Exploring Technology integration through FELA in Nigeria

OPEYEMI MICHAEL AJAYI (Finland), KIRSIKKA RIEKKINEN (Finland) and OLUWAFEMI ADEKOLA (Finland)

Key words: Framework for Effective Land Administration, Technology, Land Administration, Nigeria

SUMMARY

Efficient land administration systems play a crucial role, particularly in developing nations that are experiencing rapid urban population growth and significant changes in land use. Land, an indispensable requirement for human sustenance and a catalyst for fostering economic progress, is at the heart of various developmental initiatives. The United Nations duly recognised the significance of land when it was incorporated into the 2030 Agenda for Sustainable Development Goals in 2015. The integration of technology into land administration has been well established in developed nations for quite some time. However, in developing countries, such as Nigeria, the adoption of technology in this field is a more recent development. This is mainly because of the historical reliance on manual practices in land administration. In recent years, Nigeria has undertaken efforts to enhance its land administration system with the objective of establishing a transparent, efficient, and sustainable framework. This framework is commonly referred to as the Framework for Effective Land Administration (FELA). This study endeavors to evaluate Nigerian land administration within the context of the Framework for Effective Land Administration (FELA), focusing on technological integration. It seeks to identify any shortcomings in land management practices through a thorough and systematic review of the existing literature.

Through the utilisation of focused keyword searches pertaining to land administration in Nigeria, this study examines the ramifications of integrating technology. The exploration pertains to the utilisation of technology integration to enhance the fulfilment of FELA's objectives within Nigeria. The historical evolution of land administration in Nigeria is discussed, and the study investigates various aspects of technology integration in Nigeria's land administration.

The conclusion underscores the imperative of unwavering commitment to continuous technological innovation, policy reforms, and capacity-building initiatives for the full realisation of the Framework for Effective Land Administration (FELA) in Nigeria. Addressing the challenges in technology integration within Land Administration Systems (LAS) in Nigeria and identifying key factors for integration, this study produces the prerequisites that would facilitate technology integration in the country's land administration. The findings of this research provide a solid foundation for future advancements in the field.

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1 INTRODUCTION

Land and resources are indispensable to all human endeavors. The significance of land for human development and existence cannot be overstated, as it serves as the foundation for all growth processes and constitutes a substantial portion of a country's global wealth. Likewise, intense competition among individuals, organisations, and government institutions underscores the critical need to possess, use, and regulate land and its resources, particularly in urban areas. However, due to limited resources, effective Land Administration Systems (LAS) has become imperative (Fateye et al., 2020). Land administration entails "the process of determining, recording and disseminating information concerning the relationship between people and land." (Vos et al., pp 2, 2017). Effective land administration is essential, as it serves not only to meet our fundamental requirements for human survival but also to enhance individuals' interconnectedness, comfort, and prosperity (Jacobs 2015).

The emergence of novel technologies has presented unparalleled prospects to foster innovation and enhance the efficiency of LAS. According to Fateye et al. (2020), transitioning from traditional methods to technology-driven land administration systems is associated with the ever-changing nature of emerging land issues. This shift addresses the growing land crisis and capitalises on technological advancements to effectively resolve land-related challenges. Integrating technology into land administration can significantly enhance the efficiency of its procedures by simplifying processes, reducing costs, and accelerating and increasing transparency in the process (Zuniga, 2018). Cetl, et al. (2023) describes that a modern land administration system equips nations with tools to implement land-related laws and management plans by calculating, documenting, and sharing data on land ownership, property value, and resource utilisation. The goal of any land administration system should be to bring about social harmony and stability by safeguarding the interests of all parties involved, including governments, investors, dealers, landowners, and their associates (Odeyemi et al., 2023). The importance of having land administration systems that are fit-for-purpose, inexpensive, inclusive and supported by enabling technology cannot be overstated (Jacobs 2015).

The establishment of a comprehensive Land Administration System has become crucial to ensure economic effectiveness and uphold ownership rights (Burns et al. 2023). Equitable apportionment, dissemination, and reallocation of land proficiently and productively presents

an obstacle which can be attributed to lack of technological innovations. The concept of smart land administration underscores the use of innovative technologies in service procedures. While developed nations lead in adopting emerging technologies, certain emerging economies like Nigeria which are historically reliant on human labour and paper records, are exploring innovative approaches (Oberdorf 2017; Benbunan-Fich & Castellanos 2018).

Land administration attained a significant turning point when the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) adopted FELA. Framework for Effective Land Administration (FELA) serves as a blueprint for governments and institutions to manage land resources effectively, ensuring sustainable economic development, environmental stewardship, and social stability. FELA serves as a blueprint for governments and institutions to manage land resources effectively, ensuring sustainable economic development, environmental stewardship, and social stability. FELA aspires to become a globally adopted standard. The FELA is designed to serve as a roadmap for LAS policymakers and practitioners, aiming to enhance secure and reliable people-land relationships, thereby contributing significantly to ongoing sustainable development efforts (Ahsan, et al., 2023). Early studies have suggested the need for country level assessments using FELA to address LASs issues (see, for example Bennett et al., 2021). Consequently, FELA has been used for country level assessment of LASs in several regions/countries such as Europe (Unger et al., 2022), Chad (Unger et al., 2023) and Pakistan (Ahsan, et al., 2023). However, the framework has not being adopted/used in the case of Nigeria.

