

## A FRAMEWORK FOR ASSET TRANSFERS

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### ABSTRACT

The processes used to transfer immovable property from a seller to a buyer in South Africa are outdated and not digitised. Paper-based documents increase the risk of fraud and misrepresentation. This study considered the implementation of a cloud-based centralised database for property supply chain partners to enhance transparency, turnaround times, and security while minimising risks and costs. Digitalised property processes would result in title deeds' dematerialisation and not merely the automation of the paper-based system. This qualitative study was exploratory, and semi-structured interviews were conducted with role-players involved with property transfers in South Africa. These included the South African Reserve Bank, the Department of Agriculture, Land Reform and Rural Development, the Law Society of South Africa, mortgage originators, The Banking Association, the Department of Home Affairs, the Registrar of each Deeds Office, the Surveyor General's office, municipalities, software companies, National Treasury, South Africa's Central Securities Depository (Strate Ltd), and the Tshwane Metropolitan Municipal Council.

### OPSOMMING

Die prosesse wat gebruik word om onroerende eiendom van verkoper na koper in Suid-Afrika oor te dra, is verouderd en nie outomaties nie. Dokumente in papierformaat verhoog die risiko vir bedrog en wanvoorstellings. Hierdie artikel oorweeg die implementering van 'n wolkgebaseerde, gesentraliseerde databasis met eiendomsaanvoerkettingvennote, om deursigtigheid, omkeertyd en sekuriteit te verbeter, terwyl die risiko en koste geminimaliseer word. Die digitalisering van eiendomsprosesse sou lei tot die dematerialisering van die titelbewys, en nie bloot outomatisering van die papiergebaseerde stelsel nie. Die kwalitatiewe navorsing was verkennend, en halfgestruktureerde onderhoude is gevoer met rolspelers betrokke by eiendomsoordragte in Suid-Afrika. Dit het die Suid-Afrikaanse Reserwebank, die Departement van Landbou, Grondhervorming en Landelike Ontwikkeling, die Prokureursorde van Suid-Afrika, verbandopstellers, Die Bankvereniging, die Departement van Binnelandse Sake, die registrateur van die aktekantoor, die landmeter-generaal, munisipaliteite, sagtewaremaatskappye, die Nasionale Tesourie, Suid-Afrika se Sentrale Sekuriteitebewaarpark, sowel as die Tshwane Munisipaliteit se Raad, ingesluit.

## 1. INTRODUCTION

The asset management lifecycle has four core functions, namely planning, acquisition, operation and maintenance, and disposal. The acquisition phase differs for different types of assets, and may also take various forms, which include outright ownership, hire, or lease [2]. The focus of this article is on the acquisition of immovable assets through outright ownership, whereby properties are purchased for cash or through a loan.

Legal systems aim to regulate and maintain order in societies by protecting people's rights [16]. The government administers property rights that are encapsulated in a title deed and recorded in a deeds registry [7]. Original copies of all property transfers are kept as security documents and proof of ownership [7]. Only conveyancers may attend to immovable property registrations in South Africa, and currently lodge paper documents with the deeds office for property transfers between buyers and sellers [7]. Paper documents are problematic, as they can be misplaced, destroyed, or fraudulently copied. The handling and storage of documents also incurs additional costs. It takes time to manually compile, check, file, post, and process paper documents, and the current paper-based systems are outdated, risky, sluggish, cumbersome, and costly [22]. The duplication of effort and the risk of error that flows from the present system create inefficiencies [1]. Some of the major problems associated with land property transfers in and between many jurisdictions are:

- cumbersome and tedious processes;
- indeterminate delays;
- lack of transparency among role-players involved in a transaction;
- enhanced opportunities for fraudulent activities;
- porous security of confidential data; and the
- potential threats to ownership titles, legal rights and privileges associated with immovable 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)” [1]. There is a need to review and re-engineer land administration systems to deal with the increasing complexity of property rights and land transactions. Dematerialisation consists of replacing material-intensive physical products with virtual equivalents through technological systems [20]. This infers that the land registration system in South Africa should be digitalised. However, digitalisation poses new security risks to be identified and mitigated. Ultimately, the question is: how can the end-to-end property transfer process be integrated among the different role-players to dematerialise property transfers?

## **2. THE NEED FOR SYSTEMS ENGINEERING**

A system comprises a complex combination of resources (people, software, hardware, equipment, data, information, facilities, infrastructure, etc.) that are integrated to fulfil a specified need. The integration and inter-relatedness of systems and their components enables and optimises systems' performance. Thus the combination of resources that occur in some form of hierarchy (different layers of systems in the overall configuration) or that may be broken down into subsystems (components that are unable to achieve results through the individual systems alone) determine, through their organisation, the complexity and efficiency of the overall system. A system must be functional and be designed to respond to an identified need in a cost-effective manner. Systems may be open, closed, conceptual, static, physical, dynamic, and so forth. In any system there are inputs that are converted into outputs through the system. There are also constraints that are imposed on the system and resources that must be used to realise the required results.

