased person's name.

This creates the impression that it is not only the technological systems and processes that do not allow for the transfer of indigenous property, but the people themselves that are reluctant to transfer the property from the deceased's name. Unfortunately, it is not clear as to what the cause may be, whether the cost factor, or the fact that indigenous property rights vests in the family and not in one particular person (Barry & Danso, 2014, p. 1). In addition, customary marriages also create a problem in terms of succession and property transfers of deceased estates. Gail continued:

Before we can get to transferring that house, I have to sort out the family ties, who's in the family, to figure out who are we gonna transfer this things to [...] So, it gets very complicated. You have customary marriages coming in [...] there were a long time where there was uncertainties in community, out of community of property which again impacts on property rights because now does the spouse have a right on the property? Doesn't she have a right on the property? Who's got the right? [...] As time goes by, those things are being decided in courts but we don't have all the decisions that we are looking for yet.

It seems as if courts are approached for decisions regarding the devolvement of a deceased's property where it is not clear who the beneficiaries are. This may add to the cost of the transfer, as well as increase the timelines for such property to be transferred. Furthermore, many other sub-categories with regard to the process theme has been identified which will be discussed next.

5.2.2.1 Cadastre and deeds office

As previously mentioned, the deeds office and cadastre both form part of the Department of Rural Development and Land Reform (DRDLR). These offices have been separated and are presented as separate entities for the purposes of this study so that individual perspectives

from the different offices can be recorded. Steven explained the responsibilities and functions of the ten deeds offices across South Africa that has been established by legislation:

We've got ten deeds registries but there's only one branch of deeds registration in South Africa which is responsible for property transfers and the registration of mortgage bonds, servitudes, and a whole series of documents according to the requirements [...] as set out in the Deeds Registries Act, and that's Act 47 of 1937 as amended ... and also read together with the Sectional Titles Act [...] and that's Act 95 of 1986 also as amended. Those two read together solidly. We've got a land registers and we've got a sectional title register.

It is clear therefore that the deeds office is founded by statute and carries out its roles and responsibilities in accordance with the statute that governs it. Vincent concurred with Steven with regard to the deeds office functions when he said:

It is important to [...] make our land registration system more user-friendly' The cadastral land registration system, as you know, is based on a diagram and obviously then the title deed who tells you who the owner is and subject to what conditions. All land registrations take place in [...] in the ten deeds registries in the Republic of South Africa. We do have the Deeds Registries Act, which is our main source of land registration. Then we have the Sectional Title Act.

Vincent went further to explain that only a title deed is a valid document that is necessary for property to be transferred from one owner to another. This proves that the formal system is strictly adhered to. Those who are not in possession of a title deed will therefore not be able to transact, borrow money against the property, or even alienate the property. A deed can only be registered in a deeds office. Any other record is not a valid record.

While ownership information is recorded in the deeds office, property sizes and coordinates are recorded in the cadastre. Many people often assume that these two functions are one and the same thing. The cadastre is different from the deeds office as explained by Barry:

[An] electronical cadastral system is not [...] the electronic deeds registration system. An electronic cadastral system is a system that encompasses all [...] land entities and the rights that are assigned to those land entities and other activities that are stemming out of that repository such as [...] facilitation for development [...] which will include administrative procedures [...] for instance for [...] changes made to land parcels in terms of use and the other [...] by subdivision, consolidation, and so on and so forth.

This means that the cadastre stores all land parcel information. This is in line with McDougall et al. (2013, p. 32) who explained that the cadastre holds an up-to-date spatial and written record of land parcels, boundaries, interests and transactions. Barry went on to clarify that an e-DRS is a system that is being implemented in the deeds office, while e-survey will be introduced on the cadastre side. Together these two projects make up the a-cadastre programme:

There are therefore simultaneous projects underway for both the deeds office and the cadastre to be transferred to an electronic platform. Both projects are managed by the Department of Rural Development and Land Reform who has appointed a project manager and architects to build the electronic platforms for both projects. The deeds office and the cadastre work in different technological systems and also work with different industry partners. As such, a one-size-fits-all platform would not work to integrate systems in this environment. This concept also was not clear to all the participants that were interviewed. Many of the professionals deemed e-DRS to be one project and not all participants could relate to the complexity of the project. According to Barry, the purpose of the e-cadastre programme is:

to create better platforms for access to this information by various stakeholders for different purposes. [...] The cadastral system...has got pillars. There are four main pillars [...] the land surveying fraternity itself, particularly those who are in private practice, the Surveyor-General's Office, the Deeds Registration Office or deeds office, and the conveyancers.

Jan asserts that the processes in the Surveyor-General's Office have been manual to date (2016), "we have predominantly been working on hardcopy paper format [...] a paper trail". Like the deeds office, the cadastral office has also worked on a scanning project to convert paper documents into a digital format:

Not all of them are scanned yet. [...] I would say maybe 15% of the survey records in the country have been scanned. We're receiving it in a electronic format ... they're adding it onto the existing [...] continuous map that we have.

In addition to scanning current and past paper documents, land surveyors are also allowed to submit their new applications on a CD, or they could email the documents and the application information. Although these documents have been converted to a digital format, the origin of these documents is still paper-based. The documents had to be printed, then physically signed and thereafter scanned onto the CD or computer to be posted or emailed to the surveyor general's office. These are not viewed as dematerialised documents, but as digitised documents.

Steven confirmed the importance of surveyed property when he mentioned "Land needs to be surveyed properly first and needs to be approved by the relevant surveyor-general and only at that stage, once that has been done, can you then effect transfer to a beneficiary of that ... in terms in that diagram. It's an entity of land that has actually been surveyed and is capable of ownership." By and large, property transfers can therefore not be executed in the deeds office unless the land had been surveyed previously. These subdivided property records have been stored and maintained for hundreds of years already. Jan pointed out:

Every land parcel currently coming into the office is based on an underlying cadastral. What I mean by that is [...] all land, the entire country was subdivided into farmland [...] dating back in the 1800s/early 1900s. There is reference to every land parcel in the country. There must be in the region of 3.9 million parcels ... land [...] documents in our office that we manage.

The cadastral system is updated whenever the size or boundaries of a certain property description changes, whereas the deeds records are only updated when a change of ownership is being lodged by a conveyancer. A land surveyor would be part of the cadastral application and a conveyancer would manage the deeds office transaction. It is therefore possible that the property description and size of the property as recorded by the deeds office may differ from that of the cadastre, as the property may have been subdivided and no new change of ownership has been recorded by the deeds office. These differences in information between the two systems may also pose huge challenges when trying to combine technological platforms as per the e-cadastre programme. Jan concurred that transfer applications where ownership details need to change may not necessarily be updated in the cadastre, “If there’s no change in the cadastre, in other words, I’m the owner of that land parcel and I’m selling that land parcel in its entirety to you there’s no SG interaction.”

Steven also supported this view by clarifying that updates in the cadastre are not always updated in the deeds office:

It is a negative [...] system of land registration. [...] for simplicity sake [...] the negative system implies that what is captured at the time is the one that is [...] displayed as information. Should there be a change maybe in the future you’ll only update it again in the future when the next transaction takes place ... he [she] could’ve been deceased six months. We don’t know about it until it’s actually reported and lodged within this office for updating. In other words, either in the estate transfer or for whatever other estate transaction that might be involved. Only then do you update [...] the information.

So [...] that's the systems applied in South Africa' There's no automatic change. It's only as and when you deal with that transaction do you then update the status. Only formal recording a registration according to the Act [Deeds Registries Act No 47 of 1937] it's permissible.

Barry (cadastre) confirmed the differences in property information that reflects in the deeds office and the cadastre:

Some of the land parcels that are created they sometimes never get registered. Remember though that the parent would've been registered a long time ago, and then there was subdivision. But that subdivision order never did anything. So, if you look at registered properties and created properties you will always see the difference, because what has been created and not registered will not appear with the registered deeds. And then people will say, ah, but the SG [surveyor-general] saying one and the deeds is saying another. No, your data, guys, is not correct.

To obtain the full view of a particular land parcel, an enquiry should be drawn from the deeds office for ownership information as well as a separate enquiry drawn from the cadastre for land size and coordinate information. Another complexity that is added to land administration in South Africa, is that province layout and names have changed numerous times. The property description that has been captured in the deeds office may as a result differ from the property description that was recorded in the cadastre. Barry said, "if there is the integration the deeds environment will become aware of the subdivisions as and when they happen". These differences need to be addressed and updated for all properties before a meaningful and effective integration can be implemented.

There are very specific functions that need to be carried out by the cadastre, and a unique set of functions for which the deeds office is responsible. There is a responsibility on the land surveyor and the conveyancer to ensure that the information submitted to the cadastre and deeds office are correct. These roles are governed by statute. Steven summarised:

The correctness of the information is the responsibility of the conveyancer in terms of regulation four [...] 43 and 44 of the Deeds Act [No. 47 of 1937]. It becomes his [her] responsibility. The deeds office records what is given to them. They don't check the correctness of the information; it's not our function. There's [...] a balanced responsibility. Certain things that the conveyancer is responsible for [...] and certain things the deeds office is responsible for.

It therefore seems as if the conveyancer functions and those of the deeds office overlap to some degree. Although the double accountability and additional checking capabilities may add to the security and rigour of title in the South African land administration process, the question has been asked as to whether this rigour is really necessary. Vincent tried to clarify how the responsibilities are divided in practise:

It's the conveyancer that ultimately takes the responsibility for the correctness of that document and the registration thereof. The only responsibility that would be on the deeds office to determine whether the deed that is being registered is an ... is going to create an indisputable title deed in terms of the Deeds Registries Act [No. 47 of 1937] not whether this person's marital status or whether he's [she's] divorced from his wife [her husband], it's ... that's all the conveyancer's responsibility.

Vincent went on to envisage that the implementation of e-DRS may have an immense impact on conveyancers “... and the conveyancer's responsibility might become a bit more in that they would have to then link up with Home Affairs and say this is Vincent's thumbprint, is he a South African citizen? Is he on your population register? Or isn't he dead?”

Vincent further drew attention to the fact that registrars manually sign each title deed for registration to take effect. With a dematerialised process there would not be any physical signatures. This part of the process can be compared to making an internet bank transfer. The process is completed on a computer and no manual signatures are necessary. “The deed

will be executed in front of the conveyancer and just lodged at the deeds office for [...] registration and not execution.”

Melissa extensively discussed the integration of the deeds office and cadastral systems. These two departments have different processes, which are not related in many aspects. Both departments also have a history of paper documents that need to be converted to an electronic mode in the form of scanned documents. In addition, it seems as if there was dialogue to combine the cadastre and deeds office in the e-DRS platform. In the researcher’s view, this may not be a feasible approach as efforts to align information before it can be integrated may delay the implementation of the e-DRS system. This discussion was summarised as follows:

The processes will still be [...] the two different main service delivery processes that will be followed ... and those are still supported by the Act [Deeds Registries Act No. 47 of 1937]. The current view of the department is not to join the two branches...The intention is now to look at [...] system development although the two branches remain two branches. It is two different professions [...] so even the merge of the two branches in potentially a [...] single government component, might be problematic but there is nothing that stop us to develop a single integrated automated system that will be used. Because their business processes, their service delivery process, are unique, 80% of the system, is actual common functionality because it’s almost your support processes. There’s [...] the intention to do all kinds of [...] data-cleansing exercises [...] that they’ve started with to align it between the two units...They have two different Acts [Deeds Registries Act, No. 47 of 1937 and Land Survey Act, No. 8 of 1997], they are two totally different work things that they do. We should rather focus on a common system with integration but with two different modules, if I can call it like that, still run by the two different professions.

Vincent had been involved with the deeds office for many years and provided a history of the title deed from 1656 when the first title deed was registered in South Africa. He is of the view that eDRS will create a lot of additional jobs and will not negatively affect the

economy. He is of the view that the current deeds registration system must largely remain the same:

[In] 1656, when the first title deed was registered in the Cape Town deeds office ... we started in 1996 with the Electronic Deeds Registries Act [No. 47 of 1937] to change it. It will be a very sad day if we change our land registration system. There's only six and a half million land parcels registered in South Africa. We've got a population of 55/60 million so there's so much titles that must still be provided. There's gonna be so much work for everybody that I don't think anybody ... a small firm is not going to [...] it ... it's not going to detrimentally affect them.

The examination process in the deeds office is quite in-depth and lengthy, and various aspects are checked and confirmed. There has been criticism of this in-depth examination process, especially since the conveyancer is responsible for the correctness of title. Whittle (2014, p. 1) is of the view that the South African deeds offices' concern should be limited to the validity of the title, not the validity of the underlying agreement. If this is carried through, the amount of time that property transactions take in the deeds office could be significantly reduced. Encumbrances that are identified will prevent the transaction for the transfer of the immovable property. Vincent reported:

They [the examiners in the deeds office] still investigating to see if it is the rightful ... the registered owner that's passing transfer, whether there are any encumbrances against the property like mortgage bonds and attachments and if they are being dealt with simultaneously, whether the conditions that are being perpetuated or recreated are registered in terms of the Deeds Registries Act [No. 47 of 1937], whether any person that has a [...] registered right in the property is a party to or a privy to the deed or whatever because you've got all these conditions in favour of the Home Owners' Associations, the property may not be transferred without their consent. That will ... the deeds office will have to see if there is consent.

This view of Vincent is clearly opposite to what Whittle (2014, p. 1) envisaged. Steven explained a few other impediments that are checked because these impediments may reduce the ability of the rightful owner to legally alienate the property. Examples of these instances are where it has been established that the owner is mentally ill or has been sequestered. In these instances, a curator needs to transact on behalf of the lawful owner:

They [the examiners] want to go and check is there any impediment or any interdict against that person. If he's [she's] sequestered, there's a sequestration notice against that person's name, that means he [she] cannot deal with the property. He [she] cannot sell it out there. Obviously, we're gonna require [...] a trustee of the insolvent estate to deal with this. If the trustee of the insolvency estate is dealing with it [...] and then this printout of the person shows a sequestration of no problem, he's [she's] doing it in terms of this sequestration.

Where irregularities are found pertaining to the legality or correctness of information and documents that had been lodged with the deeds office, the transaction is rejected and referred back to the conveyancer. Where the conveyancer is able to rectify the mistake, the transaction can be re-lodged. There is a perception among various participants that were interviewed that the quality of the applications that are lodged have diminished quite substantially. On the other hand, there is also a view that the examiners reject matters lodged without having properly examined all documents. Sadly, the buyer and seller are trapped in the middle of transactions that often take longer to register. Additional checking points that have been put into place to curb the number of incorrect or fraudulent applications from reaching the registrars in the different deeds offices, adds to the lengthy turnaround times that has become to be associated with property transfers.

Steven explained, “This [examination] is a very lengthy and complex process of legal examination and deeds do get rejected. We've got very high statistics. Some offices as high as 50% of deeds coming in get rejected. In other offices, a bit lower, down to 25%. The

process is, I would say, 95% the same throughout each office. Johannesburg, for example, may have introduced [...] another point to say I want to check. Before it goes to microfilming, I've got a pre-check and they set up their staff to do that pre-check because they've had issues. So, if they've got an extra point whereas Cape Town office may not have that point.

Ashley explained that “the document ... is crucial to upholding [...] the letter of the law. The records in the database would speak to ownership.” Ashley asserted that legal control has become embedded in the property documents that are drafted by conveyancers. Consequently, it is crucial for documents to be drafted with correct clauses to reflect the agreement reached by parties to the transaction. Electronic records management also need to cater for changing technologies. Documents need to remain legible and accessible for many years so that the legal ownership of people can be proven in the event of disputes arising:

The documents that were written in 1850 is still readable by a human today and you can still refer from the intent of the document and you can interpret it based on the laws at the time. Whereas [...] you try and open a spread sheet let's say by Lotus 1 2 3 fifteen years ago, you know [...] the rendering of that information becomes subject to today's rules. If you remove [...] the legal requirement of documents out of the system ... you know, attempt to streamline the system, removing a lot of the legal control out of the system. We're picturing a world where you systemise a lot of the process [...] but you still uphold the law by using legal documents...

To ensure the longevity of documents, technology has been employed to assist with the capturing and storing of documents, in particular the title deed. Barry expressed that “much of the benefit of digitising the process is about efficiency gains. We currently manage paper records even after registration and in a paper world, you can't really bring the data that went

into the documents into play.” Charlie confirmed that the paper title deeds are returned to the bank for safekeeping after the registration process had been completed:

The paper lands up going back ‘cause it’s still a manual [paper-based process] at the end of the day but certainly those bank documents and all of those other documents they become electronic originals.

The Electronic Communications Act (ECT Act) (No. 36 of 2005) regulates, enables, and facilitates all forms of electronic communications and transactions in South Africa. For purposes of sections 14(1)(a) and (b), it should be noted that a computer printout of an ‘original’ electronic document does not constitute an original. An original message remains in electronic form, and it is the first generated copy by the sender or an agent of the sender (ECT Act). Charlie (e4) explained the operation of the EFT Act as follow:

The ECT Act, section 14 effectively says, in layman’s terms, it says if I take this piece of paper and I scan it in a manner, put it on the glass and I convert it into electronic form, let’s call it a PDF, in such a way that I can categorically prove that that document could not have been tampered with then the paper original and the PDF are both originals ... the method of scanning to convert documents into electronic form so that they are originals and therefore they can be relied on - originals for the FICA process, they can be relied on originals in court later in terms of the bank security documentation.

The statement made by Charlie above is very important with regard to document management principles pertaining to the property market in South Africa. Correctly scanned documents can preserve the quality and comply with requirements set out by law for electronic images to be used as proof of ownership in a court of law. Charlie linked the use of advanced electronic signatures to the electronic images to further provide a secure alternative to drafting and signing of paper documents. Combined, these aspects can revolutionise document management in the property market. Another legal compliance issue

is the identification of customers. FICA procedures are done by different stakeholders in the end-to-end process. This seems like a duplication of efforts and processes, and Paul posited:

The customer comes in, walks to the attorney's office, and he [she] signs everything. He [she] gets FICA-ed and everything there again so amount [...] of duplication starts right in the beginning. I think South Africa still got as far as the world is concerned the best system. [...] so it might be duplications but it's a system that's come over time.

Lester confirmed the duplication of effort and tasks but explained that different role players have different roles to fulfil in the property supply chain. He was of the opinion that although estate agents may have processed a FICA procedure, that conveyancers would redo the same FICA procedure as part of their due diligence measures:

The agent's cause is to sell the property. For them, the name, the ID, is merely a technicality, the bond is [...] hurdle to pass to get the bond approved. The information in principle is the same, yes, but FICA, for instance, the FIC [Financial Intelligence Centre Act 38 OF 2001] says the agent must do the FICA. The transferring attorney must do it again on his [her] own. The bank must do a FICA, which they pass on or tell the attorney to do, which used to be the same but nowadays two of the biggest banks don't allow the same attorney to do the bond and to do ... so already there's three FICAs in the line checking the same thing, the same ID, the same name, the same ... because in that process you often pick up mistakes, 'cause you don't rely on a one hurdle. No conveyancer or few conveyancers will rely on an agent to accurately get the information.

It was not expressly clarified by any of the participants whether eDRS will assist in eliminating much of the duplication that exist in the system. Vincent was of the opinion that e-DRS could not be implemented until all documents had been converted to an electronic platform, "However, you cannot start electronic deeds registration system if all your records

are not electronically scanned.” Yet later in the same interview, Vincent contradicted his previous statement by saying:

The scanning should not [...] withhold us implementing the system. If your title has not been scanned you will have a kiosk at the deeds office where you bring your title to, it gets scanned first, and then you electronically lodge.

[Technological and business] Rules may be programmed to check and confirm certain elements in an electronic document. This means that a computer programme can facilitate intelligent documents. For example, a document that has bearing on a private company will automatically have reference made to ‘the director/s’, while a document that is compiled for a customer who is married in community of property will also automatically populate the spouse’s information where necessary. Similarly, business rules may provide check points for pre-agreed criteria that may include FICA checks. Charlie said:

We have an electronic automated set of rules that will programmatically check the FICA documents and the old mortgage pack in terms of are the right documents there depending on the transaction type, depending on the parties type. We lock all of those attributes into [...] the artefact that’s created which is the document. When it goes to court one day, everything is contained within that single PDF and an electronic expert or a ... even a judge can just click on the field and say, right, I can see Anthea signed this document at this time in this place and it had to be her because in the background, these were the processes followed to identify her whether it was a biometric, whether it was a FICA process, whatever the case. One of our goals is if we [the vendors] can on behalf of the banks and help the bank to control the document, control the signing of the document, and by the document I mean the contents, static or variable, and control the signing that actually nobody has to check that document.

This control can assist to reduce the turnaround time by pre-programming certain functions and electronic checking capabilities. An electronic document is very different to a paper

document, in the sense that paper documents needs an initial on every page. An electronic document does not contain different pages and therefore only needs to be signed once, without any additional initials. Charlie elaborated:

You no longer need to initial each page 'cause the electronic document now is effectively one page. Look, as you visually see it on the computer, it's twenty pages but actually electronically the computer doesn't know any different. It's one page. So, you no longer need to initial each page. That document is only complete once everything has been signed.

Raymond also extended the dematerialisation concept into the payments realm, although he also used the word 'digitised' to explain this concept. It seemed as if many participants did not understand the difference between digitisation and dematerialisation, although they all agreed that an electronic process should replace the current manual and more paper based process. The researcher encountered many such instances during the different interviews where digitisation and dematerialisation were used interchangeably, when in fact they do not mean the same thing at all. Raymond remarked:

And also your bond documents that you get from the banks, [...] the power of attorney, the concession, the ... all the documents that we generate can be digitised and it can be digitally stored and it can be electronically signed which make all this paper flow redundant. Currently, there's still [...] a paper-based ... paper trail between the paralegal through a requisition for admin to pay out the money and there's where the fraud happens, so we take that out.

There are many benefits attached to using electronic documents. For example, an electronic document can be retrieved effortlessly from anywhere by different stakeholders. Charlie expressed, "give each party that needs it the ability to use a real-time request and retrieval process to get that document. So, there's no central repository but there is the ability with the customer's permission to go and pull these documents instantly."

Lester explained that the preparation of deeds documents is a very controversial issue. Conveyancers need to make sure that the correct documents are prepared correctly for the correct transaction, and are being forced by banks to, at a premium, make use of vendor packages to prepare the documents when conveyancers prefer to use their own templates at no additional cost to themselves. Although intelligent electronic packages were designed to simplify things, Lester cited quality concerns with regards to the use of generic templates. Despite raising these concerns with the banks, conveyancers are still obliged to use vendor packages in order to compile the documents that need to be lodged with the deeds office for property registrations:

The preparation is two stages. One is to have the right documents for the right transaction and software vendors try to push with this huge barrage of [...] pre-programmed, pre-written [...] templates for each possible transaction while [...] this other half of the transaction needs to import the variables, the names, ID numbers, erf numbers, correctly into the programme, which used to be the most difficult part of the ...technical aspect of conveyancing just to get all the information right everywhere, every time, all the same which a computer obviously can do in the right...the document is designed for a specific transaction while the software vendors has a generic document with two/three hundred variables that it completes and [...] fills in as you go along which is the way almost all programmers want to do it but not us. Many of the conveyancers don't want to do it that way.

Ashley then explained that a centralised document management system will better control across the property supply chain. This view is in conflict with the view that was put forward by Lester:

As such, the deeds office can control its own activities and not regulate the activities of other entities with whom it may interact. The attorneys' space where we automate as much of the processes they need to do for them ... bank content that needed to be rendered on the attorney desktop by centralising those things. You don't need to have a

distributed system on documents lying everywhere. You can have one central [...] sending point for these documents and you can enforce [...] a lot of [...] the quality issues around the document and a lot of the [...] content issues around the document.

On closer analysis, all participants agreed that the implementation of an e-DRS system into the deeds office and cadastre was important. Private organisations appear to have made better progress in implementing initiatives that can accommodate an electronic interface. Not all participants agree that the current process and registration system need to change. There is also no convergence across government departments in this regard.

5.2.2.2 *Efficiencies*

Steven summarised the benefits of electronic documents management in terms of increased efficiencies due to a saving in the process time, conveyancers can immediately attend to notes that have been raised by examiners, and a reduction in the number of rejected deeds. He lists a few shortcomings that need to be addressed outside of the e-DRS scope which are insufficient qualification on the part of the examiner and inexperience of conveyancers. These shortcomings, if addressed adequately, may assist to reduce the number of rejections that are currently occurring in the deeds office:

In terms of our electronic documents management system...It would cut down on process time, number one. Time and certain practices, such as rejection of deeds...The deed doesn't comply on the basic requirements upon lodgement electronically checked and immediate dismissal. So you not wasting time, you will have more efficiency coming in. If there's any notes raised...and electronically can be attended to virtually immediately so it may not necessarily result in the rejection of the deed...I think it's gonna cut down on our rejection levels the reasons it's being rejected like that. [...] two reasons. Either poor conveyancing or poor examination on the side of the deeds office in terms of the

qualifications. Examiners not being adequately qualified...on a conveyancing side, a conveyancer, inexperienced...not giving sufficient documentation.

Ashley summarised the benefits that increased efficiencies may bring as a more streamlined process and increased revenue:

I think there's a lot of benefit to be brought by efficiencies [...] not physically having to, have to manage the paper. This will lead to a more streamlined process allowing for an end to end platform which [...] which can only be more efficient than, than the current paper-based one. You could bring efficiency to the deeds office and trade that for, for revenue.

Gregory also said that they “try to streamline the stuff as far as possible because of time constraints as well,” thereby adding time savings as an efficiency benefit.

5.2.2.3 Inefficiencies

Various inefficiencies exist in the end-to-end process. One such, as highlighted during the interviews, is that different processes and procedures exist at different municipalities and deeds offices across South Africa. The different requirements were confirmed by Charlie when he explained, “Again, frustrations that we have there is every single council has different requirements. Some need a certain lot of docs; others don't, some want it; some do, and they change that on a regular basis.” Peter concurred and added that the current paper-based system adds to the inefficiencies that exist:

The current system is reasonably inefficient. It's a manual process and what you have is, you've got pieces of paper that flows between different parties and obviously there's delays in [...] terms of the flow of paper. We all know the inefficiencies of a paper-based system, so to try to get a municipal clearance certificate is a process that can take a week, and somebody's got to physically write it and what not, whereas here you would, the parties would have access to the full information relating to a property.

The master of the High Court has been accused of being responsible for enormous delays in transferring of property of deceased estates (Amadi-Echendu, 2013). This aspect was extensively discussed during the interviews and Gail defended the office of the master as follow:

If they say we delay, then my question is this: this application was received on the nineteenth. I received it this morning; it will be issued today. Its twenty-four hours. So, you know, if the file was not available it would've taken longer... I don't see how we can be blamed for delaying because... in terms of our performance agreements I have five work days within which I have to do that file. So, it does go out as soon as I get them because I don't wanna fall behind. If we are the ones delaying the transfers I'm not sure where we are delaying it... the process is we just approve and, you know, give the final go-ahead but the main process falls within the hands of the executor. If there are objections then it will delay because now you have the whole objection process to follow. Usually, the beneficiary is then very quickly seeing, oh, but actually it's our executor that's holding it up, it's not the master. There can be a holdup like with copies because they need to attach ... deeds office directly requests certified copies of certain documents from my main file and if they can't locate the file immediately it can be a holdup with copies.

Based on the explanation given above, it appears as though there are parallel processes that take place between the master of the High Court and the executor of an estate. Delays that occur with the executor is apportioned to the master of the High Court's office. This confusion and misunderstanding may occur in the absence of clear guidelines between the roles of the executor and the master of the High Court. A delay is justifiable where objections have been raised with the master of Court, which needs to be dealt with as a separate process.

5.2.2.4 Gaps

Time delays between the actual occurrence of registration and when it is reflected on the system have an effect on payments and many other factors. In this regard, Ashley concluded that the lack of implementation of available technologies is the reason for the gap that exists between registration and payment:

The delivery of the property happens on registration payment ...actually happens two or three days later. [...] The gap is that, the deeds office and the department [of Rural Development and Land Reform] and government, doesn't currently, hasn't currently implemented [...] technologies that are available.

Charlie also stated that the deeds office examination time can be reduced by using technology because “they [the examiners in the deeds office] can turn around these documents, verifying these documents, in a matter of hours as opposed to two days which it took before.” Peter was of the opinion that the entire end-to-end process time could be reduced if stakeholders were able to interface their technological systems with each other and share information. He said:

The parties have to engage with each other in order to effect a transaction whereas, here what you'd have is a seamless [...] process, where once the information is being sent through [...] the various parties would be able to interface electronically with each other - cause what you almost end up with is an instantaneous bond registration and transfer of a property. Whereas now, [...] that process can take six to eight weeks very easily.

Currently, there is also a lack of stakeholder communication. It is essential that sustainable supply chains consider and use the interrelationships between the supply chain members, resources, activities and interfaces that comprise coordination, interaction, co-operation and competition (Gopalakrishnan et al., 2012, p. 194). One aspect of this lack of communication is that cadastre activities are not transferred to the deeds office as described by Barry as

“currently we don’t inform the deeds office that this property... is going to be subdivided”. However, only properties which changed ownership are registered in the deeds office. In other words, if a property has been subdivided, that change in property information will not be recorded in the deeds office, only in the cadastre.

Fred observed that, in order to dematerialise the title deed and implement e-DRS, deeds office staff would need to be retrained. In addition, current documents would need to be updated in such a way that the documents’ integrity remains intact. A constraint that Fred identified is the limited availability of skilled resources in South Africa that could assist to update these documents in the correct manner in order to retain the integrity of the document. Also, the new e-DRS Bill needs to be passed by Parliament for the envisaged changes to take effect:

The limitation is in your technical resources within the department or [...] within the country that has knowledge and experience of those records is limited. You have to keep the integrity in place of a record. So you can’t just [...] tell the database administrator move that to that because they have to know the contents of the information and how that will impact. The people in Deeds aren’t actually [...] computer literate or they don’t use that as part of their work. So there is a huge challenge there if you go electronic. The act needs to be passed.

The lack of skills and the retraining of staff seems to be a big gap and concern to private and governmental organisations alike. Ashley also alluded to the lack of skills in the deeds office as identified by Steven (earlier on in the study) as well as Fred in the previous comment:

To implement an IT project of the size that’s required for this is probably gonna to need some expertise which doesn’t exist in the deeds office. There’s a ... call it a process problem in government to implement these things and, and a skills problem in government to implement these things.

Lester concurred, “the state is simply not [...] there’s not sufficient experience and [...] expertise to properly deal with software and computer contracts”. Jan added that skills of the land surveyors for the cadastre comprise another constraint, “... we have a number of professional land surveyors that are practicing their trade and their profession in excess of sixty/seventy years old. Now why I say that is they are not computer literate.” Although age brings with it much experience and knowledge, the challenges associated with older staff is that they may not be computer literate, or may be unwilling to change. Consequently, introducing an electronic platform for the processing and lodgement of new property applications may be problematic.

Updating of the relevant legal statutes to cater for electronic mechanisms is still a gap that should be bridged. The more obvious legislation is the e-DRS Bill that has already been circulated for comments (2016), although other enabling legislation may also have to be updated to make provision for an electronic workflow and electronic signatures. Jan elaborated:

Land Survey Act 8 of 1997 does not talk to an electronic format. He [the person who was tasked to rewrite the Deeds Registries Act 47 of 1937] has rewritten the act pertaining to various rules and regulations on this ... on the act but to accommodate for a [...] e-cadastral, a digital environment but that act must still be passed.

According to Wendy, there are “...a whole value chain of things that... must be fixed. I don’t think that in this whole process you should underestimate the resistance.” The resistance issue has also been widely mentioned across the various interviews that were conducted. This matter is further discussed under the construct “*Electronic deeds registration.*” Jan added, “one of the gaps would be your back-scanning...to get everything on an electronic... continuous map environment”. Peter concurred that “there’s something like 400 million pieces of paper that firstly...from the existing deeds office that have to be put from paper into electronic records system. And only then can you consider adding to that.” The back-

scanning activity is a project that is taking place within both the deeds office and the cadastre in preparation for the implementation of e-DRS.

Jan also identified another gap in the form of un-surveyed land that would need to be addressed, “there are some what we call [...] un-alienated state land, which is un-surveyed state land, but we’re aware of the position of it but the actual boundary, the exact corner boundary, of that particular land parcel has not yet been defined.”

Ashley raised a concern that was also voiced by other participants. He is concerned with the deeds office’s capability of choosing an appropriate vendor to assist them in building the frontend for the new envisaged e-DRS system. There have been previous attempts by the deeds office to build such a frontend, but these attempts were unsuccessful:

The world is covered with vested interests [...] and everyone [...] thinks of their interest, and in government, it’s a difficult space to procure systems efficiently. Choosing and deploying the right solution, is probably the biggest gap. The deeds office struggles with the balance between service delivery and employment. The biggest problem... is to have a government with the want, the need, and the will to implement something, well and having a supplier that, that shares that vision.

Steven listed a number of gaps that the deeds office has identified during our interview. These gaps include outdated technology used by various entities including the municipalities and conveyancers, training initiatives for deeds office staff and other role players in the property supply chain to close the skills gaps identified, the introduction of change management initiatives in order to realign business interests, no trading account for the surveyor general (cadastre) that was approved by National Treasury and unsuccessful employment equity initiatives:

...the local authorities: are they geared up? Do they have the budget... to electronically meet the requirements of the day? What type of threats are happening? What stakeholder engagements need to take place? [...] what is the threat to [...] the city

conveyancer who's getting all this participant work? ...Training...has to be looked at in terms of budgets and a whole series of other aspects. The whole change management and the mind-set changing of everybody, internally, externally. Every person that we're already interacting with to some degree will have to do some change. For some, it will be minimal impact and for others, [...] a major impact. The conveyancer [...] as a practitioner out there who doesn't have the necessary equipment is gonna have to acquire that first time round but a minimal impact would be on people like SARS, for example. The conveyancer's responsible for collecting, let's say, the transfer duty receipt. He [she] will still get that electronically, he [she] will still pass it to us, but our link will then be to verify that transaction, which then have a link directly to SARS to verify certain information ... not sufficient IT staff or skilled IT staff maybe within a local authority.

Melissa summarised the gaps within their organisation and mentioned that The Deeds Registries Act does not allow for electronic applications, external stakeholder management in the property market was lacking, auditors identified certain control aspects in the envisaged architecture that needs to be corrected, reskilling of people, the absence of a strategic leader who can implement the drafted e-DRS plans, the code for e-DRS should be written and a cost forecasting should be completed. These aspects are very similar to what was conveyed by other participants:

Processes can run in parallel and the Act [Deeds Registries Act, no. 47 of 1937] doesn't currently provide for that. We've also recognised in the original design that we have not really done proper external stakeholder engagement with regard to the system...there were a few things related to the Act [as above] and there were a few things related to just common controls that [...] the auditors picked up at that stage that need to be revisited... We need to revisit the organisation architecture and vendor system specifications then the code need to be developed. You need to reskill people. Their mind-set needs to change to client focus, client-centric delivery service focus. If that

doesn't kick-off at the same time as organisation architecture kick-off we going to miss the whole thing. The plans to do all of it is on paper and it need to be implemented. You need a strategic leader and most probably a political correct leader who can influence other departments maybe through the DG [director-general] and all the [...] interdepartmental [...] forums that exist. You can only outsource the work [...] and you need a structure to drive that.

Michael outlined gaps that should be addressed as changes in legislation, mitigating risk and reducing fraud, as well as requirements around the block chain technology:

There're umpteen legal acts that need to be changed to facilitate electronic deeds registry, replacing a title deed with an electronic record...it's more about mitigating the risks, it's more about reducing the fraud that is currently taking place in the industry...what this block chain technology is proposing. It's just how long it takes to get there and how quickly it can be done.

The priority gap that this participant listed was that legislation should be amended to enable electronic property registrations. A legal framework would thereafter need to be developed in order to mitigate risks upfront. He also observed that the current structure would need to be adapted to make provision for block chain technologies to be introduced, if that route should be decided on in future.

There are therefore many gaps that have been listed by both private and governmental organisations. Many of these gaps were identified by numerous organisations and many were confirmed through the interviews that were conducted. Different organisations are responsible for closing these gaps, but all organisations seem to be reluctant to initiate a process to address some of the gaps until the deeds office has committed to the implementation of e-DRS.