The aim of this study is to examine the implication of integrating technology into LAS in Nigeria. This study conducts a comprehensive analysis of land administration in Nigeria, providing insights into the impact of technology integration in alignment with FELA's principles. The investigation explores the purpose, benefits, challenges, and potential recommendations associated with technology integration in Nigeria. To achieve this aim, this study conducts systematic literature review (SLR). The SLR focuses on some research questions:

Question 1. What are the Challenges of technology integration in the Land Administration System in Nigeria?

Question 2: What are the Factors Influencing Technology Integration in Land Administration in Nigeria?

Question 3: What are the Prerequisites for Technology Integration in Nigeria's Land Administration?

In the following sections, this study comprehensively examines the historical evolution of Land Administration Systems (LAS) in Nigeria, explores technology integration within LAS, and delves into the Framework for Effective Land Administration (FELA). Section 3 outlines the methodology, while Sections 4 and 5 respectively present the results and discussion.

2 LITERATURE REVIEW

Conducting a comprehensive literature review, this paper elucidates the attainment of research objectives. It includes a meticulous analysis of technology integration in land administration,

emphasising the evolution of LAS in Nigeria and the Framework for Effective Land Administration (FELA).

2.1 The Framework for Efficient Land Administration (FELA)

UNGGIM, the United Nations Committee of Experts on Global Geospatial Information Management, endorsed the framework for effective land administration (FELA) in August 2020. FELA is a comprehensive policy guide created by the Panel of Experts in Land Administration and Management. It provides guidance to nations seeking to establish new land administration and management systems or modify current ones, with the goal of guiding to close the gap of the cadastral divide (UNGGIM, 2020). FELA outlines nine strategic pathways to aim for efficient land administration, all based on the UNGGIM-prepared Integrated Geospatial Information Framework (IGIF) concept. Every pathway has links, overlaps, and focuses on a single goal. Every path leads to the alignment of strategies, techniques, and instruments unique to land administration and management that can be applied at the national and local levels for the accomplishment of FELA; these pathways are all connected to the SDGs and the IGIF (UN-GGIM, 2019). The nine strategic pathways: Governance Institutions and Accountability, Policy and Legal, Advocacy and Awareness, Capacity and Education, Partnerships, Innovation, Data, Finances, and Standards, are the cornerstones of FELA and can be seen in figure 1 below.

Figure 1: The nine strategic pathways (UNGGIM, 2020)

Land administration is a social activity that is influenced by organisations, governance, and accountability (UN-GGIM, 2020). The responsibilities and objectives of land administration influence its efficacy and efficiency; risk in land use management can be reduced if roles and objectives are distinct, clearly defined and enforced (Pereira et al., 2018). Maintaining a standard is necessary, especially at various levels where adherence to laws and policies, and the implementation of best practices is crucial for Land administration (UN-GGIM, 2019). Land management and administration systems inevitably involve partnerships. Partnerships are the cornerstone of efficient land administration, regardless of circumstances (UN-GGIM, 2020). In land administration, innovation is both needed and advantageous (Fateye et al, 2020). Technological advancement and societal pull can both spur innovation in land administration. When combined, these factors support process enhancement, technological development, and the development of creativity and innovation (UN-GGIM, 2020).

Large amounts of information are usually produced by operations in the Land administration system, and it is important that the framework includes accurate data documentation on land ownership, use and value. (UN-GGIM, 2019). Additionally, all stakeholders must be engaged with land administration to guarantee sustainable land management (Pereira et al., 2018). FELA demands that land-based organisations be run effectively and efficiently (UN-GGIM, 2020). The financial strategic process in FELA highlights the significance of comprehending the costs associated with adoption and the continuous financial commitment necessary for upkeep (UN-GGIM, 2020). FELA advocates for the creation of long-term knowledge and skill transfer in land administration at the necessary level for all stakeholders. (UN-GGIM, 2020). The goal, according to De Vries et al. (2021), is to raise the level of knowledge and awareness of land administration by means of both traditional and cutting-edge methods. It is imperative for professionals in land administration to consistently possess advanced spatial skills and knowledge to provide seamless and error-free processes and procedures (Chigbu et al., 2021).

On the other hand, technology integration is a vital aspect of all strategic pathways in FELA as it enhances the efficiency, transparency, and accuracy of land administration processes while simplifying data collection and management. By utilising digital tools, land administration agencies can gather, store, and analyse data related to land ownership, land use, and land tenure, thereby minimising the errors and inconsistencies that are common in traditional land administration systems. Additionally, digital platforms and tools facilitate communication and cooperation among land administration agencies, landowners, and other stakeholders involved in the land administration process, which can help expedite the process and reduce delays and inefficiency.