Despite the complexities, it is necessary to design systems in such a way that changes can be accommodated as seamlessly as possible without impacting the overall configuration of the system. Good designs can also extend the lifecycle of systems. Systems engineering principles can enable more effective and efficient systems that ultimately meet customers' requirements. The environment in which a system operates dictates the system's architecture. A systems engineering process should ideally identify a customer need, a problem (including the magnitude and the resultant risks of the problem), conduct a feasibility study, develop operational requirements, and support the system through maintenance activities and the iterative assessment, validation, and process improvements as they are required. In the context of this article, it was established that land administration processes are complex (made up of many interrelated parts), cumbersome (difficult to use or deal with because of their length or complexity and the various stakeholders that are involved in the process), and tedious (continuing for too long).

## **3. UNDERSTANDING PROPERTY TRANSFERS**

In line with the systems engineering process, it is necessary to analyse the component parts of the land administration system in order to examine their interrelations and to decide on a future course of action.

The process of acquiring property is complex, and spans private and public entities that exchange information, money, and documents from standalone technological systems while maintaining and adhering to legal obligations and regulatory responsibilities. According to [9], 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”. The supply network for immovable property exchanges comprises buyers, sellers, estate agents, mortgage originators, conveyancers, municipalities, the Master of the High Court, and the Deeds Office. Managing processes in supply chains through competition would lead to competitive advantages and enhanced trust relationships [19],[25], if managed correctly. However, the fear of being compromised as a business may lead to the information shared in inter-organisational settings being strained, and the flow of information would need to be managed through various types of contract and agreement [11].

The multifaceted functions and tasks associated with immovable property transfers may be underestimated. There is a need to manage the end-to-end process of property transfers to mitigate the numerous risks that can manifest throughout the process among the various relationships and entities. In order to manage better the pockets of processes in the end-to-end process, it is crucial to view that process as a whole. This view is in line with the systems approach, which would assist in building more efficient and streamlined processes to enhance supply chain partner performance so that the emphasis is placed on the final output, regardless of the individual contexts and relationships [9],[5]. [3] propose that “confidentiality, anonymity, privacy, verifiability and non-repudiation” should be used to measure different role-players’ levels of confidentiality. Shared rules and principles could enable appropriate decision-making capabilities to minimise risks [19] using technological systems; this may result in improved supply chain performance in efficiency, cost, flexibility, and responsiveness [10]. Each supply chain partner is responsible for its own technological systems, and must buy into shared and integrated visions and systems that require a clear understanding of supply network goals and information infrastructure [13].

Technology is advancing rapidly, and security measures should also evolve as a result. Automation has advanced operational processes and reduced redundant and repetitive work, such as the need for different entities to re-enter the same information for common clients [21]. However, despite the existence of information technology systems that create, receive, and store digitised documents across various role-players, the South African land registration process is still paper-based (De Wet and Du Toit, 2000:78; Goodman, 1994:138). Moreover, introducing an electronic system to manage property transactions may bring about different risks that would need to be mitigated [18].

Figure 1 shows the interaction of the various constructs discussed in this article. Land administration comprises the Deeds Office, which provides ownership information, and the Cadastre, which holds the land boundary information that forms the foundation. The supply network partners are named ‘economic agents’, as their actions promote commercial performance. Information technology systems record transactional information, which is used to compile relevant property documents, and these records need to be appropriately managed. Records management must extend to include commission payments, deposits, profit distribution, and loan repayments.

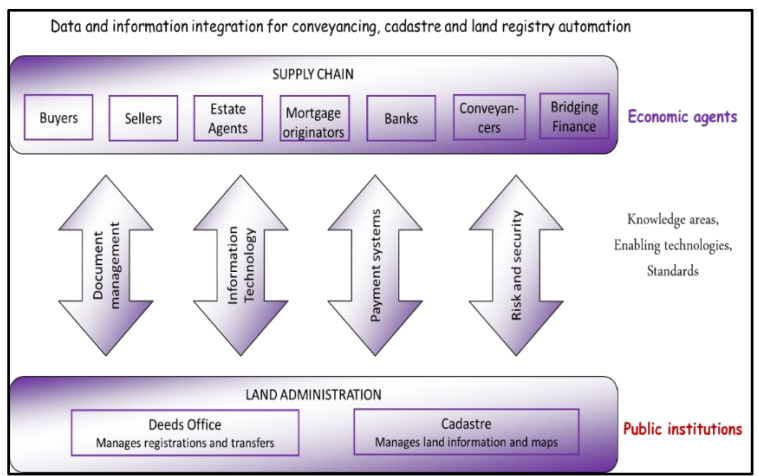


Figure 1: Conceptualisation of study

#### 4. RESEARCH METHODOLOGY

The exploratory research approach was set in the interpretivist paradigm. Qualitative semi-structured interviews were conducted with various role-players involved in South African property transactions. National representatives of the major role-players were purposively identified. The sample included the Law Society of South Africa, mortgage originators, The Banking Association, the Department of Home Affairs, the Registrar of each Deeds Office, the Surveyor General's office, municipalities, software companies, the National Treasury, South Africa's Central Securities Depository (Strate Ltd), the Tshwane Municipal Council, and the Reserve Bank of South Africa.