5.2.2.5 *Integration*

Ashley said, “Estate agent electronically communicates with the attorney to say... I’ve sold this property, here’s the offer to purchase [...] and they put the document into the electronic system and it appears on the attorney’s side.” What Ashley explained here refers to a technological system that was put into place by one of the vendors for estate agents to electronically instruct transferring attorneys, who are appointed by the seller, to initiate certain processes while the banks are processing the home loan application. Paul also confirmed that various integration efforts in the property market have resulted in improved communication among stakeholders. Integration that was built behind the firewalls of organisations, is a costly to implement and maintain, it takes long to implement and updates to the link need to be scheduled to be implemented:

Even in those days, we put a button in place that the estate agent could send a electronic instruction to the attorney already and it [...] connects various parties in terms of updates and communication...Integration that had occurred behind organisations’ firewalls have resulted in improved security and improved information and document exchange, it goes straight through the firewalls, straight into their systems, and it removes then [...] capturing the application again”. Installing or updating technology and software that have been integrated tightly (behind the firewall) is a costly exercise...for big corporates to make changes.

He went on to explain that banks connect with many stakeholders and the information is dispersed across the bank’s systems, which in turn feed into many products offered and other systems hosted by the bank. This makes the integration of any new product or technological platform very complex and expensive:

A bank system connects with so many others of their systems and clients and I think over the ten years, banks have tried to make their systems a lot leaner. These things feed into systems that eventually is always populated somewhere.

Gail revealed that the master of the High Court also interacts with the municipalities who work according to their own set of rules. The master of the High Court has limited capacity to act and interacts with municipalities with regard to deceased estates where the municipality needs to recoup rates and taxes for the property that forms part of the estate of a deceased person:

Master of the High Court, municipality, deeds office, Home Affairs. You know, there's a lot of conflict between the way in which we approach a lot of the work. We've had meetings with the municipality. They have their own set of rules that they work on. [...] they want us to make the call on who's the beneficiary which we can't do. I can tell them, listen, I have the estate report that just because a person's name is on the letters of authority doesn't make him [her] the heir in the estate. Either a will or intestate succession is going to determine my beneficiaries. That person that is on ... whose name is on the letters of authority is merely authorised to finalise the deceased's matters.

Ashley clarified that estate duties are payable to SARS in certain instances, but every transaction needs a tax clearance certificate which is requested from SARS by the conveyancer. The link with SARS works much better than the link with municipalities. "... with SARS there's an electronic link [...] into e-filing and [...] from the attorneys office they can apply for figures [...] then [...] pay it through e-filing then and get the tax clearance certificate." Raymond explained that the envisaged PEXSA system could also assist SARS to identify whether estate duty is payable on a particular property. He continued:

Capital gains tax. SARS don't know if you have multiple properties. So in PEXSA we have the ability [...] to track through the vendor packages to see if that is your first property or if this is a second and investment property or what type of property and we can alert SARS to say that in terms of capital gains tax this is a investment property and there's capital gains tax applicable.

Michael was of the opinion that SARS payments can be effected as part of the disbursements and not upfront as per the current process:

You pay transfer duties upfront. You get a certificate to say that you've paid the transfer duties which then gets bundled together with the documentation which allows you to submit your property for registration... Why can one [...] not build a system which says we put all these things together, these are the things that have to happen, and on registration you will be paid. SARS works that way with probably most other taxes: PAYE [pay as you earn], VAT [value-added tax], all of those things are post-event. Why do they have to have this upfront?... the first tier has gotta be SARS. If you've issued a guarantee [...] for transfer duties, SARS has gotta be paid. It's a [...] not-negotiable, rates clearance, current bondholder. All of the first tier payers who have a bite at this...the seller's entitled to any net proceeds...the money is where the money needs to be. It's in the banking system.

In the same vein, the municipality can also be paid at the end of the registration process.

Raymond is of the view that this may reduce fraudulent activity:

I would far rather have that money in my pocket and have somebody give the municipality a guarantee that on registration of transfer, provided they can give you a final amount outstanding; there's somebody who's guaranteeing to pay it for you, then you don't need to give the money physically to the municipality. If you don't give the money physically to the municipality there's less chance of that money disappearing.

Ashley explained that the deeds offices systems have the capability for access into their technological system by an individual requesting information, but their system also allow for other external computers to interface with their computers. This is significant as it demonstrates that certain capabilities have already been created for electronic interfaces with industry to occur:

The deeds office got two interfaces into their system. They've got a deeds Internet which is the sort of the human usable side where a human can sit there, then they've got a Internet service interface where computers can interact with their computers.

The same capability for different platforms to sync and talk to each other is also being built within the cadastre, whereby the deeds office, cadastre and municipality systems would align property information with each other for an integrated view of the information to be made available to each other and to members of the public:

The three are gonna talk to each other and it's gonna have to be stack, stack, stack. So, that the information currently that is stored in terms of property descriptions from the municipality, the deeds office, and the Surveyor-General's Office. And the bank can be in sync. I wanna call it two [...] platforms. The one is on top of the other. Ours is at the bottom, [...] the e-cadastre, and the ERDS [sic] is on [...] top of us. They gonna have to sync onto us.

Fred shared that previous discussions with regard to e-DRS included integration with the municipality to obtain electronic rates clearance certificates, SARS for electronic tax certificates and the DHA for an online identity verification. He cited discrepancies where the information that was recorded in DHA were incorrect which necessitates a more flexible approach. In addition, the e-DRS system should also have interfaces with the Law Society to confirm that conveyancers who is working on a property transaction is qualified and active on their register. Also, interfaces with the Sheriff of the Court to confirm the existence or absence of interdicts is also important. The idea is to build a platform with all the necessary stakeholders interfacing into the e-DRS system and allowing each stakeholder to share information with each other while preserving the integrity of each data source or the integrity of the data itself. This is a crucial element of the e-DRS system which will be incorporated into the framework that is the outcome of this study:

It's to verify the ID number [...] with Home Affairs [...] third-party interaction is primarily with Home Affairs, SARS and the municipalities or your local authorities to get your rates clearance and your tax clearance...create that system for the Law Society [...] we also discussed was the Sheriff of the Court because the interdict is a very important function. The surveyor-general's information and the Deeds information is two separate entities and they actually don't [...] interlink. But to actually have a [...] fully integrated system they call it master data management...you don't touch your original electronic record so that never modifies it and it keeps the golden thread from your master record to your original record. Your integrity is still intact but this is more usable and then you use [...] as you develop your system you actually use your master record and not your original record.

Fred also explained that integration with the Law Society and PLATO will assist to verify the status of the various admitted conveyancers and land surveyors. It happens that some conveyancers or land surveyors are scrapped from the roll and should therefore not be allowed to work on new transactions. Also, certain processes that need to be completed by conveyancers can be linked to their biometric data which will completely eliminate the outsourcing of such functions. The verification process is currently paper based and errors do occur:

If we have [...] at the Law Society have registered practitioner conveyancers, if we have that register, and that register is maintained [...] we've [...] found that there's a lot of conveyancers practicing that's not [registered] and also [...] in the past [...] we actually found that it's not the conveyancer coming in and signing in, it's his [her] clerk. [...] they're signing at execution. So that will be stopped because it's a electronic signature by hand and because the [...] electronic signature comes from the digital certificate that is linked to your biometric or minutiae information [...] of your fingerprint [...] I can't give my smartcard or digital certificate to my secretary and tell

her to sign. I have to actually sign it because I have to supply my fingerprint as well. So it will make the [...] integrity will be a lot more secure.

Additional hardware in the form of computers and scanners, and additional software development may be required for access into the e-DRS system as mentioned by Peter, “For anybody to interface with the system, there’s obviously hardware equipment required and so on and to understand what it is you need to actually have to, to interface.” These integrations may occur on various levels and may take some time to complete. Peter further stated:

One can have a fairly simple system. Then if you’re wanting to build interfaces between the office [deeds office] and all the different areas be it municipalities, SARS, CIPC [Companies and Intellectual Property Commission], Home Affairs and so on [...] that could take a while longer, those would be different phases. So, you could start with a phase one and then you know phase the whole project over a ten- or fifteen-year period.

Peter asserted, “banks like to retain control”. Raymond also expressed that interfacing with the bank will allow the bank to retain control over the transactions and the disbursements of funds, because they would be able to monitor the progress of the transaction and the respective payments associated with the transaction:

We give the bank in the PEXSA system a user interface where they can see all the transactions that [...] meet the conditions of sale that’s lodged, that’s in prep, and that registers today plus they have the ability to pull a transaction before payment from the banks’ side.

George also confirmed that the PEXSA system aims to bring different role players together when he stated “PEXSA is getting all the role players together to make sure that transactions are valid, that disbursements are valid [...] fully authorised [...] that the deed is valid.” Lester highlighted a problem that was recently exposed in their organisation with regard to a debit

order that needed to be loaded onto the municipality computers. The envisaged e-DRS system will hopefully assist to eliminate some of these existing challenges:

Are you aware that for the past ten years [i.e. 2006–2016] that the banks would complete the form for a debit order...That simple instruction wasn't in the City of Cape Town's electronic data system so it simply allowed incomplete and incorrect forms to be submitted [...] and you know that kind of inexcusable blunder it causes a lot of damage.

On closer investigation. It appears as if private organisations have mostly engaged in integration initiatives. With the exception of DHA, governmental organisations seemed to have lagged behind. Many private organisations seemed to have built a business around the integration of various role players. As such, these organisations were able to highlight much of the gaps that exist in the property market that would need to be addressed for more efficient integration to be done.

5.2.2.6 Technology

Raymond emphatically stated that biometric identification should be embraced in the property market in order to eliminate identity and other types of fraud:

You need to embrace technologies where it's voice or biometrics. [...] There's many technologies that you can use, you know, to [...] to enhance your security but I think we must get away from paper.

Vincent also confirmed that the deeds office wants to incorporate a link into DHA as part of the e-DRS implementation to allow for identification verification, and this happen on different levels. Firstly, DHA can verify the identification of all buyers and sellers, as well as conveyancers and other role players involved in the transaction. The researcher overserved during the interview that the DHA made extensive use of technology to track entry into their building, as well as track the movement and actions of their staff members.

Secondly, biometric identification can identify deeds office staff and allow for access to perform certain functions in the examination process. For example, the registrars in each deeds office could use biometric identification to provide authorisation electronically for the registration of all approved transactions. This process may reduce the time associated with registration procedures, especially when it is compared to the current manual signing of paper documents by registrars:

We even thought of linking up with Home Affairs that the owner will have a thumbprint and it will be linked up with Home Affairs and Home Affairs will say, yes, that is Allen ... and conveyancer also with a thumbprint or to enter into the system with a [...] retina recognition so that he [she] can get into the system, he [she] can say proceed with the registration. The Registrar of Deeds is the only person once again with a thumbprint at ten o'clock the morning that's going to say all the deeds lodged on that day that's in my inbox is registered on that day. So, it's all registrations are going to take place within a millisecond.

To allow for biometric and other types of identification, Barry articulated, “banks are mostly now electronic in operations” while Peter remarked that applications for finance are received electronically from various sources and banks also electronically instruct conveyancers with regard to bond registrations that need to take place for loan applications that had been approved:

At bank level, they certainly have extensive systems. Banks would electronically instruct the attorney. Your application form will come in electronically. It would be either through your mortgage originators or software vendors that act on their behalf. It's again a electronic interface that goes out to them, it actually does keep them abreast of where the application is so they received it, approved it in principle and so on.

The aspects that were mentioned by Peter regarding interfaces that had been put into place for banks to electronically receive and send applications, were also confirmed by Paul as

mentioned earlier in this chapter. Ashley added that technology has enabled automation and improvements to many business processes and functionality:

Because people have electronic identities and they have electronic documents, but they never knew how to put them together. You probably find that 95% of documents are actually prepared in that way [electronically] in this process most of the documents are prepared by the system.

Adequate integration and centralised control in terms of software updates and changes may be simplified and released to all users by forcing all users to run updates in order to access the latest version of documents before users will be allowed to compile any document as stated by Ashley:

If you've got a clause that needs to be deprecated today, you stop it today and there's no [...] problem in updating it to the rest of the world to be able to get that all into their specific version of the document.

The conveyancing updates for deeds office documentation are more frequent than changes on the surveyor-general (cadastre) side and “you don't automate as much as you do in the legal system in the surveyor side,” Ashley added. Ashley also drew attention to the fact that South Africa is a progressive country and have technological platforms available that is comparative with international benchmarks:

There's [...] technologies available in [...] South Africa that provides the deeds office with what they would need to be, to have a e-DRS system. South Africa is actually very progressive [...] when it comes to electronic systems in [...] banking and I think it comes from unique South African problems.

Steven informed that at the deeds office “we don't wanna rely too much on external systems. We don't wanna rely on records where we know Home Affairs hasn't got an accurate record.” As custodian of the land asset register, it is crucial for the deeds office to retain control of the register in order to protect the integrity of the register. Melissa highlighted that

government departments do not have the competency to build and maintain IT systems, but reiterated that careful consideration should be given to the type of systems that are required, the partnering with the correct business partner or vendor at an affordable price and the type of agreement that is entered into when requiring technological capabilities:

There's normally in IT what we refer to as a build-or-buy decision. It means that we determine what is available in the market, and that can be worldwide. Should the vendors have a software package or a portion of which will meet our requirements, then one will look at that as to buy it. In government, it is not our core competency to develop systems. It is not our core competency to establish a organisation architecture. You need experts in IT project management, which is again not a skill you will find in a department like this. That's not what we do. We don't run IT projects. You can drastically strengthen the controls in your process through IT. It's no longer a human [...] check that you [...] have. IT is very expensive.

Governmental organisations clearly have limitations as highlighted by Melissa. It is important to recognise these limitations and to continue focusing on core capabilities and organisational mandates. Michael shared that technology may assist to implement and change many aspects of the current end-to-end property process, but he also cautioned that certain existing technologies may still be necessary to use in the future. The legal and strategic framework will need to guide the deed office and cadastre to choose the technologies that aligns with their business proposition and strategic intent. Once the correct technologies has been chosen and implemented, the capability to effortlessly process a higher number of transactions exists. Also, technology should assist to verify the validity and accreditation of all role players that are involved in the process. These aspects were discussed earlier in the section with regard to interfaces that are built to confirm accredited membership to for example PLATO and the Law Societies:

There are still some spaces where traditional database management is still the right way to go and one just has to go through this process of understanding where traditional databases belong and where these new [...] sort of crypto-type things belong. Because it's a system and the repetitive nature of those systems means that it doesn't take that much more work to do that many more transactions. We know that there're [...] a number of parties who are purporting to be estate agents who may not be registered with the Estate Agency Board. We've got those who are [...] have been booted off the [...] role as practicing conveyancers but the reality is that you, the man in the street or woman in the street, dealing with this lawyers who's presenting themselves as conveyancer – how do you prove that they are alright? There's admin issues behind that. Can an electronic system in some way improve that? Absolutely. Real-time.

Lester described technologies that are deployed in the conveyancing environment which include Windows, Office, Excel, WordPerfect, Systems provided by Comcorp, e4 and Korbitec (especially if you are on one of the bank's attorney panel), or proprietary software that was written by individual organisations:

The obvious Windows and Office ... almost every Word spreadsheets, Excel and other databases almost all conveyancers in this country use it I know. They also use WordPerfect, which was a earlier and better program than Word [...] virtually standard throughout the legal fraternity. Specific software for your office. [...] very few people go onto [...] other systems ... and then on the conveyancing side, because the banks default to standard systems like Korbitec and e4 [...] we basically have no choice. If you're full on into conveyancing you do both transfers and bonds [...] and to do bonds you're simply obliged to use certain software, usually a choice of one or two...Many attorneys use a consolidated package that does both your transfers and your bonds and a couple of other things. To be seriously into conveyancing nowadays you can't be without this Microsoft Office, Windows [...] and a Korbitec/e4 package to do your bonds. Some of us, like my firm we, also have proprietary software that we wrote

ourselves and it's just simpler and faster it's ...we only pay to develop it and not per transaction.

Ashley further explained that the deeds office technology is very old, but legacy systems are also a challenge in banks and other governmental departments. Technology changes very quickly nowadays and new technology acquired may become obsolete very quickly. Ashley is of the view that the deeds office is experiencing similar trials:

Some of the technology is here of course some of the deeds offices still work on very antiquated ... they moved away from microfilming but they now scanning due to the state system and the tender system. Oh, it's extremely inefficient. They're using technology that often has already been taken over by a competitor.

Lester described that some of the technology in the deeds offices that was purchased with the view to assist with e-DRS implementation has also become outdated even before the system could be implemented which confirms what Ashley had stated earlier on. These older systems create huge inefficiencies in the system:

That literally happens regularly within the deeds office. You sit with technology and [...] equipment that's already outdated, pushed out and killed by a company who bought it out...This problem of outdated systems is also a problem in other governmental departments. [SARS, municipalities, master of the High Court, and so forth], "some of them they have primitive technology. They can't properly do a job unless you make a copy and you just walk across to the other guy or the secretary."

Fred expressed that microfilm, which is technology that is used by the deeds office, can remain in service for up to four hundred years, "If you preserve microfilm [...] it can last up to four hundred years where [...] magnetic tape can last about forty years and if you look at discs maximum of [...] twenty years if you lucky." Technology may also provide an electronic and automatic workflow and checking capability. Lester however cautioned against 'ticking off of boxes' and standardising certain processes to the extent where systems

and technologies can be circumvented by fraudsters. Technology may also provide checks for other technological systems. One such technology is Google Verify:

There's a service from Google, Google Verify, that the banks use in preference to the FICA and checking IDs and thumbprints...The ID for the box-ticking, as we call it. All the boxes are ticked. Google comes back and say but something doesn't match. This person works in London, working banking somehow, seems to be at the horseraces and living on the other side of Chelsea or whatever.

Lester further noted that maintenance of systems is problematic, especially in certain geographical areas. Centralised functionality is concentrated in major cities and it may take a while for assistance to filter to other areas:

The deeds office, like in Cape Town, there's a huge problem with... with computer systems because the computer-qualified people, and there aren't many of them, that's with the department [Department of Rural Development and Land Reform] sit in Pretoria next to the deeds office there. If they have a problem, they walk next door, ask come and sort this out. In Cape Town, you send up a message and they will look at it after they've looked at it in Pretoria, after their own people, after the Chief Registrar's demands, and then in a week or two they'll get to Cape Town or Durban for these problems in the electronic age.

Generally, it seems as if professionals and private organisations are better geared to deal with technological advances. While many organisations house legacy systems, software updates and the integration of technology appears to have been introduced more effectively in these organisations. In addition to older technology that are being used in governmental departments, a lack of skill and IT capability causes a delay in integration efforts. Also, the type of technologies that are procured, seem to become obsolete quite quickly.

5.2.2.7 *Manual processes*

Manual processes use a lot of paper. The deeds office receives paper documents from conveyancers during lodgement, which are then examined by deeds office staff. Steven indicated, “we have deeds and documents and files which reside within a deeds office and originally all in paper format. The client’s copy consisted of paper ... and the deeds office consisted of paper.” Lester added, “in the deeds office, everything’s electronic but the deed of sale and the loan agreement on which all of this is based, is not electronic.” Wendy mentioned that “the entire process of the transfer of property is still based on [...] a premise that it’s a manual paper-based ... system. Some parts of it have been digitised. That whole process is essentially manual with some electronification and even with this little digitisation exercise it will still be paper-based.” Gregory remarked, “from a lawyer’s point of view, a lot of the documents that have to be handed in is actually physical documents as far as I understand at the deeds office.” Paul stated, “... 2005, we walked into the banks and you see these reams of paper ‘cause it was faxed.” It is therefore clear that the property processes is predominantly manual and paper based.

Although many digitisation efforts have been put into place and the functionality exists for bond and other documents to be generated and signed electronically, the deeds office and cadastre still operate manually and therefore Barry explained, “the problem there again is that you still have to reproduce this on paper to allow the examination process because the examination process is not electronic.” Charlie corroborated this by stating that electronic signatures “hasn’t made as big a difference in the life of the bond attorney as it should because... they’re getting the documents electronically but they still have to go print ... and then they have to scan it to the bank.” Jan also stated, “When the work comes in in a paper format ... the approved document is a paper trail.” Reducing electronic documents to paper only to scan it in an effort to digitise the paper document create huge inefficiencies.

Information is manually typed into a computer but many transcription errors can occur. Manual processes may therefore allow for unintentional errors to creep into the documents. Gregory expounded, “[t]here’s also just capturers sitting there and typing information in ... that’s obviously typing errors where they said there’s a remainder for a specific land parcel but if you go and have a look in the SG’s office there’s no land parcel subdivided.” Steven clarified, “we capture the size of the land, we capture the... current registered owner for example [...] but we don’t have the conditions of title and we also indicate the title number [...] in that electronic information but you have to actually physically go to that deed to go and see what is the content of that deed.” This may account for a portion of the mismatched information between the cadastre and deeds office. Also, changes that occur in the cadastre are only updated in the deeds office when a change in ownership is recorded.

Vincent pointed out that delays are caused in the process when conveyancers need to wait for the go-ahead from banks before registration can occur. Conveyancers do not always have the autonomy to complete all tasks in isolation of the bank:

Everything is done electronically. We get [...] our instruction electronically [...] we [...] upload our documents...We cannot lodge until the financial institution gives us a proceed...we lodge. Before we can register we must inform them...once it’s registered we inform them that it’s registered. They do all their payments electronically. So with the electronic deeds registration ... and they are one step ahead of us.

Barry was of the view that submitting the application, for a subdivision for example, on a CD made the entire process electronic. The scanned image that was placed on the CD has its origin in a paper document that was printed and signed in person, before it was converted to the scanned image. This makes the process a manual paper based process, despite the fact that a digital application is eventually lodged with the cadastre. In the cadastre, the digital document is reduced to paper to enable the examination process, as the capability to

electronically check a document does not yet exist in the cadastre. Vincent also considered the submission of cadastre information as electronic, and said:

The Surveyor-General's Office is already lodging diagrams electronically. They're examining it electronically. The act [Deeds Registries Act No. 47 of 1937] does not restrict them from doing it. The only reason why... why we're not doing it in the deeds office is because we haven't [...] got so far as to amend our act [as above].

Dematerialisation of the title deed is in fact a lot more than simply automating or digitising processes or certain parts of a process. Paul explained:

So it's all XML [...] files and updates that comes and we import ... we host templates for three/four banks already where they just push us the data and we insert it into their template. They would get from the attorney systems into theirs and we get it directly from the banks into our system. We've taken time on to remove paper and also get real-time updates for them.

These document generation technologies do not re-type the information needed but use information that was sent through electronically from the previous source. Property valuations are also conducted remotely by means of desktop valuations. Paul explained, "Lightstone [a privately owned company that provides intelligent property information for banks to do desktop valuations, without a valuer visiting the property being purchased in person] ...banks use their data for those desktop-type valuations." Gizelle enlightened:

Our role is to provide estate agents with information related to the property market, a suburb, a street drilled down to a particular household. We explore aspects like the value of a property, all the transaction activity that took place within a street or suburb or town, along with numerous other information datasets to help estate agents understand their market and the property market. Our primary focus was to develop an automated valuation method that allowed our banking clients to determine an accurate value of a property, based on current market attributes.

She went on to outline Lightstone's process as:

- An estate agent would use their property report prior to conducting a valuation on a property.
- An estate agent would use their reports to assist the client in understanding the value of his or her property.
- The estate agent would use suburb reports to assist at show days to help potential buyers understand the area they are buying into.
- Once an offer has been made, the banks would receive an application for a loan. The majority of banks use Lightstone as a desktop valuation. This valuation figure contains an accuracy score and depending on that score, would determine whether to send a valuer to the property or not. If no bond is approved [or if it is declined, a valuer will not go to the property].
- Should a valuer be sent, that valuer would use Lightstone EzVal platform to complete the valuation process. This platform begins on the bank's initiation to send a valuer to completion of the valuation process.
- Bank would approve/decline bond.
- Some conveyancing attorneys use Lightstone at this point to do live deeds searches.
- At any point, a buyer or seller can purchase property-related reports from Lightstone via their Internet site.

Referring to the title deed that confirms ownership, Ashley verified, "you can always revert to a document which unfortunately at the moment is still in a paper format." Manual processes are also very cumbersome, as stated by Paul, "one page goes missing, you need to re-fax." Additional controls need to be put into place to manage these manual processes as explained by Ashley, "there's lots of [...] ticks and balances around the process that currently

[...] is still manual”. Michael referred to delays that are experienced by manual processes, “if you’re reliant on this paper trail and everything gets held up [delayed]”.

Despite the many interventions to do away with paper, “there’s a lot of faxing and e-mailing still which could be more [...] content-specific” (Ashley). The application that is made to the municipality for subdivisions is manual, as confirmed by Barry, “That application made to the local authority will be paper-based and the consent will also be a paper document.” In addition, applying to municipalities for rate clearance certificates is also a manual process. Some entities have intervened and fulfil a manual role to simplify this part of the process for the conveyancer as explained by Charlie:

The manual application is we basically mean that. [...] the attorney would apply online, the attorney doesn’t feel the effect of it. We then print the application out, take it in manually to council, sort out what needs to be done, and bring the figures back, load it up, and send it through to the attorney. So we basically play the electronic process.

In this instance, the manual paper-based function is completed by another entity. For the conveyancer, the process of applying for rates clearance certificates may seem electronic. Each municipality uses a separate database and there is no centralised functionality. This implies that each integration with any municipal entity becomes a separate process, which could be an extremely costly exercise, not to mention the time constraints that come into play. Steven explains, “You’ve got, like, 284 local authorities. Each one of their systems is not on par because of their budgeting.”

Fred mentioned that, due to manual processes, many errors can occur, paper documents can be lost, it takes longer to work through paper processes, and special technology is necessary to assist with paper documents:

So there can be [...] human error, typos, or there could also be errors on this document that now is a legal document. After it’s been captured, then the document is scanned

and then stored digitally the [...] original copy is then delivered back to the conveyancer or the bank. The original can be lost. After it's been [...] registered [...] or executed and numbered and captured...

Many parts of the end-to-end property process is manual. Electronic processes are interrupted when an electronic document needs to be reduced to a paper document and then converted back to an electronic document. These manual processes happen with different role players across the supply chain, and eventually also at the deeds office. Much efficiency may be gained if these manual processes can be eliminated. Upon closer investigation, it appears as if the manual processes occur mostly within governmental departments, for example, municipalities for rates clearance certificates, and the deeds office for registrations and transfers of immovable property

5.2.2.8 Digitisation

What does it mean to go electronic, or to digitise? Barry explains it as follows, “It means that you should create a platform and means for the profession to then [...] submit electronically so that no typing needs to happen now again.” Digitisation implies changing a manual process to become electronic. This can be done by means of capturing information into a computer program or database, or by scanning a paper document for it to be made into an electronic form. Charlie described, “when we say it’s an electronic process it’s purely workflow” and went on to say that their organisation has initiated activities to covert as much paper onto digital platforms. He was careful to point out that, despite everyone’s best efforts, not all parts of the property process can be converted to an electronic environment because the deeds office still require that paper documents are lodged with them for registrations:

to completely automate or make electronic the documentation. So literally an attorney will scan it and the bank will receive everything electronically on a Internet-based [...] system ... we can automate as much as possible in certain spaces but actually we can't

affect the whole end-to-end turnaround time because there's certain spaces that we can't change.

Barry explained digitisation processes at the cadastre as follows:

There is a data-capturing process also inside there to take what is here and capture it [...] into the system so [...] which means you have to type in the [...] property ID, the [...] description of the property, those coordinates captured in distances and directions. That is captured into our information system that we call CIS [cadastral information system]. So, the things may have come through by paper media but there were processes and [...] computer systems that were developed to capture this information in. Such also include a workflow management system.

Barry continued and said that after capturing or scanning, staff and the general public may access the digitised information electronically:

From that capturing that is where our special database is created which then [...] enables people to view the cadastral boundaries in an electronic platform. People have got access to our scanned images to our Internet site and also that electronic era when it comes you are able to look at the history by[...] pulling those scanned images ... without going to the archives where we have put the physical documents.

According to Steven, paper processes have also changed to become more electronic within the deeds office. He explains that paper registers went into disuse in 1974. Microfilming was introduced into the deeds office environment in 1984 and it is still in use today. Various copies are produced in the digitisation process to allow for disaster recovery and back-up procedures:

Since 1974, we started to take the land register, which was in paper format, and put it into an electronic format ... electronic in a sense of that it was data captured...It started being captured in 1974. So obviously the [...] paper land registers [...] went into ...went into disuse at that point, and they were discontinued. We started...in the year 1984

microfilming and imaging. That imaging continued, and it still continues today, but the machinery changed in 2005 when we did this microfilm. We produce three copies. Two of them were known as silver copies, in other words your master copies. [...] the one silver would be kept on site and the other one off site for disaster recovery purposes because remember that's your deeds office copy. We had what is known as a di...diaz copy, D...D-I-A-Z-O, a diazo copy, and that is the one that would be used by clients.

The digitisation in the deeds office is an ongoing project. Paper documents that are still being lodged at the deeds office are converted into microfilm and data capturers re-type information into the deeds office computer in order to update their information. There is also effort being made to covert previous paper documents form much earlier years into images.

Steven elaborated:

A lot of that has been digitised but there's still a lot more to be digitised still from the old records. Our day-to-day imaging started in 2005. When it came to microfilming, the client's copy was still paper. However, we filmed it to create a microfilm for the office copy... We've still got a paper copy coming in but we are now creating an image ... as the deeds office copy ... but to provide security on that [...] image we send it back into an archive writer and an archive writer...takes the image and converts it back to microfilm. Should the digital image be lost or destroyed we can reproduce from that archive ... disaster recovery... a back-scanning project which was part of our [...] what we call the e-cadastre project which we need to digitise everything.

Melissa confirmed that a back-scanning process was underway at the deeds office, “there was a whole back-scanning exercise as part of the previous delivery which came to a standstill. There are [...] daily, what we refer to as either live-scan or daily [...] operational-scan.” Digitisation has also started at the Surveyor-General’s Office. To facilitate this, the office has been allowing land surveyors to submit their work via e-mail or on a CD as stated by Barry:

We have introduced what we called multimedia lodgement. So we're saying [...] people can lodge paper, fine, but [...] the paper they would've prepared they can still scan it and submit it by e-mail as PDF or people [...] can compile their submissions and burn it on a CD and send that CD in.

Even though applications may be lodged in a digitised form, this still involves a manual process. The master of the High Court is also in the process of digitising their processes as mentioned by Gail:

The next step in the development of the system actually started on Monday where we now are beginning to move away from paperwork because on Monday...we introduced a digital signature.

Digitisation, as mentioned previously, refers to the conversion of a paper document into an electronic format. The document may have had its origin in an electronic form, but may have had to be reduced to a paper document at some point or the other. Although a paper document has been converted to an electronic format, it does not mean that dematerialisation has taken place. For dematerialisation to occur, the electronic document needs to remain in an electronic format throughout the process. When closer analysing the data, it appears as if banks are better geared to accommodate dematerialisation. Also, private organisations have upskilled themselves and can accommodate a paperless environment. It appears as if governmental organisations lag behind in this regard. Participants from professional bodies and government departments appears to not understand the difference between digitisation and dematerialisation.

5.2.2.9 Dematerialisation

Dematerialisation is a financial term that is associated with the trading of listed shares in South Africa. The organisation that successfully advanced this project in South Africa is

Strate. Although Strate has been working in this environment for many years, they have never had a disputed transaction. The term *dematerialisation* is being extended to the property market in this study. Dematerialisation of listed shares was explained by Michael and clearly indicated the process efficiencies that were gained by its introduction into the shares environment:

If I had a certificate for a million shares and I was only trading a thousand shares, I'd have to uplift the million shares certificate, hand it in, get it split into two, one for the 990-odd thousand to redeposit that because I wasn't selling those, and the one for the portion I was gonna trade which I could then trade on the market. So very cumbersome paper-intensive admin-intensive process those 8 000 trades a day took anything up to two/three, maybe longer, weeks to actually settle. It was cumbersome, it was admin-intensive ... if you're reliant on this paper trail and everything gets held up.

He went on to explain that dematerialisation refers to doing away with paper altogether. The process was introduced in a piece-meal fashion in the shares environment. The contractual obligation to settle became the final step in the process. Electronic settlements became a daily feature. Michael also reiterated that the mechanism of dematerialisation can be extended to any other type of asset, for example moveable or immovable property:

Dematerialisation represents a natural progression...you do away with a paper record, and you end up with an electronic record which ultimately allows for the book-entry transfers of ownership...The role players are still the role players in the marketplace. It's the role they perform... the function they perform has changed slightly over time. When electronic settlement was introduced, electronic securities processing transfers introduced, we moved into a space where we had rolling contractual settlement on a daily basis...The reality then is that once that settlement has happened there's nothing else that needs to happen. The contractual obligation to settle was brought in when one has this electronic environment [...] and the ability to enforce it...In theory, you can do it for any asset that you can actually uniquely identify.

Michael created the link for dematerialisation to the property market by explaining that crucial information can be validated at source (meaning the initial entity that collates and captures the information at the beginning of the transaction) and biometric identification to verify the identity of the people involved can also occur from the onset. This corresponds with the view that Jerry put forward regarding the upfront introduction of biometric verification via DHA. Upon an irrevocable confirmation from the deeds office that ownership had transferred from the seller to the buyer, in other words, when a property has registered, irrevocable payment should be made:

Property transfers would be another case in point where you'd have the ability to uniquely register the ownership of an asset in a far more efficient way than it is today... your central register is validated before the documents [...] even get there you're actually taking away a whole chunk of time. I don't need to validate and vet that the ID number's right because it's already been validated and vetted from where? From the source. From Home Affairs. Deeds Registry has been working on a project for a number of years now on what they call their electronic registry, which was, and probably is [...] really just scanning your paper document into a PDF format type thing. That is not an electronic registry upfront. What they talking about is not changing the way things work. The deeds office needs to be able to issue a confirmation that a transaction has taken place that the property has registered. That confirmation needs to be irrevocable...On the strength of that irrevocable confirmation payment needs to happen irrevocably...What we're talking about here is something that you could, in theory, cut and paste to anywhere in the world.

Essentially, technology can assist to validate much of the information without any manual checking. “Our office have to move with the times, it has to become digital. Everything else is digital,” Peter elucidated. Vincent appealed for electronic lodgements to be introduced by the deeds office:

Let us have a mechanism how to lodge deeds at the deeds office electronically, have it registered electronically, have it stored electronically, and have notifications back to the owners electronically.

Some of the functionalities that have been incorporated into current business processes were aimed at replacing paper-based processes as confirmed by Paul:

The whole aim of this was to move paper away, to go electronic. We did that for home loans. We put a button in place that the estate agent could send a electronic instruction to the attorney already and it [...] connects various parties in terms of updates and communication.

Jan reported, “there’s not gonna be any [...] paper trail in the new [...] in the perfect new world”. The ‘new world’ would refer to the dematerialised world. Ashley confirmed that various initiatives were introduced to remove paper from processes as far as possible:

We’re providing solutions to quite a few of the financial institutions that [...] around the same thing trying to [...] dematerialise [...] whatever we can in the process, for example, interbank guarantees [...] is, there’s no need to have those in paper anymore.

Barry added, “the system also calculates and checks for consistency of the data”. This aspect is a unique capability that technology provides so that certain types of risks and errors can be automatically mitigated.

Dematerialisation differs from digitisation in that processes are not merely automated. Wendy discussed the concept of dematerialisation quite extensively and explained that the entire existing process and framework would need to be reengineered. An advantage that may be gained from the dematerialisation of the title deed, is a reduction of the costs that are associated with the registration of property. The reduction will hopefully enable a higher percentage of the South African population to participate in property ownership. She summarised as follows:

We have been looking at e-conveyancing. In other words, to... dematerialise all title deeds and to [...] make the payment and settlement of the transfer of ownership of property much more efficient and secure and free from fraud that is currently played. And cheaper. E-conveyancing [...] leads to a far more efficient, cheaper and more accessible, if you will [...] ability to [...] own property and, of course, the ownership of property starts with transfer from the previous owner. It means it's no longer [...] paper proof of ownership; it's electronic proof of ownership. There's digitisation of [...] something and dematerialisation. It's not the same thing. What they doing currently is digitisation. So, transferring information that's on paper into digital format. It doesn't do away with the paper...The record is now electronic. So, it would be a totally, totally different format. It would not be a scan of the current title deeds, which actually doesn't take away the legal basis for that ... title deed but what we want to do is take away the legal basis for the title deed and replace it with electronic form. The deeds office at the moment is manual. So I [...] mean, it has electronic bits and pieces but [...] certainly the title deeds are not dematerialised. There's no electronic record so its redesign of the whole process, the reduction in the cost thereof.