2.2 Integration of Technologies in the Land Administration System

Numerous studies have explored various aspects and implications of integrating technology into land administration practices. These studies have shed light on the potential benefits, challenges, and opportunities of integrating technology into land administration. For instance,

Adeoye and Mensah (2008) assessed the computerisation of land administration systems as a tool for good governance. The authors emphasised the necessity of digitalising the land administration system due to the shifting priorities of contemporary societies, the pervasive influence of globalisation, and the ongoing revolution in information technology. Nevertheless, the study highlighted that digitising the land administration system will lead to enhanced land title security, reduced alteration of land documents, and the re-verification of property records. Acharya's (2009) study addresses the associated challenges and potential remedies of implementating geospatial information and communication technology for land administration systems. The author claimed that the implementation of a digital land administration system may be a vital tool for achieving the overall goals of a nation's land administration system. The study conducted by McLaren and Stanley (2017) focused on ICT for land administration and management. The authors highlight the crucial role of Information and Communication Technology (ICT) in promoting good governance in land administration. They emphasised that ICT plays a significant role in enabling open and transparent access to land records, ensuring accessibility for all individuals.

In their comprehensive study, Luyombya and Obbo (2013) conducted an in-depth analysis of the digitisation status within the land register of Uganda. Their main goal was to evaluate the extent to which technological innovation was integrated into land registration procedures. According to this study, Uganda's land registration system continues to rely on manual processes that primarily involve paperwork. However, notable endeavours are currently underway to transition from the traditional manual approach to a more advanced digitisation system. Jacobs (2015) conducted a similar study to critically assess the use of technology in land administration systems for sustainable development in Uganda and Ghana. The study confirms that the integration of technology in land administration in both nations, resulted in an improvement in the systems of ownership, institutionalised land policies, and productive communication between the stakeholders. Obayomi (n.d.) conducted an analysis to determine the necessity of computerising land information systems in Nigeria and agreed that computerised LIS has the potential to bring about adequate land administration. Augustus and Olakanmi (2016) examined the significance of cadastral survey information on Nigeria's land administration. The primary objective was to establish a contemporary digital database to enhance the efficiency and efficacy of land administration and management practices within the country. According to the findings of this study, digitisation is an essential component for the management of spatial data and administration of land, as well as for the resolution of environmental and human issues. Akeh and Mshelia (2016) examined the significance of Geographic Information System (GIS) in the context of urban land administration in Nigeria. The authors posit that the integration of GIS technology into land administration practices has the potential to expedite the registration of titles, enhance tenure security, streamline land application procedures, and disseminate information. Finally, the study conducted by Fateye et al. (2020) examined the extent of knowledge among land specialists regarding emerging technologies that could enhance the land administration system in Nigeria. The present study revealed a significant lack of awareness. As a result, increasing efforts are recommended to

educate and raise awareness of technological innovation. It also suggests improving collaboration between experts in the field and academia, providing training and retraining for personnel, and implementing a strong institutional framework to enhance the LAS in the country.

2.3 Historical Evolution of the Land Administration in Nigeria

In Nigeria, the land administration system predates colonialism. (Babalola et al., 2015; Fateye et al., 2020). Land administration was predominantly organised around customary land tenure practices (Udoekanem, 2014; Akingbade, 2022). Land ownership was characterised by a communal and familial arrangement where it was held in trust for the benefit of all family members, as highlighted by Omuojine (1999). According to Babalola et al. (2015), distinguishing features, such as trees that represented each community or family unit, were responsible for determining land demarcation. The land administration system exhibited a commendable level of establishment after amalgamation in 1914. This historical event witnessed the merging of the Northern and Southern protectorates, a strategic manoeuvre undertaken by British colonialists to facilitate streamlined governance and efficient administration. However, following its independence in 1960, Nigeria enacted diverse land policies within its numerous geographical areas. In the northern region, the prevailing public land ownership system was established according to the provisions outlined in the Land Native Right Ordinance. Conversely, a dichotomous system was in place in the southern and western regions, wherein customary and statutory land holding systems operated in conjunction. This arrangement remained in place until 1978, when the Land Use Decree was introduced, which is now the Land Use Act, Cap. L.5, 2004. The Land Use Act was introduced to address the disparities inherent in land administration systems, the subsequent legal disputes, and the challenges governments encounter in acquiring land for public purposes (Nwokike., 2019; Ibrahim et al., 2021). Fateye et al. (2020) also stated that the Act serves as a comprehensive framework for unifying land tenure systems and provides guidance for effective land administration practices within the country. The Act entrusted the land to state governors, who were allowed to approve the statutory rights of occupancy. Surprisingly, even though the grounds for promulgating the Land Use Decree may have seemed commendable, the land policy did not achieve its intended goal. The inefficacy of the Act can be attributed to various elements, notably technical challenges such as the absence of essential cartographic resources for ascertaining property ownership and the precise division of urban and rural zones (Nwokike, 2019). This dissatisfaction and shortcomings in the implementation of the Land Use Act of 1978 led to the need for evaluation by many stakeholders.