A desktop study informed the interview questions. The interviews were recorded to provide an unbiased account of the collected data. Data obtained from the qualitative interviews were transcribed verbatim and analysed using content analysis. The interviews' coding with identified themes and transcriptions were sent to all of the participants to review the meaning and interpretations attached to the interview data. All data were anonymised.

The task of choosing the best technological solutions has become highly relevant. Multicriteria decision-making (MCDM) addresses decision-making problems when there are several decision criteria. It selects, evaluates, and ranks alternatives using a number of different criteria and sub-criteria, which are usually in conflict. MCDM helps decision-makers to identify their requirements and objectives and to understand decision-making problems more thoroughly. MCDM provides strong decision-making in domains where the selection of the best alternative is highly complex [19], and is commonly used in information systems. The analytic hierarchy process (AHP) was used to capture experts' knowledge of the available choices regarding a land administration system. AHP was used owing to its flexibility, the intuitive judgement of experts using a common platform, and its ability to check the inconsistencies in judgements. Since options are constructed into a hierarchical structure, the importance of each option becomes clear [19]. The qualitative results were extended by compiling a questionnaire that was distributed to ten technology experts, using convenience sampling, to elicit responses about preferred information systems for a land administration system. Only nine responses were returned; one was incomplete, and three were incorrectly ranked. Only five of the questionnaires were used to rank the responses.

Objectives and alternatives were compiled, based on the qualitative data; and the criteria that the experts had to use to guide their decision-making about implementing a centralised land administration system were specified. The experts were asked to rank the options that were provided according to their preferences. The completed questionnaires were transferred to an Excel spreadsheet and weighted. The process for ranking involved normalisation of the experts' opinions to facilitate a determination of the normalised weights to calculate a weighted decision matrix (WDM).

#### 5. PRESENTATION OF DATA COLLECTED

The Deeds Office is a government department that administers and maintains the property registry of South Africa; but the two property organs (i.e., the Deeds Office and the Cadastre) are managed as separate entities. The Master of the High Court attends to the property of deceased persons separately. There is a need to integrate the different government departments to promote enhanced visibility and access to common information [4] in order to speed up applications, minimise disruptions, and enhance process quality. All names used in this article are pseudonyms. Participant 1 said the Department of Home Affairs' biometric database could ensure the real-time biometric verification of buyers, sellers, and other role-players. Participant 2 explained that the integration of different supply chain members would allow certain aspects, such as interdicts and other encumbrances, to be flagged. Proper checks and balances must also confirm that all provisions and conditions of loans and property transfers are complied with.

Governing bodies that oversee and manage professionals in the property value chain, such as the Estate Agency Affairs Board for estate agents, PLATO for land surveyors, and the Law Society for conveyancers, are an additional layer of stakeholders that must be considered. The visibility of these bodies' membership registers could identify unauthorised individuals who should no longer participate in property transactions (as explained by Participant 2). Participant 3 noted 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". Participant 5

also confirmed that, “if we have [...] at the Law Society 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 practising that’s not [...]”. According to Participant 4, “you need to prove identity and you also need to prove [...] credentials, [...] because people get [...] added and disbarred all the time”. PLATO keeps a record of land surveyors who are active and accredited. In addition to expelled members participating in property transactions, fraudulent impersonations may also lead to voidable transactions, civil suits, and interest claims.

[6] said that appropriate recordkeeping includes the physical and intellectual rights over records to track and trace these records easily. Participant 5 noted: “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”. Participant 6 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.

Supply chain partners must be able to retrieve real-time information. This could be enabled by accessing a centralised data storage platform. Participant 7 commented: “ive 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”. Participant 8 agreed: “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”. However, the issue of the trustworthiness of the custodians of such a centralised repository remains a concern.

Once a property has been registered after the initial purchase, various transactions may still be processed as part of ongoing maintenance. This may include holds being placed on property accounts, caveats being registered, and encumbrances recorded against registered properties. The Sheriff of the Court registers interdicts and other encumbrances that may prohibit the transfer of immovable property. These impediments and encumbrances are currently manually checked, and might not be identified. Participant 9 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. Property attachment that is executed by the sheriff which can also negatively impact on property transfers”. The Master of the High Court also deals with the property of deceased estates and will, in these instances, upload their authority to proceed with a transfer. Participant 10 explained: “We will register the caveat as soon as the application ... the appointment has been made to protect the interests of the person in an immovable property”. Departments currently work in isolation, and technological systems do not allow for the sharing of crucial information about properties.