Paul said that dematerialisation efforts “seems to be mainly driven by the private sector therefore people don't really have interfaces into public sector departments and that's still [...] something new for ... in their world...it almost [...] doesn't exist, interfaces into government departments, Home Affairs and Human Settlements, and, internally it does exist but not to external sources”. Barry confirmed that the property process would need to be reengineered:

Going to the electronic it would mean reengineering the business processes so that they themselves become business processes for strictly electronic operations also providing this mechanism of electronic lodgement of surveys.

Melissa expounded that the way that entities engage with each other will change when an electronic workflow is introduced. She also suggests a piecemeal approach, especially when building interfaces with other governmental departments:

The moment you go total electronic [...] there's a total different way of how you interact with your conveyancer, your public, or whatever. The first tranche [a portion of something, especially money] might be to just establish that system and then take it from there because to do that kind of change in [...] a government department I think is just too big. We're only working with getting it in place for certain basics ... and that does not include integration to all possible parties. That includes integration to banks, SARS, Home Affairs, municipalities and certain of the fraternities.

Jerry clarified that Home Affairs (DHA) had successfully moved to an electronic system whereby people applying for identity documents no longer have to complete any paper applications:

We are also an organisation that is [...] moving from a paper environment to a paperless environment. Now you are no longer completing a paper to get the card. We send all those electronically which is quite faster. We are moving from the manual system. We took the paper records, we scanned it to convert it.

Dematerialisation fundamentally differs from digitisation in that manual and paper based documents and processes are completely eliminated. However, irrevocable payments are normally linked to the transfer of ownership in a dematerialised environment. To date, the property market has not introduced irrevocable registrations and irrevocable payments into their environment. Analysis of the data indicated that private organisations are better geared to implement dematerialisation into the property market. Even the deeds office and cadastre appear to not fully understand the difference between digitisation and dematerialisation.

5.2.2.10 *Electronic deeds registration*

Vincent emphasised the secure land register that is kept and title system that is followed in South Africa. We do not require title insurances. When introducing e-DRS into the deeds office, this security needs to remain intact:

We've got a very unique land registration system. We do have the best system in the world. Our security of title is based on the working relationship between the conveyancer, the deeds office, the surveyor-general and the surveyor. We don't have to take out title insurance. South Africa being an extremely title-conscious country. We want proof of ownership, and this title deed is.

Michael concurred that title insurance is not necessary. He suggests that problem areas identified that can increase risk should be addressed and eliminated as soon as possible:

Why should I buy title deed insurance? Oh, because you're protecting yourself against the possibility that somebody fraudulently replaces you on the system as being the owner of your property. Well, okay, but fix the problem instead. Why would you create another inefficient industry at a cost to every good citizen when you could actually go and fix the problem to start with? And there's no need for title deed insurance.

“This programme is about these pillars of the cadastre,” Barry explained. There are existing working relationships that need to be integrated more tightly by means of a central technological platform:

These organisations by the way of their work ... it's interrelated. It would even be better to [...] get some integrations and also to establish a system that will be all-inclusive but that will provide for the individual functions that they have to [...] perform. But the data stores consolidated and all that and also create an environment for electronic [...] lodgement and [...] processing of these things.

Building an e-DRS requires collaboration with all stakeholders to ensure that such a system caters for all the necessary requirements that all role players may have. These collaboration

efforts are often referred to as stakeholder engagement. Peter surmised, “if we are moving into an electronic interface that there’d be a considerable [...] consultation that takes place with [...] key stakeholders”. Charlie added, “... it’s absolutely critical to get all the role players involved in a project of this size and [...] magnitude right from [...] day one”. Peter was of a similar opinion and said:

From a bank’s perspective, the interface between a bank or a conveyancer and the deeds office, there needs to be engagement between those stakeholders to determine how are that interfaces gonna take place and how one actually secures it. And how one authenticates documents and so on.

Gregory supported the stakeholder engagement efforts to the broader community that needs to take place with regard to the building and implementation of the e-DRS system, but required that, in addition to receiving communication specific to system requirements, to also obtain suggestions for better approaches to aspects like training:

It will be nice if they have an information session [...] or a workshop [to] show how it will be and maybe invite some of people of council, maybe some stakeholders, and then maybe that [...] information how it’s trained or how it must be utilised.

Wendy also accentuated the importance of stakeholder engagement in order to build a single vision for the industry, and said:

And if you start off on one direction and... you don’t have everyone on board then [...] you have to do double change management. I guess it could move quicker but it’s [...] appropriate that it moves... at a speed where everyone is on board.

Michael agreed that large-scale collaboration needs to take place. To obtain buy-in from the industry, understanding should be built as to what dematerialisation is and the benefits that can be derived should be explained:

How do we get a collective understanding of what dematerialisation is? Until all the parties are actually prepared to talk to each other and... all talk with each other, you will have a view that says, well, we don't like that because it's a threat to our business. People who have got very, very strong views about [...] why the system should stay the way the system is and [...] I think in many respects it comes down to an understanding of what dematerialisation is and what it will achieve versus the perceived threat of what's it gonna do to my business. [...] the electronic record keeping [...] is an enabler for significant risk mitigation.

Steven highlighted that a lot of resistance to implement e-DRS has been identified:

There's also [...] resistance to change. That's internally and externally and from just about every stakeholder that we've seen to some extent, there is some form of [...] resistance.

Lester acknowledged that automation removes control and discretion from individuals. This constrains accessibility within organisations:

What conveyancers are very scared of is that you lose a measure of discretion ... the discretion of the conveyancer who thirty years ago would still pick up the phone and phone the bank manager's manager and just say, look, let's us have a look. Nowadays, it's [...] fairly pointless [...] just to get through the barriers to the right person who knows. In the end, you just put up a message and tell the bank we noticed this, we are concerned. Twenty years ago [...] the state officials – local, provincial and state government, and some parastatals – were accessible. If it was important you could see the general or the regional manager.

Melissa acknowledged that stakeholder engagements need to occur. External stakeholder engagements have not taken place in the past but future engagements need to take place in an organised manner. Different groups will be invited to participate at different parts of the process:

Therefore, if we now start again, we will include the vendors as well. They're part of what we refer to as external stakeholders. The banks, all the fraternities, will be included [...] municipalities and so on. Those stakeholders will be engaged, will be involved, there will be information sessions, the department [Department of Rural Development and Land Reform] will listen to their [...] views on different things as part of the consultation process for the Bill [e-DRS Bill]...It is the stakeholder engagement and buy-in and communication and what we refer to commonly as organisational change management. Organisational change management in this instance is not only inside the organisation but it is a interaction with all the external parties for many of these things that we want to achieve we need expert service providers...establish the control environment as the platform from which we can then appoint [...] service providers.

Wendy agreed that the deeds office is internally focused at present. This explains why external engagement has not yet occurred; “the deeds office...because at [...] the moment they are coping with what they have and [...] trying to make that more efficient and effective rather than looking to the future.

Procuring contracts from government is “a difficult one because putting something like our intent on paper is difficult,” said Ashley. Gregory reported that they [the deeds office] faced many system constraints:

This programme was probably written about three or four years back and this stage, because of procurement issues, we don't got a new tender there in place so we're still on. We don't got growth in our side and that's unfortunate. We try to, as far as possible, keep the wheel not from falling off but that's unfortunately part of local government.

Fred confirmed that the procurement process in government structures is very lengthy and it can take up to two years to secure equipment:

Although you can develop the system probably in three months' time [...] you'll probably have to test it for at least six months to at least. To deploy desktop computers and [...] self-service stations in the deeds office that will take about six months. And our procurement cycle ... But if we look at past procurement cycles it can take up to two years to get large amounts of electronic equipment procured. And then training the people [...] can only start probably after the first six months because we don't have any equipment now to train them on.

Electronic lodgements and deed registration may lead to a reduction in the number of deeds offices in South Africa, as also mentioned by Ashley:

There's limits to where you can have deeds offices. You know as a country we have ten of them [...] but in reality you probably only need one central one...In addition, centralising the ten deeds offices would also be an expensive exercise. "In a physical world it's difficult to, to have the paper available only in one space. [...] because you know to physically move the paper there would be costly."

Electronic submissions will also assist to reduce geographical boundaries as described by Barry, "It helps people that are quite far from the office. [...] if you are submitting to Bloemfontein and they're sitting somewhere in Springbok or somewhere like that and at least you've got [...] Internet." The reduction in the number of deeds offices or the number of processes involved after the implementation of e-DRS may have a negative impact on jobs. This contradicts the government's vision of creating jobs in South Africa and the effects would need to be considered very carefully.

Due to the many separate initiatives put into place predominately by the private sector, it seems as if the missing component is the frontend that needs to be built at the deeds office and the Surveyor-General's Office. This was confirmed by Charlie who stated:

Up until the point of lodging these documents at the deeds office, the industry is ready. We have the data in [...] various systems, be that bank systems, be they attorneys'

systems, we have the documents in electronic form, we have [...] signature technology which means we can be truly paperless. What's really just lacking now is a system to talk to at [...] the deeds office which, as we [...] all know, is e-DRS ... as an industry, we[...] extremely well placed and really that is the missing part now.

There have been several attempts to put together a frontend for electronic lodgements at the deeds office. Steven acknowledged that work that was completed in previous projects may still be used in the future:

This electronic transition isn't as simple as what it sounds like. There was some good work done by the [...] current service provider but they never [...] finished because the job was too enormous, time ran out. Intellectual property that came out that belongs to the government in terms of work done, in terms of organisation architecture, for example, that is totally reusable and will be used because there was a lot of groundwork done then.

Fred also explained that previous projects to implement e-cadastre had unsuccessfully taken place and provided an extensive history of previous attempts from as early as 2010. The original project focused only on the deeds office and not on the cadastre. The main driver was to back-scan all paper documents in order to move all documents onto a digital platform. He further explained that all hardware components have been acquired. Much of the architecture has been developed for e-DRS, but certain components would need to be rewritten and integration with the relevant role players need to occur:

The Department of Rural Development and Land Reform – there used to be a programme, or it's busy being closed out, called the e-cadastre programme. To actually update and modernise [...] deeds registration and [...] land [...] or the surveyor-general's system for land survey. So basically at this point in time, the e-cadastre programme will only focus on deeds modernisation and not on surveyor-general modernisation. We look at the systems processes [...] software applications [...]

databases, all that, how they should fit together and work with the new system, Project Vulindlela that started in 2010. That was the first attempt of getting a electronic [...] lodgement system into place. Project Vulindlela was supposed to deliver the user interface. Project Vulindlela had two major parts, the system and the back-scanning project, and the focus was on back-scanning and not on the application development. So that's why all the technology are [...] in place except the user interface. Five years' development and design, into in the system [...] that is now frozen. So all we have is designs basically [which] we can carry forward but if we look at [...] because your software and your middleware and everything [...] actually you have to upgrade at least every six months otherwise you [...] come out of step with your support and maintenance from your [...] manufacturers. So basically we'll have to start with code development from scratch but the reason why we've taken so long is because our main focus was on back-scanning and not on system development. We actually used the enterprise architecture that came from Project Vulindlela to deploy first all the technology architecture. So, it's from the hardware base level to the middleware. So, the only missing part is your user interface. Everything is already installed. Now all we just need to integrate that or deploy the application on top of it and then [...] migrate the data into the new database [...] then all the data vendors, external parties, SARS [...] banks can access our information [...] through that open standard. So [...] I think in two to three years' time the e-DRS will be fully functional.

Melissa also elucidated that the 2011 design and the new e-DRS Bill are almost fully aligned and only certain control aspects need to be better specified:

There's been [...] some work done in terms of building the architectural platform from an e-DRS perspective. The architectural design that was done in 2011 were, in my opinion, excellent. The current Bill [e-DRS Bill] [...] 99% if not 100% aligned to that architectural design. The changes that they proposed, which I thought [...] should just be specified better in terms of controls. There were also from [...] the internal audit

review that were done on the system specifications comments made on certain aspects in the specifications which needs to be corrected. The work that was done is still valid.

Wendy explained that agreement regarding what has been put into place needs to happen next in terms of funding models and infrastructure:

Lifting those things to the level and agreeing those [...] standards, agreeing the planned architecture is the next step. There are a myriad of funding models you could use, depending on what infrastructure you decide on. They would need to [...] fund their [...] development themselves and recover that over time with fees. Each affected area will typically carry their own costs. The overall effect on the economy however should be dramatically positive because it reduces the costs, it makes it easier to utilise.

Steven confirmed, “I’ve been working on it [e-DRS] since 1997 and we are now 2015 and I’ll still say another ten years possibly.” He further outlined that the project would need to be implemented in a piecemeal fashion to enable better control:

This is a really expensive project, has to be done in bite-size chunks. When we tried the big bang approach to try and do everything at once it was one budget and you’ll find it just comes to a grinding halt. We may have to do it in segmented bite-sized chunks, processes that all slot in at some point.

Charlie was also of the opinion that a ‘big bang’ approach is not feasible and that it should be approached in various phases:

To bite it off in chunks and really to start at the core and then work out from there and not to try and take on too much. I think that’s why it’s failed several times. Be very clear on what [...] actually the end goal is and what they’re trying to achieve and not to [...] change from that objective. They [the deeds office] need to focus on the core, which is what their role in the process is, which really is to manage the transfer of the title ... to have a secure central place that it can happen. It’s too fragmented and disjointed at the moment.

He then went on to state that the envisaged e-DRS platform should be internet based and the correct architecture is crucial:

The way they design it, it has to be Internet services-based. It has to be architecturally done correctly. It's gotta be secure. It needs to be as open a system as possible. Not [...] closed.

Melissa concurred with a phased approach with e-DRS implementation, “You can’t really [...] do a big bang approach with such an extensive change not only within the organisation but also with its [...] stakeholders out there.” She further explained that not much reengineering would need to take place. This is in contrast with the views put forward by Strate who successfully dematerialised listed shares in South Africa. They were of the view that much reengineering would need to take place for the dematerialisation of the title deed to be properly implemented. This statement by Melissa creates the impression that the DRDLR is working towards digitisation instead of dematerialisation of the title deed:

To a certain degree, there isn't a lot of re-engineering of business process other than automation. In terms of the process itself, there wasn't really a change. The change is the automation.

Michael also agreed that the approach of a new e-DRS system should be phased in but was of the view that a payments system had to form part of the e-DRS system. He was of the view that the new transactions could be processed in the new era, while another project digitised the existing paper based titles. In that way, the jobs that may be affected can still be preserved in the shorter term. Also, payment needs to take place simultaneously with registration, but in a tiered manner to ensure that government departments receive taxes before other settlements are finalised:

So you start with new property transactions. You process new property transactions, and as banks, you give them a timetable...give them new ones [transactions]and there's so many a month and that's 50% of our capacity. The other 50% we want you to start

looking at your records, your history, and start bringing them into the system and you can do it. You've gotta start building the functionality behind the scenes and that functionality includes the payment processing. You wanna build a structure which doesn't see those recipient bank account numbers changing at the drop of a hat. You wanna build a structure which says the first tier recipients are gonna be those parties that never really change their bank account details. Give them the amount, pay it into their account with the right reference number so they can allocate it to the right transaction. Distribute it directly. Take out that middleman. Give them what they're entitled to.

Fred concurred with a phased approach when implementing e-DRS. He suggested that documents should be renumbered to differentiate between the different provinces. Fred agreed with other participants when he stated that examiners would not have to check mundane detail. From the feedback received from Fred, it appears as though he is referring to the dematerialisation of title deeds and not just the mere automation or digitisation of paper documents. This alignment would need to be defined before the e-DRS system is implemented:

So it will have to be a [...] phased approach where the electronic [...] then slowly replaces the original. You'll have to renumber your [...] document records that move [...] between provinces. Deeds office examiners, they can actually focus on more detail than the mundane checking ID numbers, [...] you might have less examiners but you can [...] might have more levels of the examination or [...] but in [...] there the idea is to reduce the [...] errors slipping through and reduce. I know Business Saver want to reduce the timeframe. In my opinion, it's the wrong approach; you must reduce the amount of errors that could occur or [...] things you can miss.

Contrary to the majority of participants, Vincent expressed that it would be difficult to implement the electronic system while the manual paper based system is still in place. He therefore suggests that e-DRS be implemented in its entirety:

You can't have two systems running parallel to one another. You can't have somebody lodging a deed in a paper format and another guy lodging it electronically and some people are examining it electronically and some ... and it's going to be chaos and some deeds are electronically registered and others aren't electronically registered.

Peter suggested that the process should remain largely the same. The researcher is therefore of the view that Peter also speaks to the digitisation concept rather than dematerialisation:

Whatever system is built, those interfaces have to be simple and cost effective. One mustn't reinvent the wheel [...] one should rather look at what is available and read off that. If there are vendors that have currently interface with the deeds office electronically, already that one uses those systems rather than you try to build new systems to do that. The accuracy of the information is absolutely critical, the security of the information and the accuracy of the information (implementation) it can be phased.

Vincent also said that 'they shouldn't reinvent the wheel' which, along with other explanations also convinced the researcher that he too speaks to the digitisation concept, rather than the dematerialisation concept. He pointed out that the security of title should remain intact, but that the e-DRS system is already overdue:

They are already providing the conveyancers with electronic format to prepare those documents. Don't reinvent the wheel. Take the systems that we already have, just perfect them and amend the Deeds Registries Act (No. 47 of 1937) and Bob's your uncle, and then we would have had the electronic deeds registration system based on the cadastral land registration systems. The security of title must remain ... the mandate that we're giving you is do not change our land registration system ... given the amendment that we brought about to the act [Deeds Registries Act No. 47 of 1937] it is possible to retain our system as it is. Why are we trying to reinvent the wheel...My credibility regarding this electronic registration system is gone down the drain because every year I say next year or the year 2013 and then 2016 comes and they say how far? And I say, no, we're

back to square one. I can't tell you, why we're not there yet. We should have been there ten years ago.

The implementation of an e-DRS system may have diverse implications. One such implementation may be the loss of jobs. Wendy expressed concern that “technology always has that disruptive effect. They're going to say, yes, but this will put me out of business.” In contrast, Jan believed that jobs would not be lost because he indicated that affected staff should be used in other work areas to fill positions of people who resign, die or retire:

A lot of the staff are [...] scared and have this fear of [...] losing their jobs. No, it's not gonna happen. Instead of me having ten people examining the work that's coming in I might only need four people. I'm probably gonna need eight to start off with ... then I'll take those other two and they'll be seconded to another section. There should never be that fear. How are you gonna get rid of staff? They retire, they resign, you just might not refill their position. There's no need for that fear ... those two staff that ... we will be assigning them to [...] assist the computer illiterate land surveyors.

Melissa positioned the loss of income as a reason for some of the resistance that is being experienced as a result of the e-DRS implementation. She also alluded to a reduction in the number of deeds offices after the e-DRS implementation and suggested that people are retrained and upskilled to be able to function in other lateral positions:

The external parties that [...] might resist this whole thing because it will take work away from them, potential income away from them ... in this whole implementation we not going to [...] people are not going to be taken out of the picture. So, they not going to say you don't have a job anymore, you have to leave. People will have to be reskilled and redeployed ... people who are not currently able to work with electronic systems will have to be totally reskilled [...] to understand the role that they need to play and that's difficult. I do not necessarily think [...] that the deeds office anticipated that, that there will be a reduction in [...] registration offices over the country, and it might not even be something that they want to do in this first tranche.

Steven acknowledged that certain job functions may fall away. He too suggested that staff be reskilled to move into other departments. He identified the loss of work to corresponding attorneys as geographic boundaries will no longer be a problem when electronic lodgements are introduced. In addition, the number of examiners in the deeds office may also need to be reduced. Staff would also be able to work from remote areas and may not need to come to the office for work – the so-called flexible working of job design:

Processes will fall away; there will be an organisational change effect. Your data typists, for example, will not be necessary. So what are the plans? Either reskill, upgrade their skill, follow all the labour principles, move to another department. Your conveyancing profession, the number of people involved within that firm, may have to rationalise as well because the nature of the work has now changed. Some of the secretaries may not be necessary. They could lose their work. You don't need that many conveyancers in a firm. You could [...] deal with less ... losing work to co-participants ... and I'm just looking at the conveyancing firm. We've identified certain posts that would look as though they are going to disappear totally and then [...] it'd have to be reskilled but then it could also be maybe a less ... a less number of examiners required ... and then what is the impact in terms of legislation on office hours ... because I can technically work from seven o'clock in the morning and then the impact is on offices themselves. Do you even require office space to be able to work from home?

Vincent also mentioned various implications in introducing e-DRS which include remote access to e-DRS, less office staff required as a result of less manual tasks, automatic archiving of documents, positive environmental sustainability, more customer service centres and less deeds offices and improved access to public information:

You can lodge deeds electronically from anywhere if you've got a laptop and you've got a modem and it [...] links up to the system in the deeds office. It is very cost effective because conveyancers will not need an office; you can actually sit from home. The deeds office staff can be minimised because they also do [...] not need office space. Archiving

of the documents can all be done electronically. We're going to not cut down so many trees. We can have satellite information offices at every municipality where, if I want to go and find out if you're the owner of the property or I want to find ... get a copy of the title deed, I can go to this information satellite office. The costs involved in this it's going to be a computer and a modem. And let me tell you, all firms have computers. Just a modem to link up is gonna cost you R2 000/3 000. So [...] affordability I don't think it [...] is a problem.

Vincent predicted that the new e-DRS system could be equipped with additional functionality to acquire transfer duty receipts from SARS and rates clearance certificates from municipalities:

With our electronic deeds registration system, why do you want to lodge a transfer duty receipt if you can link up with SARS and SARS will give you the green [...] flag to say all transfer duty has been paid and you link up with the City Council of Tshwane and they say all rates have been paid. So you're going to eradicate a rates clearance certificate, you're going to eradicate the transfer duty receipt.

The entire end-to-end process is quite interrelated. According to Peter, “there's also reliance placed on by a whole host of people on extracting information out of the deeds office. Now they would need to be able to continue to do that because this is ... you know ... that vendors and lenders and everybody else.” Melissa cautioned, however, that processes and relationships may change with the e-DRS implementation, although how this change will affect existing processes was not clarified:

Information should, in my view, come from the state. We are the owner, if not the custodian, of that information. I'm not sure if we would consider partnering at that stage but I think that's, you know, something they'd need to look at later. Roles will change and to change roles in the organisations, and I think more so in government, is huge. Vendors ... they will then be our competitor or we will be their competitor which might not exist in the current landscape.

Michael was of the opinion that current vendors in the property market that purport to assist with dematerialisation efforts, have built their business propositions around paper documents. There will not be any paper in a dematerialised environment which may have a significant effect on vendor businesses. As such, the role that vendors currently play will need to change in a dematerialised environment:

The bottom line with all of those vendor systems is those vendor systems are doing nothing more than giving a window into what is inherently a paper system behind it. So somewhere along the line, this paper is still moving through the market. A dematerialised environment no longer sees that paper moving. The electrical wiring certificates and the municipal certificates and all of this sort of stuff where you've got service providers having to provide certain proof, which currently is a piece of paper flowing around still.

Gregory further reported that their office will continue to maintain their own database of property information in order to verify that the billing is charged to the correct owners:

If the above negatives [...] are looked at and [...] mitigated and [...] seen to, then it will probably streamline the information coming through [...] but we still will go through a verification process. It doesn't matter even if you're guaranteed it's a 100% we still go through a verification process.

Lester opined that the practices across the ten deeds offices in South Africa should be streamlined by adapting the best practices and discarding the less affective practices:

If they took the best of practices from the ten [...] registries, combine that as policy, and eliminated the worst of practices from [...] the industry ... it all depends on at what stage does the conveyancer lose control.

The way forward in terms of an e-DRS at the deeds office seems muddled at the moment. There are numerous opinions and even the opinions within the same business units differ.

Raymond pointed out that an industry standard should be identified and adopted:

We as an industry must actually standardise. We have a protocol and everybody understands how that works. Somebody in this space must actually lead that process to bring the players together to set those standards.

Steven was of the opinion that a single platform will be developed within the deeds office environment. Authorised persons will be given access to that platform based on the level of access that they require. Access will be granted after predetermined verification strategies have been employed:

They're gonna create a portal and in that portal, everybody enters that portal. Every practitioner: internal, external, etcetera. But their user profiles will be different. We want to start bouncing against [...] the law societies and against maybe the Department of Justice and [...] and the prosecutorial development as well [...] to go and check to see whether an attorney is still admitted, have been struck off, etcetera. So that ... that's the further check. Not just to get the verification on credentials but to check that you are still valid and you can still transact. These checks will have to be done before the conveyancer can actually lodge. Have you got a security key? Are you a registered conveyancer? Are you still practicing? Is your account in good standard? A lot of checks and balances are done prior to that. That can be done within seconds. The conveyancer comes in, he's gonna have to register with the deeds office. He's gonna have to go through biometric.

Fred relayed his vision of the e-DRS system as a service model. Various checks and validations will be built into the system at reservation (entry-level phase), at lodgement and just before execution. No scanning will take place anymore. Data capturers will have to be redeployed to other positions. Contrary to what National Treasury is hoping for, he does not foresee a reduction in the turnaround time. He also states that the deeds office would be able to integrate with SWIFT or PEXSA for irrevocable payments to be included as part of the registration process, but he reiterates that this envisaged concept is still only looking at digitisation and not dematerialisation in its true sense:

It will more go towards a service model. Power of attorney will still be on paper. There's certain pre-checks that when [...] the conveyancer will lodge it's actually checked at lodgement and then there's actually checks before [...] he [she] even starts lodging... there's a reservation process. There's three checks. There's checks at lodgement and then there will be [...] the second before execution. We'll check for interdicts and stuff like that. He'll do the reservation, he'll obtain his information and he can at his own pace feed the information back. It's only when it's lodged then it will close that information, check that all the necessary information is provided. There's the reservation, lodgement [...] execution, and the moment it's executed all the records will be updated. So there's no scanning anymore. There's no [...] data capturing [...] teams of people scanning actually will have to be redeployed. e-DRS [...] I know everybody's hoping for a very quicker turnaround time. [...] It will probably come down to five days overall from [...] lodgement to execution. The moment it's executed it can actually issue a electronic certificate to the bank saying this title now has been [...] executed. We can integrate with [...] the same messaging system as SWIFT and then maybe send it to PEXSA. They must be able to validate it has originated with us. That's why we say it's a [...] either a electronic certificate or it's a encrypted message. The title deed will become a electronic record that stays dormant and you actually just move the certificate around. At this point in time, we haven't looked at dematerialisation. We only looked at the electronic part, making it all electronic [...] creating a digital process.

The master of the High Court indicated that they would welcome closer working ties and an electronic interface with the deeds office in order to access property information of deceased persons even before the family advises them of such property. The master of the High Court can also put an indicator onto e-DRS to 'flag' any properties identified as belonging to a deceased person:

E-DRS ... well, it would be nice if we can have like a viewing function on it. It would actually help a lot if deeds office [...] and us were linked in the sense that the minute

that we register the estate that ID goes through to deeds office so that we are sort of on the same platform and they can immediately ... that gets flagged with them to say if they have a transfer on this thing, on this ID number, that is a deceased person. But the same would happen if they had were linked to Home Affairs that the minute that ... same as that ... what we are linked. If they can actually put in an ID number and say, oh, but this person is deceased.

Vincent expounded on e-DRS benefits as being cost savings, time savings, and accessibility to deeds office information by the general public:

All the positives are ... it's going to be cost effective, it [...] is going to save time, it [...] is going to take the deeds office to the people. In actual fact, We [...] can even break down our deeds office then to one deeds office.

Fred listed a number of challenges that need to be addressed and mitigated before e-DRS can be implemented successfully. The loss of jobs and retraining of staff will necessitate negotiations with unions and redeployment of staff to other job functions. Conveyancers may need less staff and will need to attend to matters themselves because of biometric identification – no longer via their secretaries or administrative staff. Corresponding attorneys will no longer receive lodgements to do on behalf of attorneys who reside outside the jurisdiction of a particular deeds office. Additional computer equipment, scanners, and internet connectivity will need to be obtained by conveyancers and other role players in the industry. The businesses of vendors operating in the property market may negatively be affected. Additional measure would need to be put into place to secure documents:

Electronic lodgement –You have to retrain people. If we look at Deeds currently [...] I think 25% of the people actually use computers for their work...Conveyancers are adversely affected because their whole way of working will change...It won't impact banks or other financial institutions that drastically [...]The original copy [title deed] is now electronic [...] sitting on [...] a server somewhere within Deeds. That security

will [...] have to be addressed because [...] the reason why the bank keeps the original is for security on the bond...conveyancers. They will have to get more computer equipment [...] and then [...] will have to have a internet connectivity [...] because it [...] they will be hosted [...] through the Internet on the worldwide web [...] but they'll also have to mostly likely procure [...] biometric devices, smartcard readers...you'll have to talk to the unions because if you changing 80% of your people's work methods and their primary job functions...With the e-DRS, that information will be available to the public at a lower cost than the data vendors can...A corresponding attorney and with the new system you can lodge in Polokwane, you can lodge in New South Wales. You [...] don't have to be in the country. Electronic records are more fragile than paper documents. It can be attacked [...] and you can lose electronic records but that's why we keeping the microfilm.

Lester listed the benefits of e-DRS implementation as:

Speed, reliability, accessibility, and then obviously in the long range, moving up on the technology scale, getting the entire transaction encrypted inside the record. That transaction is the title deed, is the record, is the photograph of the owner, very, very difficult to [...] falsify.

The benefits are in line with what has been highlighted by other participants. He further expressed the desire to be able to individually interact with the deeds office even after the implementation of the e-DRS system. Losing the ability for conveyancers to lose their discretion is a huge issue for conveyancers:

Transaction the conveyancer worked on for months. Some cases like big transactions we work on for a year or two. Huge effort, get it together and lodge it, and now the poor examiner must sit in literally a few hours, get it in his mind, identify everything. They are very experienced and some of them are very good with that but it's still a [...] very [...] unequal match in a certain sense. The examiner wasn't involved with all pain of getting the right information to be signed, to put the thing together. So he [she] simply

takes as often happens. So where is that? Why isn't that there? The conveyancer is at fault ... dream of that you could take your big transaction, discuss with the examiner, and quite probably nine out of ten queries is gonna resolve right there.

Melissa acknowledged the following benefits with e-DRS implementation: shorter turnaround time, integrated information, integrated title register, reduced ability to execute fraud through better control measures, but she was unable to foresee a reduction the property transaction fees:

Obviously the intention is shorter [...] delivery times. It should be the total [...] the end-to-end service. The other benefit is the advanced [...] information that need to be provided ... the fact that the information between the surveyor diagrams and the deeds [...] title register will then be integrated. That kind of information was not available up to now. I think it's mainly those three things: [...] reduced ability of fraudulent activities through better controls, shorter [...] service delivery times, and advanced [...] and elevated information provision. I know there was the intention that the fees will come down. I [...] cannot see that that will happen but that's just my personal view.

Paul highlighted that electronic mechanisms “removed the fax cost” and “the processes are getting a lot more seamless and integrated and that’s where the benefits will come from where it’s been ten years ago”. Gail summarised the benefits of e-DRS as follows: easier tracking of transactions, a clear audit trail, and better monitoring tools:

I can track much easier how far a file or a matter is in progress. I can track who worked on it, when did they work on it, and what did they do with it? Did they make changes or not? I can track [...] what our turnaround times are. Are we complying with the mandate that government gives us? ... be able to look on a countrywide scale what is the status. How many estates ... for us, for instance, how many estates have been reported? How many has been issues with the letters of appointment? Even if the file is not available, if somebody requires information, I can still go in without that file and obtain that information.

Wendy delineated the benefits to include access to property registrations by the poorer communities:

More people can [...] participate in [...] the property market. Now property is the best form for the lower end of the market to [...] build wealth and [...] that's what we desperately need in this country: to build wealth in terms of cost-benefit analysis. I would say the benefits weigh far outweigh the costs.

Michael also listed benefits of introducing an e-DRS system: real time processing capabilities, enhances investor protection, and better facilitation of the process:

The process is significantly elongated in the old manual paper space and it had become real-time. What the electronic era brought about was significantly enhanced investor protection. There's a lot that was brought about by the introduction of [...] an electronic with the dematerialised record which allows one to better facilitate the process of ownership transfer.

Fred summarised the benefits of e-DRS as follow: less costs, increased information storage capabilities, audit trail, and improved security in the form of advanced digital signatures:

It's positive because it will be less costs. With electronic lodgement, you can actually increase the number of information that we actually store. You can actually work out any doubt and prove who actually signed the document, when it was signed and [...] by whom. It will also electronically check the time to a millisecond.

There are numerous benefits and challenges associated with the implementation of an e-DRS system which would need to be addressed and mitigated. Stakeholder engagement is important and may assist to identify and put mitigating factors into place. Stakeholder engagement may also assist to explain the concept of dematerialisation and allay fears of job losses that may arise. Job losses were perceived as a threat across private and public organisations. Also, the majority of the

participants (public and private) was of the view that e-DRS should be implemented incrementally.

5.2.2.11 International

Vincent explained that Namibia, Botswana, and Swaziland uses the land administration system that is followed in South Africa:

The Department of Land Affairs for South Africa, Namibia [...] Botswana, Swaziland, because they have the same land registration system. They adopted our Deeds Registries Act [No. 47 of 1937]. They just gave it another number, but they've got the same system as ours.

It stands to reason that these countries can all benefit from advances that South Africa makes with regard to deeds office processes. Peter emphasised that we should consider other global dematerialisation initiatives and learn from mistakes made by other countries as well as learn from best practises that can be introduced in South Africa:

If you look at our world, there are a number of examples of a cadastre system in our world. Make sure they leverage it off known best practices around the world in this area. And also pitfalls... We do it easier and with less mistakes than [...] this frontier countries have done in this space.

Steven cited the Netherlands as an example of how flexible working can be used with regard to job design. In an electronic environment, it is not necessary for certain staff to work from the organisational offices:

If you look at the study done in Netherlands – half of the [...] staff there are on an electronic system. They work from home for maybe three to four days a week. There's no project like this elsewhere in the world ... because of our [...] unique system.

Steven went on and acknowledged that the deeds office does not have the capability of building an e-DRS system, “we don't have the capacity in-house to be able to deal with such

a mammoth project”. Ashley complained that local expertise is not used and that the South African government source expertise and technology from abroad instead:

From a government perspective, that they always go abroad, you know. Then they in Turkey then they in the Netherlands then they in Canada, everywhere looking for companies to do the technology, where in South Africa, so, from a financial point of view they can actually save millions if they just look for what is available already and make use of that.

Vincent confirmed that various international studies have been done by the deeds office and he has been part of various delegations that visited different countries. He cited examples from Hong Kong, Ontario and Australia:

The State of Ontario ... we couldn't adopt that system because once again they do not have guaran ... they do not guarantee title. If you go to Hong Kong, they've got a very good land [...] electronic registration system but also not based on [...]. If you go to [...] Australia they ... but they got the Torrens system [see 2.5 above], which is a positive deeds registration system. They've also got electronic ... They started long after we even ... and their system is up and running.

Raymond, in turn, also presented some international benchmarks and cited examples from Australia, the United Kingdom, Wales, the United States of America to illustrate that payments can be introduced as part of the registration process:

The United States, they have a standardised mechanism in place. If you look at Australia [...] they've implemented RITS [Reserve Bank Information and Transfer System]. [...] It's only at 2 030 financial institutions and over a six trillion dollar market and they've got the EDR [electronic deeds registration] already in ... into their ... payment system. In the UK and Wales, they use CHAPS [Clearing House Automated Payment System]. They also busy looking at enhancing that solution and then Ireland – they started a similar project. You have Netherlands but they only focusing on EDR; they're not

focusing on the payments. The payments are still normal EFT process. We think there's a huge opportunity [...] because we are actually leading with Australia and [...] Ireland is now really getting into it. Law societies in other countries are actually playing quite a dominant role enforcing this payment solution down to the attorneys and actually pull the banks together.