3 METHODOLOGY

This study uses a systematic literature review (SLR) to evaluate technology integration in land administration in line with the framework for effective land administration in Nigeria. Systematic literature review (SLR) is a valuable method used across several fields to enhance the existing knowledge of certain topics. A systematic literature review is a widely used research method that helps researchers to identify areas with an abundance of existing research

and those in need of further investigation, as defined by Webster and Watson (2002). In this study, the SLR followed a five-stage methodology.

Stage 1: The development of the questions in accordance with the objectives of the study.

Stage 2: Search on Scopus and Google Scholar.

Stage 3: Identifying research articles.

Stage 4: Analysing and synthesising the papers that were chosen.

Stage 5: Provide the results, discussion, and conclusions.

In the first stage, research questions were created to best facilitate and direct the goals of the study.

The second stage involved choosing search phrases that might be used to identify papers that covered the study's objectives and identifying the databases that would be used for the systematic review. Google Scholar and Scopus were selected as a result. An extensive collection of academic materials, including journal articles, book chapters, dissertations, and conference papers, can be found using the public search engine Google Scholar. Scopus is the largest multidisciplinary abstract and citation database of peer-reviewed literature, containing about 6.8 million conference papers and 21,000 peer-reviewed publications. These factors led to the selection of both databases based on the reliability and precision of their data. Both databases were searched using the following keyword sets: Technology integration/ in land administration/for effective land administration/ in developing countries/ Nigeria - Adopting technology/ for effective land administration /Nigeria - Framework for effective land administration/in developing countries/ Nigeria /through technology integration- Technology implementation/ in land administration /for effective land administration / in Nigeria. From search from Scopus Framework for Effective land administration (FELA)/ in developing countries/ Nigeria - Introducing technology/ in land administration /for the framework for effective land administration / in Nigeria.

The third stage involves choosing the research papers to be selected for the compilation phase. Only those that examined land administration in line with FELA or technology integration in land administration were considered, and those that did not were eliminated. Through evaluation of content, only English language papers with fully accessible texts were examined to make sure the papers addressed the three predetermined study questions, Q1, Q2, and Q3. Thus, an initial total of 600 research papers were retrieved from Google Scholar and 17 from Scopus; of these, Google Scholar yielded almost 70% of results that were unrelated to the study. We were able to obtain a final dataset consisting of forty research papers by applying the selection process for research papers. The selection process is described in figure 2 below.

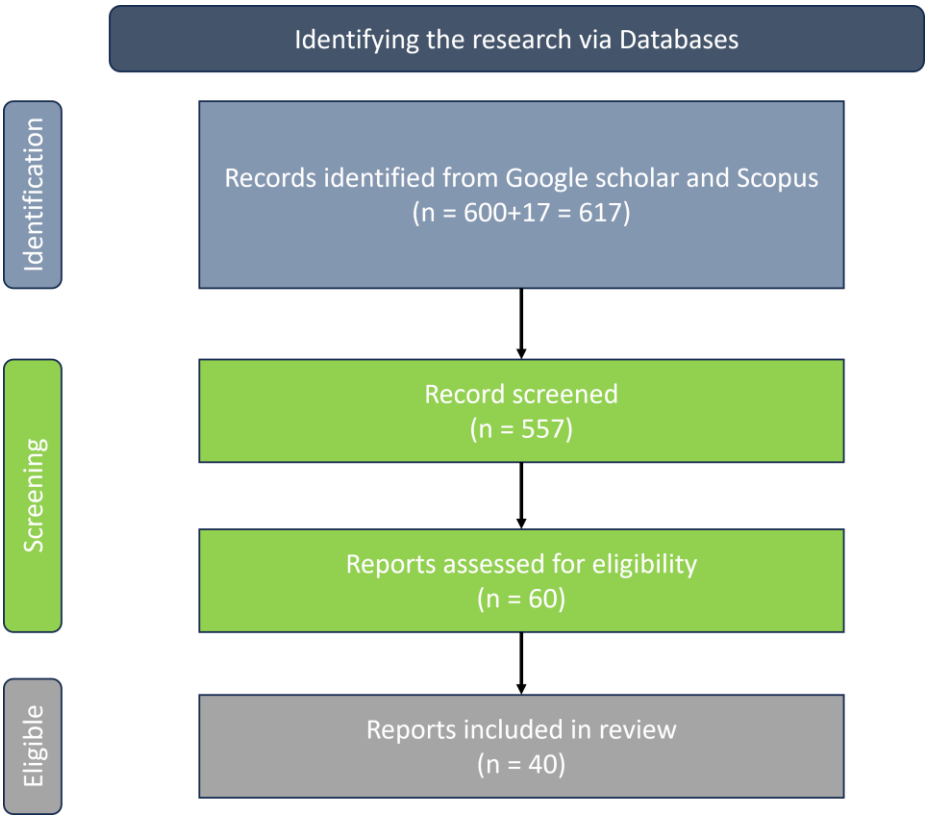

Figure 2: Process Diagram (PRISMA)

Source: Authors' construct

The fourth stage involved examining the final 40 research papers' material from the perspectives of the number of publications annually, the authors' place of origin, the geographic location of the study, the type of academic paper, and the FELA prerequisites. The fifth step involved discussions over the examination of the content and the presentation of the work's conclusions, which served to provide a broad perspective of technological integration. Figure 3 provides an overview of the current study's comprehensive literature review process.

