

Using enterprise resource planning systems to manage property processes

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Background: The various organisations that are involved in property transfer transactions tend to work as autonomous units within the end-to-end property supply chain. This compartmentalisation of activities and tasks creates inefficiencies and a lack of transparency.

Objectives: There is a need to review the current paper-based processes by evaluating the end-to-end processes in their entirety.

Method: Semi-structured qualitative interviews were conducted with prominent role-players involved in the property transfer process in South Africa. The general systems view was used as the theoretical underpinning of the research, whereby property processes across the property supply chain should be viewed as a single system.

Results: Enterprise resource planning (ERP) systems may assist in integrating workflow processes to enhance productivity and collaboration, and improve overall property processes. The participants confirmed the need for a centralised platform with integrated workflows.

Conclusion: Participants who were interviewed concurred that a centralised system would produce numerous benefits and enhanced efficiencies through a streamlined and more transparent process. Therefore, the researcher recommends that an ERP system be introduced across the property supply chain. A centralised ERP management system would enable all parties to a particular property transaction to have sight of the progress of the transaction and reduce capturing errors across various systems.

Contribution: The article will be useful within the immovable property industry, as well as to the buyers, sellers, and academia. Future studies could focus on how an ERP system could be integrated into the property supply chain.

Keywords: enterprise resource planning; property processes; general systems theory; processes; property transactions, supply chain.

Introduction

'Conveyancing' is a legal term and focuses predominantly on legal aspects related to the sale and transfer of immovable property. In this article, the researcher aims to look at the operational component of conveyancing, rather than the legal component. Property processes are largely paper based, and are usually managed by using spreadsheets, emails and making telephone calls. Private entities have made considerable effort to automate certain processes, but organisations involved in the end-to-end property registration process remain largely individualised and operate in silos. The legacy systems in silos have resulted in many delays, increased costs, duplication and processing errors, not to mention creating opportunities for fraudulent interactions to occur (Amadi-Echendu 2017). Managing the output (in this instance, property registrations) from organisations that operate in silos can be very challenging. With advances in technology, alternative operating models must be explored. The relevant question here is: How can technology assist in enhancing the management of property transactions?

Enterprise resource planning (ERP) helps to coordinate business activities that extend across different sections or departments within an organisation; it may also involve integration across different organisations within a supply chain (Chofreh, Goni & Klemeš 2018). The integration of business functions across supply chains is required for effective decision-making and reports that require a holistic view of the supply network (Chofreh, Goni & Klemeš 2017). Considerable effort is needed to introduce shared systems like ERP into business processes and technologies. Simply linking systems of the various organisations is insufficient, and business process reengineering is necessary to realign certain working procedures and working arrangements. However, the

integration may result in changes in how people perform their work, as well as requiring a financial investment into technologies that can accommodate the required integration (Fernandez, Zainol & Ahmad 2017). Legacy systems may be more challenging to integrate. Other implementation considerations apply to current versus to-be workflows, organisational cultures, and how work is performed (Chang et al. 2015), as changes to how work is performed may affect the organisational culture, for example. Reengineering can occur by introducing incremental steps or by following a radical approach, whereby changes occur simultaneously. This article considers ERP as an option in the end-to-end property registration process.

Methodology

The researcher followed the interpretivist paradigm and used semi-structured qualitative interviews to explore how the property transfer process in South Africa – as the case study environment – can be improved. The population comprised role-players that form part of the end-to-end property transfer process in South Africa. Purposive sampling was used to identify the sample of 17 participants that formed part of the data collection process. To enable a national perspective, representative organisations of different professional groups that are involved in the end-to-end property process participated in the research, rather than individual professionals. The purposive sample included the Banking Association, the Master of the High Court, the Law Society of South Africa, the Pretoria Deeds Office, the Surveyor-General's office, South Africa's Central Securities Depository (Strate Ltd), Tshwane Municipal Council, and the Reserve Bank of South Africa. A qualitative methodology was viewed as suitable to explore how the current end-to-end property process can be improved. All participants consented to the interviews and completed a written consent form. Audio recordings of all the interviews provide the impartial evidence to improve the credibility of the research.

The audio recordings were transcribed verbatim. After the transcribed data were grouped into themes and subthemes, the data were interpreted through content analysis in the context of the general systems theory (GST). The themes that were identified were emailed to each of the participants as part of a member-checking process to ensure that the correct interpretations were identified and to provide each participant with an opportunity to clarify any misinterpretations. Figure 2 was constructed to reflect how an ERP system is envisaged within the property space. The GST guided the interpretations of the real-world system application and forms the cornerstone of transdisciplinary systems from the researcher's perspective.