Michael also named a few international experiences of where Australia, Canada, the United Kingdom and Bermuda have been investigating and/or implemented an e-DRS system into their environments:

You're starting to see things coming about. You're starting to see [...] the starts in Australia. You're starting to see [...] fresh looking at it in the UK market. You've got stuff in the Canadian markets which started, got it wrong, may be reinventing it. Bermuda went from rural [...] tribal landownership to a fully-fledged dematerialised register in one step and they've missed everything in between. Some of the states in the US have got systems up and running. When we started this discussion, there was nobody else in the world was doing it [...] and you're starting to see it happening.

Lester enlightened that a dual system has been implemented with the Law Society in England whereby conveyancers and attorneys can choose to use an online or manual system:

Law Society England – they just call themselves the Law Society [...] – and the deeds office started instituting electronic transactions but as a option of first choice or the default choice. You can choose paper or electronic and that immediately had ... I think it was something like 30 or 20% surge in electronic submissions because they didn't stop the train, get on the bus, or vice versa.

Fred commented that the processes and systems involved in conveyancing in the different countries differ substantially and can therefore not be meaningfully compared to South Africa. The conveyancing processes in New Zealand and the Netherlands, for example, are much simpler than the processes in South Africa:

Now, like New Zealand and Australia and Netherlands and all of them, [...] they actually had simpler business processes to electronic and there wasn't the separation between the surveyor-general [...] so the cadastral information of the deed, the ownership information wasn't separate. They were actually [...] one entity. So, it's much quicker to go electronic because you have simpler processes [...] simpler [...] regulations, and so forth [...] and ... but technology-wise it's very quick, it's ... to implement.

Both private and public organisations had conducted research into e-DRS initiatives that had taken place in other countries. However, all agree that another country's framework cannot be implemented as-is within South Africa. It is valuable to learn from other countries' mistakes and to use benchmarks for components that may be considered within South Africa.

5.2.2.12 Payments

After registration [of the new property], funds are disbursed to a number of role players. With regard to payments, George said, "Conveyancers normally issue guarantees for certain payments that need to be made, but banks predominantly make provision for these payments to be effected," to which Raymond added, "in terms of the Act [Deeds Registries Act, No.47 of 1937], the transfer attorney is responsible for the disbursements of all fees ... appointed by the seller". Vincent was of the opinion that the payment process would not change after the implementation of an e-DRS:

The funds would be disbursed exactly as it's done now. So nothing's going to change with the payments. [With deceased estates, monies need to be paid into the estate for distribution.] ... if they sell a property in the estate, the conveyancer is supposed to pay the money over to the estate late account, which the executor will then distribute in terms of the liquidation and distribution account.

PEXSA is an organisation in South Africa that has put together a payment system which they hope to implement into the South African property market. This payment system will

be able to integrate all role players in the property market that need to make or receive money that is linked to a property transaction in the process of being registered. They have already built the platform is have engaged with key stakeholders in the industry in order to implement their platform. It is important to note that this platform can be introduced into the property market even before e-DRS has been implemented. Raymond elaborated:

PEXSA South Africa was initiated with the aim to simplify and streamline the payment and the settlement process and to improve those processes and standards for same-day payments and settlements. PEXSA will engage with all the stakeholders in the industry, including the banks, which is a bond bank, your cancellation bank, but in this instance also the transfer attorney. We have engaged with stakeholders over the last four/five years to talk about reforming the industry. For that we've engaged with PASA [Payments Association of South Africa], and today we are registered as a systems operator in the RTC [real-time clearing] environment for real-time clearing, which means that you can settle within sixty seconds. We've engaged with the Reserve Bank, we've engaged with National Treasury. National Treasury giving their full support. We see a huge opportunity for SARS. SWIFT is a very [...] important player in this process. We've engaged the banks, SA Home Loans, the attorneys, the bridging houses, and vendors. The way we see how to take this thing forward is once we implement this system you need a standard [...] and technology forum or committee for the industry, and there we propose that a bank will chair that committee and that is where all the home loan divisions and treasuries come together. The payment system can be implemented without the EDR at this stage.

Wendy reasoned that the PEXSA platform is a secure platform that can deliver in terms of the 'delivery versus payment' concept. This means that ownership is transferred at the same time as money is exchanged:

PEXSA ...We see it as a precursor. In other words, what it does is secure the [...] payment but the front-end part of having all title deeds dematerialised so that it can be

delivery versus payment is [...]. So it's not the entire value chain but it's certainly a large component ... We wouldn't restrict competition in this space at all.

Although National Treasury was of the view that access into the payment space should not be restricted, Michael opined that only one service provider should operate in the payments space for increased control. His view was that competition in this space would add to the cost and complexity of the model. There are other areas where competitive advantage is better suited:

There's no competitive advantage for multiple players in that space because what are you doing? It's [...] in theory it's nothing more than a coordinator... that should never ever be a competitive space. The competitive space you've got over here is the estate agents charging you different commission rates, providing a different service, the way that they interface with you as a client, how they deliver their service to you.

Raymond went further to explain the envisaged process of the PEXSA payment system may be triggered by information received from the Deeds Office Tracking System (DOTS) to confirm that an application is 'on prep' – about to register. They would then confirm all amounts with pre-loaded beneficiaries and upon confirmation of registration, payments would take place:

What we propose within the PEXSA system, is that PEXSA to have all the access links to BankServ, the deeds office, the attorneys, and the banks and when you actually get the deeds office tracking system, the DOTS [Deeds Office Tracking System], from the deeds office. At the moment it's going into numbering. We then get the trigger. We know when we get the trigger we will actually, through our PCH [payment clearing house], then settle the cancellation bank, the transfer attorney, the estate agent, the seller, SARS, the fidelity fund, and bridging houses. On prep, you will have your pro-forma ready; you will know of all the source of funds and you know all the beneficiaries and you know on registration the system will just transact. It's a real-time check.

According to Raymond, this new payment system is expected to bring about numerous benefits including: a clear audit trail, reduced opportunities for fraud, reduction of multiple cash movement, irrevocable payments, increased transparency of the payments process, elimination of repetitive data entries, improvement of liquidity, reduces costs, improvement of standards and procedures and integration opportunities for supply chain members:

There's a clear audit trail between the paralegal and the admin department. We can take fraud out of the system and also how we can actually streamline the process, bring the clearing and the settlement closer. The closer your clearing and settlement the lower your risk. The key drivers are to implement an irrevocable same-day settlement process to improve oversight...also to reduce the multiple movements of cash through the market. Transparency where banks will now actually see what is happening within the transfer attorney space. It will definitely address fraud, money laundering [...] Benefits to the bank it's irrevocable same-day, it reduces the fraud, account holder verification, it mitigates your payment and the settlement...they can [...] monitor the [...] conveyancers. It's interoperable...it integrates into any software vendor package. It eliminates repetition of data entry. It improves standards and procedures. [...] it speeds up the settlements and improves the liquidity and velocity of money. It reduces costs due to a leaner and a quicker system. We have extensive reporting.

George listed the benefits of introducing an irrevocable payments system and surmised the elimination of the principle risk, process efficiencies through centralised processing and a reduction in credit risk and fraud risk:

If you manage it correctly [...] you take away the principle risk and that is the risk that if I make the payment I will not get the property or I will transfer the property and never receive the payment. One would be some efficiencies that hopefully they will be able to gain in terms of getting everything centralised. The possibility would be to actually simplify the process. Reduce the risk [...] credit risk, fraud risk, on a number of [...] places and hopefully make that payments process I think much more efficient.

Michael added that transactions cannot be reversed in the Reserve Bank books. If reversal of payments were to be allowed at the Reserve bank, the integrity of their system would be undermined and compromised. It is therefore crucial for all processes leading up to the payment to be completed and finalised properly without any recalls and changes taking place that could impact on the payments process:

Today in the payments space, how do I reverse a payment that's been made through one of the central bank systems? The only way I do it is to book a new transaction to equal ...I cannot go into the system and say [...] hang on, let's undo. There's no undo button in the central bank's settlement system. The minute you start allowing undo, you're actually questioning the integrity of the recordkeeping system to start off.

Raymond asserted that the 'delivery versus payment' concept should be manifested in the e-DRS system. This means that payments need to be made immediately upon registration so that the transferring of the asset and payment take place simultaneously:

And that will happen in the EDR that the moment the money flows you will get your title at the same time. In [...] the current situation is ... you wait for the registration to happen and then, only then, cash will flow.

Linking to the fact the no reversals take place at the Reserve bank, George emphasised that Reserve Bank payments are irrevocable, and concurred with the importance of the 'delivery versus payment' concept:

The movement of property that is linked to the movement of the funds ... and the so-called – what we call 'term delivery versus payment' addressing [...] solvency, finality and [...] irrevocability issues because I think once a payment has been passed across the books of the [...] the bank in [...] the central bank that payment is final and irrevocable and it can't be under ..., overturned. Once settlement has taken place that's legally when the transfer of ownership has taken place. Once the payment is the [...]

settlement has been ... notification reached this operator, they can then transfer the ownership of the underlying asset.

Michael supported the view that e-DRS payments would need to be irrevocable and explained how this occurs in the shares environment. He emphasised the payment versus delivery process is protected by law and that payment cannot happen without delivery, and delivery cannot happen without payment:

It's actually payment versus delivery in the sense that the cash settles at the central bank, the Reserve Bank, and on the strength of the cash settling at the Reserve Bank we get a message back from the Reserve Bank to say we have settled this cash. This money has been put into Dale's account and you can now initiate the transfer of ownership. So, this delivery versus payment process is protected in law and it's on the basis that the one will only ever happen if the other is guaranteed to happen, and they happen literally within milliseconds of one another. So, you can never ever have a situation where payment is made and securities don't transfer or the securities are transferred and the payment isn't made.

George delineated the payments process from a Reserve Bank perspective: designated settlement organisations (Bankserv, Strate and PEXSA – these organisations are also known as clearing houses) and banks participate in the settlements system (SAMOS) at the Reserve Bank. These settlement organisations need to ensure that the transfer of ownership takes place when the transfer of funds has taken place. However, in the property space, registration or transfer of ownership takes place first and then funds are transferred. Guarantees are usually put into place by conveyancers before registrations are finalised to ensure that the required funds are available:

Only banks or designated settlement systems that participate in the settlement system ... an exchange can be mandated by the banks to submit settlement instructions on their behalf and then that would ... that exchange or a clearing house are then able to actually

co-ordinate the process to make sure that delivery versus payment takes place or in other words that transfer of ownership will only take place if transfer of funds has taken place. Like PEXSA or a Strate or BankServ [...] any of those [...] are then authorised by the banks to submit payments to SAMOS [South African Multiple Option Settlement] for specific purposes.

George highlighted the block chain technology and distributed ledgers that can record and handle the transfer of assets, including property transfers. These technologies can prove ownership and transfer of the asset:

Companies is looking at the block chain technology and distributed ledgers, using distributed ledgers, and using the block chain technology to [...] handle the transfer of ownership of assets. Property transfers, I think, is the type of [...] asset that would be one of the target areas or the areas where people will spend some energy to say can't we actually have this deed of property done in distributed ledgers where we can prove who's the owner and [...] that transfer has taken place. If you talk about disruptive technologies going forward, something like in the property market, I think with the block chain technology and distributed ledgers I think will probably ... can be a focus area.

Wendy stated that each title deed can be managed by a block chain technology. She explained that bitcoin as a cryptocurrency is a separate issue as the block chain technology and the distributed ledger. Block chain technology could operate with the Rand (the South African fiat currency). The ledger would record the history of every property that is recorded therein:

If you envisage ... a fully electronic system, I mean, it would be great if they used block chain technology for example and you have a block chain for each title deed. You must separate bitcoin, the currency, from block chain, the technology. Block chain would ... could work on rand just as easy as. I mean, you don't need to ... you don't have to have block chain and bitcoin. It ... you can separate the two. So, I'm thinking of block chain as a technology with rand. So it's not a question of can we accommodate it? It's a

technology that will be deployed. When you talk about a distributed ledger, I would imagine you would have a ledger for each property. Like, all the transactions that ever happened to that property would be in that ledger.

Michael shared that authoritative bodies (such as SARS and SARB) would need to recognise new currencies for such currencies to become accepted as a trading functionality in South Africa. Cryptocurrencies are not in the control of a central bank. As such, the question of who owns the register would need to be addressed. This corresponds with the literature where Peters et al. (2015, p. 5) stated that block chain records are different from existing ledgers in that they are decentralised, and there is therefore no central authority verifying the validity of transactions:

There's a lot of noise in the marketplace about what distributed ledgers and [...] block chain and cyber currencies and all of these things really are and where their best applications points are. There's no doubt that when you starting to talk about something like this you have to start looking at the ... how the central bank recognises some of these systems, particularly when you're talking about the cyber currencies, the cryptocurrencies. They certainly wouldn't endorse it, they will not endorse something that sees [...] SARS being cut out of it. So if [...] you and I agree via some cryptocurrency and I give you so many bitcoins for my transaction and SARS never knows about it, well, we've got a problem. One of the questions that one should ask about this [...] block chain kind of technology is, who owns the register? Who has the right to give effect to changes in a register?

In terms of the envisaged process, there are other functionalities that Michael thought should be carried outside the block chain technology if it should be implemented. He was of the view that the cadastre component would need to be maintained separately and that only the ownership component should be incorporated into the block chain technology if it is incorporated into the property market:

I've gotta have a reference to the surveyor-general's (SG) diagrams and say, well, that piece of property's identified by the following four corner posts and it's got reference numbers, GPS coordinates. Would I carry that in a block chain? No, I wouldn't. I'd have a reference number in a block chain but somewhere along the lines, somebody's gotta have that information to prove that this particular property described as erf 1 Illovo is in fact erf 1 Illovo and it's recognised by the SG as being erf 1 Illovo. There're a number of people who are saying that it can work in the property space. [...] I've yet to see a compelling argument for it. I've yet to see a compelling argument against it. So time will tell.

Lester also seemed to support the block chain technology for recordkeeping and shared that the NASDAQ [National Association of Securities Dealers Automated Quotations] has incorporated bitcoin technology into their business design. He summarised the advantages of the block chain technology to include accuracy of encryption, decoding and dematerialisation, immediacy, secure, and all ownership details can be embedded into one electronic record. He was not optimistic that this technology would be introduced into the South African environment over the next few years:

They [NASDAQ] announced last year July that they're converting to [...] bitcoin technology. Not for the money but for the speed of accuracy of encrypting, decoding and dematerialising transactions. Block chain ... the transactions are immediate. You have both the money and the transaction and all the detail you can't falsify and you have a [...] virtually uncrackable transaction record. I just can't imagine that this would be in South Africa in the next ten years. Your title deed, your photograph of the owner, where your transaction details themselves, are all embedded in one electronic record on the [...] cloud or on the Internet not under the control of government or deeds office or anyone like Apple or Google. It is a proprietary system that you buy from NASDAQ, and those people and I know Bloomberg [delivers business and markets news, data and analysis to the world] is planning on commercialising it. If you go with the block chain

route, it is brilliantly fast in certain aspects; in other aspects very slowly property, but does not foresee its implementation in South Africa, especially not in the near future.

The most important concept related to payments is the “delivery versus payment” concept. Payments need to be irrevocable to provide security to all claimants. New payment technologies that has been incorporated into the payment space relate to block chain technologies and the distributed ledger, whereby a central bank do not necessarily need to be a role player. However, central banks may assist to transact with these technologies by using fiat currencies, and cryptocurrencies are not compulsory in this regard. It appeared as if only organisations (public and private) who are currently involved in payment transactions had knowledge of irrevocable payments and the new technologies.

5.2.3 Theme 3: Security

The current deeds registration system has several drawbacks, such as low efficiency and ineffectiveness, while the cadastral surveying system may fail because of incomplete land information (Divithure & Tang, 2013, p. 220). This section of the data findings present evidence with regard to security aspects that were collated from the different participants. The subcategories of this theme include fraud, compliance, risk, risk mitigation, and other general security features that, due to insufficient acknowledgement by the participants, did not justify a separate subcategory.

5.2.3.1 General security features and aspects

Even through an e-DRS system has been approved to be introduced into the deeds office, Vincent informed, “the security of title must remain”. It is crucial for the integrity of the property register to remain intact. Steven supported this view and remarked, “the whole idea of electronic is to still keep it digitally secure and when we’re looking at the digital security, security’s always been paramount.” Ashley shared the same sentiments when he said, “you know, you don’t want to have ownership getting drawn into question [...] when there’s

issues with the data”. Charlie stated that security is very important and certain technologies can assist to ensure security with “... the advanced certificate being the most secure.” It is important to ensure that the types of security that are introduced can assist to add to the security and not create further opportunities for hackers and fraudsters to access and alter property information. One such technology to increase security is a digital certificate. In addition, he said:

The bank user and the attorney would have to have digital certificates, whether they were individual digital certificates or whether they were entity certificates, in other words on behalf of the law firm or the branch [...], there's both actually still today. From an authentication perspective, and also we use those certificates to encrypt data and encrypt documents. The private/public keys that's all part of ... PKI [public key infrastructure] and part of digital certificates. Effectively we see it as a [...] an absolutely critical layout on top of any of our solutions.

Charlie acknowledged that digital certificates use encryption that protects the content of the message. Authentication will provide access to open and view the contents of a message that has been sent. These messages could range from an instruction by a bank to register a bond, to progress messages forwarded to the relevant stakeholders that for part of a particular message:

When you download your document [...] it's downloaded with your certificate. It's [...] effectively encrypted for your certificate so if you then e-mail that document to somebody else ... to me I can't open it. Digital certificates in particular will always have a part to play in terms of authenticating and [...] enabling us to encrypt and do a whole lot of other [...] clever things from a security perspective.

Ashley mentioned that electronic platforms may have unintended consequences if technological systems are relied on for the wrong purposes and intentions. In law, the intention of the person who drafted documents are supreme and it is therefore important for

technological systems to uphold the same. In addition, signatories and those who have access to technological systems should be strictly controlled:

It's very easy to [...] have unintended consequences by relying on a system of information instead of a legal process to [...] transfer property. You can always go review the document again to make sure what the intent was of that process. The ECT speaks of what they call electronic signatures. Those are in order to qualify signatures that are there to stringent rules in how to identify the [...] players in the system.

Charlie confirmed that electronic signatures are very secure and was of the opinion that electronic signatures were more secure than ink-made signatures because biometric identification, which is unique to each individual, is used to verify the signatory. An audit trail is also recorded of when the signature was signed, and by whom it signed, as well as any changes that were made to the document before the signature was made:

It's a lot more secure than even the wet ink kind of signature because it records a lot of biometrics involved in it. Little technologies that go in and retrieve date and time stamp from the [...] and it watermarks it behind the signature, and as I mentioned, there's biometrics behind the signature. There's a full record of when exactly each signature was done, when changes to those documents were done. The last thing you do on a document needs to be a signature that then verifies all the changes. If you then make a change to that document the whole thing breaks and you cannot do ... so it's very, very secure in terms of that.

Fred also highlighted the mechanisms electronic signatures. Once a signature has been completed and accepted, the document which was signed cannot be changed anymore. The technology employed can also prevent a signature from being copied and used elsewhere. X509 certificates are issued by the South African Post Office and also e4 (as confirmed by Charlie):

The digital signature is an X509...it's a proper encrypted signature... after you've signed the document with that type of signature, you can't change it or modify it...certain information is actually embedded...certain parts of the document...it can contain information, it can be secured when you sign it, so you encrypt it...sign on a [sic] electronic document but I can use that same signature and paste it onto another document, like pasting a [sic] image across...with the X509 certificates you...you cannot do that...there's a whole, um, certificate authority structure...there's a [sic] issuing authority that can be the Post Office...the negative of that is, if you want to use that on a power of attorney level every citizen in the country will have to be issued a [sic] X509 certificate.

Lester confirmed that electronic signatures have not yet been properly implemented and stated that this aspect should be properly implemented before e-DRS is implemented. The implication is that documents may not be sufficiently secured by means of electronic signatures if electronic signatures are not widely used by entities who needs to secure documents:

You can't jump three stairs up here. Take it step by step and that first step is obviously electronic signatures so you can start checking whether documents are valid or not.

You're not going to believe it. It's still not working properly.

Peter summarised a few security measures that should be considered: back-up facilities need to be put into place, and fidelity insurance need to be in place for parties to be held responsible where they were negligent:

There need some form of backup in the event of a catastrophe that records are not destroyed. They would need to be able to serve as a base for any court case. It would be enough provided the, there's some form of fidelity insurance. That insures that if there is anything untoward that has taken place that those parties can be held responsible. How does one validate that the transaction is an authentic transaction, that the necessary signatures are held, that's the seller of a property or the bank selling that

property authorising the transfer of that property where it has a bond registered over it. You know the cancellation of its bond. Banks ... They would still need to be able to exercise the controls around authorising a transaction to a point.

Gail added that other general security aspects include a firewall to protect each separate entity, back-up procedures for business to be continues without disruption, and security against hacking attempts:

You need [...] almost a fool proof system. You need firewalls in place. There has to be a backup on that so that it doesn't stop service delivery. In the deeds office your backup is going to be a lot more vital because you're sitting with the entire country's property registrations on your database. If that gets hacked that is horrific, the consequences for that is horrific.

5.2.3.2 Fraud

Michael highlighted that the paper environment with the trading of shares was characterised by a number of fraudulent transactions:

There was a fair amount of fraud which was taking place in that space so certificates became [...] sort of fraudulently replicated and you never really knew whether you actually held [...] a genuine holding on the register.

In the same manner, much fraud may be occurring in the current paper based property sector, as Michael further elaborated on a number of places where fraud can occur including within the deeds office itself, at banks, conveyancers, and the Law Society:

I think there probably are cases, confirmed cases, where transfers have taken place without due permission. So what have we done here? We've seen what was supposedly a perfect register of ownership of properties being tainted by fraudulent transactions. Now that could be caused by a whole host of things and it could've been initiated by a number of different places. It's ... the potential exists for fraud inside the deeds registry itself, the potential exists for fraud from a conveyancer's perspective. We do know that

there have been fraudulent transactions taking place. We know that there are banks that have paid out vast amounts of money on confirmation that transaction has been registered only to discover that their transaction wasn't registered and they've paid the money away. They're facing a potential loss because the asset isn't in fact transferred into their client's name. The bond that they were supposed to register isn't in fact being registered with the property. You just go to the Law Society and look at their fidelity fund and R400 million a year and it's growing every year. We cannot continue to allow that amount of money to be misappropriated in the system just forever. Fix the problem.

Paul said, "there are professionals out there that manipulate these things. That's where you get fraud." Jerry expressed concern about fraudulent activities that were uncovered while people were applying for identity and travel documents. To overcome the fraud, the DHA centralised functions into one building:

We had a centre for taking the prints, we had a centre for taking the picture but we have since brought them together ... in one centre so that you are there. You [...] take the [...] print and the picture because people were starting now to say when you move from there they call another person ... comes and take the picture and it's [...] not you. So, that's why we closed that gap.

To address the meddling of professionals in the deeds office process, Fred explained that to prevent any undue influence, no human interaction will be allowed in the envisaged e-DRS system and process:

Because of the electronic workflow process [...] there's no human interaction between the examiners and the conveyancers or the clerks of the conveyancers. So, I can't walk in and pay a examiner because I don't know who's examining my title. We can maybe look at a system to hide the identity of a conveyancer as well so that the two parties can't collude. It's built on [...] the world's best practices standards for security implementation.

Charlie explained, “the banks don’t have any kind of control over the transferring attorney and that’s also where a lot of those fraudulent activities have [...] taken place ...” Gail explained that the major type of fraud identified at the master of the High Court was the falsification of documents. An example that she cited was of a falsified date-stamp that has been used to try and validate fraudulent documents. Despite a link with DHA to verify the deceased statuses of people, fraud is still occurring in their environment:

We’ve picked up fraudulent letters [...] a date-stamp that’s being used on documents. So, we are going to engage with the deeds office [...] with a request to please stop any transfers that come through under that particular date-stamp. What’s interesting is we still get fraudulent matters in our office despite the fact that we are linked with DHA. Oh, the fraud wasn’t committed in our office. The fraud was already committed at DHA. Their system ... their information on their system was wrong and we worked on that ... falsification of documents. It happens before they actually enter our office. You know [...] because we work on the paperwork we receive.

Raymond confirmed that paper documents are not necessary in order to verify and authenticate people anymore. He states that paper documents make the property system very cumbersome. It is also the paper documents that enable a lot of fraud in the property market:

You don’t have to scan a piece of paper to authenticate people today. That is [...] it’s paper, it is [...] cumbersome, it actually causes time delays, it is not efficient, and you can actually defraud it because the colouring in paper copies is not always 100% perfect. We’ve seen it in many instances where documents were actually transmitted through technologies to the bank which was incorrect and [...] although it was [...] approved.

Raymond alluded to irregularities that may occur with regard to registrations and was of the opinion that a lack of a regulatory framework could be blamed for the opportunity that existed for fraudulent transactions to occur:

There's no certainty in payment, huge risk. You actually leave that whole transaction in the hands of a third party, and the fraud today is just enormous. Where that party is digging into the trust accounts, people aren't getting paid, and there's no structure. There's no real regulated environment to make sure that that transaction is secure when you actually make sure that those properties register in the deeds office and that the payment and the settlement must take place. The mortgage bank and this cancellation bank don't have any oversight of what's happening in the transfer attorney space and that is where the fraud happens. There's collusion, there's fraud, there's money laundering – all of that is happening in that space without any oversight. This industry ... neglected in terms of a regulated framework where you have secured settlement processes. It's in [...] you can't believe that the whole industry didn't do anything many years ago. It is lagging and that is why we need to leapfrog and actually get the new system in place.

Raymond pointed out that fraud also takes place in SARS whereby transfer duties are claimed back from SARS for property transactions that were supposedly cancelled but still continued to be transferred in the deeds office:

There's fraud in SARS where a paralegal's currently ... they cancel properties before the date of registration, they claim the transfer duties back from SARS, but they still continue with the registration in the deeds office, and SARS is thinking that the property registered [...] didn't register, it was cancelled, and they paid the transfer duties back to the attorney.

Raymond furthermore stated that it appeared as if there was no oversight of the trust account at the sheriff's office:

The sheriff fidelity fund ... very interestingly is that all monies, every single rand and cent that ... going through a property is going through this sheriff's trust account. There's no interbank payments, nothing. So, the sheriff says they trust their sheriffs and they just hope that whatever they tell them is in the trust account is in the trust account

but there's no checks and balances in a sense from an electronic point of view. [...] They just believe that their sheriffs are doing their jobs and there's no bank oversight of what's happening [...] into the sheriff's trust account.

Lester cautioned that standard systems which forces everything to fit into a predetermined mould creates a lot of loopholes for fraud to occur:

It's humans interacting in transactions. There may be a slick agent who slipped in a clause that suddenly comes out and the purchaser phones you the night before you register and say but, wait a minute. It's no use to say then electronically we're proceeding and say, hang, stop it, I'm not registering. There's a [...] breach in the transaction. Humans prefer standard systems which they can subvert for fraud so it doesn't get noticed. Some of the biggest fraud happens with standard electronic systems that are so good and so fast that no-one notices that it's fraud. It's happening more and more that fraudulent transactions slide right through because electronically it looks perfect.

5.2.3.3 Compliance

Charlie said, “in the past, it was a paper document that was then what you would take to court and then they would have to bring in a signature expert”. George explained the process that is followed for a new entity to be registered on their system: validation of the new user, technical requirements should be met, an operational agreement is signed, timelines for processing are agreed to, and confirmation by banks that the new user would be able to submit payment instructions on their behalf:

When a party registers, there's a whole process that we take through. We [...] need to make sure that the legal entity is [...] a valid legal entity. Obviously, we make sure that all the technical requirements are met. Then also, the operational agreement on what is happening, who's informed, what's the timelines that we adhere to, and things like that. From our perspective, it's more an operational risk. The banks that will participate

will have to come and say, yes, we are happy that PEXSA can actually submit the instruction on our behalf.

Paul stated certain components that need to be built into an electronic platform to reduce risks and these included prompts with regard to attorneys that has been scrapped from the roll (the same would apply to estate agents and land surveyors), client consent forms should form part of the supporting documents, as well as enquiries into which money needs to be credited:

That attorney, if he's [she's] non-performing, will be removed from the panel in terms of turnaround time, in terms of compliance documents. There's a consent form, which the client signs off ... an IDX [Industrial Data Xchange] consent form, DEA [Document Exchange Association] consent form, and [...] it also comes in and it also is part of the supporting documents that goes to the bank. In the application form, the client signs off, there's also a consent there that they [conveyancers] could do credit checks and those kind of things. Somebody says pay that into that account. Do you actually own that account? Checks like that ... when they send it they will send you an SMS as well that they've received this request.

Melissa was of the view that “there will be totally advanced controls through things like [...] advanced digital signatories [...] and many of the electronic interaction that we anticipate and [...] no longer the manual intervention on that”. Charlie mentioned that electronic signatures needed to be done in the presence of an authorised person and that the security of this method is trusted, and “under the ECT Act [No. 25 of 2002] have to be signed in the presence of the [...] counter-signatory. The banks know that that document ... when they receive it they [are] 100% sure that it has in fact been completed.” Charlie explained that a process of validation needs to be followed before digital certificates are issued, such as obtaining copies of identity documents:

They can't actually get onto the system in the first place without having a digital certificate. It's like the key to the house. The process to issue you with a digital certificate is very important. So, we would get a copy of your ID document, we would follow quite a [...] strict process to [...] grant you that certificate in the first place and those certificates are only valid for certain periods. There's a process behind that that the attorney goes through [...] to [...] attain that [...] advanced [...] digital certificate.

Lester also highlighted the usefulness of the ECT Act [No. 25 of 2002] and was of the view that the ECTA Act already incorporates the components that are necessary for electronic transacting:

They've been busy for fifteen years to try and rewrite the Deeds Registries Act [No. 47 of 1937] for electronic purposes. The ECTA Act [Electronic Communications and Transactions Act No. 25 of 2005] is a brilliant [...] intermediary act to deal with current transactions in documents, as you know, for some parts in electronic form. Why are you trying to rewrite a [...] Deeds Registries Act to now suddenly be totally electronic? Simply use the act, ECTA Act, where the deeds office been trying forever, for the last fifteen years, to rewrite the Deeds Registries Act. The ECTA Act already covers 90% of that. The Deeds Registries Act [No. 47 of 1937] is still going strong the way it is because it's a very, very well-written document. There's nothing wrong with it. The principles are there but simply because they want to do away with paper they want to rewrite the act, which I think is folly.

Steven outlined a few compliance issues around interdicts, encumbrances, and endorsements that may prevent the registration of properties from taking place. A legal process should be followed to rectify mistakes in a title deed. Therefore, it is important to property check documents to make sure that they are error-free. Only authorised users will gain access the e-DRS system to upload documents or change information on predetermined levels, and many others, including the public, would be able to only make enquiries on the e-DRS system:

Then you've got your [...] interdicts against the ... and [...] basically your property printout to affirm the property details and to see whether there's any encumbrances against them like a mortgage bond that must be dealt with. We can't transfer with a mortgage bond being open. There's also the attachments coming from the sheriff which can prevent transfer. You can't just say they're correct because these are documents that have been signed by those parties. If they're saying that what that is [...] the title deed is wrong, then there's a legal process to rectify that claim. So that becomes rejectionable in that sense. So, there's gonna be lots of checks and balances in [...] place I think, and then you start with SARS. You start with the local authority. That is where the digital certification comes into play. What [...] am I entitled to do on the system? I can enquire on the system but I'm gonna be billed for it, thank you. Anybody will be able to enquire and get registration ... information right down to the [...] public.

Gregory pointed out that the correctness of information is an important aspect of land registration. Mistakes made can have adverse effect on the billing of property taxes and services:

To make sure the information we get through is correct as far as humanly possible ... there's also less mistakes and I don't know what their verification process regarding that ... We got a ... basically a goldmine of information that you can run your checks against. Every few you let through makes a mistake later on that's got a billing issue. There's no way that we know for a fact all the information we get in a weekly file is actually all the transactions that has really taken place.

Jan was also concerned about the correctness of information, and said, "each and every land parcel must be unique within itself [...] to avoid any duplication". Barry agreed that revenue might be lost due to incorrect recordkeeping and this may affect the state's income potential in the form of incorrect amounts that are charged, or in some instances, not even charged at all:

For servitudes, for instance, let's say like powerline servitudes and so on, it has an impact on the value of the property. If Eskom never registered those servitudes but they had had them surveyed, it means the municipality may not be charging. You know, whatever they could charge from Eskom from ... for that strip which is theirs in terms of the servitude right ... or that strip the impact of which would not have been discounted on the rates that are paid by the landowner.

Peter described, “first of all a municipal clearance certificate that the rates and taxes are paid. If it's sectional title, that the body corporate levies are being paid. They need to make sure that [...] SARS is comfortable with the deal.” Raymond pointed out that fraudulent oversights with regard to SARS payments also do occur, “The third issue with SARS is where you still owe money to SARS and the liability's then on the attorney to pay once it's been transferred and this doesn't always happen.”

The credentials of surveyors, estate agents, and conveyancers need to be confirmed, as was emphasised by Jan, “looking at my register, this register here, to tell me who's registered. This is updated every three months.” Barry was in accord with the upfront checking of credentials so that professionals who were struck off the roll can be prevented from being involved in current and future transactions:

You can then check with [...] with the council that registers these people to say is surveyor so-and-so in good standing and on the [...] roll. So, surveyors that were ... as soon as a [...] person is struck off the roll, the [...] SG is informed so that anything comes that has got a signature of that person it's [...] it's not that person. I mean, it's [...] not gonna be entertained because they're not in [...] good standing.

Ashley concurred, “you need to prove identity and you also need to prove [...] credentials. [...] because people get [...] added and disbarred all the time.” Ashley explained in detail the confirmation of credentials and the security aspects related to this. He mentioned that it may be more appropriate to use fingerprint technology in some instances rather than voice

recognition technology. Other technology that could be used in the authentication process includes PINs or passwords. Generally, two combined methods and technologies are best suited for increased security:

You not going to get an attorney to speak into a microphone to [...] verify who they are, you would use [...] you'd rather use a fingerprint or you'd rather use [...] something that they have, like certificate. It always comes down to [...] what you have, what you know, or what you are. [...] So, those are the three key things of identification and most systems that would be of fidelity required by a e-DRS would normally require two of those things. So, you would either have to know something, and have something or be something and know something or have something and be something. [...] So [...] what that means is you've got to have some biometric [...] identification whether that would be fingerprints, whether it be voice, whether it be a retina scan, you know, any facial recognition. So, you know, those are things and by having one of those factors you would also then need something that you know, so, in that case it's normally a password [...] so, it'll either be you have a certificate and you know the password. Or you have, you set a fingerprint that you have a password or have a certificate and have a password or so, and you have a voice print, so two factors of the three things.

Charlie added that they have provided training to conveyancers for them to identify forged documents:

We've trained attorneys as to how to identify forged ID documents when they scan it and they convert it to electronic ... with the new ID card that you can just swipe it, etcetera, etcetera, and it can go back and hit Home Affairs. All the biometrics will be on the card.

He added that a central repository for FICA identification is not advised because “[a] central repository is [...] not up to date. It's also open to attack.”

Barry (cadastre) further listed a few more compliance issues that should be considered comprising of consent letter from the municipality granting permission for subdivision, all formalities of the checklist should be complied with, examine transactions to ensure compliance to the Land Surveyor Act [No. 8 of 1997], and the diagram should be structured in a particular way.

The consent letter from the local authority consenting for this subdivision to take place must be attached as well. The surveyor-general will not examine that submission if [...] the consent is not there. So, consent is one of the requirements. There's a docket there at the SG office, which lists things that must be there in the [...] submission and then [...] there are people that check at office. There are people who for instance, who then [...] take these submissions and examine that everything is done according to the Land Surveyor Act [No. 8 of 1997]. When you look at a diagram, it is structured in a particular way. The diagram now, not the ... okay, that document ... is structured in a particular way, certain data goes there, some data goes there, something [...] comes here and some goes there and [...] at the bottom. So, there's a lot of information. So, that information gives intelligence to this particular land parcel.