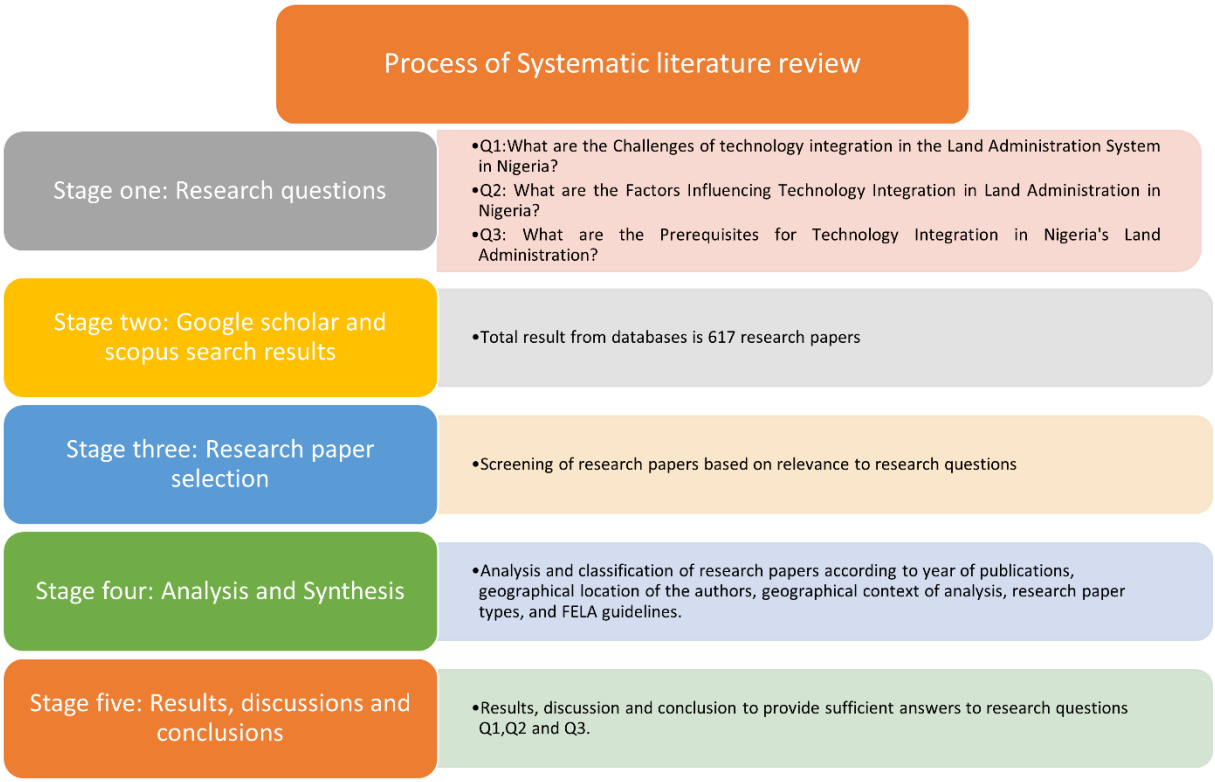

Figure 3: Summary of systematic literature review procedure

Source: Authors' construct

4 RESULTS

In this section, we present the outcomes of our investigation into the challenges, factors, and prerequisites associated with technology integration in Nigeria's Land Administration System (LAS), as outlined in our research questions. Delving into the intricacies of these issues, we provide insights derived from a meticulous exploration of the literature and a comprehensive analysis of the land administration landscape in Nigeria. The results not only shed light on the identified challenges and influencing factors but also contribute to establishing a foundation for effective technology integration, aligning with the goals of the Framework for Effective Land Administration (FELA).

4.1 Challenges of technology integration in the Land Administration System in Nigeria

Several scholarly investigations have extensively documented the challenges of integrating technology into Nigeria's land administration systems. In Vaibhav's (2015) research on African cadastres, the author highlighted that Nigeria's cadastral system predominantly relied on analogue methods, wherein physical files were manually stored and retrieved for various cadastre-related tasks. Babalola et al. (2015) observed a conspicuous need for a comprehensive land administration model that effectively promotes sustainable development within land

management. According to Didigwu and Olakanmi (2016), this issue is linked to capturing spatial data and maintaining databases. Akeh and Mshelia (2016) linked the challenges of integrating technology into land administration systems in Nigeria to the need for a standardised land administration system. In another study, Abolade et al. (2018) examined the challenges of digitalising land administration. This study highlights the issues of deteriorating infrastructure, limited internet access, and a shortage of skilled personnel. Akingbade (2022) posited that the shortage of skilled personnel, as emphasised by Abolade et al. (2018), can be attributed to the fact that a significant proportion of private surveyors were trained in traditional surveying techniques, lacking adequate understanding of geospatial information practices. However, while research has shown that technology plays a vital role in land administration systems, Nigeria still needs to realise the potential of information and communication technologies to improve land usage, control, and management. Fateye et al. (2020) acknowledged that the observed deficiency could be ascribed to suboptimal utilisation of information and communication technology (ICT).