Another area of concern is the payments to various role-players after registration has occurred. Payments occur via EFTs and journal transfers, and may be reversed if errors are identified. Participant 11 confirmed: “The payments are still [the] normal EFT process”. Payment intermediaries such as Strate, SWIFT, and Bankserv are already processing irrevocable payments, which should also extend to property transfers. Payment Exchange of South Africa (PEXSA) (Pty) Ltd also has a built-in payment solution that could be introduced into the property space. For security purposes, one impartial entity should resume responsibility for this function. Participant 2 noted 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? In theory it’s nothing more than a coordinator and it’s not a ... that should never ever be a competitive space”. The additional role-players currently involved in property transactions appear to be unnecessary, and could be removed from the process in the future. The principle of delivery versus payment involves the paired principles of ‘irrevocable payment/commitment to payment’ and ‘irrevocable transfer of/authority to transfer legal ownership’, which do not necessarily require any intermediaries [15].

The South African Revenue Services (SARS) and municipalities collect money for property services rendered (waste collection, sewerage, etc.) and taxes that are payable in respect of the property being sold. There has been much disagreement about how the current process is managed. Participant 8 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”. Pro rata payments are also collected. According to Participant 2, “You pay transfer duties upfront”. Amounts due to sellers are usually repaid after registration. Participant 8 did not agree with upfront payments of property transactions, as other taxes are paid afterwards. He was of the view that all costs should form part of the disbursement of payments after the new property has been transferred. It may be argued that a lack of control forces the collection of more money than is necessary to counter any delays in the property transfer process. At the transfer’s conclusion, a reconciliation must be executed manually before excess monies are reimbursed. In addition to the extra time and personpower that is required, the process increases the risk of funds being misappropriated. In the light of technological advances, current and outdated property process methodologies must thus be challenged.

Table 1 below provides the computation of the ranking and preferences of the experts in view of the framework to support the effective performance. The questions were provided to the experts and their responses followed the process for MultiCriteria Decisions. The table highlights the Normalisation (N), the Weighted Normalised values and the Weighted Normalised Matrix which were eventually summed to help in the determination of ranking according to highest weighted sum.

**Table 1: Preferred options from AHP process:**

	PZ	N	WDM	P5	N	WDM	P6	N	WDM	P7	N	WDM	P8	N	WDM	Sum	Ranking
Q1	4	1.00	0.25	2.00	2.00	0.50	1.00	0.25	0.06	3.00	0.75	0.19	1.00	0.25	0.06	0.88	1
	1	0.25	0.06	3.00	0.75	0.19	4.00	1.00	0.25	4.00	1.00	0.25	3.00	0.75	0.19	0.69	2
	3	0.75	0.19	1.00	0.25	0.06	2.00	0.50	0.13	1.00	0.25	0.06	4.00	1.00	0.25	0.63	4
	2	0.50	0.13	4.00	1.00	0.25	3.00	0.75	0.19	2.00	0.50	0.13	2.00	0.50	0.13	0.69	2
Q2	4	1.00	0.25	4.00	1.00	0.25	3.00	0.75	0.19	4.00	1.00	0.25	4.00	1.00	0.25	0.94	1
	3	0.25	0.06	3.00	0.75	0.19	1.00	0.25	0.06	3.00	0.75	0.19	2.00	0.50	0.13	0.44	3
	1	0.75	0.19	2.00	0.50	0.13	2.00	0.50	0.13	2.00	0.50	0.13	1.00	0.25	0.06	0.50	4
	2	0.50	0.13	1.00	4.00	1.00	4.00	1.00	0.25	1.00	0.25	0.06	3.00	0.75	0.19	1.56	1
Q3	2	2.00	0.50	4.00	1.00	0.25	3.00	0.75	0.19	4.00	1.00	0.25	3.00	0.75	0.19	1.13	1
	1	0.25	0.06	2.00	0.50	0.13	2.00	0.50	0.13	3.00	0.75	0.19	1.00	0.25	0.06	0.38	3
	4	0.75	0.19	3.00	0.75	0.19	4.00	1.00	0.25	2.00	0.50	0.13	4.00	1.00	0.25	0.88	2
	3	0.50	0.13	1.00	0.25	0.06	1.00	0.25	0.06	1.00	0.25	0.06	2.00	0.50	0.13	0.38	3
Q4.1	1	0.50	0.25	2.00	1.00	0.13	2.00	1.00	0.50	2.00	1.00	0.50	2.00	1.00	0.50	1.38	1
	2	1.00	0.50	1.00	0.50	0.25	1.00	0.50	0.25	1.00	0.50	0.25	1.00	0.50	0.25	1.25	2
Q4.2	2	0.67	0.22	3.00	1.00	0.33	3.00	1.00	0.33	3.00	1.00	0.33	2.00	0.67	0.22	1.10	1
	1	0.33	0.11	2.00	0.67	0.22	2.00	0.67	0.22	2.00	0.67	0.22	1.00	0.33	0.11	0.66	3
	3	1.00	0.33	1.00	0.33	0.11	1.00	0.33	0.11	1.00	0.33	0.11	3.00	1.00	0.33	0.88	2
Q5	1	0.50	0.25	1.00	0.50	1.00	2.00	1.00	0.50	1.00	0.50	0.25	1.00	0.50	0.25	2.00	2
	2	1.00	0.50	2.00	1.00	2.00	1.00	0.50	0.25	2.00	1.00	0.50	2.00	1.00	0.50	3.25	2