Gail outlined a few compliance issues that the master of the High Court needs to adhere to or ensure others interacting with the master adheres to: prior consent from the master in certain instances, application is only lodged in the deeds office when power of attorney has been endorsed, a caveat is registered as soon as the appointment has been allocated to an attorney, as well as compliance with a checklist. Parliament and the minister regulated the turnaround time of an application that is sent to the master's office:

If they wish to sell us [...] an immovable property that belonged to a deceased, if they wanna sell it from the estate, they need my prior consent as well, which we refer to an application in terms of section 42(2) of the Administration of Estates Act [No. 66 of 1965]. Once we happy with the application, we endorse the power of attorney and only then

can they lodge in the deeds office. We will register the caveat as soon as the application ... the appointment has been made to protect the interests of the patient in an immovable property. We have what is referred to as an annual performance plan that we have to comply with, which is not just from the minister's side but also from Parliament's side. On a sale is what we refer to as your section 42(2) where we actually endorse the power of attorney. Our turnaround time on that is five days, which in most cases we do comply with. If an application comes for the sale of a property, we have specific forms that they have to comply with. It's like a checklist.

Raymond explained the envisaged payments process at the hand of compliance issues that need to be in place for payments on the envisaged PEXSA system to be made. These include registration of all participants, real-time checks that money is in an account or fund, and successful validation of all participants. When registration confirmation of a property comes through to PEXSA from the deeds office and all validation processes were successfully completed and all conditions were met, payment will automatically be initiated. Any changes to payment details would need to be formally effected and no last minute changes will be introduced manually without proper validation and investigation:

All participants in PEXSA, all attorney firms, all estate agents, they must register as members or participants in PEXSA. [...] they can only be a registered if they do have a valid fidelity fund certificate. We lock them in the system like in the JSE [Johannesburg Stock Exchange] with the brokers. You cannot transact on the Johannesburg Stock Exchange if you are not an accredited member. So we validate. Real-time check when you make a deposit that the money is already ... that the money is in the account ... the fidelity fund [...]. They are now in a busy ... in a process of testing their electronic fidelity fund certificates. As you meet all the conditions. it will go green. When DOTS comes in and it says registered, this triggers automatically. It's the ABS [asset backed security]; everything else has been done. Because those figures could change, all these account numbers, they all locked in the system. Nobody can change anything and if

anybody wants to change an account number, then there's a process they must follow to get approval to change the number, and a reason why it changes and then people must sign off. The whole flow of messaging between the banks also needs to be looked at.

Lester explained that there are many procedures that conveyancers need to comply with. Different banks have different in interpretation of the FICA Act and therefore require different procedures to be complied with. In addition to banks, municipalities and SARS also have different procedures and interpretations which should be honoured. In Lester's view, much less discretion is awarded to attorneys which complicated their work:

Banks' side involves these very, very little discretion, choice [...] alternatives left. You simply do what the bank's software package tells you to do. You can't mould out. The difficult part is the template of the bond. The difficult part is how each bank interprets the compliance and FICA rules, and the one bank says you send this proof of residence or [...] the ID copy, one bank says it must be in colour, the other says it's black and white. The one bank says you must stamp it, original, cite it. The other one just says original or a copy of original. You get them at municipalities, at SARS, at many places, even in the banks, and all they do the entire day is for hundreds of files check [...]. If it doesn't look perfect or they don't recognise what it is they throw it out.

He further asserted, "a guarantee, you can stand on it, you can rely on it, you can give keys". This means that a guarantee can ensure payment take place which can allow buyers the right to move into their new properties, but these guarantees may be withdrawn by banks before a property has registered: "Technically, the bank is allowed – and it stands in the guarantee they can at any time withdraw. They can – the day we register – withdraw." The withdrawal of guarantees pose a huge risk to the transaction. However, Lester added that banks would not unduly withdraw guarantees: "No bank will likely withdraw from a guarantee a day before a transaction unless there are very good reasons. Say there was fraud."

Lester elaborated that compliance in the conveyancer's world also means that certain documents needed to be accumulated as evidence which are lodged with the deeds office as supporting documents:

Compliance, yes, I've got the rates clearance. Yes, I've got the transfer duty receipt. Yes, the electrical thing is in check. Yes, the plumbing certificate. Yes, yes, yes. These are ticking boxes but that doesn't mean that the seller and the purchaser agree and that that can go through.

But he also cautioned that exceptions (different types of applications that differ from the majority of applications) may cause a lot of damage in the form of increased turnaround times, fraud, and an array of other things:

And the law reports on the [...] library shelves are the exceptions when something that we didn't think would happen, happened or that we thought shouldn't happen did. There's a qualification. You didn't do it properly, so the instruction go next time you may not do X before Y and we'll be fined. It's [...] compliance and it's strangling. You must now have a letter from the client authorising you to invest their funds but if you don't get the letter and you don't invest the funds you'll get a reprimand from the Law Society anyway because you can't allow funds [...] to lie around. You must invest it whether or not you have a letter. You're stuck with compliance that the auditors picked up. When it comes to the trust account, the Law Society says, yes, you must do this, must do that, and we end up doing a lot of unusual unnecessary things purely because nobody in the system understands why it's there or why it's necessary because the auditor said if you don't do it, if there's a qualification error ... That is something that needs to be looked at which basically means that a board of directors and municipality, a company and attorney maybe may have the right and have the right to say, yes, I see their qualification but, yes, it doesn't mean everything's wrong.

5.2.3.4 Risk

Fred mentioned that the misalignment of information between conveyancers and banks causes for payments to be made before registration has taken place:

The conveyancer clerks actually stand in the office [...] especially on Fridays and then they phone the office and they say, ja, it's now being executed and then the conveyancer in firm actually phones the bank and ... so money's transferred and then, oops, okay, no, it wasn't signed or it's being rejected there at examination. There's actually no confirmation between Deeds and [...] and the bank unless the bank checks on the DOTS system [...] and fortunately most of the banks do [...] all the big banks do. So, they [...] check on the DOTS system that it has been registered but [...] it has happened that the conveyancer has informed the bank that it's been registered and it hasn't but there's no ... currently Deeds doesn't issue anything.

Steven highlighted that many talented and experienced people are leaving organisations with their knowledge and skills and flagged this as a risk:

The smaller municipalities that they cannot keep up with [...] major technological changes and also skills. Since democracy in 1994, a lot of people have been fast-tracked into senior positions and yet they are now given this portfolio of having to address something on a technical level. They don't have the experience or the knowledge. People that have the knowledge are leaving. Change obviously brings about an effect and it may affect a person's livelihood, affect his [her] function, affect his [her] job.

Jan explained that the manual applications that are forwarded to cadastral offices of the surveyor-general by land surveyors are received in paper format, which are hand-delivered or posted, or in digital format in the form of a CD that is posted or delivered by hand. These applications are accepted on face value, and there are no measures in place to confirm their validity or origin from a security perspective. The face-value acceptance was confirmed by Barry:

An envelope comes here with diagram and other things that have been signed by the land surveyor who have done it. That's all we have and that is all we've been accepting. Let's talk about paper, for instance. Where was the security there? Taken it at face value and processed it. If there's no other way, how do you test it? How do we test it? That is even how courts work.

Jan outlined an additional risk that may occur at the Surveyor-General's Office. The original land was measured by horseback and may have resulted in inaccurate measurements:

With 3.9 million land parcel paper documents in the [Surveyor-General's] Office, a duplication is humanly possible because of the poor measurement factors that were being used. They were measuring with chains and rods and distances measured by horseback and so forth [...] they found that, at the end of the day, the so-called remainder of the land, of that land parcel with all the subdivisions, was zero or a negative amount. Happens because of inaccurate measurements and also I would once say it because of the hardcopy paper trail that we run, your data is not correct. Well, it's there but it's inaccurate; it's not in the format that we require it. Human error can prevail once again.

Wendy explained that an electronically stored document may be more susceptible to an increased threat of hacking: "If you have a central approach to keeping the electronic deeds and [...] current status and everything that goes with that it makes it [...] more vulnerable to cyber-attack." The increased threat on electronic documents was confirmed by Jerry who said, "The other is the question of the hacking which to date we can talk with pride that we have not experienced." Gregory stated that access may become a problem, "the problem is gonna if [...] there's not strict control regarding that access." George described numerous risks that may occur from a payment perspective comprising principle risk, operational risks, systemic risks, and reputational risks:

What you want to achieve with the DVP [delivery versus payment] basically is to make sure that [...] there's no principle risk involved in that transaction. There's operational risks. There's a whole host of testing to make sure that the instructions that we receive from them are correctly formatted [...]. They have the necessary operational resilience and things like that. More than 90% of the settlements that goes through in South Africa in the payment system is done directly in the system as a single payment or [...] even if you look at the batch of settlements. So [...] that is how we normally look at it. So, BankServ is not identified because of their value but they could create a systemic risk. But because of they are so intertwined in some of the payment streams, if something goes wrong it will have the reputational risk for us. PEXSA. There is a principle risk that they need to [...] look at credit risk. They need to see how they actually evolve the whole process in terms of all the risks that they want to do but that's a bit outside of the domain of the system. Streamline that whole process, reduce the risk in that process. You're at the risk of what happens to the money in the trust account, etcetera.

Raymond maintained that the proposed PEXSA system will offer complete oversight and a full audit trail to overcome the current uncertainty of payments and non-compliance:

There's uncertainty of payments, non-compliance, and [...] payment of proceeds of sale are going to incorrect parties. We offer complete oversight, the full audit trail [...] and it's totally built on a secure platform. It takes risk out of the system for them [all stakeholders] because paralegals cannot really commit fraud anymore because you closed the gaps. There's a clear audit trail between the paralegal and the admin department. We can take fraud out of the system and also how we can actually streamline the process. Bring the clearing and the settlement closer. The closer your clearing and settlement the lower your risk. The key drivers is to implement an irrevocable same-day settlement process to improve oversight. The moment they [...] detect there's [...] illegal action or anything happened, they can pull that home loan. It will definitely address fraud, money laundering [...] where more and more people are buying properties in companies.

He further explained that EFT payments are unsafe and not advised because such payments can be reversed after they had been made:

You can never transact and pay and settle a transaction through a EFTs [electronic fund transfer] because an EFT is revocable. There might be people in the market that would try and motivate an EFT-type of transaction. It is because they don't understand [...] the complexity and [...] the seriousness of this type of transaction. You can process the EFT today and tomorrow I can lodge a dispute with the bank, the bank will give me my money back.

Lester, however, noted that dispute resolution with some of the governmental organisations with which conveyancers interact is problematic because staff do not take responsibility to address matters that are brought to their attention. Escalating matters will cause further problems with future transactions in the form of increased turnaround times and undue delays:

The first world remedy – you report him [her] to his [her] boss, which means next time he [she] gets your stuff he [she] isn't very friendly and he [she] may just drop a paper or file it in the wrong place, which really happens often, the victimisation. The senior person [...] doesn't like it either, and then you go to the ombud that has a lot of clout and then the hair flies and everyone is unhappy and you must rely on that because it's serious. They will fire that official because he [she] shouldn't be there. If it's not so serious, the official is now being reprimanded. He [she] did a job poorly and in our experience, you just find suddenly things take even longer because those officials are very, very clued up. They know how to make something drag its feet and not go further. There's been a complaint, send us a report. The report goes up, totally whitewashed. They say, ja, there was an error, the conveyancer didn't complete properly. Understand, it's something new but, yes, but we've rectified it and now issued it and we know for a fact then that clearances that have been waiting for [...] ten times longer than it should have been. They had the papers, cleared it without even looking. Afterwards, the

problems – even worse creep up – because they didn't even look at it, they said, oh, oh, the report, spent ten minutes issuing the clearances and two days writing a report for management. We pick it up from SARS or the municipalities so that it's been institutionalised, that's government, they're sitting, they're either retired. Senior managers don't dare to walk in because the [...] union and the Constitutional Court will [...] get their head. They walk into your office and say, Johnny, you haven't done this job, it's been three weeks now, it's still lying on your table, take it, do it now. They're scared to do it, they don't do it. So, by definition, going the correct prescribed route means you are delaying your own problem, you're making it still bigger because now you know for three or four weeks [...] however long the ombud or the tribunal takes, it will be stuck. The system is designed to fail.

He continued to explain that junior staff often takes money in exchange for increased service delivery. However, the process time often creates doubt as to whether the information contained in the documents is correct:

Junior officials – the account creditors – have a huge influence. They control it [the processes], they often have their own crannies [a small, narrow space or opening] and systems and they start taking kickbacks. We suddenly see in the city that efficiencies improve very quickly. They phone us at the law firm and say something's wrong; there's a runner in there, because suddenly we're picking up clearance coming faster than they can. A ten-day process takes two days. How does that happen? In Johannesburg nobody complains because it's so slow, it's so inefficient, that the only way you can get it through is via a consultant who charges a fee, and half of which go to the official. They tell us nothing happens there if the official doesn't get payment. If he [she] doesn't get that [...] envelop or a backhander, he [she] won't even touch a file. A lot of people waiting for houses in the system, just pay whatever because they must get into the houses. So corruption feeds on itself. That is a huge problem.

Jerry noted another risk that has been identified in the form of identity documents of infants that are issued are not accompanied by fingerprints. Years later, it has happened that people other than the infant has come to apply for identity documents:

People would in one way or another get access of that [...] birth certificate and it's not their own and they try and apply using it. You know, paper today taking the scanners, high-quality scanners that we have, they can reproduce that say your certificate and we will not, might not even see that this thing is a [...] reproduction. That's [...] how technology has improved in terms of this.

In addition, Jerry also expressed concern for a few other types of risks. In the past, people would change the photograph in the green identity documents whereby identity fraud we now committed with someone else's credentials. At the DHA, some of the paper that was used to create identity documents were stolen. In contrast with Lester, Jerry is of the view that less human interaction will minimise fraud that may occur. Regulating the people who are in contact with technology to create identity and other documents should therefore be strictly regulated. The other risk highlighted by Jerry was strict control over the developers who created the systems that are being used in the DHA:

We experienced fraud in different ways, especially when we were using a book. People change the photo. Somewhere, somehow the sheets that produce the [...] book will get stolen. We had some of the prints which were not good and we could not take them. The risk is basically human intervention. We should have minimal or zero as far as possible of human intervention. Once they can get into the system they can bring anybody they like to come and populate with fingerprints on this but they [...] have not yet managed up to now. That is the risk. The other risk that is there but it's a bit far-fetched is [...] developers of the systems. The major risk is [...] the person. You need to do vetting with your [...] staff to make sure that you have indeed employed honest people.

Ashley shared that, in the event of biometric information being compromised, it is advisable for another form of security to be in place, for example a password, to prevent the completion of a fraudulent activity:

Once the information about the your fingerprint is compromised [...] someone else could still be applying that information as if it was you. That's why one of the extra factors is required, so whether it's your retina looking into a [...] eye scanner [...] If that information got compromised then you still gonna have to supply a password.

Gail also remarked that after installing a link with DHA, they are now working towards the incorporation of fingerprint identification into their environment:

We link with Home Affairs to verify that the deceased is really deceased. We are now moving forward with the fingerprint identifications so that we can close another loophole there.

The building of the e-DRS platform is an important issue, and Ashley was concerned that the correct partners need to be building such a system, “there is a risk in picking the wrong player for this.” Raymond agreed with this notion and mentioned that organisations may work to not make your initiative succeed due to hidden agendas or fear of losing their jobs. Due diligence and proper investigations would need to be done to ensure that basic and back-up procedures are in place with the new partners:

If you start, and you start working with the wrong individuals, they can actually kill your initiative even before you start at the ground. There's hidden agendas, there's politics in the banks. People are scared that they can lose their jobs. You don't know that environment how often it's being audited, who audits that environment, what's their backup, and disaster recovery policies, how often they test it. And they don't communicate that to the industry and there's no forum in the industry where they report back on frequent disaster testing failover procedures. The attorney firm doesn't know what is happening but they don't receive their transactions. In the meantime, there's a

switch in the middle that does not perform and because it's not regulated nobody's liable.

Ashley further argued that the deeds office systems are outdated:

If you look at their current systems, a lot of them are aging badly. And they're not being kept up to date. I think it's because of the model they chose originally. [...] to pay upfront and leave maintenance for later.

In addition to the building of an e-DRS, Raymond was of the view that the building of a PEXSA system was important to incorporate last minute encumbrances: “Last minute interdicts, non-payment of estate agent commission, and fidelity fund interest payments, it's all key drivers for this PEXSA initiative to [...] be implemented.” Gail summarised a few pertinent risks that are not unique to their [master of the High Court] environment which include the risk of people claiming money from the guardian fund that does not belong to them, fraud, unauthorised access to systems, paper documents and files that are misplaced, and the knowledge and skills levels of staff:

The risk at the guardian's fund, of course, is people claiming money that doesn't belong to them. The biggest risk that we all have is fraud. What we have identified here is people getting access on a part of the system that they're not really supposed to have access on and they can then make changes which is a problem if it's somebody that doesn't have the authority. If you have an electronic system, that is a risk. Anybody can go in and change who's the owner of that property. You still think you have a property and you don't have one anymore. People lodge information with us saying that they are the executors and somebody can go in and change that information and appoint somebody else, which is a risk. Paper does get misplaced sometimes. So, there's a risk. There's a big misconception within the communities. People who are not used to this. I mean, we're twenty years down the line. Most of these guys have got no clue what we are talking about. There is some guys out there that are really good in estates but here with

us, it's just the staff with minimum requirements. You have to have an LLB [Bachelor of Laws degree] so at least you have to know something about the law.

Michael added, “how comfortable are we that everybody that’s playing a part in the system is actually above board and if there is fraud being committed, and we’re seeing it ...”

Raymond was very concerned about the use of conveyancers’ trust accounts and discussed this at length during the interview. He stated that interest earned on investments made with client’s money is not paid over to clients or fidelity funds, and client’s money may be used as bridging finance in attorneys’ operating accounts. Michael confirmed Raymond’s statement that no check and balances are in place for the sheriff’s trust account:

You take my million rand as a deposit but you put it in your family trust account and you earn a interest in your family trust account versus having it in your firm’s trust account and then you, as a client, you’re not covered if anything goes wrong with that specific firm because then that trust account is not actually with the fidelity fund. And the fidelity fund don’t earn the interest on that money. People are not using the trust accounts for the purposes it should it’s supposed to be used. What the attorneys are doing currently, they putted that money in Investec, for argument’s sake, in an investment account and, because you’ve signed a power of attorney with the attorney, the attorney will withdraw the money a week later in his operating account and he will do bridging [bridging finance is a money advance]. So you think that you have got money secured in an investment account but in actual fact the attorney is doing bridging finance and again you’re not covered and you don’t know. So, the attorney calculates the interest that he [she] was supposedly earned at Investec but he’s [she’s] making 40 and 60% interest by using your money for bridging. And he’s [she’s] paying you 4 or 5% as if it was so-called money market account where he [she] invested your money. So, you can see how ... you know, the attorneys, how they actually wash money and how they play with consumers’ money and you have no idea where it is and the risk. On the sheriff fidelity fund, very interestingly, is that all monies, every single rand, and cent

that ... going through a property is going through this sheriff's trust account. There's no interbank payments, nothing. So, the sheriff says they trust their sheriffs and they just hope that whatever they tell them is in the trust account is in the trust account but there's no checks and balances in a sense from an electronic point of view. [...] they just believe that their sheriffs are doing their jobs and there's no bank oversight of what's happening in [...] the sheriff's trust account.

Michael listed additional risks that need to be acknowledged which include undue delays and rejections, bridging finance houses sometimes are not repaid for the money they advanced, the deeds office provides DOTS registration details which are later retracted, payment details are changed at the last minute to incorrect and/or fraudulent accounts:

If I was a conveyancer today and I'm handing in a pack of documents which I've gone through, I've satisfied myself is accurate reflection of this transaction that needs to take place, the minute I hand it over I've lost control over it...I need to know that nobody else can get their grubby little mitts on my money. You hear the horror stories where they're getting excuses that, sorry, this is ... there's been a delay here, there's been a delay there, documents have been rejected, but meanwhile back at the ranch, it's quite possible that somebody's actually used your money and they're trying to wait for the next transaction to register so they've got the money to do yours kind of thing. When that transfer attorney does the distribution, he [she] distributes the net proceeds to the seller and the seller's got the obligation to pay the bridging house. The bridging house has on occasions never got that money, and they've lost millions because of it. We've encountered issues where DOTS [deeds office tracking system] number would be told to the transferring attorneys at eleven/twelve o'clock in the morning and they will instruct the banks to do the necessary pay-outs only to discover that the deeds office records that DOTS number, and you say I'm sorry, this transaction didn't happen, we haven't actually allocated this thing, it's only up for registration tomorrow. Now what? You can't stop this payment process. You'll get a transfer registration going through

and at the last minute, somebody comes, oh, this bank account number has changed. Please change this account number to this. Don't do the necessary checks, money gets paid into that bank account, never to be seen again.

Michael is of the opinion that an organisation that does not have a vested interest in the outcome of the transaction need to take the lead to monitor the registration and related processes. He also touched on indigenous properties and suggested that common areas are given to the community to own:

How do I as an independent party look at both sides of a [...] transaction? How do I look at the payment leg? And how do I look at the securities leg? And how do I give both parties the assurance that the other one can perform? If I am on either side of that fence, I'm giving you the assurance of course I can perform. You've gotta take my word for it. If I'm in the middle and I'm saying to you of course they can perform, I've checked that they can perform, I've got no vested interest in telling you that they can perform. The same way as I've got no vested interest in telling them that you can perform. How do you deal with trying to give people ownership of probably the biggest asset they would ever own is their home, and give it to them in a way that the headman can't decide tomorrow to take it away from them? The headman won't let them sell it because he controls it. So you've gotta find ways to allow that cultural thing to still exist, give them the power and the authority over [...] the common areas in the village, the village sort of communal square, the ... some of the facilities in the village, but allow people to own.

Lester cautioned against the use of standardised mechanisms because these types of systems are easier for fraudsters to access:

The modern box check, box-ticking, cross-checking, verifying, compliance efforts, they [the banks] want a cast-in-iron template with no exceptions, no changes. Most criminals, electronic, that would [...] prefer a system where you just have one hurdle to get over, and while in this system, there are several hurdles. All box-ticking will be bypassed. Criminals, that's the first they focus in. They focus on people who work inside,

get the information and it suits them very well when that entire system relies on ten boxes ticked and they very quickly figure out how to get the ten boxes ticked.

5.2.3.5 Risk mitigation

George stated that although biometric identification measures do not yet form part of the PEXSA system, simultaneous transfer of funds and ownership, verification of payment details, the payment of only valid transactions and the high level of encryption may eliminate tampering of any kind and largely mitigate risk:

You want to make sure that it [...] the funds and the asset will be transferred simultaneously although it's not technically possible at this moment because it's two systems, but you want to make sure that the process actually protect. If there's any changes we want to test it to make sure that the process is [...] smoothly from a payments perspective. So that's how we will see that risk, for them [all stakeholders] to make sure that it's only valid transactions are processed. In this area we're not using biometrics at this stage. The encryption that SWIFT does is normally on proprietary boxes and things like that and that gives us a level of [...] assurance that [...] the transaction is duly signed, digitally signed.

Jerry, in contrast to George's earlier views, noted that biometrics reduces fraud. The effectiveness of the fingerprint verification would be dependent on the quality of the fingerprint that was originally stored:

Biometrics reduces fraud. But the real basic thing is, right at the start you must have taken a good-quality print right at the beginning to store. The fingerprints of people which is part of the biometric are not the same and that becomes something that you can use to identify a person with certainty to say I am 100% sure this person before me is who she [he] says she [he] is. Put your fingerprint on the scanner and with your identity number, 'cause we make use of the ID, and then if you are who you say you are, it would match with our system. With the smartcard, we know some people tried already

to manufacture it but they couldn't because it has many different features. They [...] couldn't store the [...] person's biometric inside. Our firewalls are [...] quite good. He [she] can't be selling any property which is not his [hers]. So [...] that's how I think they will definitely benefit with [...] biometrics. It must be mandatory. Because if you leave it, then you still leave a big gap.

Raymond explained that the envisaged payments systems will be very transparent and parties would be able to track the progress of payments:

So that their clients can actually track and see where the money is invested and when the property registers and how the money would flow on date of registration showing their customer transparency and certainty of property transactions. If there's a change of account bank numbers, they should be notified via SMS or e-mail so they are aware there's been a change. This system will give the ... all players certainty to tell them on date of registration the money is in your account. With every payment you will get an acknowledgement that that payment happened. It mitigates failure as well.

Raymond also asserted that multiple payments that are linked to each other in the current process, might become a problem if any of the payments prove to be problematic. The entire batch of payments would be delayed if there was a problem with one transaction that formed part of the batch in the current process. The envisaged payments system will treat each payment separately, and the entire chain of transactions therefore does not have to be delayed as a result of one error, or because of a delay in one of the transactions:

So, you've got now six transactions. They all depending on one another. If one of them fails, what do you do? Now you must actually start rolling back all of them. Where in this methodology, if you settle one and it's zero balance and it settles, the next one will follow, the next one will follow.

As a mitigating factor, Michael supported the view that PEXSA should only be an enabler to the disbursements of funds. As such, PEXSA would not be offering a service that can be

regarded as competitive. Therefore, it would not make sense for more than one transaction to be operating in the payment space:

There is no need for a PEXSA to actually take ownership of a single cent in the process.

They're an [...] enabler and the only money that should be going to them should be their fees for a transaction or coordination function that they perform. That's not a differentiating service but it's integral to this.

5.3 Summary

This chapter presented the data that were gathered in this exploratory study. The data were discussed under three themes that were identified during the coding process, namely SCM, process and security. The data portrayed in this chapter are actual words that were used by the participants, and the wording was not changed to comply with language rules, i.e. quotes were provided verbatim. This chapter may be illustrated by Figure 5.1 that illustrates the three main themes with all its subthemes as developed by means of the coding process.

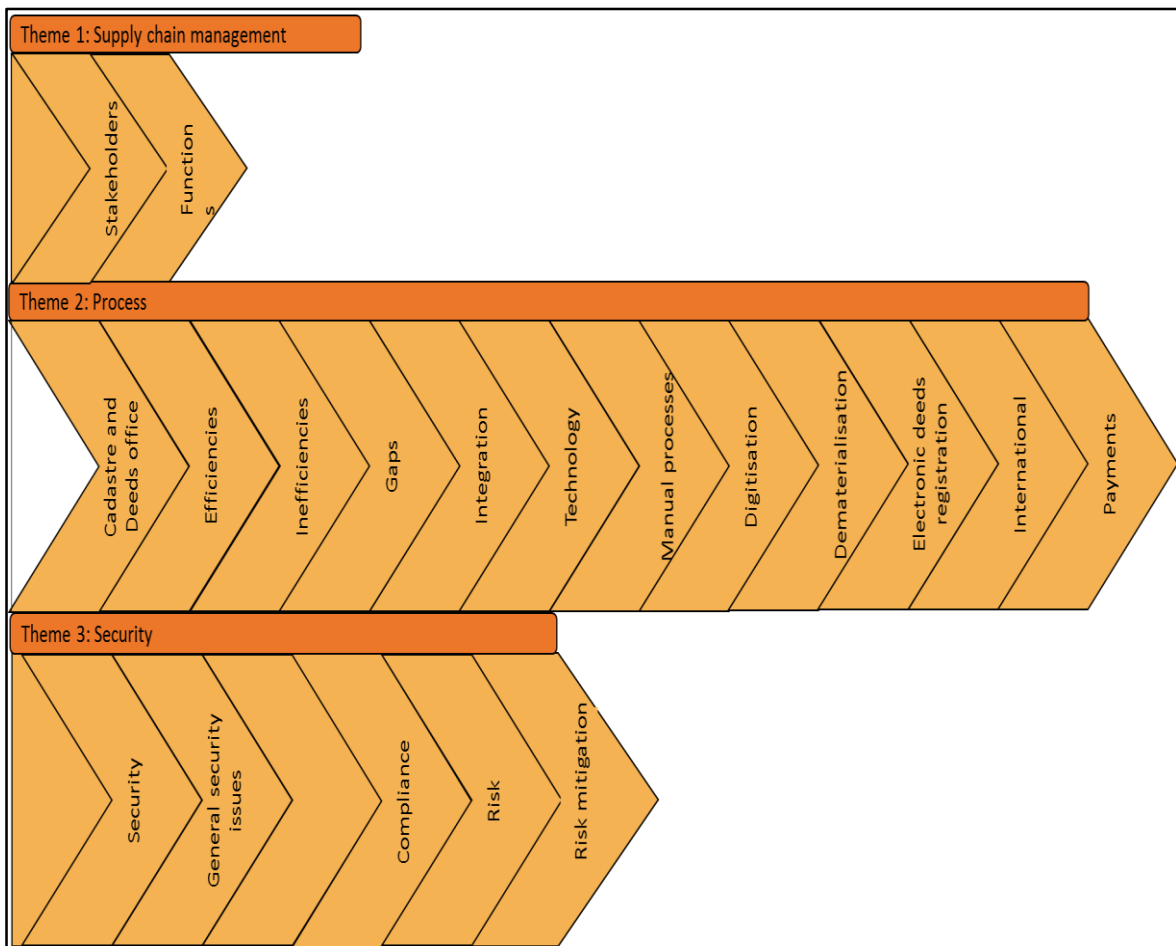


Figure 5.1: Summary of themes and subthemes

The following chapter will be a discussion chapter that will aim to interpret the data presented in this chapter as well as link the data to literature and other documents that were collected during the data collection phase.

CHAPTER 6

Discussion

6.1 Introduction

The previous chapter presented that data that were gathered during the data collection process. The data included responses from participants who formed part of nineteen interviews that were conducted. This chapter provides a general discussion of the analysis that was conducted in the previous chapter. It summarises the implications and findings of the study. It reports a framework that was developed from participant responses. Participants in this study had a wide range of experience and knowledge with regard to property-related aspects. The researcher was responsible for collecting all the data herself.

As noted earlier, the land registration process in South Africa is characterised by manual interlinks and paper-based documents, which makes the current process tedious and cumbersome. The following research question were therefore asked:

RQ: How can the end-to-end property transfer process be integrated among the different role players to dematerialise property transfers?

Secondary research questions have been formulated as follow:

- What gaps would need to be addressed before electronic end-to-end registrations can be introduced into the South African environment?
- What measures do supply chain partners perceive should be put into place to enable dematerialisation of the end-to-end property transfer process?

The primary research objective of this study was to develop an integrated framework for the dematerialisation of property transfers.

The secondary research objectives were:

- to identify gaps that would need to be addressed before an electronic end-to-end registration process could be introduced into the SA environment; and
- to identify the measures that current supply chain partners perceive would enable dematerialisation of the end-to-end property transfer process.

6.2 Theme 1: Supply chain management

This theme had two categories, namely stakeholders; and their functions and roles as identified by the participants.

6.2.1 Implications of Theme 1

The sub-categories that formed part of this theme were the stakeholders involved in the industry and the various roles and responsibilities of the various stakeholders. The interviews confirmed the illustration presented in Chapter 3 (Figure 3.1) which aims to show various role players that are involved in the property process. Many of these role players are active at particular instances of the end-to-end process and may not be part of the entire process. It appears as though these organisations (both from government and the private sector) tend to work within their own technological systems and this causes a silo effect across the entities involved in the property market. Although much has been done to try and link all the entities in the industry, these linkages have occurred at a premium which is charged out to buyers and sellers. This has increased the overall cost of property transfers as also confirmed by National Treasury.

Both Pienaar (2009, p. 22) and Muller (2015, p. 1) confirmed that increased cost is indicative of property transactions which excludes a certain component of the population who simply cannot afford to participate as a result. The South African National Development Plan 2030 aims to reduce housing for more people to meaningfully participate in the economy. Overall,

digital storage is also much cheaper than the physical storing of originals (Rusbridge, 2006, p. 7) and can assist to reduce costs. Supply chain integration may also assist to reduce costs (Koçoğlu et al., 2011, p. 1631; Zhao, Huo, Sun, & Zhao, 2013, p. 120) because the supply chain functions as a single unit that is motivated by customer demand (Farhoomand, 2005, p. 26) as opposed to different organisations responding to needs individually. The impact study document also outlined that entities will experience decreased costs as they move away from a more manual transfer of data after the initial capital investments (Socio-economic impact assessment document, 2015, p. 14). In addition, e-government strategies should also aim to integrate legislation, policies and procedures across the public service sphere into business functions to support governance and accountability.

In summary, the **first finding** confirmed by the study in terms of the interviews, literature and impact study document is that costs are expected to decrease after the initial investment in integration efforts of processes and technology.

Some of the roles of the stakeholders were directly related to the transfer and registration of immovable property, while other roles were of an enabling nature. Some of the stakeholders were of the view that all current role players should be allowed to continue their work as they currently do without many of the processes changing. Peter said, “One mustn’t reinvent the wheel [...] one should rather look at what is available and read off that.” Vincent agreed, “Don’t reinvent the wheel. Take the systems that we already have, just perfect them, and amend the Deeds Registries Act (No. 47 of 1937).” Ashley added “So I think there’s [...] technologies available in [...] South Africa that provides the deeds office with what they would need to be, to have an e-DRS system.” Peter further explained, “If there are vendors that have currently interfaced with the deeds office electronically, already that one uses those systems rather than you try to build new systems to do that.” However, the current processes have been put into place to work with paper-based documents. The researcher is of the view

that the entire process would need to be reengineered to accommodate a dematerialised environment, whereby paper documents are completely excluded. It also appeared as though not all of the participants understood the difference between dematerialisation and digitisation. This aspect will be further discussed in Theme 2. In addition, the role players who wanted the process to remain largely the same were predominantly enablers who may be protecting current business interests.

The impact study document identified that a redesign of processes, policies, and procedures; and the related retraining of staff will need to take place with the implementation of an e-DRS system (Socio-economic impact assessment document, 2015, p. 15). Stakeholders who are directly involved in the property transfer process who were interviewed in this study were of the opinion that some of the work of some role players would change with an electronic deeds registration system. Fred stated, “if I have a bond I don’t have an original copy. The original copy is now electronic sitting at Deeds. The original will be electronic [...] sitting on [...] a server somewhere within Deeds.” The inference drawn here is that there will not be a paper document to advance through a manual process. Naturally, technology would need to be adapted to cater for access and storage capabilities, not to mention security related aspects to provide the necessary risk mitigation. The staff of entities interacting with these electronic processes would need to be retrained and this speaks to a definite change in the current process.

Another change would be with vendors who are currently buying and reselling deeds office information. The deeds office may be in a position to repackage and sell their information more intelligently in future, which may mean that these vendors will not be able to create a sustainable income from reselling deeds office information in its current form. Michael said, “the role that vendors currently play will need to change in a dematerialised environment”. Melissa stated that “Vendors ... they will then be our competitor or we will be their competitor which might not exist in the current landscape.” Fred agreed by saying that “With

the e-DRS, that information will be available to the public at a lower cost than the data vendors (external organisations that build and maintain technological systems) can and that will have a [...] impact on the economy because we actually creating [...] work opportunities for other companies.” It appears as if the biggest change envisaged will be for vendors in the property market. The impact assessment document also noted that a significant loss of business might occur with the implementation of an e-DRS system, which may provide similar services to the vendors’ current value proposition.

Furthermore, a corresponding attorney is used to lodge paper documents in the deeds office, which has jurisdiction over the property being transacted. An electronic lodgement will eliminate the need for corresponding attorneys altogether, as an electronic submission can be effected from anywhere in the country, regardless of the deeds office in question. Fred highlighted: “A corresponding attorney and with the new system you can lodge in Polokwane, you can lodge in New South Wales. You [...] don’t have to be in the country.” This statement implies that, with an electronic conveyancing process, an attorney could attend to and lodge property transactions for registration in South Africa even when that attorney is outside the geographical boundaries of South Africa. Some conveyancers who were able to secure additional business from their location advantage will forfeit such business transactions in an electronic lodgement environment, since a lodgement can occur across geographic boundaries in an electronic setting. The new Deeds Registration Bill has been changed to make provision for the electronic lodgement of paper and electronic documents (Deeds Bill, p. 6; p. 8). Thomas et al. (2014, p. 6) also observed that conveyancing practices changed with the introduction of an electronic property system in Australia.

Finding 2 has therefore been formulated that certain entities will be impacted by changes to their business models and value propositions with the introduction of an e-DRS system.