4.2 Factors for technology integration in Land Administration in Nigeria

This study identifies five key factors, illustrated in Figure 4 below, that can enhance the integration of technology in Land Administration in Nigeria.

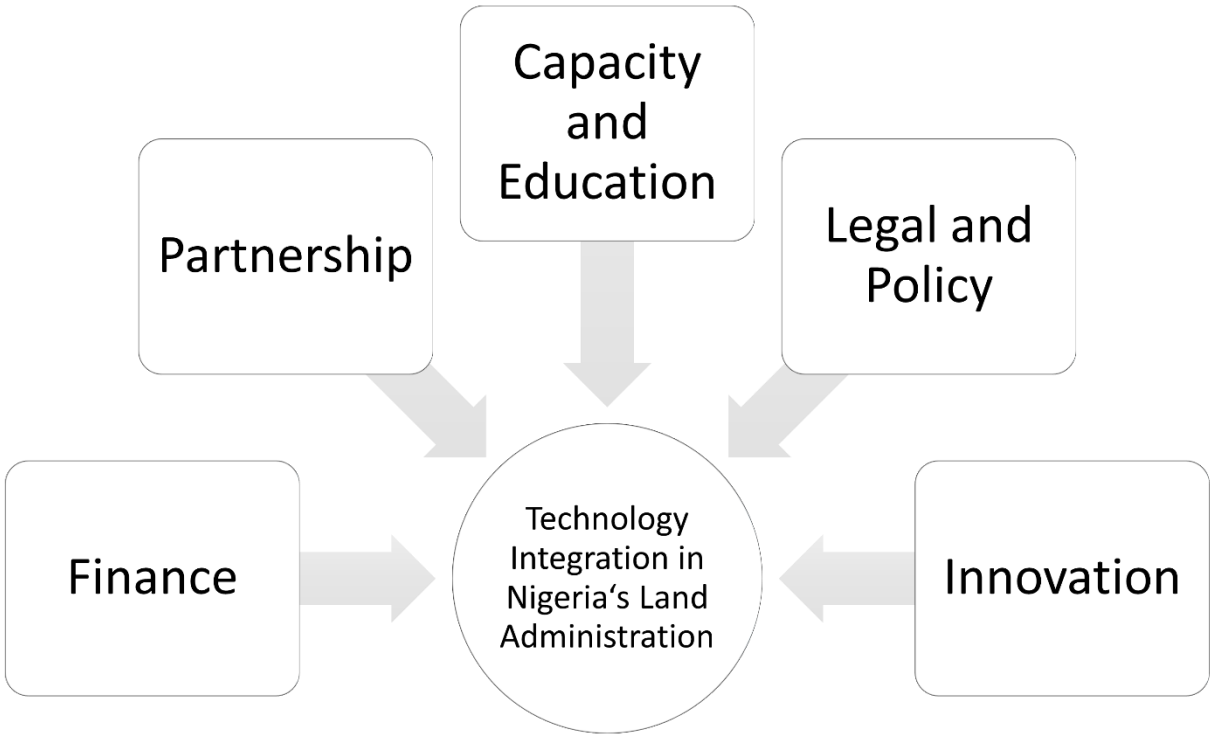

Figure 4: Factors for technology integration in Land Administration in Nigeria

Source: Authors' construct

- **Finance**

Drawing upon the scholarly work of Mbee and Joseph (2023), it can be reasonably inferred that financial considerations exert a predominant influence on land administration systems. As van der Molen (2006a) posited, the efficient functioning of land administration systems necessitates substantial capital investment. The operational capacity of these systems is intrinsically contingent upon the extent of investment allocated to acquiring the requisite hardware and software components (Akeh and Mshelia, 2016). In numerous states within the Nigerian context, a pervasive issue persists: the statutory agencies responsible for the operation of land cadastral systems grapple with a significant dearth of financial resources. As a result, this unfortunate circumstance engenders the consequential absence of comprehensive databases pertaining to land ownership, land markets, and transactions. This finding is consistent with the assertions made by Dada (2003) and Adjekophori et al. (2020), which suggest that the issue of land administration in Nigeria is compounded by inadequate financial support allocated to the pertinent agencies responsible for cadastral mapping. Consequently, the findings of this study lend credence to the conclusions of other studies that acknowledge finance as a limitation of the land administration system.