Multicollinearity was used for analysis of the most critical aspects for the digitalised system involving the transfer of high value products. The experts ranked the most cost efficient execution of the transaction by all parties, improved efficiency of execution of the transaction, the recapturing of correct information with the previous incorrect information deleted, and a manual process workflow management. The aspects which were prioritised for effective performance of the system were system processing, configuration, system performance, criteria for transfer of assets, correcting errors and securing information exchange. The weighted medium was calculated and used for ranking the most critical aspects for effective

performance of the system as per the experts' perspectives. Table 2 below provides the questions and their scored ranking by the experts to guide the development of the framework.

**Table 2: Options as per the expert choices:**

Criterion	Rank
<b>1.0 Processing of Transfer</b>	
In a digitised system involving the transfer of a high value product/intellectual property (house, vehicle, patent etc.) where such process involves multiple parties and related stakeholders it is important that the system:	
1.1 Ensure that the transaction is completed in the most cost-efficient manner for all parties involved	1 <sup>st</sup>
1.2 Ensure that the entire transaction involving the transfer of said asset, from order-to-cash is completed digitally on the system	2 <sup>nd</sup>
1.3 Ensure that the record of the asset is accurately tracked throughout the entire supply chain process	3 <sup>rd</sup>
1.4 Ensure that the risk of the transaction/transfer process being compromised through for example tampering is prevented	4 <sup>th</sup>
<b>2.0 Configuration of the Digitised System</b>	
The level of access to information within a digitised system can vary depending on the nature of the network/relationships between the parties/role-players involved. Within a digitised system involving the transfer of a high-value asset the access levels should ideally be configured as:	
2.1 Equal view and edit access to all information across the transfer process by all role-players. (All view and edit transactions are tracked)	1 <sup>st</sup>
2.2 Full domain-based access to view and edit information based on the role-player's domain within the process (the process is sub-divided into domains and the respective domain owner gives access rights to other role-players on a request basis)	1 <sup>st</sup>
2.3 Discretionary access to view and edit information for role-players granted by an assigned system controller (one role-player owns and controls all access rights for all other role players on a request basis)	3 <sup>rd</sup>
2.4 Limited/controlled view and edit access to the information by the various role-players based on the information required for their domain within the process. (domain-based access determined upfront, no role player can access information beyond their domain within the process)	4 <sup>th</sup>
<b>3.0 System Performance</b>	
A digitised system usually creates certain benefits for the participants in such a system as compared to a manual system. Within a digitised system involving the transfer of a high-value asset the system needs to ideally ensure:	
3.1 Improved efficiency of execution of the transaction	1 <sup>st</sup>
3.2 Improved security and controlled access to information	2 <sup>nd</sup>
3.3 Improved accuracy of execution of the transaction	3 <sup>rd</sup>
3.4 Improved transparency of information for all parties concerned	4 <sup>th</sup>
<b>4.1 Criteria for Transfer of Assets</b>	
A digitised system allows role-players/users different ways in which to capture or edit information on the system. Within a digitised system involving the transfer of a high-value asset the system needs to ideally ensure:	
4.1.1 All role-players to re-capture the entire record of the transaction into their respective domain within the system (information already captured by another role-player in the process is recaptured)	1 <sup>st</sup>