In the current property supply chain, the role players operate in silos. At the time of this research, all organisations that formed part of the property supply chain worked in their own technological systems and hardly shared non-essential information with others in the supply chain. Thomas (2009, p. 2) confirms that the property sale, the mortgage origination and the settlement processes have been considered to be three entirely separate functions. Typically, staff dealing with these functions all work from different offices and each use different technology to assist them in their respective activities. As a result, users need to re-enter information into separate programmes (Thomas, 2009, p. 2). Gizelle confirmed, “At the moment, the deeds office manually capture each transaction.” Gregory expounded, “[t]here’s also just capturers sitting there and typing information in ... that’s obviously typing errors where they said there’s a remainder for a specific land parcel but if you go and have a look in the SG’s office there’s no land parcel subdivided.” The impact assessment document also addressed silos, although the focus was for the various governmental departments that would need to be integrated (Socio-economic impact assessment document, 2015, p. 44).

The impact assessment document stated that technological integration with key stakeholders would increase transparency and enhance communication. Integration initiatives would require a financial investment from the various organisations and may influence the current processes and interactions that exist in the industry. Jan explained that the information in the cadastre, the deeds office, and the municipality needs to be aligned and shared:

The three are gonna talk to each other and it’s gonna have to be stack [...] so that the information currently that is stored in terms of property descriptions from the municipality, the deeds office, and the Surveyor-General’s Office and the bank can be in sync. I wanna call it two [...] platforms. The one is on top of the other. Ours is at the bottom, the [...] e-cadastre, and the ERDS [sic] is on [...] top of us. They gonna have to sync onto us.

The Department of Home Affairs (DHA) have implemented biometric fingerprint identification that is used by some of the role players in the industry. However, banks for example, verify the identity of customers who enter their branches, and this verification may not be applied consistently in all property transactions. There is a view that these biometric verifications should be enabled at estate agent level when the buyer of a property has been identified, so that fraud can be mitigated and possibly eliminated from the onset. This would affect the current process for estate agents. Jerry expressed, “the biometrics in my opinion should be right at the start wherein you will then be certain with whom you are dealing.” The impact assessment document also highlighted the need for the deeds office to use X509 security where smart card and biometric information will be necessary (Socio-economic impact assessment document, 2015, p. 24). From a supply chain perspective, biometric identification can assist to reduce fraudulent activities earlier in the process and increase transparency. The security aspects with regard to biometric identification will be discussed in Theme 3 in the study.

A finding of the impact study document was that banks already maintain a supply chain perspective with regard to property transactions (Socio-economic impact assessment document, 2015, p. 17). A few of the participants were of the view that all of these organisations should be managed as a ‘logical unit’. It was also mentioned by a few participants that many of the current role players have a vested interest in the industry. One of the participants particularly mentioned that an independent third party who does not have a vested interest would need to take control of managing the end-to-end supply chain. Paul argued that “the bigger players that want to control the market ... they’ve suggested ways of doing it but they not the right people. It needs the independent arm to [...] cater for it.” Peter urged that “what you don’t want is somebody to have a monopoly over the whole thing.”

The researcher is of the view that a monopoly can only be created if an entity has a vested interest in the outcome of the transaction. As such, it would benefit the industry if an

independent entity can be identified to manage the property supply chain in its totality. Davis-Sremek et al. (2010, p. 42) suggested that IT has the capability to drive the efficiency between supply chain partners and the capability to bridge functional silos. Kanagasabapathi and Balaji (2013, p. 419) specifically state that cloud computing creates a single hub, and therefore enables organisations to overcome silos. The technology and capability therefore already exists and simply needs to be implemented and enforced across the property supply chain.

6.3 Theme 2: Process

This theme had many sub-categories, namely: Cadastre and Deeds Office; Document Management; Efficiencies; Inefficiencies; Gaps; Integration; Technology; Manual processes; Digitisation; Dematerialisation; Electronic deeds registration; International aspects; and Payments.

6.3.1 Implications of Theme 2

Many of the individual entities in the property market have automated certain components of the end-to-end property process. Although these efforts have digitised many parts of the process, the process is still mainly paper-driven and therefore manual in nature. Wendy also mentioned that “the entire process of the transfer of property is still based on [...] a premise that it’s a manual paper-based ... system. Some parts of it have been digitised. That whole process is essentially manual with some electrification and even with this little digitisation exercise it will still be paper-based.” Gregory mentioned, “From a lawyer’s point of view, a lot of the documents that have to be handed in is actually physical documents as far as I understand at the deeds office.” The literature also states that although many systems had undergone a computerisation procedure, the reengineering attempts mainly focused on the “presentation of manually entered information rather than the direct and automatic registration of digital applications” (Sandberg, 2010, p. 101).

Finding 3: E-conveyancing should be introduced in South Africa in a similar manner as the dematerialisation of shares; in other words, mere automation of processes will not suffice.

Digitisation implies conversion of manual processes into electronic processes; therefore, “no typing needs to happen,” said Barry. Scanned images are paper documents that have been converted to an electronic platform. This does not mean that the process had become dematerialised. There seemed to be a misunderstanding of this very concept among many of the participants who were interviewed. In particular, with the exception of DHA, it appeared as if private organisations were better geared to accommodate a dematerialised environment than governmental institutions. Some thought that the fact that certain types of information could be viewed on their computer systems meant that the process had become ‘electronic’, which is not the preferred state for dematerialised registrations to commence. Electronic access to view documents does not mean that the document is no longer founded in a paper format. Furthermore, receiving files on a CD or in e-mail format, as is the case in the Surveyor-General’s Office (cadastre), also suggests a manual system, because the document has its origin in paper that has simply been converted to a digitised medium.

Dematerialisation is a financial term, which refers to replacing material-intensive physical products with virtual equivalents. Information and communication technologies (ICTs) are the main drivers of this (Sissa, 2011, p. 67). According to Măgureanu (2012, p. 77), dematerialisation of title refers to replacing paper with electronic recordings. Wendy explained that with dematerialisation “it’s no longer [...] paper proof of ownership; it’s electronic proof of ownership.” The current processes would need to be re-engineered and not only aspects of the process automated with components that are integrated to a limited extent. With this in mind, Steven said that the deeds office “want to start bouncing against [...] the law societies and against maybe the Department of Justice and [...] and the prosecutorial development as well [...] to go and check to see whether an attorney is still

admitted, have been struck off, etcetera”. In other words, third-party verification and authentication methods will become more crucial going forward. Steven said, “Not just to get the verification on credentials but to check that you are still valid and you can still transact. These checks will have to be done before the conveyancer can actually lodge.” Barry was in agreement with the upfront checking of credentials, “you can then check with [...] the council that registers these people to say is surveyor so-and-so in good standing, on the roll. Surveyors that were struck off the roll – the SG is informed.”

A dematerialised electronic record is not as susceptible to acts of God as paper documents (Field and Van der Wal, 2001, p. 41). Electronic documents do not need to be transported physically and can therefore allow a cost saving on handling, postage, and courier costs. Wendy stated, “e-conveyancing [...] leads to a far more efficient, cheaper, and more accessible, if you will [...] ability to [...] own property and, of course, the ownership of property starts with transfer from the previous owner.” Electronic documents can easily be stored and retrieved, and electronic communication is instantaneous. It also reduces the errors in documentation as intelligent software can guide the creation of standard documents. Ashley explained that “the document... is crucial to upholding [...] the letter of the law. The records in the database would speak to ownership.” The integrity of each document and its technological accessibility would need to be ensured to enable a sustainable electronic system. Ashley went on and expounded:

The documents that were written in 1850 is still readable by a human today and you can still refer from the intent of the document and you can interpret it based on the laws at the time. Whereas [...] you try and open a spread sheet let's say by Lotus 1 2 3 fifteen years ago, you know [...] the rendering of that information becomes subject to today's rules. If you remove [...] the legal requirement of documents out of the system ... you know, attempt to streamline the system, removing a lot of the legal control out of the

system. We're picturing a world where you systemise a lot of the process [...] but you still uphold the law by using legal documents...

Although the Surveyor-General's Office (cadastre) has access to a programme that allows them to view title deeds and ownership information, and the deeds office can access cadastre information from the Surveyor-General's Office via a computer program, these two departments function completely independently. Electronic access to view does not mean that integration has taken place and that different departments are 'fully entwined', as stated by Vincent:

We're one department or it's one department and they're fully entwined, fully linked, and when ... the day it comes that we can press a button to lodge - the surveyor-general is on board already ... because all their diagrams you will be able to view electronically. If a registrar of deeds or somebody in the deeds office wants to check the diagrams or plans or whatever they do it on deeds view. If one looks at the surveyor-general and the chief surveyor-general, they're all in [...] the same department [...]. The Department of Rural Development and Land Reform, and they are one. They've already ... our systems are linked up.

On closer examination, it seems as if the vendors and entities that have been involved with the dematerialisation of listed shares in South Africa have a better understanding of dematerialisation. Many participants appear to have heard of the dematerialisation concept however did not demonstrate a clear understanding of the workings and implications thereof. Instead, digitisation and automation activities were confused with dematerialisation undertakings. On the whole, it appeared as if all participants agreed that a conversion to an electronic platform should take place.

Finding 4: Dematerialisation and not only digitisation needs to be introduced into the e-DRS system.

Having access to view certain information does not mean that integration has taken place though. Private entities like the vendors involved in the property market have engineered platforms to allow for electronic information exchanges between different entities, for example, banks electronically instruct conveyancers when a bond for a new property needs to be registered. This does not mean that the conveyancer and bank systems have integrated to the extent where they operate from the same electronic platform. Each entity still operates and works in their own technological system, but key information is exchanged on a “push” or “pull” basis via a secure technological switch that operates on public and private keys.

The impact assessment document also surmised that the information exchange and constant updating of the large database of landed property information necessitates that land administration systems keep pace with rapidly changing information and communications technologies in. It went on to demise that the existing system should be reengineered to improve efficiency so that pressure on the manual system is reduced for delays and threats to the validity of South Africa’s property register to be minimised.

In summary, **Finding 5** is that integration efforts should be relooked and a new industry model would need to be enabled for the transfer of landed property in order to improve the availability of information and the accuracy of registration for land administration in South Africa.

All land in South Africa consists of land parcels that have been surveyed and are capable of ownership. All of these land parcels form part of an underlying cadastral of farmland that has been subdivided. Jan pointed out:

Every land parcel currently coming into the office is based on an underlying cadastral. What I mean by that is [...] all land, the entire country was subdivided into farmland [...] dating back in the 1800s/early 1900s. There is reference to every land parcel in the country. There must be in the region of 3.9 million parcels ... land [...] documents in

our office that we manage. These land parcels are being matched into a continuous electronic map. Jan stated, "I would say maybe 15% of the survey records in the country have been scanned.

The cadastre holds an up-to-date spatial and written record of land parcels, boundaries, interests, and transactions (McDougall et al., 2013, p. 32). The deeds office also has historic paper documents that need to be digitised. This digitisation is aimed at building an electronic continuous map of all property in South Africa in preparation for the conversion of paper based platform to an electronic platform. This will allow for electronic lodgements of new transactions and electronic access by the public and other role players to land information. The cadastre is updated whenever the size or the boundaries of a certain property changes. Jan added:

If there's no change in the cadastre, in other words, I'm the owner of that land parcel and I'm selling that land parcel in its entirety to you there's no SG interaction.

Similarly, the deeds office has embarked on efforts to digitise their paper title documents by back scanning all paper title documents. Another gap that has delayed the e-DRS implementation so far is "your back-scanning to get everything on an electronic," as stated by Jan. Peter concurred, "there's something like 400 million pieces of paper that firstly have to scan, from the existing deeds office that have to be put from paper into electronic records system". Ashley added, "Choosing and deploying the right solution, is probably the biggest gap. The deeds office struggles with the balance between service delivery and employment." Ashley spoke quite extensively on choosing the correct vendor to partner with in the building of the e-DRS platform. Alignment of vision and ensuring delivery versus payment are important aspects to ensure:

That alignment of vision is important since anyone can take a billion rand from government and tell you they can deliver a system. It's that [...] proven track record [...] that you really need to [...] provide these things.

The deeds office also only updates ownership information when a new transaction for a change in ownership is submitted by a conveyancer. Steven explained:

It is a negative [...] system of land registration. [...] for simplicity sake [...] the negative system implies that what is captured at the time is the one that is [...] displayed as information. Should there be a change maybe in the future you'll only update it again in the future when the next transaction takes place ... he [she] could've been deceased six months. We don't know about it until it's actually reported and lodged within this office for updating... Only formal recording a registration according to the Act [Deeds Registries Act No 47 of 1937] it's permissible.

The deeds office is updated only when there is a change in ownership that is formally lodged by a conveyancer. As a result, there will be differences in the information that is stored by the deeds office and that of the Surveyor-General's Office, or the cadastre as it is also known as. The different information in the two offices may create challenges for municipalities who need to bill owners for municipal rates and taxes. Incorrect billing may cause the state to lose income. As a result, these entities that rely on the correctness of the ownership and land information maintain separate records which require additional manpower, time, and effort. These duplicate efforts can be sufficiently addressed if a trusted and trustworthy electronic platform can be developed to integrate cadastre and deeds office information.

Certain legislation should also be enhanced to cater for electronic lodgement and electronic registration of immovable property in South Africa. The law should be further enhanced and harmonised regarding the making and maintenance of electronic recordings, with the minimum risk to infringement of legal rights (Măgureanu, 2012, p. 80). Melissa stated, "The current Bill [e-DRS Bill] [...] 99% if not 100% aligned to that architectural design. The changes that they proposed, which I thought [...] should just be specified better in terms of controls." While the e-DRS Bill has been updated to cater for electronic interventions in property transactions, other related legislation may also have to be reviewed to align with

the purport and objectives of the new bill. Examples of such legislation may relate to the Matrimonial Property Act 88 of 1984 and the Sectional Titles Act 95 of 1986, which do not directly relate to the transfer of all property, but may sometimes form part of a transaction. This aspect was also highlighted in the impact assessment report (Socio-economic impact assessment document, 2015, p. 31).

Finding 6 therefore states that other legislation that may affect property transfers should also be updated in accordance with the new e-DRS Bill in the larger e-DRS project.

In addition, much of the information is still captured manually into different computer systems and packages by the different organisations. Gizelle explained “At the moment the deeds office manually capture each transaction which is then sent electronically in batch files through to Lightstone.” Barry also stated, “There is a data-capturing process also inside there to take what is here and capture it [...] into the system so [...] which means you have to type in the [...] property ID, the [...] description of the property, those coordinates captured in distances and directions. That is captured into our information system that we call CIS, cadastral information system.” This may lead to transcription errors, which may ultimately lead to rejections in the deeds office. Often quality checks are put into place to confirm the information captured, which adds to the cost in the form of salaries payable and additional time invested in this extra process. The recapturing of information may also lead to organisations working in silos and not exchanging critical knowledge and information with each other, because information that can be shared should be additionally and manually captured for this purpose. If information is conveyed electronically in a dematerialised setting, the recapturing effort can be eliminated. Information would be checked at the original source only and will become available throughout the supply chain.

The literature confirms that information sharing through inter-organisational information systems enables organisations to detect and communicate customer requests across the

supply chain (Soliman & Janz, 2004, p. 698), therefore making the supply chain more responsive, competitive, transparent and capable (Chengalur-Smith et al., 2012, p. 58; Marinč, 2013, p. 82; Ye & Wang, 2013, p. 371). Risk and uncertainty can be minimised (Li & Lin, 2006, p. 1645).

Finding 7: there is a need for a centralised information sharing capability whereby non-competitive information that are collected from the onset of the transaction can be verified and made available across the supply chain.

The electronic lodgement of property transactions may lead to a reduction in the number of deeds offices in South Africa. Ashley mentioned, “there’s limits to where you can have deeds offices. You know as a country we have ten of them [...] but in reality you probably only need one central one.” One centralised deeds office may affect certain types of jobs, which will mean that people would need to be retrained and upskilled to perform other job functions and roles. This would particularly affect data capturers. Many of the participants reiterated that people would not lose their jobs as a result of the e-DRS project. Wendy expressed concern that “technology always has that disruptive effect. They’re going to say, yes, but this will put me out of business.” In contrast, Jan believed that jobs will not be lost, “A lot of the staff are [...] scared and have this fear of [...] losing their jobs. No, it’s not gonna happen. Instead of me having ten people examining the work that’s coming in, I might only need four people. I’m probably gonna need eight to start off with. Then I’ll take those other two and they’ll be seconded to another section.”

A proper change management process would need to be embarked on to ensure that all affected people are redeployed sufficiently. However, Linton and Dwyer, (2016, p. 26) is of the opinion that organisations who focus on change management initiatives miss out an opportunity to change the behaviour of their staff members. Concerns with regard to job losses were recorded in both private and governmental representative responses. Job losses

and the retraining of staff were also acknowledged in the impact assessment document (Socio-economic impact assessment document, 2015, p. 11). The National Development Plan (2012, p. 17) also highlights the importance of job creation which is in conflict with the findings associated with the e-DRS project. Although no literature was identified with regard to job losses with regard to the e-DRS implementation in South Africa, the many different sources that were interviewed across public and private entities, as well as the impact assessment document provides the basis to elevate this as a major challenge that was identified in the study. As such, careful consideration would need to be given to this aspect throughout the implementation process.

One of the biggest constraints with implementing an e-DRS system is resistance encountered from supply chain partners and even deeds office staff. This was confirmed by Wendy, “I don’t think that in this whole process you should underestimate the resistance.” Steven agreed, “there’s also [...] resistance to change. That’s internally and externally and from just about every stakeholder that we’ve seen to some extent there is some form of [...] resistance.” This was also confirmed in the literature by Ageron et al. (2012) who stated that resistance to change occurs in most organisations. The impact assessment report also makes mention of resistance to change that was conveyed by numerous stakeholders that were interviewed (p.19). The resistance may be linked to perceived job losses that were discussed in the previous chapter. Effective organisational change management activities would need to be embarked on to change these perceptions.

The current process is characterised by delays and uncertainty in the current process. Raymond maintained, “There’s uncertainty of payments, non-compliance, and [...] payment of proceeds of sale are going to incorrect parties.” The supply chain can only move at the speed of its slowest transaction and it is currently difficult to find out why there is a delay and who is causing it. Integration will facilitate communication between different partners of the property supply chain, which in turn would increase transparency, save time and

reduce uncertainty and stress. Integration would provide a means of monitoring the performance of different partners, while reducing the opportunity for undetected fraud. Uncertainty in the supply chain may be mitigated by imposing guidelines and codes underpinned by current understanding and practice (Shih et al., 2012, p. 70).

A central system would reduce the number of times data have to be re-entered therefore easing the administrative burden and reducing the chance for errors to occur. However, the impact assessment report also highlighted that if the system is not well-designed and implemented correctly, there is the possibility that the property market could be viewed with heightened uncertainty which could detract from economic growth and investment (Socio-economic impact assessment report, 2015, p. 21). Conversely, the new e-DRS system which should also address existing uncertainty in the end-to-end property process, should therefore not create new uncertainties in the process.

Ashley explained that by centralising aspects “You can have one central [...] sending point for these documents and you can enforce [...] a lot of the [...] quality issues around the document.” The impact assessment document construed that an integration between systems and the centralisation of functioning can improve social cohesion as departments share best practices in improving system operations (Socio-economic impact assessment document, 2015, p. 40). Ashley also asserted that:

As such, the deeds office can control its own activities and not regulate the activities of other entities with whom it may interact. The attorneys space where we automate as much of the processes they need to do for them ... bank content that needed to be rendered on the attorney desktop by centralising those things. You don't need to have a distributed system on documents lying everywhere. You can have one central [...] sending point for these documents and you can enforce [...] a lot of [...] the quality issues around the document and a lot of the [...] content issues around the document.

In essence, this means that the use of the correct templates for the compiling of the title and other documents can be controlled from a central point. Without downloading the latest version of the software, conveyancers and other entities would not be able to use any of the documents. This has a security benefit as this process will ensure that all conveyancers are working on the latest version of the document and therefore all conveyancers will have the correct clauses and wording in the document when the documents are compiled. The literature confirms that the cloud allows a user to upload data to various hubs, sync to multiple devices simultaneously and provides access to shared information (Brown & Bielskus-Barone, 2013, p. 3837). Von Suchodoletz et al. (2013, p. 140) also suggested that cloud technology can be a feasible solution for smaller organisations like sole proprietor estate agents and conveyancers who do not have their own scalable solution.

The current property transfer process does not make provision for indigenous or family property. Gail stated that, “That’s [indigenous property] a big problem that we’re facing at this stage because the concept of a family home which isn’t part of our law but is part of some of the cultures and it doesn’t exist in our law. So, I can’t work if somebody tells me, ja, but it was a family home, we don’t wanna transfer it. You have to transfer it. It has to go to a beneficiary or a group of beneficiaries or you have to sell it to somebody but you can’t ... have to take it off the deceased person’s name.” Steven declared, “you first have to get title before you can transfer property, that’s the title in the deeds office.” Family-owned property does not have a registered title as no one individual owns the property. This was also confirmed in the literature (Barry & Danso, p. 1). This is so since many properties are deemed to be indigenous property, which is not registered according to Western registration processes.

Formalised land registration systems do not adequately address informal and indigenous rights (Enemark, 2004, p. 5; UN Habitat, 2012, p. 12). Customary authorities regularly use private and community-based conveyancing procedures and avoid governmental

administration structures in selling land by means of notes or oral agreements (Barry & Danso, 2014, p. 1). This may lead to those families being unable to access finance for property development to take place. In essence, these communities may be excluded from participating in the formal economy because their properties are seen as unregistered and therefore not able to provide security for loans advanced by financial institutions. Despite the fact that the new e-DRS Bill does not incorporate the recording of customary or indigenous property (section 9.4, p. 59), the impact assessment also concluded that there is a need to incorporate indigenous properties into the national register (Socio-economic impact assessment document, 2015, p. 2).

Finding 8: There is a need to incorporate indigenous property information into the national land administration platforms.

The current manual lodgement system also records a high number of rejections. Steven delineated this as “Some offices as high as 50% of deeds coming in get rejected. In other offices, a bit lower, down to 25%.” That means that one in four transactions received by a deeds office may be rejected. In addition to the time spent in logging the transaction and examining and then re-examining the corrected transaction, much time is lost in the process. Rules may be programmed to check and confirm certain elements of documents that are lodged with the deeds office electronically. Electronic lodgements may consequently help to reduce this number, therefore facilitating higher efficiencies in the process. Steven stated, “The deed doesn’t comply on the basic requirements upon lodgement electronically checked ... and immediate dismissal so you not wasting time, you will have more efficiency ... coming in.” The impact assessment document also covered rejections in the deeds office (Socio-economic impact assessment document, 2015, p. 27). The one view identified by predominantly vendors and enabling bodies, is that electronic documents may allow for a systematic rejection to take place due to pre-programmed rules within the e-DRS

technological system. This outright rejection from the onset will initially increase the overall number of rejections, until the quality of the lodged transactions improves. The second view identified by predominantly the professional bodies representing conveyancers and banks, is that a manual interface should still be maintained for extraordinary transactions to be discussed as and when necessary.

Other efficiencies that can be gained by dematerialising the title deed are a streamlined process, an end-to-end platform and increased revenue. Revenue will be increased due to earlier registrations that enable earlier interest income to accumulate, more transactions completed in a shorter period that translates to lower salaries, less people employed as less manual functions will be required in a dematerialised environment. Meanwhile, there are many inefficiencies in the process. Manual processes of other role players in the supply chain will also impact the end-to-end processing capabilities. Charlie expressed, “every single council has different requirements.” Peter voiced, “you’ve got pieces of paper that flows between different parties and obviously there’s delays”. He added, “a municipal clearance certificate is a process that can take a week and somebody’s got to physically write it”. While the majority of the participants were of the view that the e-DRS system should be incorporated in a piecemeal fashion, the reality is that entities that form part of the supply chain who is not geared to comply with the industry standard of technological compliance and efficiencies, will cause the turnaround time to increase and for the value of the entire process to be lowered. By enabling a supply chain approach, many of the inefficiencies and wastage (Muda - a Japanese word meaning futility; uselessness; wastefulness) can be minimised and even eliminated.

Technology can assist to reduce examination times as explained by Charlie, “the examination function can be reduced by using technology because they can turn around these documents, verifying these documents, in a matter of hours as opposed to two days which it took before.” He expanded, “once the information is being sent through, the [...] various

parties would be able to interface electronically with each other...what you almost end up with is an instantaneous bond registration and transfer of a property. Whereas now that [...] process can take six to eight weeks very easily.” This is confirmed in the literature by Kochan (2013, p. 276) who stated that some efforts have been made to use technology to make recording systems more searchable and useful, there is still a great deal of modernisation and innovation needed to update the recording process and to increase compliance with it.

In contrast, the impact assessment report cautioned against the use of centralisation, stating that centralisation could detract from quality of examination (Socio-economic impact assessment document, 2015, p. 20). There are a number of property rules that apply uniquely to specific provinces. The risk is that the new electronic system will randomly assign examiners to a national database, who may not fully understand and allow for these convolutions. Rules may be programmed to counter some of these permutations, which may still allow for a centralised distribution capability. These aspects would need to be carefully plotted when building the architecture of an e-DRS system.

The expertise needed for such a complex project as the design and implementation of a national e-DRS system is very specialised and, as Ashley said, “to implement an IT project of the size that’s required for this is probably gonna to need some expertise which doesn’t exist in the deeds office”. Melissa agreed that government departments do not have the competency to build and manage IT systems. The impact assessment report also flagged as a risk that the deeds office does not have the necessary IT skills (Socio-economic impact assessment document, 2015, p. 20). Ashley was concerned that the correct partners may not be secured to build such a system, “there is a risk in picking the wrong player for this.” Raymond agreed with this notion, “If you start, and you start working with the wrong individuals, they can actually kill your initiative even before you start at the ground.” It is therefore obvious that the required IT skills may need to be sourced from external sources. As such, it is imperative that the correct partners and business model is chosen to allow for

the mitigation of risk, as well as ensuring the sustainability of such a system for the long term.

Risk factors in choosing the wrong partner include choosing a partner that may create a monopoly in the property market. Vincent relayed that various vendors were already working in the conveyancing space and he was of the view that:

We have vendors that is working in the market place. I don't think we should ... the monopoly should be granted to [...] a single vendor. I think it should be open and, like we're doing now, we have the choice whether we're going to use Korbitec or we're going to have L@W. I've got a choice. So, I don't think it should be given to one because that person is then going to have obsolete ... absolutely in a monopoly and where [...] is the freedom [...] of choice then?

Peter supported the idea of open competition and said, “one needs to keep competition in, in, in this space. That [...] what you don't want is somebody to have a monopoly over the whole thing. [...] because that just introduces inefficiencies.” On the other hand, sustainability of the system over the long term is important. The impact assessment highlighted the importance of environmental sustainability as the use of paper will decrease substantially because most interactions will be electronic. It is expected that the issued deed will no longer be printed and stored physically by banks, conveyancers or the deeds office (Socio-economic impact assessment document, 2015, p. 27). In addition, the technological systems also need to keep pace with the changing environment. Computer programmes and languages are continually updated. Ashley further argued that the deeds office systems are outdated:

If you look at their current systems, a lot of them are aging badly. And they're not being kept up to date. I think it's because of the model they chose originally. [...] to pay upfront and leave maintenance for later.

If this updating functionality is left to the deeds office and the systems and software are not maintained, the deeds office may very soon end up in a similar position to what they are facing now. If the functionality is outsourced, the deeds office may not have full control over the systems and programmes. As custodian of the land register, it is imperative that the deeds office retains full control over anyone or any process that may affect the integrity of the property register.

Rates clearances and tax clearance certificates seem to be huge bottlenecks in the current property process. Vincent was of the view that the new e-DRS system might “eradicate a rates clearance certificate, you’re going to eradicate the transfer duty receipt”. Many of the participants, including Vincent, were of the view that the process to obtain tax and rates clearances was completely electronic. Ashley explained that his organisation also assist conveyancers to electronically obtain rates clearance certificates from municipalities. He did not explain the specifics:

We’ve been issuing electronic rates clearance certificates so, so when you engage with a municipality ... that links the attorney to the municipality ... you connect [...] electronically to the council. They then electronically revert with the figures that is outstanding on the property [...] through normal EFT or [...] electronic payments. You then pay what needs to be paid and you then get an electronically signed rates [...] clearance certificate.

Yet, Charlie contradicted this view by clarifying that his organisation provides a similar service to conveyancers, which is still a very manual process that his organisations tries to simplify for the conveyancers:

Their organisation makes the process seamless for conveyancers because, the attorney would apply online, the attorney doesn’t feel the effect of it. We then print the application out, take it in manually to council, sort out what needs to be done, and bring

the figures back, load it up, and send it through to the attorney. So we basically play the electronic process.

The delay in the property process that is caused by the rates clearances and tax certificates was also a finding in a previous study (Amadi-Echendu, 2013). For e-DRS to be successful and fully operational, all role players that form part of the property supply chain would need to commit to the acquisition of the necessary technological and other skills, equipment and the building of the required interfaces for meaningful connections with other supply chain members for sufficient information and document exchange.

Time lapses between registrations and payments can result in interest claims and other disputes. A central payments system would offer the opportunity for greater accuracy and economy. A greater degree of automation and certainty should produce considerable cost savings. Michael surmised, “The deeds office needs to be able to issue a confirmation that a transaction has taken place that the property has registered. That confirmation needs to be irrevocable. On the strength of the irrevocable confirmation payment needs to happen irrevocably.” Raymond suggested that PEXSA should have “all the access links to BankServ, the deeds office, the attorneys, and the banks” and then on registration “settle the cancellation bank, the transfer attorney, the estate agent, the seller, SARS, the fidelity fund, and bridging houses.” According to Raymond, the centralised payment system is expected to:

address fraud, money laundering ... it's interoperable ... it eliminates repetition of data entry. It improves standards and procedures. There's an enhanced audit trails, reconciliation process is ... it speeds up the settlements and improves the liquidity and velocity of money. It reduces costs due to a leaner and a quicker system. We have extensive reporting. There's more visibility of liquidity and flow within the system.

Finding 9: A centralised payment systems should be incorporated into the property registration process.

A new concept of block chain technologies and the distributed ledger was mentioned by quite a few of the participants. Some of the participants, however, had not heard of these concepts. There is a possibility for these technologies to be introduced into the property sector in the future. Exactly where these technologies need to reside is unclear at this stage. Wendy surmised, “it would be great if they used block chain technology for example and you have a block chain for each title deed.” Whether or not virtual currencies will become part of the industry by combining these currencies with the block chain technology, remains to be seen. The SARB has indicated that they are willing to introduce a national digital currency (e-NCA, 2017).

George was also in favour of the introduction of the block chain technologies and the distributed ledger as he stated that these technologies would prove ownership and give details as to when a transfer has taken place. He also emphasised the importance of effecting irrevocable payments in real time. However, South Africa’s largest banks, in collaboration with SARB, the Financial Services Board, the Payments Association of South Africa and the central securities depository Strate formed a working group that, in October 2016, successfully swapped an asset via a block chain network that was set up among themselves (Naidoo, 2016). Consequently, it seems as if the technology is being investigated in collaboration with the central bank in South Africa. These aspects will be elaborated on in the third theme.

Finding 10: Block chain technologies and the distributed ledger may be incorporated to manage property ownership of landed properties.

6.4 Theme 3: Security

This theme incorporated General security features, Fraud, Compliance, Risk and Risk mitigation as subcategories.

6.4.1 Implications of Theme 3

Integration behind organisational firewalls have resulted in increased security and improved communication, as confirmed by Paul, “it goes straight through the firewalls, straight into their systems, and it removes then [...] capturing the application again.” According to Muir (2007, p. 6), the database should be protected by a suite of security measures, namely firewalls and intrusion detection systems.

The integrity of the property register should remain intact and the security of title should therefore enable equal or increased protection in an electronic environment. Brown et al. (2012, p. 69) argue that preservation activities should still render data authentic, reliable and usable with its integrity intact. It is important to keep evidence of the process followed and all changes made to records. In an electronic document, an audit trail will assist to records all those who provided information into a document as well as a record of what has been done and by whom it was done. Chachage and Ngulube (2006, p. 9) asserts that the provision of metadata to prove the integrity of an electronic document and statutory compliance forms part of records management. Marobella (2005, p. 19) stated that “compliance is mainly concerned with information integrity, privacy and records retention.”

An e-conveyancing service should also be capable of processing a range of payments electronically, such as conveyancers’ and estate agents’ fees and other disbursements (Rajashekhar, 2006, p. 13). Raymond clarified that EFT payments are unsafe because “an EFT is revocable.” Such a system rollout and its implementation also need to be carefully planned as certain capabilities need to be in place with its implementation. This was confirmed in the literature: A particular strategy should be planned over the long term as professional development of surveyors and other professionals need to be factored into university programmes and educational programmes so that the strategy can be supported (Stuedler et al., 1997, p. 10).

The participants of this study also accentuated the importance of the ‘delivery versus payments’ concept. This means that the payment should offset the simultaneous transference of ownership in the deeds office which will reduce the time that exists for possible fraudulent activities to occur as is evident in the current process. In addition, the lapse of time between registration and authorisation and subsequent payments may create opportunities for misconduct (Castellano, 2015, p. 635). In addition, the payments should be irrevocable. George listed the benefits of introducing an irrevocable payments system and surmised the elimination of the principle risk, process efficiencies through centralised processing, and a reduction in credit risk and fraud risk:

“If you manage it correctly [...] you take away the principle risk and that is the risk that if I make the payment I will not get the property or I will transfer the property and never receive the payment. One would be some efficiency that hopefully they will be able to gain in terms of getting everything centralised. The possibility would be to actually simplify the process. Reduce the risk [...] credit risk, fraud risk, on a number of [...] places and hopefully make that payments process I think much more efficient.”

Michael cautioned that the reversal of transactions should not be allowed, “the minute you start allowing undo you’re actually questioning the integrity of the recordkeeping system to start off”. Neither the impact assessment study, nor the new e-DRS Bill contained any reference to the irrevocability of payments. Michael further explained:

The deeds office needs to be able to issue a confirmation that a transaction has taken place that the property has registered. That confirmation needs to be irrevocable. It cannot be revoked for any reason whatsoever. It needs to be irrevocable. On the strength of that irrevocable confirmation payment needs to happen irrevocably.

Finding 11: The same-day irrevocable settlement of ownership transfers should be implemented into the new e-DRS system and related processes.

Biometric identification has already been made available to some organisations (banks, the master of the High Court and insurance houses) in order for them to identify their clients and combat identity theft. If an attacker succeeds in stealing someone's credentials, the hacker could access the customer's cloud services, monitor actions, manipulate data, and redirect people to unauthorised Internet sites, which could cause reputational or financial impairment and harm (Brender & Markov, 2013, p. 731). The Jerry observed, "the biometrics in my opinion should be right at the start wherein you will then be certain with whom you are dealing. When the person wants to buy a property and he [she] approaches the agent." As a result, it is advisable for estate agents to initiate the verification of the person who is completing an offer to purchase to buy a property. Jerry explained that an organisation needs to build the link with DHA to enable biometric verification. Hence, the Estate Agency Affairs Board would need to enable this link for estate agents.

While it is true that biometric information can be useful, it is also known that information from the DHA may not always be current and correct. Steven observed, "We don't wanna rely on records where we know Home Affairs hasn't got an accurate record." Low 2010 (Socio-economic impact assessment document, 2015, p. 5) points out that using multifactor authentication by implementing a mixture of token- and knowledge-based authentication procedures will deliver increased security. This means that an outsider would need to gain access to a token and guess the correct password before gaining access to the system. In addition, each user's identity should be verified independently (Low, 2010, p. 5). Steven confirmed the literature when he stated that a combination of security factors would help to overcome inaccurate or incorrect biometric identification:

are the three key things of identification and most systems that would be of fidelity required by a e-DRS would normally require two of those things. So, you would either have to know something, and have something or be something and know something or have something and be something. [...] what that means is you've got to have some

biometric [...] identification whether that would be fingerprints, whether it be voice, whether it be a retina scan, you know, any facial recognition. So, you know, those are things and by having one of those factors you would also then need something that you know, so, in that case it's normally a password [...] so, it'll either be you have a certificate and you know the password. Or you have, you set a fingerprint that you have a password or have a certificate and have a password or so, and you have a voice print, so two factors of the three things.

Finding 12: Biometric identification should be introduced at the start of the property process and multi-level security should be implemented to increase security features.