- **Innovation**

The conventional land administration system in Nigeria has not undergone significant changes since its establishment during the colonial period. Although some states, like Lagos, Abuja, and Kaduna, have attempted to incorporate technology into their land administration systems, there are still shortcomings. It is worth noting that land administration systems worldwide are experiencing innovative approaches and the adoption of advanced technologies, as stated by Van Oosterom et al. (2020). However, in Nigeria, the integration of technology in land administration is insufficient. To encourage the use of technology and improve the efficiency of land administration systems, it is crucial to embrace innovation by implementing new methods and streamlining processes within the land administration domain, as suggested by Abolade et al. (2018) and Fateye et al. (2020).

- **Partnerships**

The Nigerian government's collaborations with public, private, and developed countries are instrumental in integrating technology into its land administration (Arimoro, 2019), which could provide practical and technical guidance to several states on land matters to enhance the security of documents and properties, strengthen the capacity of organisations, promote increased participation in land markets, and help build confidence in land markets, ultimately boosting economic development (Owotemu et al., 2022). Given the numerous benefits that can be derived from an efficient land administration system, it is imperative that the government and other stakeholders take the initiative and demonstrate their commitment to the integration of technology into this sector (Abolade et al., 2018). This will not only increase the capability of key professionals to manage the sector but also contribute to the overall development of the country.

- **Capacity and Education**

Nigeria is currently grappling with a shortfall in capacity for executing land administration tasks in a sustainable and efficient manner. To address this issue, one potential solution is to enhance organisational capacity through education. It is essential to simultaneously build capacity and establish necessary facilities. Moreover, it is crucial to expedite capacity development to the extent that land users and owners in all Thirty-Six (36) states, as well as each local government department and division, can participate in the assessment stages of their land administrative system development after incorporating technology into its operations. This would bridge the gap in any automation system in creating functional use of appropriate technology tools such as GIS, LIS, Blockchain, and other useful applications. Regrettably, Nigeria's ineffective application of its land management system is attributable to a scarcity of personnel with the requisite education. As a result, obtaining a certificate of occupancy is challenging and unpleasant, driving individuals to resort to unofficial means and even verify the date of ownership prior to the LUA's promulgation. (Abolade et. al, 2018; Ibrahim et. al, 2021; Udoekanem & Muhirwa, 2019).

- **Legal and Policy**

The Land Use Act of 1978, now the Land Use Act, Cap. L.5, 2004, which is firmly entrenched in the Nigerian Constitution, necessitates a comprehensive review to eliminate the regressive provisions that have rendered the Act unfavourable towards the economically disadvantaged and to establish the New National Land Policy as a cornerstone (Atilola, 2010; Otubu, 2017). Given the arduous processes that constitutional amendments typically undergo, the magnitude of this undertaking is substantial. Kemiki et al. (2016) emphasised that the Land Use Act has not fully realised its potential to bring about a comprehensive transformation in the land administration system of Nigeria due to various factors such as technical limitations, institutional challenges, social considerations, and a lack of sincerity and political will on the part of different governments to implement and review the Act effectively. Likewise, the legal framework encompasses many interwoven land-related laws that have accumulated over several decades, without a concerted effort to streamline the inherent ambiguity arising from successive legislative actions. According to Ghebru and Okumo (2017), the current legal frameworks pertaining to land administration and service delivery in Nigeria must be more effective in fulfilling the essential functions required by landowners and other end users.

4.3 Prerequisites for Technology Integration in Land Administration in Nigeria

Integrating technology into land administration in Nigeria is a complex process. This research introduces a step to evaluate the feasibility of integrating technology into the Nigerian Land Administration System. The proposed steps aim at assessing the potential benefits of technology integration in land administration in the thirty-six (36) states in Nigeria. Comprising five key steps, these steps offer a systematic approach to evaluate the viability of incorporating technology into land administration practices in Nigeria. Figure five (5) below shows a visual representation of the steps for assessing technology integration in land administration in Nigeria.