Ethical considerations

Ethical clearance was obtained from the College of Economic and Management Sciences at the University of South Africa for the publication of articles from a doctoral study that was previously conducted, where the ethics clearance had

expired. The ethical clearance certificate number is OPS/2020/002 and was granted for a period of 5 years. No additional primary data collection was undertaken. All descriptive information from the original data had been removed and pseudonyms are used for direct quotations.

Enterprise resource planning as a tool

New Zealand has used an automated Torrens system since 2002. This has been very successful in the property space because of high professional standards adopted by participating practitioners although the system itself is still vulnerable to misuse (Thomas 2020). Ireland, on the other hand, has modernised and digitised their land administration system but has been struggling to implement a suitable model of an e-conveyancing system since 2005 (Murphy 2020). According to Hopkins (2020), law and practice have complementary roles to fulfil in working towards automated conveyancing in England and Wales. The author also stated that collaborative rather than prescriptive approaches were more successful in the past. Regardless of the country and advances made, it is important to identify a system that fits the social and economic frameworks of a country.

Enterprise resource planning was developed from material resource planning, the purpose of which is to integrate all aspects of a business or supply chain into one operating system (Abdullah 2017) to achieve a competitive advantage. Information is captured into an ERP system once and can then be accessed by various other role-players who are linked to the open system. The single system reduces the probability of mistakes, saves human resources from having to recapture the same information in different systems and provides access to information that can be readily updated, while repetitive tasks can be automated (Scurtu & Lupu 2016). With property transactions, the various role-players involved in the property process currently capture the same information into their organisation's technological systems individually. Transcription errors may arise where incorrect information is captured, which may ultimately delay the property transaction from being finalised. An ERP system would enable information to be shared intelligently among the role-players involved in a specific property transaction.

Other benefits associated with the implementation of ERP systems include cost reductions, process standardisation, access to reliable information, reduction of process time, the elimination of inter-organisational boundaries, enhanced scalability (Chang et al. 2015; Fernandez et al. 2017), as well as reduced inventory (number of property transfers in the process) and enhanced accuracy of demand forecasting (Chang et al. 2015). The monetary value of property transactions may be quite significant, and interest claims for any delays in registration may be substantial. Buyers sometimes also need to pay the seller occupational rent to move into the property before the change of ownership has taken place. In addition, bridging finance is sometimes obtained to cover shortfalls payable in respect of deposits

and attorney costs, which are often obtained at high interest rates. Many of these costs can be reduced or eliminated if delays can be minimised.

Although the initial ERP system was established for a manufacturing organisation, it has since been adapted to the public sector to address disconnected and uncoordinated applications of different portfolios (Fernandez et al. 2017). In the property sector, there are various public entities that are involved in the registration of properties. These include the Master of the Court for properties of deceased persons; the deeds office, which is the custodian of the property register that contains ownership information of properties; the Surveyor-General's office, which manages the recording of property values and other relevant information pertaining to land parcels; municipalities for services offered to the property; and the Reserve Bank, as the clearing house of payments. Many private entities have moved towards acquiring technologies that can intelligently populate required documents, but public entities seem to be slow in doing so.

Enterprise resource planning does not treat transactions as stand-alone activities but considers them as part of all the business processes (Madanhire & Mbohwa 2016). By implication, businesses will continue to perform their core function. Managers can manage and account for the use of resources in every business activity (Chofreh et al. 2017), as staff are involved in each transaction and a log of all activities taking place for each transaction will be stored within the shared system. In addition, ERP provides opportunities for predictive analysis, whereby anticipated problems and issues can be mitigated beforehand to minimise their effects (Gunjal 2019). The collaborative approach is commensurate with the GST, which asserts that the whole is greater than the sum of its parts (Von Bertalanffy 1972).

The general systems theory

The GST dates to interwar studies that were conducted by Ludwig von Bertalanffy to determine how to get the right number and type of soldiers, materials, equipment, arms and weapons to the right area at the right time during the Second World War. General systems theory has developed into other disciplines and is currently concerned with a transdisciplinary view, which means that each discipline engages collaboratively in constructing a common base of methods and concepts to form a bigger picture (Hofkirchner & Schafranek 2011). Gregory (2015) defines GST as elements (components that constitute a system) that are in exchange (any relationships that exist between elements) and are bounded (what separates the 'system' from the background or environment).