Criterion	Rank
4.1.2 All role-players to capture or edit only the incremental information relating to the record of the transaction within their domain into the system (only updates or changes to the original record are captured/edited)	2 <sup>nd</sup>
<b>4.2 Criteria for correcting errors</b>	
A digitised system allows role-players/users different ways in which to correct errors on the information captured on the system. Within a digitised system involving the transfer of a high-value asset the system needs to ideally ensure:	
4.2.1 All erroneous information records are deleted and re-captured correctly (existing erroneous record is deleted and re-captured correctly)	1 <sup>st</sup>
4.2.2 All erroneous information records are retained and a new corrected information record is captured (both the original erroneous record and the new corrected record are retained on the system)	2 <sup>nd</sup>
4.2.3 All erroneous information records are edited on the existing records (the original erroneous record is no longer retained on the system, only the corrected record)	3 <sup>rd</sup>
<b>5.0 Criteria to be followed for Secure Information Exchange</b>	
A digitised system allows role-players/users different ways in which to exchange information/transact securely and effectively. Within a digitised system involving the transfer of a high-value asset the system needs to ideally ensure:	
5.1 The role-player manually triggers the flow of information to the next role-player after having manually reviewed that the required conditions are met (the role-player does not release the transaction until the predetermined and agreed upon conditions have been met and or any disputes that may arise have been resolved)	1 <sup>st</sup>
5.2 The system automatically executes the flow of information between the role-players subject to certain required conditions being met. (the system prevents the transaction from proceeding to the next role-player until the predetermined and agreed upon conditions have been met)	2 <sup>nd</sup>

It is interesting to note that increased risk through tampering was least ranked by the experts and that cost efficiency was viewed to be of greater importance. A more flexible approach was preferred but they were divided about whether various domain owners needed to be able to specify the level of access the roleplayers involved in a transaction or whether a single controller should control rights and access of all roleplayers. Improved efficiency of execution of transactions was preferred. A higher weighting was allocated to the recapturing of information into specific domains as opposed to capturing incremental information and not repeating information that was captured by other roleplayers. It was preferred for erroneous information to be deleted as correct information replaces old information and the option for previously captured information to remain in the system with the new information showing alongside the older information received a lower weighting. It was also preferred for workflow to be manually triggered to the next roleplayer involved in the transaction.

## 6. FRAMEWORK FOR ELECTRONIC CONVEYANCING

Cloud computing and digital technology use the internet and central remote servers to maintain data and applications, [23] creating opportunities for new business models [17]. Small businesses like sole proprietor estate agents and conveyancers do not need to own their own servers [24], and access can be scaled on various levels. In a centralised system, buyers and sellers can receive a viewing functionality, whereas estate agents and conveyancers should be linked to specific and pre-decided criteria that must actively be managed. Revoked membership should result in system access being refused in this centralised property system, thus increasing information protection and system security.

A centralised hybrid front-end model [14] can break down the traditional silos, [12] which will also transcend regional boundaries, thus removing the need for the appointment of corresponding attorneys through electronic lodgements and registrations. A predetermined and programmed set of rules and algorithms can mitigate fraud and tampering attempts to speed up registration processes, enhance document integrity, and improve the quality and security of property transfers. An audit trail must record



the times, dates and role-players who participated in a property transaction. Although experts indicated that older erroneous information that were corrected must be replaced by the correct information, the details of the correctors making the changes made should be recorded in the audit trail. A centralised system will ultimately remove the need for individual organisations to interface their technological systems. The benefits include reduced errors, enhanced transparency, improved turnaround times, reduced fraud, and fewer costs.

So, who will need to manage such a centralised system? All entities in the current property process have a vested interest in the transactions in which they are involved. As such, there is a risk that any of these entities would promote their own interests in managing a centralised system. Many participants who were interviewed thus expressed the need for an independent entity with no vested interest to take charge of an electronic registration system. As custodian of the South African property register, the deeds office is, and would likely, continue to be responsible for the correctness of the title deed. Besides raising income through property taxes, the deeds office has no vested interests in property transactions and would be the preferred entity to oversee a centralised property system. While some questionnaire responses indicated a single system owner approach would be good, others indicated that a breakdown into various domains is preferred whereby various domain owners can allocate access and rights to the relevant roleplayers. This aspect would need to be further interrogated through a proper change management and needs identification process whereby more role-players provide inputs.

By viewing the end-to-end property transfer process as a whole, Figure 2 has been conceptualised for the dematerialisation of property transactions in South Africa. The framework integrates the entire property supply chain into an integrated system for transparent and improved information and data exchanges on each property transaction. The framework comprises a centralised data centre that will store all metadata, images, and other relevant information [12]. All policies and procedures that need to be embedded in the database must comply with industry and legislative requirements, and all supply chain partners need to ensure compliance.

In the framework, payments to SARS and municipalities are prioritised to avoid upfront payments being made; these entities are therefore shown in the system's inner circle. The integration will cater for differing levels of access depending on the roles that must be fulfilled by supply chain partners. Entities that fulfil services to core property supply chain partners are shown in the periphery of the framework. An example would be a mortgage originator who provides services to estate agents, and banks who may only be able to view transactions and not affect any changes. Similarly, buyers and sellers could also only view transaction statuses.