The e-DRS Bill addresses security matters by allowing for the registration of conveyancers as authorised users of the electronic deeds registration system. The method of controlling access consists of a registration or identification process and an authentication process (Low, 2010, p. 4). It also affords electronic signatures of conveyancers, statutory officers, notaries or registrars the meaning of advanced electronic signatures as defined in section 1 of the Electronic Communications and Transactions Act, 2002 (Act No. 25 of 2002). Electronic signatures and digital certificates may be used to identify and authenticate users who submit documents and lodge transactions with the deeds office. The use of encryption and digital certificates allows the content of the transaction and the identity of the conveyancer who certified it to be conclusively established (Muir, 2007, p. 7). Charlie confirmed that electronic signatures are very secure “it’s a lot more secure than even the wet ink kind of signature because it records a lot of biometrics involved in it. There’s a full record of when exactly each signature was done, when changes to those documents were done.” In addition, Fred also explained as follows:

after you've signed the document with that type of signature, you can't change it or modify it...certain information is actually embedded...not visible to...to human but, um, certain parts of the document will...can...it can contain information, it can be secured

when you sign it, so you encrypt it...sign on a [sic] electronic document but I can use that same signature and paste it onto another document, like pasting a [sic] image across. Uh, with the X509 certificates you...you cannot do that...there's a whole, um, certificate authority structure.

Lack of control over certain processes and role players involved in property transactions was cited as a reason for some of the fraudulent activities that have taken place in the industry. The skill with which complexity is controlled is a core competitive capability that can be exploited to improve the efficiency and effectiveness of a supply chain (Cheng, Chen, & Chen, 2014, p. 2329). Charlie explained, “the banks don’t have any kind of control over the transferring attorney and that’s also where a lot of those fraudulent activities have taken place”. Gail enlightened that the major type of fraud identified at the master of the High Court was the falsification of documents. Lester maintained, “what conveyancers are very scared of is that you lose a measure of discretion”. The impact assessment document mentioned that banks would need to protect their interests by being involved in the design and implementation process, and ensuring that they do not lose control entirely within the new system interface (Socio-economic impact assessment document, 2015, p. 17). For example, in certain instances it is necessary that the bank and conveyancers can specify the exact date on which transfer occurs, and the new eDRS should be flexible enough to allow for this. These issues need to be managed properly in a stakeholder engagement process. Also, highly sensitive data cannot be outsourced; therefore, retaining control of the encryption keys may provide a viable solution, which could prevent the access of malicious outsiders to encrypted data (Lampe et al., 2013, p. 5).

The impact assessment document made reference to the fact that the e-DRS system needs to be able to adequately respond to atypical transactions - for example, set issue dates, complex project finance, interdicts, and servitudes (Socio-economic impact assessment document, 2015, p. 20). Steven outlined a few compliance issues around interdicts and endorsements

that may prevent the registration of properties from taking place as well as “encumbrances like a mortgage bond. There’s also the attachments coming from the sheriff which can prevent transfer.” As a result, there will be many checks and balances that need to be put into place to ensure compliance and legal adherence. Michael added:

There’re umpteen legal acts that need to be changed to facilitate electronic deeds registry, replacing a title deed with an electronic record. It’s more about bringing efficiencies, it’s more about mitigating the risks, it’s more about reducing the fraud that is currently taking place in the industry.

There are various risks associated with the e-DRS system and the property environment. One risk identified by Steven was the risk of losing experienced staff, which takes their knowledge away from the industry. Effective knowledge management would need to be implemented. Knowledge management is defined as the “explicit and systematic management of vital knowledge, as well as its association with processes of creation, organisation, diffusion, use, and exploitation” (Skyrme 2001, p. 6). Gunasekaran and Ngai 2004 (p. 270) points out that knowledge management manages and identifies an organisation’s intellectual assets to achieve its business objectives. Information technology can be an enabler to assist with efforts to document and automate processes. The role of IT varies from simple automation of processes to an enabler of integration through information sharing (Chen & Ching, 2002, p. 378).

Wendy highlighted that an electronically stored document is open to an increased threat of hacking. This was confirmed in the literature by Peters and Panayi (2015, p. 10) who claim that there are numerous places where corruption of data integrity can occur, namely human error, hacking, viruses, compromised hardware, cyber threats and various types of fraud. As computer hackers become increasingly savvier and inflict more unsettling actions, computer software programs need to pre-empt and mitigate such to protect personal information (Speier et al., 2011, p. 727).

6.5 Findings

Based on the literature review, documents that was analysed and the data that was collected, certain findings have been concluded which will be presented next. The research question was formulated as follow:

RQ: How can the end-to-end property transfer process be integrated among the different role players to dematerialise property transfers?

Secondary research questions have been formulated as follow:

- What gaps would need to be addressed before electronic end-to-end registrations can be introduced into the South African environment?
- What measures do supply chain partners perceive should be put into place to enable dematerialisation of the end-to-end property transfer process?

This question is addressed and explained with the framework that was put forward in Figure 6.1 that was developed based on the data that were collected from seventeen face-to-face interviews, a review of relevant literature, and the analysis of various documents.

The findings of this study as per the three main themes that emerged are as follow:

Finding 1: Costs are expected to decrease after the initial investment in integration efforts of processes and technology.

Finding 2: Certain entities will be impacted by changes to their business models and value propositions with the introduction of an e-DRS system.

Finding 3: E-conveyancing should be introduced in South Africa in a similar manner as the dematerialisation of shares; in other words, the mere automation of processes will not suffice.

Finding 4: Dematerialisation, and not only digitisation needs to be introduced into the e-DRS system.

- Finding 5:** Integration efforts should be relooked and a new industry model would need to be enabled for the transfer of landed property in order to improve the availability of information and the accuracy of registration for land administration in South Africa.
- Finding 6:** Other legislation that may affect property transfers should also be updated in accordance with the new e-DRS Bill in the larger e-DRS project.
- Finding 7:** There is a need for a centralised information sharing capability whereby non-competitive information that are collected from the onset of the transaction can be verified and made available across the supply chain.
- Finding 8:** There is a need to incorporate indigenous property information into the national land administration platforms.
- Finding 9:** A centralised payment systems should be incorporated into the property registration process.
- Finding 10:** Block chain technologies and the distributed ledger may be incorporated to manage property ownership of landed properties.
- Finding 11:** The same-day irrevocable settlement of ownership transfers should be implemented into the new e-DRS system and related processes.
- Finding 12:** Biometric identification should be introduced at the start of the property process and multi-level security should be implemented to increase security features.

The participants who were interviewed were managers who were involved in organisations that have a national representativeness of the key role players in the property market in South Africa. As such, it is accepted that their views are significantly representative of the role players involved in the property market.

6.6 Framework for electronic conveyancing

The deeds office is a government department that is responsible for the registration, administration, and upkeep of the property registry of South Africa. E-government may provide a platform where the different government departments involved in land processes can provide an integrated and seamless database system to process applications and increase access (Bwalya et al., 2014, p. 104). It is necessary to design systems and structures that will allow for quick and efficient changes without causing significant disruptions and impacts on the overall configuration of the system. There are various bodies that manage various entities in the property market. One such entity is the Estate Agency Affairs Board, with the mandate to manage and control estate agents activity in the public interest. This body is responsible for ensuring that estate agents are accredited, and for issuing and renewing annual fidelity certificates to accredited estate agents so that estate agents can maintain a trust account for client funds. They therefore keep a register of all registered and current estate agents in the industry (as explained by Michael earlier on). PLATO fulfils a similar function for land surveyors and the LAW Society fulfils this role for conveyancers. Jan expressed that “documentation submitted to us is prepared and surveyed by external professional land surveyors, registered professional land surveyors. They [...] register with our [...] Institute of Professional and Technical Surveyors otherwise known as PLATO.” Fred also confirmed this:

If we have [...] at the Law Society have registered practitioner conveyancers, if we have that register, and that register is maintained it's [...] a very good beginning because we've [...] found that there's a lot of conveyancers practicing that's not [...]

It is therefore crucial for authoritative persons or professional organisations such as the deeds office and cadastre to gain access to such registers to ascertain the legitimacy and validity of the agents and other role players that take part in the property market. Failure to do so may

result in voidable transactions which may not be repudiated, not to mention civil suits and interest claims.

A link would need to be established for information to be exchanged between different entities and organisations. Jerry explained that an authorised body and not individual organisations, needs to build the link with DHA to enable biometric verification. Jerry explained:

People should come and say as a group like the bank are using SABRIC. For us to manage, we can't really have individual banks. They will have to come through the Law Society because we must write MoUs [memoranda of understanding] with the [...] organisation and make some agreements and declaration. So, it will be that organisation and then they will have to come through it.

Hence, the Estate Agency Affairs Board would need to enable this link with DHA for estate agents to verify the identity of their buyers and sellers. In the same manner, the Law Society keeps records of all conveyancers who have been admitted, as well as those who have been disbarred. Ashley explained, “you need to prove identity and you also need to prove [...] credentials. [...] because people get [...] added and disbarred all the time” Fred expressed similar sentiments, “If we have [...] at the Law Society have registered practitioner conveyancers, if we have that register, and that register is maintained it's [...] a very good beginning because we've [...] found that there's a lot of conveyancers practicing that's not.” PLATO keeps a record of land surveyors who are active and accredited. Jan stated, “The documentation submitted to us is prepared and surveyed by external professional land surveyors, registered professional land surveyors. They [...] register with our [...] Institute of Professional and Technical Surveyors otherwise known as PLATO.” Steven confirmed:

They're gonna create a portal...everybody enters that portal. Every practitioner: internal, external, etcetera. But their user profiles will be different. We want to start bouncing against [...] the law societies and against maybe the Department of Justice

and [...] and the prosecutorial development as well [...] to go and check to see whether an attorney is still admitted, have been struck off, etcetera. So that ... that's the further check. Not just to get the verification on credentials but to check that you are still valid and you can still transact. These checks will have to be done before the conveyancer can actually lodge. Have you got a security key? Are you a registered conveyancer? Are you still practicing? Is your account in good standard? A lot of checks and balances are done prior to that. That can be done within seconds. The conveyancer comes in, he's gonna have to register with the deeds office. He's gonna have to go through biometric. We will hold the database on that for checks and balances.

It is important that the status of each estate agent, conveyancer, and land surveyor is verified electronically in a real-time check as soon as these entities are appointed to transact in the transfer of a property title. The offer to purchase (OTP) forms the legal basis for the agreement between the buyer and the seller and the transfer of the immovable property later on. If the estate agent is not an accredited body, the legality of the legal contract comes into dispute. The same estate agent or a different one may introduce a suitable buyer to a property that is for sale, and this agent will draft an OTP, which becomes the first legal document that forms the basis of the agreement between the buyer and the seller (Amadi-Echendu & Kruger, 2016, p. 2). A link should therefore be in place for this verification to be effected.

Michael confirmed that many unregistered estate agents, conveyancers, (and also land surveyors) are still active in the property market. Proper integration and sharing of information will help to identify the guilty parties and help to increase accountability and security in the property supply chain. Michael went on to explain that integration among different supply chain members will allow for certain aspects like interdicts and other encumbrances to be flagged.

Fred also explained that a master system that links to other entities for the verification of active membership with professional bodies, as well as verification of the information that was lodged, is necessary:

The thinking back then was actually part of the e-DRS, create that system for the Law Society so then they can utilise that register. But there was [...] another one which [...] we also discussed was the Sheriff of the Court because the interdict is a very important function. The surveyor-general's information and the Deeds information is two separate entities and they actually don't [...] interlink. But to actually have a [...] fully integrated system they call it master data management. Now what you create is you create a [...] master data record of all your information that is linked. You can actually update the [...] master [...] record and correct it and link it and [...] through a team of data marshals and system processes. Uh, you don't touch your original electronic record so that never modifies it and it keeps the golden thread from your master record to your original record. Your integrity is still intact but this is more usable and then you use [...] as you develop your system you actually use your master record and not your original record.

It is important that adequate control measures are put into place to ensure that all provisions and conditions have been met. Chinyemba and Ngulube (2005, p. 12) stated that proper control of records involves establishing physical and intellectual rights over records that are being registered, classified and indexed for easy retrieval and keeping track of the record. Banks sometimes approve certain conditions that should be fulfilled as part of the finance agreement. Lester mentioned, "The conveyancer is the party who signs, who accepts responsibility and who's liable afterwards ... some compliance aspect, anything from FICA to electrical certificates to conditions in the contract that the parties may have written but not quite understood." Vincent reported:

They [the examiners in the deeds office] still investigating to see if it is the rightful ... the registered owner that's passing transfer, whether there are any encumbrances

against the property like mortgage bonds and attachments and if they are being dealt with simultaneously, whether the conditions that are being perpetuated or recreated are registered in terms of the Deeds Registries Act [No. 47 of 1937], whether any person that has a [...] registered right in the property is a party to or a privy to the deed or whatever because you've got all these conditions in favour of the Home Owners' Associations, the property may not be transferred without their consent. That will ... the deeds office will have to see if there is a consent.

Charlie expressed, “give each party that needs it the ability to use a real-time request and retrieval process to get that document. So, there's no central repository but there is the ability with the customer's permission to go and pull these documents instantly.” As eluded to by Fred earlier, a centralised system would be best suited to manage the execution of these responsibilities. The loan and other conditions should be met, and therefore the approval and all conditions should be uploaded to this central system.

The sheriff of the court registers interdicts and other encumbrances that may prohibit the transfer of immovable property. In addition to Vincent's explanation above, Steven stated, “Then you've got your [...] interdicts against the ... and [...] basically your property printout to affirm the property details and to see whether there's any encumbrances against them like a mortgage bond that must be dealt with. We can't transfer with a mortgage bond being open. There's also the attachments coming from the sheriff which can prevent transfer.” These are currently manually checked and an electronic interface should be built to enable a real-time check. The master of the High Court deals with the property of deceased estates and will in these instances upload their authority to proceed with a transfer. In addition, the envisaged system should also cater for holds to be placed, caveats to be registered and encumbrances to be flagged against registered properties as part of the ongoing maintenance function. Gail explained, “We will register the caveat as soon as the application ... the appointment has

been made to protect the interests of the patient in an immovable property.” This did however not form part of this study and could be investigated as a future study.

Although disbursement of funds currently occur after registration by means of EFTs and journal transfers, Raymond confirmed: “The payments are still normal EFT process.” Technology platforms like Strate, SWIFT, and Bankserv already have existing functionality in the Reserve Bank environment for irrevocable payments to occur. PEXSA has already built a payment solution that can be introduced into this environment as a payment frontend. Although this functionality can be extended to other role players as well, it is recommended for only one entity to play this role on behalf of the industry. Michael expressed that “When you’re at that thin edge of the wedge, there’s no competitive advantage for multiple players in that space because what are you doing? It’s [...] in theory it’s nothing more than a coordinator and it’s not a ... that should never ever be a competitive space.”

The deeds office is a government institution. SARS and the municipality are also government institutions. These institutions collect money for property services rendered (rates, sewerage, etc.) and taxes that are payable in respect of the property being sold. Fred said, “third-party interaction is primarily with Home Affairs, SARS and the municipalities or your local authorities to get your rates clearance and your tax clearance.” In the current process, these monies are collected upfront as a pro rata payment. Michael stated, “You pay transfer duties upfront.” Quite often additional amounts are collected, which are claimed back after the transfer had been completed. Michael explained that paying transfer duties upfront for property transactions is incorrect, as other taxes are paid after the fact. He is of the view that the payments platform should be able to incorporate all payments, including property taxes. These payments should occur at the time of registration when the irrevocable payments take place instead and could occur as a first-tier payment before any other role players receive their dues. Consequently, the framework has taken this into account.

Buyers, sellers, and any other stakeholders can be given access to view certain functionalities in this deeds office system, within which there should be various levels of access. Certain entities should be allowed a viewing function only, while other entities should receive the capability to change or upload information. Digital certificates need to be issued to authorised users after a stringent authorisation and verification process had been followed. Only parties linked to a specific transaction should have access to view information of the transaction. Muir (2007, p. 6) indicated that digital certificates should be required for all levels of access but only qualified conveyancers should have the ability to certify and sign electronic transactions. As soon as an authorised entity's credentials are revoked, he or she should no longer have access to view or change details within this system. This will enhance the security of the transaction and ensure that the information is protected in terms of the POPI Act (No. 4 of 2013).

In addition, all changes and information made available should be date-stamped with a corresponding log of which entity was involved and in which way he or she was involved. Gail explained, "I can track much easier how far a file or a matter is in progress. I can track who worked on it, when did they work on it, and what did they do with it? Did they make changes or not? I can track [...] what our turnaround times are." A predetermined set of rules can be programmed into the deeds office system, which can immediately flag incorrect information or documents as they are submitted. Charlie said:

We have an electronic automated set of rules that will programmatically check the FICA documents and the old mortgage pack in terms of are the right documents there depending on the transaction type, depending on the parties type. We lock all of those attributes into [...] the artefact that's created which is the document. When it goes to court one day, everything is contained within that single PDF and an electronic expert or a ... even a judge can just click on the field and say, right, I can see Anthea signed this document at this time in this place and it had to be her because in the background,

these were the processes followed to identify her whether it was a biometric, whether it was a FICA process, whatever the case. One of our goals is if we [the deeds office] can on behalf of the banks and help the bank to control the document, control the signing of the document, and by the document I mean the contents, static or variable, and control the signing that actually nobody has to check that document.

Using a predetermined set of rules may reduce the examination time in the deeds office, which may positively affect the turnaround time of transactions and registrations. For the deeds office to gain access to such information, they would need to be the overseer of the system. Charlie also stated that the deeds office examination time can be reduced by using technology because “they [the examiners in the deeds office] can turn around these documents, verifying these documents, in a matter of hours as opposed to two days which it took before.” Peter was of the opinion that the entire end-to-end process could be reduced if stakeholders were able to interface their technological systems with each other and share information. Peter said:

The parties have to engage with each other in order to effect a transaction whereas, here what you'd have is a seamless [...] process, where once the information is being sent through [...] the various parties would be able to interface electronically with each other - cause what you almost end up with is an instantaneous bond registration and transfer of a property. Whereas now, [...] that process can take six to eight weeks very easily.

Vendors in the property market have built a component of their business around linking various entities in the industry. Lester explained, “software vendors try to push with this huge barrage of pre- [...] pre-programmed, pre-written [...] templates for each possible transaction.” Barry stated, “Your application form will come in electronically. It would be either through your mortgage originators or software vendors that act on their behalf.” Fred concurred, “A lot of deeds’ information is provided by data vendors like Korbitec and

SearchWorks and [...] they make a lot of money out of that information.” These electronic interfaces and links are charged separately, therefore escalating the cost of property transactions significantly. A single platform by a single, independent entity should minimise the need for these individually built interfaces. These costs are charged out to the end user or the buyers of property. A centralised deeds office system should significantly reduce the costs associated with property transactions.

Sako (2012, p. 22) stated that cloud computing and digital technology have created opportunities for new business models. “Cloud computing is a technology that uses the Internet and central remote servers to maintain data and applications, which allows consumers and businesses to use applications without installation and access their personal files at any computer with Internet access” (Ul Haq Quddusi, 2014, p. 102). This will allow various degrees of access that can be regulated by means of digital certificates and levels of access, based on the entity and his or her involvement in the transaction. Cloud technology can be an attractive solution for small organisations like sole proprietor estate agents and conveyancers who do not have their own scalable solution (Von Suchodoletz et al., 2013, p. 140). In this regard, Lester commented:

Your title deed, your photograph of the owner, where your transaction details themselves, are all embedded in one electronic record on the [...] cloud or on the Internet not under the control of government or deeds office.

The technology used by a centralised system may be a hybrid cloud technology. In a hybrid model, the cloud computing is hosted and controlled by a third party although dedicated resources may be privately used by an organisation (Nandgaonkar & Raut, 2014, p. 736). Cloud computing creates a single hub and therefore enables organisations to overcome silos (Kanagasabapathi & Balaji, 2013, p. 419). For the SA property market, a hybrid solution may keep the costs of transacting low, enable integration among various role players,

increase transparency, and allow the deeds office to retain sufficient control over the data and documents of each transaction.

Having taken all factors as explained in section 6.6, Figure 6.1 has been conceptualised. This framework aims to incorporate all the relevant role players as identified by the various participants into a centralised property frontend that can electronically be accessed by any role player, regardless of their geographic location. One of the participants who has experience in the dematerialisation of assets put forward that an independent body that does not have a vested interest in the registration of the property should be responsible for managing the process. Because of this, it is suggested that the deeds office should fulfil this responsibility, especially since it is the custodian of the property register.

Accurate information and records are therefore their priority. In addition to enabling an electronic lodgement capability, this frontend may also serve to link all the role players and incorporate added security features. The envisaged framework will also allow more stringent control over the transactions that has been lodged for property ownership to be transferred. By allowing interfaces in a shared system, it is possible to dematerialise and not only digitise the property market. The heart of all the processes and product activity of a centralised system will be the data centre, which will be the repository for all metadata, imagery, and products (Kanagasabapathi & Balaji, 2013, p. 419).

Legislation is a concept that does not quite fit in with any other of the concepts highlighted, but anything that contravenes legislation may have the effect of rendering a transaction null and void. As a result, legislation was illustrated separately. Operational matters were separated from more strategic matters and portrayed as such. The organisations that are involved in the property end-to-end process were listed as a supply chain in order to illustrate the supply chain management that came through quite strongly across the participants. Professional bodies have also been included so that the currency of their members' statuses

can be confirmed electronically. Records are generated and consulted throughout the property process. Records and information must be able to be exchanged among supply chain members and this can be done in two ways. Firstly, messages should be exchanged, hence the message file which is shared by the supply chain members. Secondly, the capability to share, view and exchange documents should also be provided for, hence the document warehouse which should also be shared among the supply chain members.

Based on feedback received from a few different participants, the payment system has also been incorporated into the property end-to-end process. The framework in Figure 6.1 has been discussed with an architect from DRDLR in order to assess the practicality of its implementation. The discussions took place after the interview had been conducted so that the participant was not unduly influenced in terms of the data that was presented in this study. Although there are many benefits, the main benefits attached to an electronic registration system include:

- minimising fraud;
- reducing errors;
- increased transparency;
- an integrated property supply chain;
- reduced turnaround times; and
- cost savings for the industry.

There are also aspects that are fundamental to the end-to-end property process which are important and valid across all entities and processes. For many businesses to continue, the customer would need to be suitably serviced. In order to achieve this, business insights will equip entities with the knowledge to satisfy customer needs and expectations. It has been established that the integration of entities in the property supply chain is necessary for records to be correctly and securely drafted and maintained, and for information and

knowledge to be exchanged among supply chain partners. This will ensure the sustainability of the entities and the processes at large. Documents will need to be validated to maintain the integrity of the records and that of the end-to-end process. Security measures need to be put into place to ensure that no fraud, tampering or non-compliance occur at any level.

Figure 6.1 is a conceptual framework for the dematerialisation of property transactions in South Africa. The framework aims to integrate the most important supply chain partners in the property market namely SARS, municipalities, conveyancers, the surveyor general (cadastre) sheriff, reserve bank, master of the High Court, estate agents, banks, DHA and PEXSA. In Figure 6.1, SARS and the municipalities are given a priority link in terms of payments that need to be effected and they therefore appear on the inner circle of the system. The other supply chain partners are also integrated into the same technological platform, but the integration may require different levels of access which would allow for information to be incorporated into existing transactions. The bodies that are in an authoritative position over these supply chain partners also reflect on the circumference since they would only supply information in the form of updated membership registers and would not be able to gain access to the system in order to make changes to transactions that are in process.

A mortgage originator is currently not regulated by a body in the industry (Amadi-Echendu, 2013, p. 39). This entity also provides a service between the estate agent and the bank. As such, they are not part of the deeds office central system, but they are highlighted as a link between the estate agent and the bank in the framework for information purposes (see Figure 6.1). In addition, they may be given access to view the statuses of certain transactions.

It is important that the entire operations of the technological platform and all processes feeding into this platform, adheres to existing legislation that may apply in varying degrees to some or all of the transactions and supply chain partners. The purpose of introducing a technological platform is to minimise fraud, reduce errors, and reduce the turnaround time

and to decrease the costs that are associated with property transfers in the industry. These factors are illustrated at the right-hand side of Figure 6.1 and shows that it applies to the entire platform and all supply chain partners. The underlying principles that underpin the entire frontend are the following:

- customer and business insight;
- integrated business process management;
- sustainability;
- document validation; and
- security and customer service.

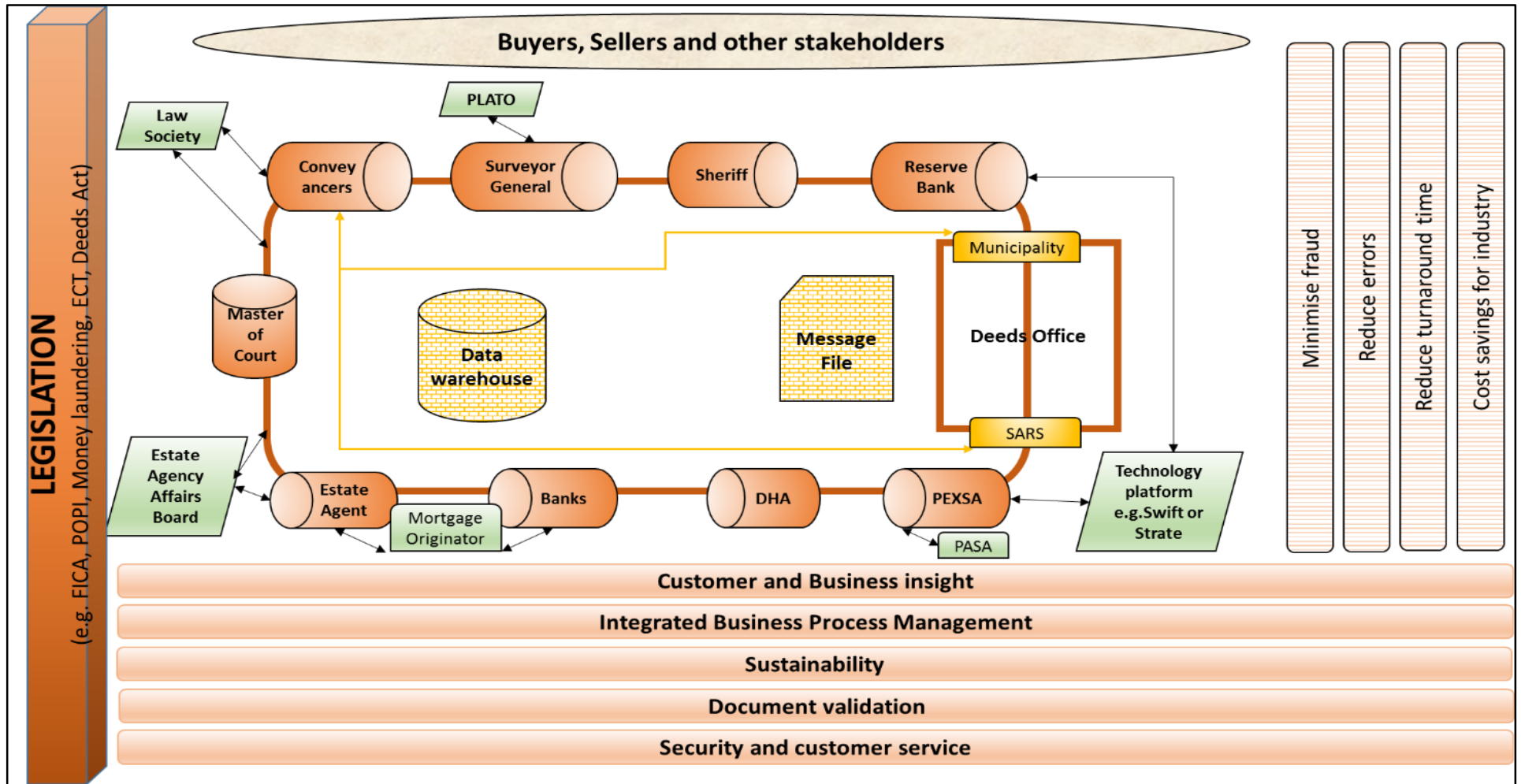


Figure 6.1: Framework for e-DRS

These principles have been incorporated in the literature study and were also highlighted by the many participants that were interviewed. Buyers and sellers are the reason why the transfers of properties take place. They are positioned at the top of Figure 6.1 and runs across the entire structure to indicate that they are involved in the end-to-end process, as the process begins and ends with them. It is not necessary for the buyers and sellers to gain access to the system to make changes, as they have conveyancers and agents that act on their behalf. They may however receive a viewing functionality.

Figure 6.1 integrates public and private organisations, as well as authoritative bodies into one platform. This will allow for transparency and information exchange across the supply chain. The data warehouse and message file that will be hosted and stored by the deeds office will enable for effective message exchange between supply chain members. Information from the onset of the end-to-end process can now be sent to the data warehouse that will build the final documents that will be required by the deeds office for registration to take place. This means that no additional integration efforts will be necessary among the individual supply chain members. Each supply chain member will add their information to the central information database that is being stored in the deeds office data warehouse. Each entry will add the credentials and time of the entry to the audit trail. When the conveyancer is satisfied that all conditions have been met and that all records are complete and correct, the conveyancer may electronically lodge the application for registration. The deeds office can within minutes electronically verify the originality, authenticity, validity, correctness, and compliance of all records and parties to the transaction, as well as electronically verify any encumbrances that may apply to the transaction that has been lodged.

As a very simplified version of the functioning of the system is as follow: the estate agent will biometrically verify the identity of the buyers and sellers and will load property information and buyer and seller information into the database. The banks will load the loan details. The conveyancer will remain responsible for the correctness of the information and

will request rates and tax clearance certificates which will be loaded by SARS and the respective municipality. When the conveyancer is satisfied that all requirements have been met, he [she] will formally lodge the transaction with the deeds office by simply ‘submitting’ the already uploaded documents and information. On examination, the deeds office will verify the information electronically and the registrar will electronically authorise the transaction(s). A notification will be triggered to PEXSA to make the necessary payments that would have been loaded prior to registration.

All supply chain partners, buyers and sellers will be able to be identified at the beginning of the process and levels of access or viewing capabilities will be allocated at the onset of the transaction. All documents and information will be sealed in the data warehouse for further transacting in the future. Combining the cadastre and deeds office information into one technological platform will enable the deeds office and cadastre to package information more intelligently. Figure 6.1 was further adapted to provide a more generic view that may be used in other contexts and disciplines in Figure 6.2.

Essentially, all role players that form part of the supply chain will still be managed as a supply chain. The supply chain will be linked to professional or authoritative bodies in the relevant industry or market that will confirm and validate membership currency of supply chain members, where applicable. Legislation is still the one anchor against which all transactions must be vetted. Operational concepts have been grouped together which shows any barriers and challenges which need to be overcome, benefits, gains, security and risk matters, and shared systems. Strategic measures are reflected as strategic impact factors (which is largely dependent on the discipline and context in which the framework may be used), and shared governance (which refers to the rules, policies and other known or agreed measures of sharing among supply chain partners). The context and discipline which may use the framework will largely decide on the mix of these measures.

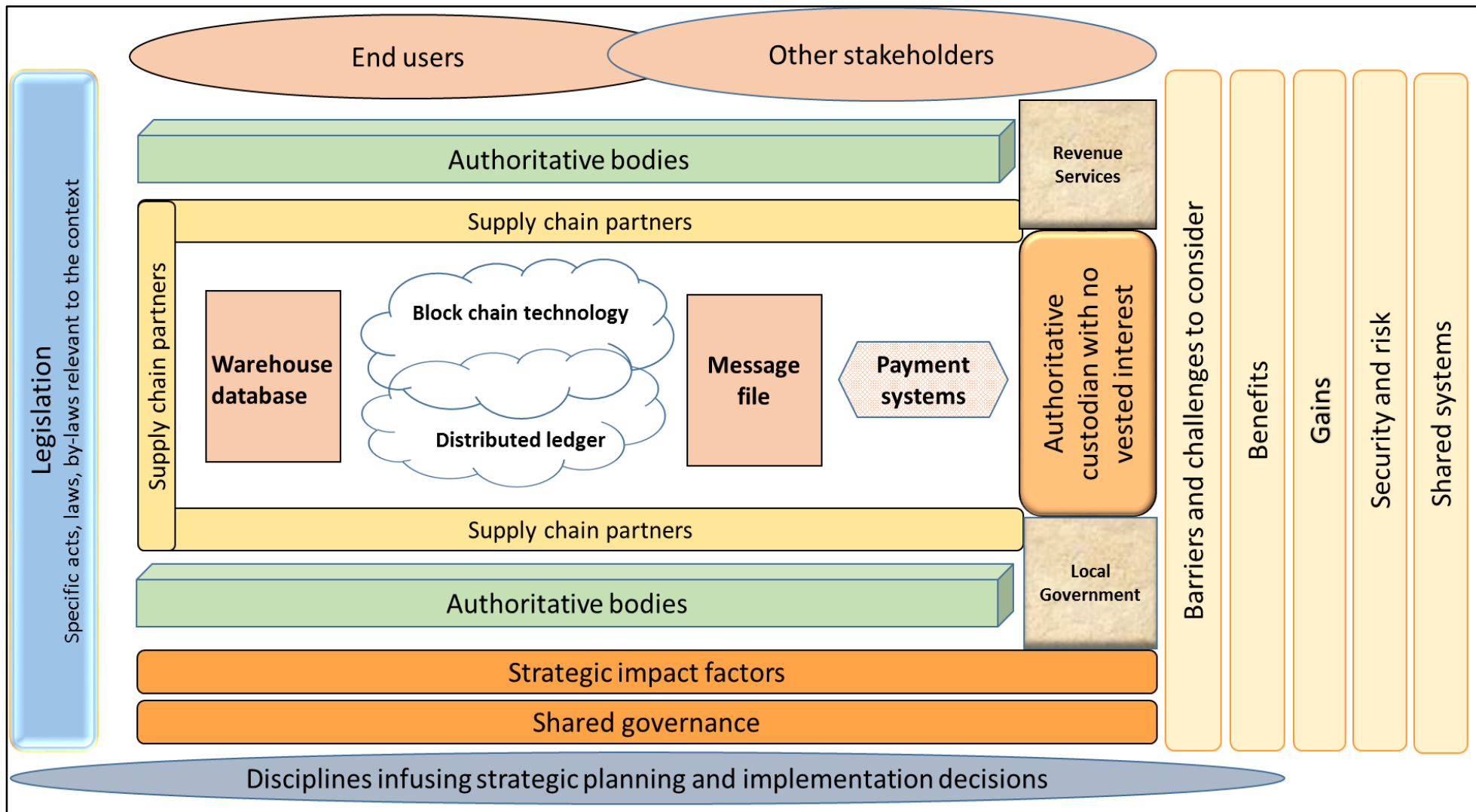


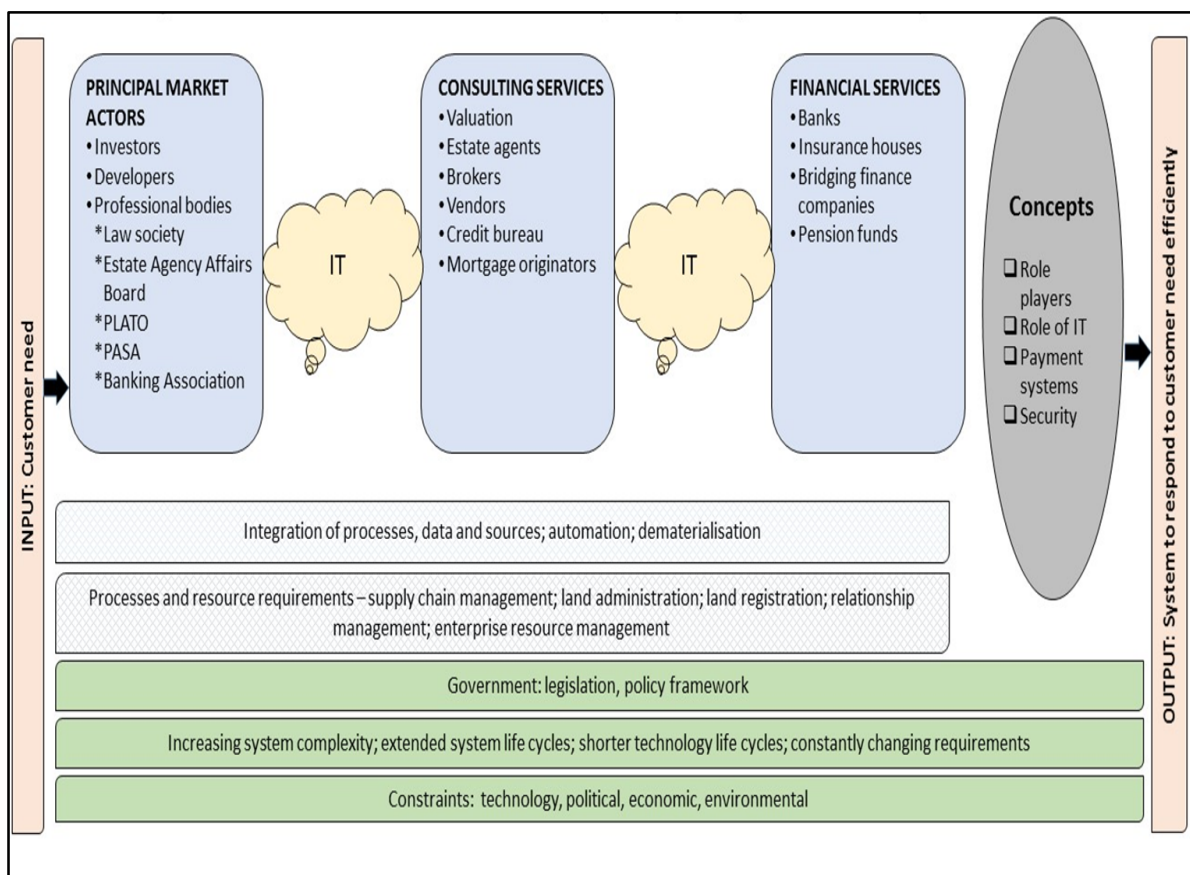
Figure 6.2: Framework for the integration of data and data sources to enable dematerialisation

Optimal performance of a system is dependent on full and timely integration of key components and the interrelationships among the components. A system therefore comprises the complex combination of resources and entities in order to fulfil a selected need. Resources may refer to equipment, software, data, information, staff, and technological systems and programmes, each with many integrating elements. Although each is unique with its own capabilities and characteristics, the composite of these must be arranged in an integrated framework or architecture. This architecture will be configured for its environment, operational interfaces, system structure, and utilisation with a continuous analytical function in order to configure the system for future courses of action. It is in this regard that figure 6.3 has been assembled.