A system can either be closed with impermeable boundaries or open with permeable boundaries although many systems exhibit characteristics of both open and closed systems. Networks may form in systems that are hinged on common interests or concerns, and hierarchical powers can form to

facilitate decision-making within systems. As such, elements from different systems may function collaboratively to form a new system that is based on common interests, products or services, while the original systems continue to exist and operate independently of the newly formed system.

The supply chain should be viewed as a system that uses different processes and entities to convert input into output. The output from one system may influence the processes of other systems, which, in turn, create a more complex structure. Rapoport (1986) referred to this as 'organised complexity'. Creating value for end users is a shared responsibility among the organisations in a supply chain. Systems theory proponents (Chicksand et al. 2012:465) view processes and outputs of a system holistically to improve supply chain efficiency. Systems thinking necessitates constant communication and integration across the supply chain network.

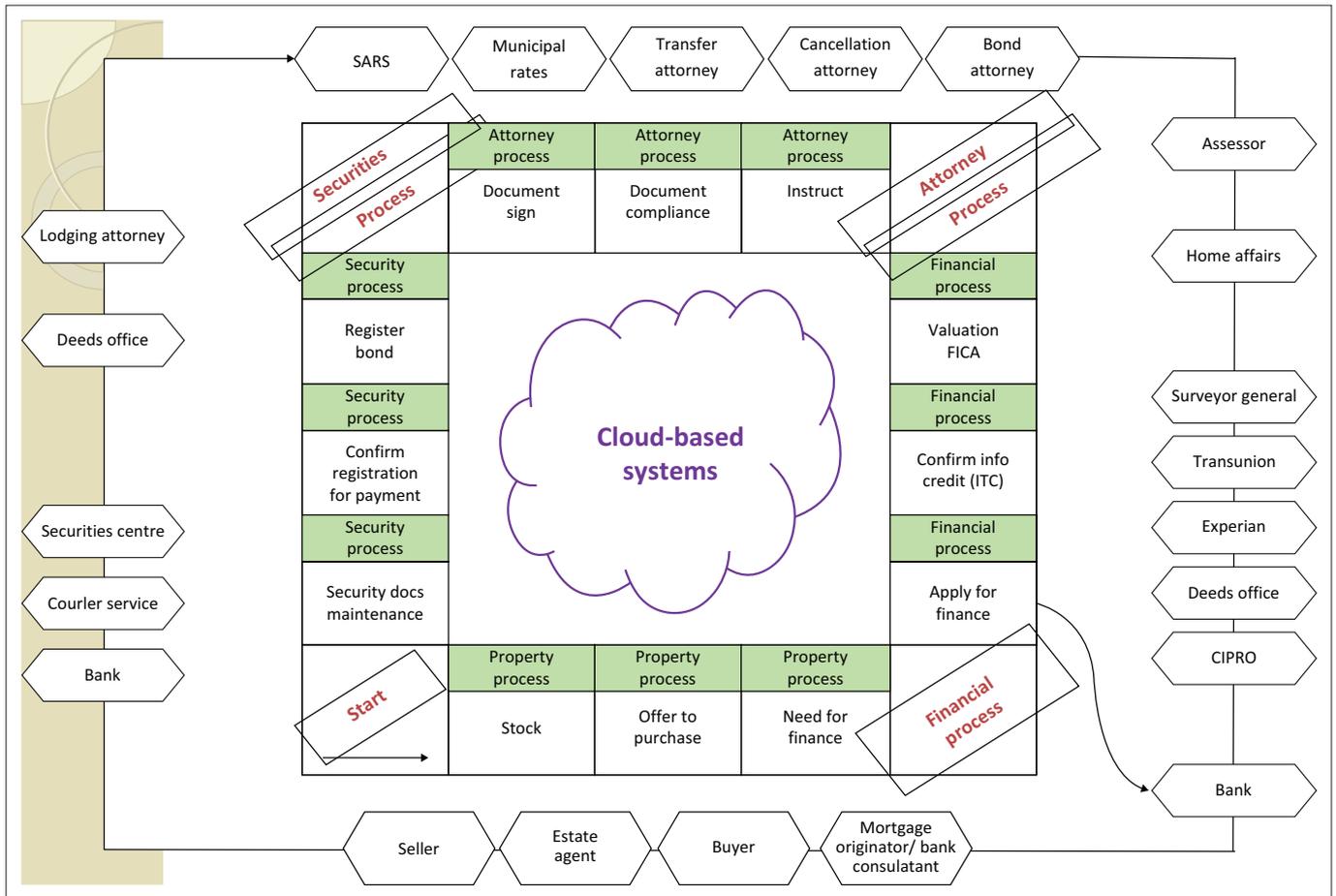
The systems approach in property transfers