Records generated by individual entities will be stored in a document warehouse, while exchanged messages will be stored in a shared message file for retrieval or viewing by authorised supply chain partners. Parties to specific transactions will therefore need to be identified upfront, credentials recorded, and corresponding system functionalities will need to be allocated to them. All data and information (old and new) should remain available for future transactions. The payment versus ownership exchange needs to occur against the backdrop of irrevocable payments.

It is important to note that a conversion from paper-based to digital documents and automated processes is not what is required. Instead, the dematerialisation or so-called digitalisation of information is necessary. This implies that all necessary documents will be generated from common information available in the central repository for secure electronic lodgement by conveyancers for ownership transfers with the deeds office without any manual interventions. These documents will be intelligently constructed with predetermined and pre-programmed codes to reflect the required clauses and information of the parties to the individual transactions. These document capabilities are already available, but documents are thereafter still reduced to paper documents in the current process.

In the envisaged process, the deeds office will electronically verify the originality, authenticity, validity, correctness, and compliance of all records and parties to the transaction. All impediments and encumbrances recorded against any party to the transaction or property should be intelligently displayed. The underlying principles that underpin the entire front-end include customer and business insight, integrated business process management, sustainability, document validation, and security and customer service. Many mundane tasks will be automated, and workers will need to be retrained to operate in a paperless environment. This will require appropriate change management and project management capabilities that should be spearheaded by the deeds office.

In the envisaged process, a buyer will approach an estate agent who will assist the buyer in identifying a suitable property. The estate agent will biometrically verify the identity of the buyers and sellers and will capture and upload the required information into the centralised database. If required, banks will load the property loan information into the centralised repository. If no loan is required, an appointed conveyancer will complete financial and other necessary information (including all payments to be made), request rates and tax clearance certificates, and SARS certificates before electronically generating the required documents. All parties will electronically sign the documents by using the necessary encryption keys, and the conveyancer will formally lodge the transaction with the deeds office. The deeds office will verify the information electronically, and the registrar will electronically authorise each transaction, thus rendering a pre-registration status. A notification will be triggered to PEXSA (or a payment authorised body) to disburse the required payments.

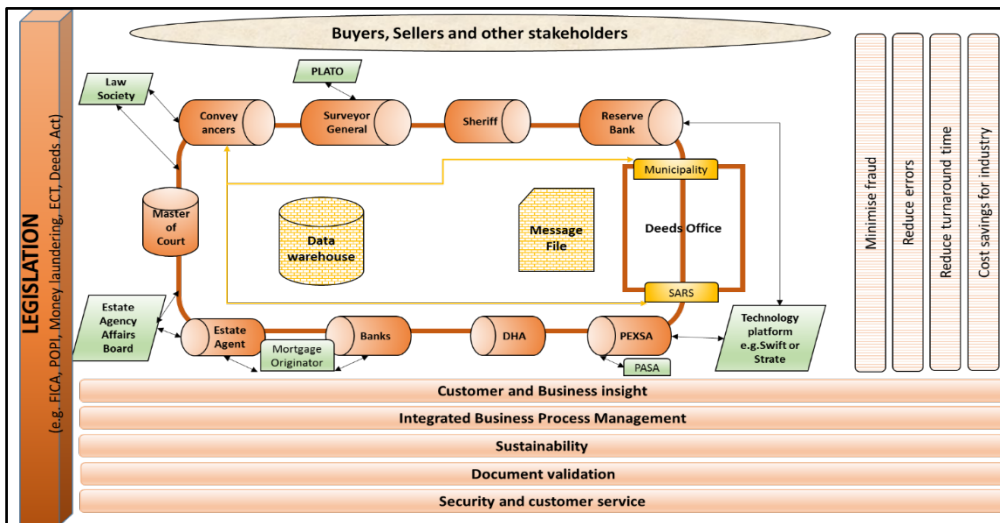
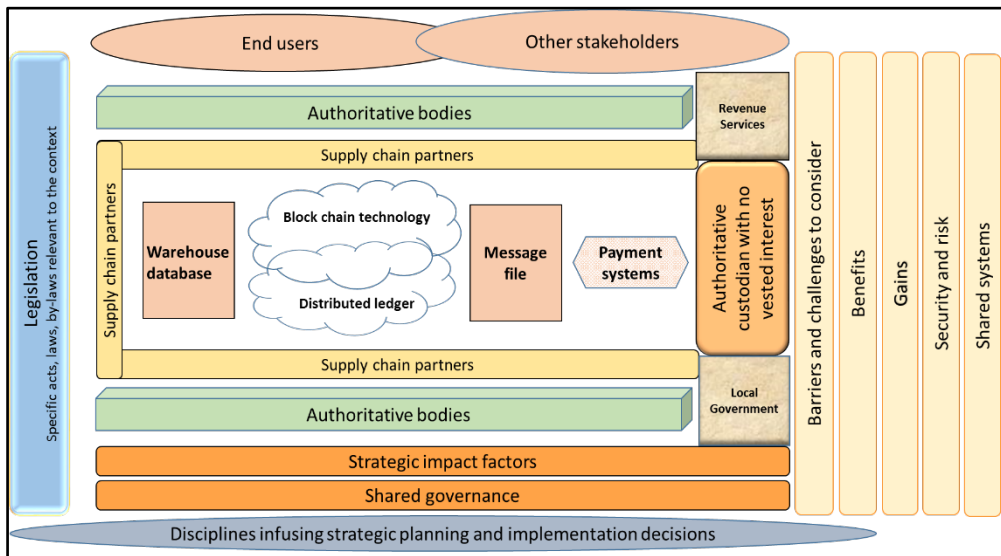