Figure 6.3 aims to illustrate a general view to that simplifies complexity in an integrated system. The input to the system is the customer need that has to be met. These inputs need to be transformed by a series of processes to effectively deliver an efficient response to the customer need that was identified at the onset. The output is therefore an integrated system that can be useful in securing that customer needs are sufficiently met. Various entities are involved in the transformation processes. These entities have been clustered in terms of principle market actors, consulting services and financial services. To enable proper collaboration and coordination, various concepts may be employed to achieve this, which may include role players, IT, security measures, and payment systems. The goal is to achieve uniformity across the end-to-end process, thus standardisation and integration across all concepts and measures need to occur.

Figure 6.3 further illustrates that the entire system should be underpinned by an integration of processes, data and data sources, through automation and dematerialisation. The system need to be compliant in terms of legislative requirements and policy frameworks. Despite

the fact that shorter shelf life of technology and changing requirements of customers and supply chain partners increases complexity in the system, the general system life cycle of a system seem to be extended as it is based on long-term relationships. This may be due to the high costs, lengthy timeframes associated with technological and other forms of integration. Of course, all systems operate in environments that face technological, political, economic and environmental influences and constraints that need to be incorporated and mitigated within the system environment.



⁴Figure 6.3: Integrated structure to address complexity – systems theory

The aforementioned clearly indicates the working of systems theory and provide explanations to illuminate our understanding of real-world systems we encounter. The researcher is of the view that systems theory is the foundation for understanding

⁴ Different bullet types are meant to illustrate the difference in the different groupings

multidisciplinary systems. Industry specialists can benefit by applying systems theory as a lens to view multidisciplinary systems and their associated difficulties. Academics can benefit by researching multidisciplinary systems with their associated difficulties and making recommendations for ways to overcome such difficulties.

6.7 Summary

This chapter provided an integration of the literature, documents analysis and interview data that were gathered for the study. Implications were derived from the data that were discussed in terms of the three themes that were identified. Twelve findings resulted from the findings that had bearing on the research objectives of this study. These findings were used to develop a framework (figure 6.1) for government to adopt in order to introduce electronic conveyancing into the South African property transfer environment. This framework was discussed with an architect that is currently employed within the DRDLR who confirmed that it is practical and implementable. The framework was further developed to provide a generalised view that could be used in other industries and contexts (figure 6.2). Also, a framework (figure 6.3) was developed to provide a view of the systems approach that was applied in this study. In the next chapter a summary of the study will be provided. Recommendations are derived in terms of the findings of the study. In conclusion, recommendations are made for future research.

CHAPTER 7

Summary of findings, recommendations and conclusion

7.1 Introduction

The previous chapter presented a discussion on the data that were gathered during the data collection process. The data included responses from participants who formed part of nineteen interviews that were conducted. This data were integrated with literature and documents that were collected and analysed during the course of the study. A detailed discussion is reflected in chapter 6. The current chapter provides an overview of the chapters, the major findings that have been grouped as per the secondary objectives, and it outlines the conclusion and recommendations for the industry, theory and for future research.

7.2 Overview

Chapter 1 provided an overview of the study, the problem statement, research question, primary and secondary objectives and the research method used in this study.

Chapter 2 formed part of the literature review for this study. It addressed land administration (see section 2.1) and the land registration process (see section 2.1.1). This chapter explained that the deeds office and the SG Office (cadastre) are managed as two separate entities but that the information from both these entities forms part of the land administration process in South Africa. The surveyor general's office (cadastre) (see section 2.1.2) was further discussed. In addition, certain international electronic conveyancing initiatives were highlighted (see section 2.1.3). The chapter also focused on records management in the contexts of electronic records management (see section 2.2.1) and records in land administration (see section 2.2.2). Electronic conveyancing in South Africa was reviewed (see section 2.2.3), and the importance of digitisation of government systems was outlined (see section 2.2.4).

Chapter 3 reported on supply chain management and various aspects related to SCM (see section 3.2), namely supply chain visibility and transparency (see section 3.2.1), supply chain integration (see section 3.2.2), supply chain networks (see section 3.2.3), supply chain sustainability (see section 3.2.4) and supply chain innovation (see section 3.2.5). It also described the role of information technology, specifically with regard to land administration (see section 3.3.1) and supply chain management (see section 3.3.2). General aspects of cloud computing were highlighted (see section 3.3.3). Furthermore, security issues (see section 3.3.4) and risk management considerations were considered (see section 3.3.5). The chapter reported on payments systems (see section 3.4.1) and payment related technologies, as well as virtual currencies (see section 3.4.2) were introduced to the study.

Chapter 4 outlined the philosophical foundation of this study (see section 4.2) and the research design that was used in this research (see section 4.3). Research design is explained under the headings Case study (see section 4.3.1); Participants (see section 4.3.2); Data collection (see section 4.3.3); Document review (see section 4.3.4); and Data collection (see section 4.3.5). It explained the qualitative method that was used to gather and analyse data (see section 4.3.7), aspects of trustworthiness (see section 4.4), including Credibility (see section 4.4.1); Transferability (see section 4.4.2); Dependability (see section 4.4.3); Confirmability (see section 4.4.4); and Triangulation (see section 4.4.5); as well as researcher positionality (see section 4.5), the limitations and delimitations of the study (see section 4.6) and research ethics (see section 4.7).

Chapter 5 reported on the data and the findings of the study. The data reported were of nineteen participants who were interviewed using semi-structured interviews. Content analysis was used to analyse the data that were collected. The data were reported as three main themes that were identified during the analysis process (see section 5.2). These themes were supply chain management (see section 5.2.1), process (see section 5.2.2) and security

(see section 5.2.3). Each of these themes consisted of sub-themes that were discussed as well.

Chapter 6 presented a discussion whereby the literature, data that were collected and documents that were gathered were integrated in order to triangulate. The chapter further outlined Implications for theme 1 (see section 6.2); Implications for theme 2 (see section 6.3); Implications for theme 3 (see section 6.4); the findings of the study (see section 6.5); and the frameworks that were developed (see section 6.6).

This chapter summarises the findings and recommendations of the study. It further outlines recommendations for future study.

The research statement for this study was that the land registration process in South Africa is characterised by manual interlinks and paper-based documents, which make the current process tedious and cumbersome. Based on the research statement of the study, the following questions were asked:

RQ: How can the end-to-end property transfer process be integrated among the different role players to dematerialise property transfers?

Secondary research questions have been formulated as follow:

- What gaps would need to be addressed before electronic end-to-end registrations can be introduced into the South African environment?
- What measures do supply chain partners perceive should be put into place to enable dematerialisation of the end-to-end property transfer process?

Figure 6.1 suggests a conceptual framework that may address the gaps and measures identified by the participants in the study, as well as the literature that formed part of this study, in order to improve the end-to-end property transfer process in South Africa. The study proposed that the e-DRS framework in Figure 6.1 might be introduced as a hybrid

cloud technology that will enable certain components to be for public viewing and certain components to be accessed by authorised users only. For example, estate agents, banks and conveyancers who perform different functions in the end-to-end property process, would receive access to upload or amend information, draft documents, and add signatures and supporting documents to a specific transaction. Buyers and sellers may on the other hand, only receive a viewing function to track the progress of their applications. Of course, the identification, authentication and validation of all users prevail.

These circumstances are not limited to the property industry, but may apply to various other types of business processes in other industries too (see Figure 6.2). The functionality that these users will have will depend on the type of access that they are granted. It is envisaged that only those parties who are directly involved with a specific transaction will be able to participate in the transaction while it is in progress. The system will record a full audit trail of all parties who were involved with and transacted in the property exchange. The findings of this study are linked to the objectives of this study as follow:

7.3 Secondary research question 1:

What gaps would need to be addressed before electronic end-to-end registrations can be introduced into the South African immovable property transfer environment?

- Integration efforts should be reviewed and a new industry model would need to be developed for the transfer of landed property. It is imperative for this model to incorporate the sharing of knowledge, information, documents and security measures. The legitimacy and integrity of all records must remain intact so that the property register for registration for land administration in South Africa can continue to protect property rights of owners, holders and possessors of property.
- All legislation that may affect property transfers should also be updated in accordance with the new e-DRS Bill in the larger e-DRS project. This may include

Acts pertaining to matrimony, sectional titles, taxation, participation bonds, succession, insolvency, timeshare, subdivisions and trusts, all of which may have indirect influences on, or be indirectly influenced by, immovable property decisions and transfers.

- There is a need for a centralised information sharing capability whereby non-competitive information that are collected from the onset of the transaction can be verified and made available across the supply chain. Information may range from volume and scheduling matters to customer information. For example, a customer may have applied for sequestration and such information need to be made available to other supply chain partners in order to minimise risks and fraud from the system.
- There is a need to incorporate indigenous property information into the national land administration platforms. Indigenous property transactions are often concluded verbally or by means of informal notes that are not recorded in a central register or system. This contributes to an incomplete national property register. In addition, indigenous owners cannot access credit in the formal market, which may hamper their ability to develop their properties, and land, which in turn may impede economic growth.

7.4 Secondary research question 2:

What measures do supply chain partners perceive should be put into place to enable dematerialisation of the end-to-end property transfer process?

- Costs are expected to decrease after the initial investment in integration efforts and technology, which in turn should translate into less expensive property transfers for buyers. Various entities have attempted to integrate some of their business processes, but individual attempts has increased the overall property transaction costs. Also, succession transfers are often not recorded in the deeds office due to the high costs.

This has the effect that the national property register is incorrect. Generally, a small percentage of the population are homeowners in South Africa. Decreased cost may allow more South Africans to become homeowners.

- Certain entities will be impacted by changes to their business models and value propositions with the introduction of an e-DRS system. A centralised system that is hosted by the deeds office may eliminate the services offered by certain businesses in the current property market. If the deeds office can package and resell property information intelligently, many resellers of deeds office information may also be negatively affected. Previously built interfaces among various organisations in the current property environment may become redundant. New interfaces into the centralised system would need to be built. Technologically disabled conveyancers, estate agents and other role players may not be able to participate in a digitised environment.
- E-conveyancing should be introduced in South Africa in a similar manner as the dematerialisation of shares; in other words, the mere automation of processes will not be sufficient. Despite the fact, that many processes have been automated at individual organisation-level, and despite electronic communication among various role players who are currently involved in the end-to-end property transfer process, the electronic documents are reduced to paper documents for lodgement at the various deeds offices to occur. These paper documents are again converted to electronic documents by means of scanning after registration had occurred. In addition to a lengthened process, this is also labour-intensive and diminishes the security around paper documents. The checking of the correctness of the documents, encumbrances, and obligations is dependent on the diligence of an individual who manually examines everything. In contrast, an electronic system could be programmed to systematically check pre-identified aspects within minutes.

- Dematerialisation and not only digitisation needs to be introduced into the e-DRS system. There is a difference between digitisation and dematerialisation. It seems as though government departments view digitisation as dematerialisation. Digitisation refers to the conversion of a paper-based document to an electronic document. Dematerialisation on the other hand, means that the document is generated, signed, and stored in an electronic format; therefore, no conversion or scanning needs to take place. By eliminating the paper-based process, much duplication can be avoided with resultant share of wallet and time reduction benefits. Also, security measures and transparency can be enhanced.
- A centralised payment system should be incorporated into the property registration process. Payments are effected by the respective banks, estate agents and/or conveyancers after confirmation of registration has been received and interest claims may arise. Discrepancies may arise regarding trust accounts of estate agents and conveyancers. Money may be reversed as payments are revocable.
- Same-day irrevocable settlement of ownership transfers should be implemented into the new e-DRS system and related processes. This will allow irrevocable payments to take place as registrations have occurred. All beneficiaries, amounts and accounts would need to be confirmed before registration, which will increase the quality of lodgements, and registrations. Interest claims will be eliminated as a result.
- Block chain technologies and the distributed ledger may be incorporated to manage property ownership of landed properties. The technology can be introduced with fiat currency and do not have to incorporate cryptocurrencies. The Reserve Bank will thus remain the central bank that can control the trading of funds and taxation.
- Biometric identification should be introduced at the start of the property process and multi-level security should be implemented to increase security features. If the biometric identification is introduced at the beginning of the end-to-end property

process, and all supply chain partners are integrated into a centralised system, the security could be increased substantially and identity theft could be eliminated.

7.5 Summary of contributions

Contributions of the study may be classified in terms of contributions to industry and contributions to theory.

7.5.1 Contribution to practice

This study contributes to practice by suggesting a framework that can be used to dematerialise the title deed of immovable property in South Africa. There is limited research on the property industry in South Africa, and this study aims to contribute to South African immovable property literature. Although the context of the study contributions took place within the South African property environment, the conclusions and Figure 6.2 provides a generalised view that can be applied to various disciplines, not only the property environment.

7.5.2 Contribution to theory

The main theoretical contribution of the study is that supply chain integration and centralisation of technologies, records management and security relates to the systems theory (Halldorsson, Kotzab, Mikkola, & Skjøtt-Larsen, 2007, p. 291). The supply chain should be viewed as a system that uses different processes and entities to convert input into output; integrates information, finance and systems; and achieves cross-functional effectiveness and efficiency. Systems thinking necessitates constant communication and integration across the supply chain network. By viewing the supply chain as a system, occurrences are created that influence the processes of other systems (e.g. the legal system), which in turn creates a more complex structure. An examination of the supply chain's systemic effects may reveal intricacies that must be considered for meaningful intervention to transpire.

With reference to methodological contribution, this study showcased the power of the case study method in explaining complex social phenomena. The potential of the case study method for theory construction should be based on a problem in the real world, rather than be solely methodology driven. Thus, a combination between different kind of methods and data will achieve the best results.

7.6 Recommendations as a result of the study

Recognising that the property market faces numerous challenges in the area of processes and security is paramount. The findings of this study pointed to six recommendations for addressing and improving property-related processes and security, especially with a view towards putting into practice of an electronic deeds registration system in South Africa.

7.6.1 Recommendation 1: The industry needs to be managed from a supply chain perspective

The various entities involved in the property market tend to operate in silos. As a result, vendors have built their businesses around connecting the individual entities, and charging a premium for each of these connections. These amounts are outsourced to the end user being the buyers and sellers of properties. As a result, property costs have soared and have become unaffordable to a large percentage of the SA population.

7.6.1.1 Recommendation for industry

If the deeds office, as custodian of the property title register, could introduce a technological system that connects the various role players in the property market, it should eliminate the need for individual entities to build interfaces in order to connect to each other, which in turn should reduce the cost of transferring properties in South Africa. Integration enables a supply chain to operate as a single unit motivated by customer requests (Palma-Mendoza, Neailey, & Roy, 2014, p. 167).

In addition to the cost saving, a supply chain perspective would also assist to make the entire end-to-end process more transparent, therefore reducing uncertainty and fraud in the process. A supply chain perspective may also reduce duplications that are taking place currently. One such duplication may be FICA identification.

7.6.1.2 Recommendation to theory

The objective of supply chain management is to incorporate activities within and across organisations to provide maximum customer value. In theory, this concept extends to disciplines other than property. Supply chains can be viewed as integrated systems because the end-to-end process across various organisations is viewed a single process. Creating value is therefore a shared responsibility among the organisations, which is in line with the systems theory to identify the value of, co-ordinated and collaborative relationships in supply networks.

The systems theory (Chicksand, Watson, Walker, Radnor, & Johnston, 2012, p. 465) view processes and outputs of a system holistically in order to improve supply chain efficiency. This study contributed frameworks (figures 6.1 and 6.2) that uses the systems view as the foundation by suggesting that a supply chain approach should be adopted for the successful end-to-end process implementation and control within a specific discipline, regardless of the type of discipline. This means that a holistic view should be adopted whereby all role players are managed as one unit.

7.6.2 Recommendation 2: Integration of key supply chain partners

The e-conveyancing network should be available at all times. Source data may be collected from a variety of disparate entities.

7.6.2.1 Recommendation to industry

The e-conveyancing system should be able to enable data uploads and data extraction on a push-and-pull basis. Warehouse data should be stored in such a way that it will allow for data to be correctly and securely stored and retrieved, as well as for historical data to be mined. By integrating key entities in the deeds office e-DRS system, the data could be verified at source in real time, which will enhance the authentication process and in turn increase the security in the process. The transparency that will be created by linking the various key role players in the process may also assist to create an additional verification of information process, whereby any party at any point could dispute the information that has been supplied by one of the entities. This will create various checkpoints in the end-to-end process.

Added to the inefficiencies is the fact that both the deeds office and cadastre need to back scan paper documents that are currently stored in a paper environment. These back scanning processes will need to be completed before an e-DRS system can be fully implemented. In the researcher's view, there are aspects that may be implemented before the back scanning projects are completed. The building of an architectural platform and industry stakeholder engagement can take place in parallel with back-scanning projects.

7.6.2.2 Recommendation for theory

The network perspective theory (Singh, 2013, p. 74) is based on competitive advantage that is achieved through dynamic interactions of supply chain networks by building long-term relationships based on trust between supply chain firms in supply networks. By integrating supply chain partners, information, records and knowledge can freely flow among the partners, which will enable better planning, coordination and management of activities in the end-to-end process. Supply chain partners can focus on their core competencies to make the supply chain more effective. This in turn will positively affect competitive advantage.

7.6.3 Recommendation 3: A centralised irrevocable payments system should be introduced

Much administrative time is spent in calculating payments that need to be made. The payments made under the current system can be reversed and sometimes take place more than a day after the registration of a property had taken place.

7.6.3.1 Recommendation for industry

A centralised automated calculation system that allows for net payments may assist to reduce the number of payments made, reduce the error rate in the calculation of payments and speed up the entire process of payment, therefore enabling real-time gross settlement, the so-called ‘delivery versus payment process’ as a minimum standard. All payments under the e-DRS system should be irrevocable, and a full audit trail of all transactions should be kept. Automatic notification of all payment receipts should occur.

7.6.3.2 Recommendation for theory

Theory that has emerged so far relates to a single payment system. At the risk of oversimplifying things, the systems theory (Naslund, & Williamson, 2010, p. 17) would be more suitable for the payment system in the context of this study. It may be more secure for a centralised payment system to be introduced into a transaction-based environment that is managed via a SWIFT system or another accredited and Reserve Bank registered authorised party. The mismanagement of trust accounts and non-payment of certain entities in the process can be eliminated.

7.6.4 Recommendation 4: The IT system should be hosted and managed by the deeds office

The deeds office is a governmental department that is accountable for the registration, administration and upkeep of the property registry of South Africa (Deeds Registries Act).

The deeds office however is legislated by statute and may not meander outside of its scope. Despite the fact that the banks already view entities in the property market as a supply chain, they have a vested interest in potentially heading up the supply chain initiative.

7.6.4.1 Recommendation for industry

To protect the public, an independent entity should be identified. Since it is a governmental function to look after society, the researcher is of the view that a governmental institution should fulfil this role. Overall, the DRDLR would probably be the more preferred entity to take charge of the property supply chain, especially since they are the custodian of the property register in South Africa.

Although it has been highlighted by many participants that the deeds office currently do not have the capability of building an in-house e-DRS platform, it will be crucial that such a system be hosted and controlled by the deeds office so that the integrity of property records can be preserved. Although an external organisation may assist to build this platform, the deeds office should remain the owner of both the intellectual property and the actual technology itself. It will be crucial for the deeds office to continuously maintain the technology so that it remains current and does not at any future point become outdated and incompatible with technologies used by supply chain partners.

Adequate disaster recovery sites and fall-over systems, as well as sufficient back-up systems need to be put in place and maintained by the deeds office as well. As such, a disaster recovery plan for the e-conveyancing service should be established to ensure that service levels could be sustained (Rajashekhar, 2006, p. 13). As such, the deeds office would need to acquire the necessary expertise to be able to maintain such a crucial system.

7.6.4.2 Recommendation for theory

Social construction of technology (Carr, 2014, p. 155) contends that human action influences technology and not the other way around. The implication is that technology should be customised to suit the environment in which they operate. If a centralised e-conveyancing system is introduced, it stands to reason that an impartial party that does not directly benefit from the system is the best to host the technology and related systems. This will allow for the best solutions to be deployed that will benefit the partners that are linked to the technology.

7.6.5 Recommendation 5: Municipal rate clearance and the tax clearance certificates should be paid as a first-tier payment after registration

The use of e-payments helps government ensure that businesses are paying their taxes and helps make money laundering and other black market activities more difficult (Evans & Abrantes-Metz, 2013, p. 17; Shields, 2014, p. 15). It is recommended that SARS and the municipality, together with the current bond account holder, should be settled as a first-tier beneficiary on receipt of an irrevocable registration receipt from the deeds office. A centralised payment system that affects irrevocable money transfers in a dematerialised environment can augment the payment versus delivery outcome.

It stands to reason that the property environment is not the only environment where taxes are payable. Similarly, other environments and industries can benefit from a tiered payment system after the fact, as opposed to an upfront payment that leaves the end user having to claim back excess amounts that have been paid in taxes. These taxes may extend beyond municipal and rates taxes as the principle remains the same.

7.7 Recommendations for future research

The present study attempted to investigate how the manual interlinks and paper-based documents, which make the current process tedious and cumbersome, can be minimised, if not eliminated. The study focused on property transfers, and other forms of ownership issues were excluded from this study. To this end, various aspects may be investigated as part of future studies.

7.7.1 Recommendations for industry

1. A future study could focus on an in-depth international comparison of e-DRS implementations.
2. Future studies could incorporate residential and commercial developers, bridging finance companies, conveyancers and not only the Law Society of South Africa, estate agents and not only the Estate Agency Affairs Board, and mortgage originators to ensure that the results can be generalised.
3. A study into the viability of block chain technologies and distributed ledgers in the property market would be advantageous. Block chain technology has the ability to revolutionise the law of contracts and processing methods by using digital contracts that does not involve any human involvement (Peters & Panayi, 2015, p. 2). Future study should consider the possibility of imposing a certain degree of regulation on Cryptocurrencies and its possible effects on market dynamics.

7.7.2 Recommendations for theory

1. The state theory of money (Salter, & Luther, 2014, p. 162) could investigate how Bitcoins can be incorporated into the state structure.
2. According to the social theory of money (Langley, 2016, p. 14) the social role of money changes continuously as the social value that people attach to money changes. Future

studies could investigate how money affects risk and economic behaviour. Particularly so when cryptocurrencies are incorporated into the economy.

7.8 Conclusion

There is a need to integrate the role players, information, processes and technology for successful property transfers to occur in South Africa. There is a need to eliminate paper-based and manual processes in the property end-to-end process. To this end, many of the current processes have been automated, but the automation happened in islands at individual organisation level. It follows that paper records are being converted into an electronic or digital format, the so-called digitisation of paper records. The original document's origin is still paper. Dematerialisation on the other hand, is not the mere digitisation of paper records. Its premise is that records are drafted, signed, stored and communicated in an electronic or digital format. At no point are digital records converted to paper documents. Accordingly, technology plays an increasingly important role.

Technology of the individual organisations would need to be integrated with other role players that form part of the supply chain. The integration will allow for the secure sharing of information and documents. Subsequently all role players that form part of the supply chain would need to be identified and authorised to receive certain types of information and documents. To avoid re-entering the same information into different technological systems, it is concluded that the centralisation of technological systems need to be endorsed. It is preferred for an authority body that do not directly benefit from such a system, to manage and oversee section such a system.

How the above need to be achieved is unclear across the many role players that were interviewed. Figure 6.1 provides a basis as to how this may be achieved. Value can be extracted from this study for other industries and areas as well and figure 6.2 provides a generalised framework that can be applied in other disciplines as well. The crux of the

conclusion is that supply chain members need to work together in a centralised system for adequate information sharing, document generation and increased security.

There is a need to incorporate additional safety measures to mitigate risks associated with the use of technology, as well as different types of fraud. Biometric identification may mitigate identity theft that has been very evident in business transactions. It is advisable that the supply chain partners who are involved at the onset of a transaction should initiate biometric identification.

Also, irrevocable payments are effected simultaneously with the delivery of assets in a dematerialised setting. For example, the property transfer and payment to all parties happen at the same time and ownership is deemed to take place when the payment has occurred. In addition to improving the process, the payment versus delivery concept will also reduce interest claims. An audit trail of 'who did what' will increase the transparency of the process and provide a tool to trace the authors of documents and activates.

7.9 Summary

This chapter provided an overview of the study objectives and the findings were grouped according to the secondary objectives. The primary research objective was to provide an integrated framework for the dematerialisation of property transfers. The framework that was developed aims to integrate the various supply chain partners in the property market in South Africa into one technological system that is administered by the deeds office who is the custodian of the property register in South Africa. The technological platform will allow each industry partner to upload information into a centralised database that will provide transparency of the end-to-end property process in South Africa. Users will need to be carefully authenticated and will have varying levels of access to view, upload and/or change certain types of information and documents. This study aimed to show that different types

of data and data sources could be integrated to manage the property market as a supply chain. As such, the property process and all involved can be managed as a single process.

Furthermore, newer technologies like the block chain and distributed ledger may be valuable technologies for managing asset transfers in future. The chapter concluded by summarising the findings and presenting recommendations for the study as well as recommendations for future research.

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Appendix A: Interview guide

Interview questions for all participants

Please explain the role your organisation plays in the property transfer process.

To what extent do you use systems and software to prepare, store and circulate documents?

Which technologies are in place to enable the use of an e-conveyancing system?

Which gaps should still be addressed and who is responsible for addressing those gaps?

What benefits and problems do you foresee section with such a system?

Interview questions for Home Affairs – currently not involved in the conveyancing process

Please explain the relevance and importance of biometric information.

How can biometric information assist in reducing identity fraud?

How can biometric information be used for property transfers?

What will Home Affairs need to do to enable a large-scale roll-out of biometric data as a security measure?

Appendix B: Informed consent document

Informed consent form

(Form for research subject's permission)

(Must be signed by each research subject, and must be kept on record by the researcher)

1. Title of research project: Towards a framework for the integration of data and data sources in the automation and dematerialisation of land administration systems
2. I hereby voluntarily grant my permission for participation in the project as explained to me by Anthea Amadi-Echendu.
3. The nature, objective, other implications have been explained to me and I understand them.
4. I understand my right to choose whether to participate in the project and that the information furnished will be handled confidentially. I am aware that the results of the investigation may be used for the purposes of publication.
5. Upon signature of this form, you will be provided with a copy.

Signed: _____ Date: _____

Witness: _____ Date: _____

Appendix C: Company Approval Document

P O Box 2100

Brooklyn Square

0075

Name of participant

Organisation

Request for permission to conduct a study

Dear Sir/Madam

I hereby invite you to participate in research that I am conducting as part of a doctorate degree at the University of Pretoria. I enclose an information leaflet that explains the title and aims of the project. If you have any queries that are not explained in the leaflet, please feel free to ask me.

Yours sincerely

Anthea Amadi-Echendu (student)

Email: amadiap@unisa.ac.za

Prof. Adeline du Toit (supervisor)

Email: Adeline.DuToit@up.ac.za

DEAR PROSPECTIVE PARTICIPANT

My name is Anthea Amadi-Echendu, a doctoral student from the University of Pretoria. My supervisor is Prof. Adeline du Toit. I am inviting your organisation to participate in the study entitled:

Electronic records management of title deeds of immovable property in South Africa

Before you agree to participate in this study, you should know what is involved and the purpose of this information leaflet is to help you decide. If you have any questions that are not explained in this information leaflet, please feel free to ask me. You should not agree to participate in this research unless you are happy with all the aspects of this study that may affect your organisation.

WHAT DOES THE STUDY INVOLVE?

This study investigates avenues to convert the current paper-based, manual property transfer process into an electronic title deed.

HOW LONG WILL THE STUDY LAST?

Individual interviews will last for approximately an hour. The entire study will last for about two years.

WHAT ARE THE RIGHTS OF THE PARTICIPANTS IN THIS STUDY?

Your organisation has a choice to take part in this study. You may refuse to take part at any time. You can also withdraw your consent at any time, before, during or at the end of the interview and discussions. Your withdrawal from the study will be without any adverse effect of any kind.

WILL ANY OF THE STUDY PROCEDURES RESULT IN DISCOMFORT OR INCONVENIENCE FOR THE ORGANISATION OR THE PARTICIPANTS?

Being part of an interview may make some participants feel uneasy. If you feel unhappy with certain questions, you may refuse to answer them. A list of the interview questions will be provided to participants to assist you in making an informed choice as to whether you would like to participate in the study or not.

WHAT ARE THE BENEFITS INVOLVED IN THIS STUDY?

This study will help stakeholders and the researcher understand the issues or factors that influence a conversion to an electronic property transfer process. The information that is gained from this study will help to develop recommendations in order to improve the process.

HOW CAN YOU GET MORE INFORMATION FROM THE RESEARCHERS?

You can contact Anthea Amadi-Echendu on 012 429 2627 or email her at amadiap@unisa.ac.za if you need more information or would like to discuss this further. Alternatively, you may contact my supervisor, Prof. Adeline du Toit, at the University of Pretoria via email: Adeline.DuToit@up.ac.za.

CONFIDENTIALITY

The interviews will be held in private and all information gathered during the course of the study will be kept confidential. The written information and the audio tapes will be stored in a locked filing cabinet in the office of the researcher when not in use. All forms will only be seen by the members of the research team. After five years, all audio tapes will be destroyed. The results of the study will be used towards acquiring a DPhil degree and aspects thereof may be published in academic journals. However, we will not include the name of the organisations where the research was carried out, nor will we include the names of any

people who take part in this study. If you are happy to participate in the study, please read and sign the attached consent form.

INFORMED CONSENT

I hereby confirm that I have been informed by the researcher, Mrs Anthea Amadi-Echendu, about the nature, conduct, benefits and risks of the study. I have also received, read and understood the participant leaflet and the informed consent regarding this study. I am aware that the results of the study, including any personal details, address and the name of the organisation in which the study will take place, will not be stated in any study reports. I have also been informed that only relevant research team members will have access to the information.

I understand that I may at any time withdraw my consent and participation in the study, without having to give a reason. I am aware that I will not suffer any consequence if I withdraw my permission at any time. I have had sufficient opportunity to ask questions. I freely declare myself prepared to give permission for our organisation to be involved in this research.

Stakeholder name (Please print)

Stakeholder signature

Appendix D: Audit Trail

- January–April 2015 - Prepared literature review and ethical clearance application forms
- May 2015 - Reviewed list of potential participants to interview
- June 2015 - Submitted application for ethical clearance
- November 2015 - Received departmental ethical clearance
- November 2015 - Established face-to-face and telephonic communication with selected participants to inquire about their interest in participating in the study
- December–February 2016 - Conducted face-to-face interviews after explaining informed consent form to participants
- December–February 2016 - Performed transcription and analysis of all interviews
- March 2016 - Conducted follow-up communications with all participants providing them with an opportunity to review transcripts
- March 2016 - Performed data analysis through transcript review
- April 2016 - Requested peer and colleague review as findings and themes emerged

Appendix E: Publications of the Researcher

MCom thesis:

Amadi-Echendu, A. P. (2014). *An analysis of conveyancing business processes in South Africa* (Unpublished MCom thesis). University of South Africa, Pretoria.

Books and chapters in books:

Amadi-Echendu, A., & Amadi-Echendu, J. (2015). Implications of cadastral systems on engineering asset management. In *9th WCEAM Research Papers* (pp. 39–48). Springer International.

Amadi-Echendu, J., & Amadi-Echendu, A. (2015). Legal aspects of engineering asset management. In *Engineering asset management systems, professional practices and certification* (pp. 1797–1805). London: Springer International.

Nieman, G., & Nieuwenhuizen, C. (2014). *Entrepreneurship: A South African perspective* (3rd ed.). Pretoria: Van Schaik. Case study p. 497.

Peer-reviewed conference papers:

Amadi-Echendu, A. P., & Amadi-Echendu, J. (2013). *Legal aspects of engineering asset management*. Paper presented at the 8th World Congress on Engineering Asset Management (WCEAM 2013), Hong Kong.

Amadi-Echendu, A. P., & Amadi-Echendu, J. (2014). *Implications of cadastral systems on engineering asset management*. Paper presented at the World Congress on Engineering Asset Management's 9th Annual International Conference, Pretoria.

Amadi-Echendu, A. P., & Pellissier, R. (2013). *A conceptual framework for conveyancing processes*. Paper presented at the South African Institute for Industrial Engineers' 15th Annual International Conference, Stellenbosch.

Amadi-Echendu, A. P., & Pellissier, R. (2013). *Lessons for South Africa from the international e-conveyancing environment*. Paper presented at the Global Business and Technology Association's 15th Annual International Conference, Helsinki.

Amadi-Echendu, A. P., Phillips, M., Chodokufa, K., & Visser, T. (2015). *Towards an entrepreneurial university within an ODL context*. Paper presented at the 26th ICDE World Conference, Sun City.

Amadi-Echendu, A. P., & Amadi-Echendu, J. E. (2016). *A study on data and information integration for conveyancing, cadastre and land registry automation*. Paper presented at the PICMET'16 Conference, Honolulu.

Articles in non-accredited journals:

Amadi-Echendu, A. P. (2014). Mortgage origination: Important lessons for South Africa. *Mediterranean Journal of Social Sciences*, 5(10), 45-51.

Amadi-Echendu, A. P., & Pellissier, R. (2014). Eliminating bottlenecks in the South African conveyancing environment. *Mediterranean Journal of Social Sciences*, 5(14), 97-103.

Amadi-Echendu, A. P., Phillips, M., & Chodokufa, K. (2014). International e-conveyancing strategies: Lessons for South Africa. *Mediterranean Journal of Social Sciences*, 5(10), 237-243.

Articles in accredited journals:

Amadi-Echendu, A. P., & Krüger, L. P. (2016). Supply chain integration in the South African conveyancing environment. *Journal of Transport and Supply Chain Management*. *10*(1), 13-pages.

Visser, T., Chodokufa, K., Phillips, M., & Amadi-Echendu, A. P. (2016). An analysis of small business skills in the City of Tshwane, Gauteng province. *African Journal of Business and Economic Research*. *11*(1), 93-115.

Amadi-Echendu, A. P., Phillips, M., Chodokufa, K., & Visser, T. (2016). Entrepreneurial education in a tertiary context: A South African perspective. *International Review of Research in Open and Distributed Learning*. DOI: <http://dx.doi.org/10.19173/irrodl.v17i4.2482>.