The end-to-end property transfer process comprises many organisations contributing different services to this process. These organisations are privately owned or government agencies, and the services they contribute cover a wide spectrum of disciplines, including finances, law, architecture and risk management. Although each of the organisations operates independently, the participating organisations need to work together to complete a single property transaction. Each of the tasks and functions completed by the individual organisations combines into the required processes for a specific property transaction, regardless of the different disciplines and focus areas involved. When viewed from the perspective of the property transaction, the various contributions from the different organisations are viewed as a single process. George (pseudonym for a participant interviewed) agreed that everyone in the property supply chain 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.' (George [pseudonym])

As such, a holistic view must be adopted when managing property transactions. This approach is in line with systems thinking and the GST. Figure 1 demonstrates the various organisational structures that form part of the property supply chain. It illustrates the order in which their functions contribute to the end-to-end process.

The process commences with a property that becomes available on the market to be sold or when a need arises for a property to be bought. The property may be used for commercial, residential or agricultural purposes. A buyer



CIRPO, Companies and Reviews Directory; FICA, Financial Intelligence Center Act requirements; SARS, South African Revenue Services.

FIGURE 1: Stakeholders in the property transfer process.

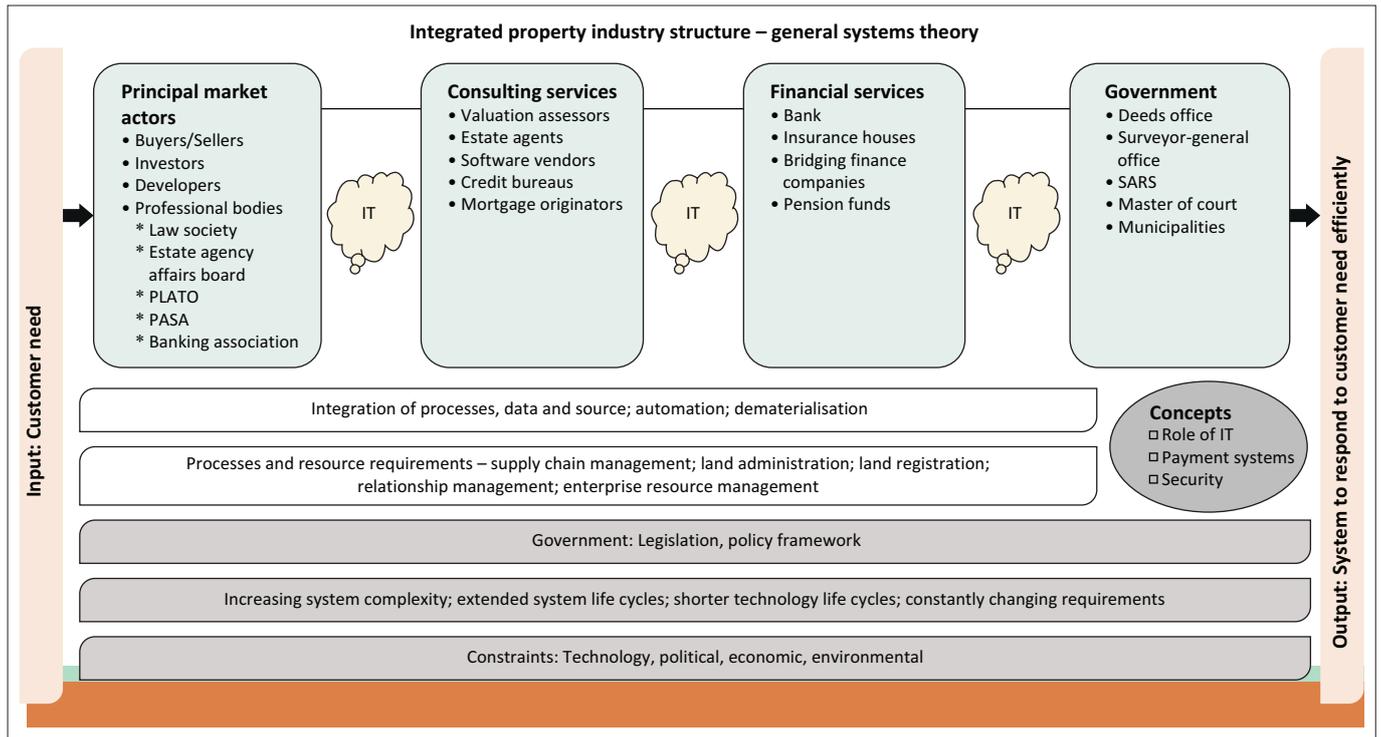
and seller are matched for each property and the property transfer process commences. The organisations involved in the process depend on the property transaction type and the mode of payment. Where a buyer needs to apply for a loan, banks and other financial institutions become involved. Should a buyer purchase the property with their own funds, banks may not be necessary in the process.