Figure 2: Framework for electronic deeds registration

Although the focus of the research was aimed at the property transfer process, the fundamental principles surrounding the transfer of all types of property (movable and immovable) remain. As such, Figure 2 was further adapted to provide a more generic view that may apply to all types of property transfers. Figure 3 was therefore constructed, setting out generic entities that may be involved in cross-discipline supply chain transactions of all assets. Professional or authoritative bodies in the relevant industry or market may still find application in terms of the structure, or such an entity may be excluded from the process or supply chain.



**Figure 3: Framework for acquiring assets**

In Figure 3, all roleplayers involved in the process have been explained as supply chain partners, while authoritative bodies replaces the specific land administration roleplayers such as PLATO, The Law Society, The Estate Agency Affairs Board and PASA. Legislation can be any policies, laws, by-laws that are relevant to other contexts. Legislation underpins all transactions concluded between entities and still applies in the updated framework. General barriers and difficulties, benefits, security challenges and risks will still need to be managed. In a simplified example, a customer need will be identified (e.g. the sale or purchase of an asset) to trigger various processes across supply chain partners (principle market actors, consulting services, financial services, ICT services and payment systems).

Figure 3 further illustrates the comprehensive integration of processes, data and data sources through digitalisation (no manual processes) and dematerialisation (paper has been removed from the processes). A cloud-based, centrally maintained, and managed database will remove the need to continuously update and replace organisational technologies, legacy systems and interfaces for optimal supply chain participation. Macro-economic pressures and changes can easily be accommodated in the shared platform. The Deeds office as custodian of the property register has been replaced by an authoritative custodian that does not have a vested interest to manage the operations of the supply chain and be accountable for the correctness and validity of the asset transfer and record. In place of PEXSA, a different entity may take charge of the payment process and is therefore reflected as payment systems in Figure 3. Since all aspects have been generalised in Figure 3, the framework is capable of being used for the transfer of any asset, not only immovable property as demonstrated in Figure 2. In a general context (thus applicable to other industries) the aspects isolated as important for immovable property transactions (customer and business insights, integrated business process management, sustainability, document validation, security and customer services) have been replaced to reflect discipline infusing strategic planning and implementation decisions. Each discipline and industry may have unique strategic measures and governance structures that may affect transactions, thereby impacting interactions and groupings. However, the architecture's configuration can be adapted to suit the property type, operational and strategic environment, supply chain design, and governance requirements.

## 7. CONCLUSION

This research reviewed the current end-to-end immovable property transfer process and identified that the various role-players involved in the property transfer process all maintain separate databases where information pertaining to their clients and transactions are stored. Many entities have created businesses around automating pockets of the end-to-end process, but the required documents are still reduced to paper-based instruments for an in-person and manual lodgement process with the deeds office that has jurisdiction. Additional conveyancers often need to be appointed due to geographical constraints, which further burden the already complex system. An integrated and centralised database was explored, and a proposed framework was mapped. The framework was further adapted to provide a general framework for

all property (movable and immovable) to be traded. Private organisations are well positioned to transition to electronic communication in the property industry, but governmental entities still require much integration and operationalisation.

Although conveyancing is a legal term, the actual transactions and activities that result in the transfer of ownership are derived from specialised business processes of the various private firms, public agencies, institutions and individuals (role-players) that are involved in conveyancing. The Electronic Deeds Registration Systems Act 19 of 2019 (EDRS) was promulgated on 2 December 2019 after it was originally discussed in Parliament in 2003. There is movement towards the digitisation of the land administration systems, albeit slow. Engineers, technicians and other business-related researchers and practitioners can provide valuable inputs into the process and drive to implement a more efficient and effective land administration system in South Africa.

Complete dematerialisation is required, not only the digitisation of paper-based and manual processes. All interactions should therefore take place electronically. It is recommended that the deeds office, as the custodian of the property register, should be in control of such a centralised database. All parties to a particular transaction must be linked to the transaction, and access requirements and credentials must be identified and clarified from the onset.

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