There are various attorneys involved in the process. A cancellation attorney may need to cancel an existing loan if the seller still has an existing loan against the property with a bank. The bank will appoint the cancellation attorney to ensure that the cancellation procedures are attended to correctly. Should the buyer need to apply for a loan, the bank that approved the loan will appoint the registration attorney to ensure that all information is correctly captured, and all required procedures are duly executed. The seller appoints the transferring attorney to ensure that ownership is transferred correctly from seller to buyer and that all payments are made correctly. These three attorneys may be from different attorney firms. If a property that is being purchased is in a different province from where the buyer and/or seller is resident, a corresponding attorney that is operating in the proximity of the deeds office that has jurisdiction over the property may be appointed to preside over the registration procedures. The originally signed paper

documents must be couriered to the corresponding attorney for lodgement in the deeds office, and this may extend the turnaround time of the application.

Each role-player will use their own technological systems to capture and store the relevant information per transaction. These systems are not shared among supply chain partners who form part of a specific property transaction, and, therefore, information in one system cannot be viewed by a role-player from another organisation in the current configuration. This lack of transparency has caused many delays and creates opportunities for fraudulent interactions. There is a need to integrate the processes across the various role-players from the different organisations into one technological platform.

Figure 2 illustrates an integrated systems approach to the end-to-end property process by using the transformation model (input-process-output process). Essentially, there is an input (i.e. the sale of a property by a seller) that, through a system of various processes, is converted into an output (i.e. the registration of the property in the name of the buyer). The seller could be an individual, company, trust or a deceased estate; alternatively, the sale may involve the transfer of property as per a court order (e.g. part of a divorce or insolvency order). Buyers may also be individuals, companies or trusts. The system comprises



SARS, South African Revenue Services; IT, information technology; PLATO, South African Council for Professional and Technical Surveyors; PASA, Payments Association of South Africa.

FIGURE 2: Integrated property industry structure.

public and private entities that are involved in a transaction to transfer property ownership. The output is the transferred property ownership. There are, however, many processes that occur within the complex system before ownership can be transferred.

Figure 2 also illustrates the various role-players that are involved in the end-to-end property transfer process. The role-players have been grouped into four main groupings, namely principal market actors (investors, developers, professional bodies); consulting services (estate agents, software vendors, valuation assessors, credit bureaus and mortgage originators); financial services (banks, insurance companies, bridging finance companies and pension funds); as well as government entities (deeds office, surveyor-general, SARS, Master of the Court and municipalities). As mentioned earlier, these role-players currently operate according to their own individual processes and they each process their part of the property transaction within their own operating systems. Figure 2 is an adaptation from Amadi-Echendu (2017), in terms of which an additional block was added to the diagram for government role-players, while buyers and sellers were added as principal market actors. This shows that the inputs into the system are a customer need (e.g. the buying or selling of a property). These inputs need to be transformed by a series of processes from the various actors involved in the process. The output is an integrated system that has successfully responded to the customer need (i.e. a property has been successfully and securely transferred from seller to buyer). Through integration, standardisation and uniformity can be achieved in the system regarding information flows, payments and document sharing.

As shown in Figure 2, the entire system is regulated by legislative and policy frameworks that enforce compliance in the structure. Although the *Electronic Deeds Registration Systems Act* (EDRSA) was signed into law on 02 October 2019, many aspects of the Act must still be operationalised. In addition, other statutes (e.g. those that govern marriages, insolvencies and divorce) that may be affected by the changes effected by the EDRSA must also still be updated. Legislation would need to be updated to enable electronic interactions among role-players, as the current conveyancing process is founded in legislation to be a paper-based system that has not yet changed in practise.

In addition, there are macroeconomic factors such as technological, political, economic and environmental aspects that affect the operation of and interaction within a system. Cloud-based technological solutions may facilitate the integration of processes, information and role-players in a centralised platform. Routine tasks and security checks can be automated through blockchain and biometric technologies to mitigate identity theft. However, the way in which work is conducted will need to be reengineered. The conversion of manual processes into electronic processes will be insufficient. Instead, digitalisation needs to be introduced into the current workflows to enable the secure electronic and intelligent compilation and sharing of documents and information among authorised supply chain partners. The electronic document needs to remain in an electronic format throughout the process until the property has been registered in the new owner's name. The current process

reduces all electronic documents to paper documents that must be lodged with the deeds office for registration.

The centralised system will enable all parties to a transaction to view the progress of the transaction, thus enhancing transparency. Information pertaining to rules, policies and legislation can be intelligently programmed into software to reduce any errors when documents are compiled within the system. These technologies are already being used by some of the role-players, but the full value of this functionality has not yet been realised. One of the participants remarked that correctly compiled documents could reduce the number of rejections currently experienced in deeds offices:

'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 lodgment 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 (pseudonym) summarised the benefits that increased efficiencies and may bring about, namely 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.' (Ashley [pseudonym])

Regarding the security aspect relating to electronic documents and their ability to be recognised in a court of law, Charlie (pseudonym) explained that technologies can help to enhance security and reduce errors and fraud:

'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.' (Charlie [pseudonym])

To confirm the automation and ease of collaboration within a digitised system, Raymond (pseudonym) corroborated the reduction of fraud by having a secure digital audit trail:

'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.' (Raymond [pseudonym])

There is a need for a centralised information-sharing capability for property transactions, whereby non-competitive information that is collected from the outset of the transaction can be verified and made available across the supply chain without duplication of efforts and processes. Information may range from volume and scheduling matters to customer information. For example, a customer may have applied for sequestration and such information needs to be made available to other supply chain partners to minimise risks and fraud in the system. The new industry model must 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 and land administration in South Africa can continue to protect property rights of owners, holders and possessors of property. Up until now, South African landowners have not had to take out insurance to protect themselves against a claim to their ownership title, and this security should remain intact.

Various entities have attempted to integrate some of their business processes, but individual attempts have increased the overall property transaction costs, which are essentially outsourced to buyers and sellers. The ERP system is expected to decrease costs after the initial investment in integration efforts and technology, which, in turn, should translate into less expensive and faster property transfers for buyers.

The findings of this research are therefore the following:

1. Costs are expected to decrease after the initial investment in the integration of processes and technology.
2. Certain entities will be affected by workflow changes – which may affect their business models – with the introduction of an ERP system.
3. Merely automating processes will not suffice.
4. An integrated ERP system for the transfer of landed property will improve the availability of information and the accuracy of registration for land administration in South Africa.
5. There is a need for a centralised information-sharing capability, whereby non-competitive information that is collected from the outset of the transaction can be verified and made available across the property supply chain.

Conclusion and recommendations

The current property transfer process in South Africa is paper based. The parties to specific property transactions work within their own technological systems, which makes the current property process fragmented. Many of the participants that were interviewed concurred that a centralised system would have many benefits and would enhance efficiencies through a streamlined and transparent process. The researcher posits that an ERP system could help to break down the silo effect currently experienced with property transactions. This would allow parties to specific transactions to share resources and information and would facilitate the simultaneous building and collating of the documents required for the ownership of title to be transferred from seller to buyer. It is therefore recommended that the role-players involved in property transactions be viewed and managed as a property supply chain within an ERP system.

Industry specialists can benefit by applying GST as a lens to view multidisciplinary systems and their associated difficulties. A centralised system can provide more security through increased transparency, which will build trust across the property supply chain. The integrity of the data will be kept intact, which will protect the integrity of the asset register. The turnaround time will be reduced, while the efficiency of service delivery will be enhanced. The application of more up-to-date technologies can provide the impetus for further improvements and research that can lead to further advancement in this area. Therefore, it is recommended that an ERP system be introduced across the property supply chain. Future studies could focus on how an ERP system could be integrated within the property supply chain.

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Competing interests

The author has declared that no competing interest exists.

Author's contributions

I declare that I am the sole author of this research article.

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Data availability

Data are also available from the University of Pretoria repository as this article is an extraction of a doctoral study. The researcher is also in possession of the data and analysis.

Disclaimer

The views and opinions expressed in this article are those of the author and do not necessarily reflect the official policy or position of any affiliated agency of the author, and the publisher.

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