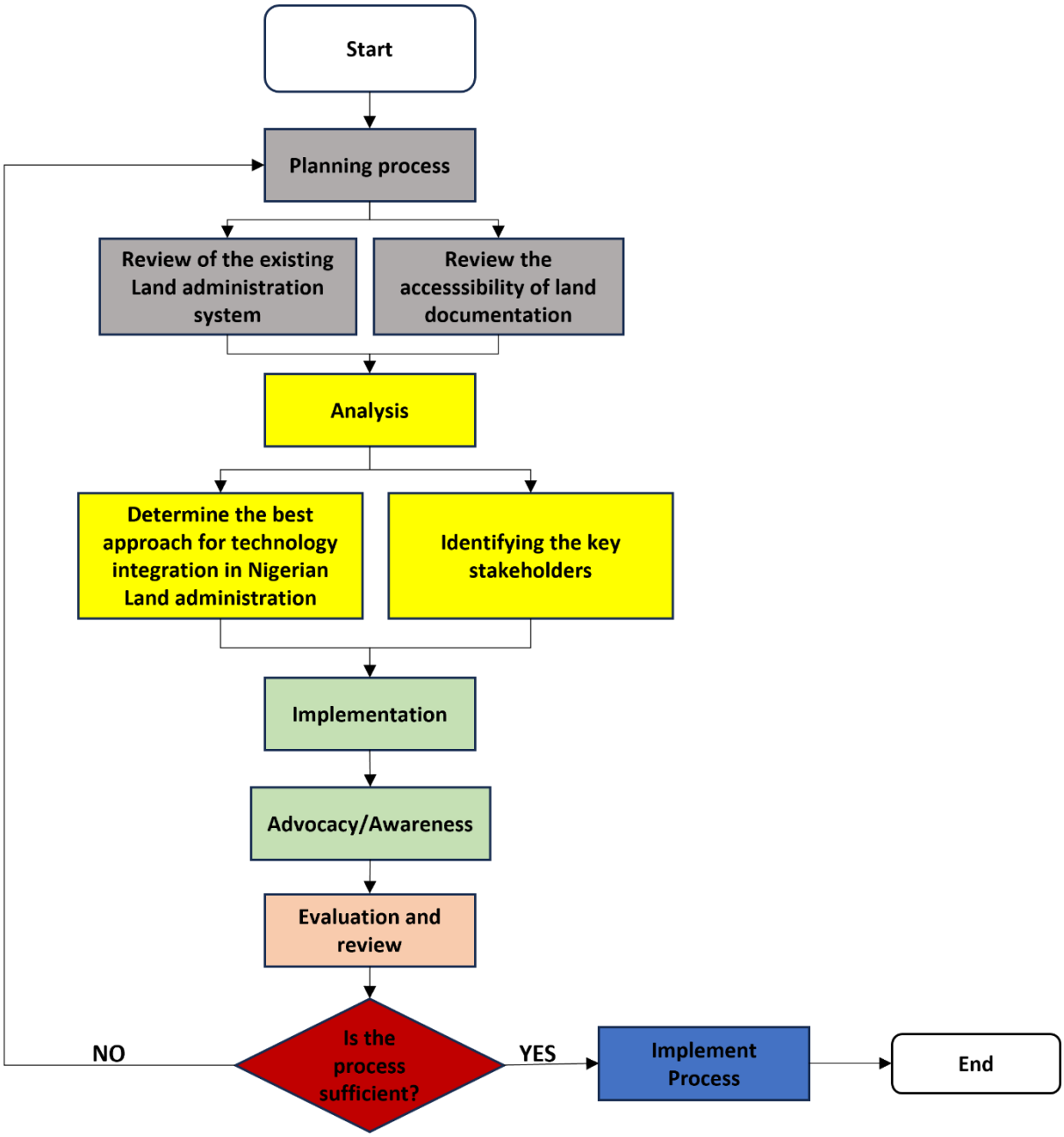

Figure 5: Prerequisites for technology integration in land administration

Source: Authors' construct

- Planning
    - Review of the existing Land administration system

The availability of reliable land data is essential for the efficient and successful administration and management of land and the resources connected to it. Data collection and storage for Land administration in Nigeria is done manually through the Ministry of Land for most states. Which over the years has resulted in bottlenecks, laborious processes, rampant forgeries, document

laundering, land bribery, duplicate allotments, neglected applications, allotments from "Parallel Ministry," inconsistencies in land use, and encroachments plague them. It is challenging to undertake planning, development, and utilisation of resources in a sustainable manner for the benefit of people without current and functioning land data. The existing Land administration system should be reviewed to determine areas of immediate improvement, and how technology can be efficiently integration in the land administration system.

- Review the accessibility of land documentation.

Official land administration is not generally accessible to the public. To create a sufficient plan for technology integration for FELA in Nigeria, the level of accessibility of the public to Land administration documentation must be thoroughly reviewed.

- Analysis
  - Determine the best approach for technology integration in Nigerian Land administration.

Setting up and operating a national repository for land title ownership and documentation in all states and the federal capital territory; working together with states to deliver technical support to conduct land cadastral inventories across the country; assessing individual "possessory" rights employing standard procedures; promoting state and local governments to develop a tribunal system for land dispute resolution; and designing a process for land valuation in both urban and rural areas. These are some of the steps that can be taken for technology integration in the Nigerian Land Administration system. The Nigerian Land administration system is currently in need of great improvements. The best approaches must be determined for the implementation of these improvements.

- Identifying the Stakeholders

This step involves identifying the key stakeholders in technology integration in FELA in Nigeria. Some of the major stakeholders are the government Ministry of Lands, Housing, and Urban Development (FMLHUD), the Federal Ministries of Aviation, Defense, Education, and Interior, as well as the Federal Capital Territory Authority and the Central Bank of Nigeria. These are the federal organisations that oversee public land to conduct their operations. The Federal Ministries of Agriculture and Rural Development, Power, Petroleum, Transportation, Water Resources, and Works are among the other agencies that oversee government land for infrastructural and natural resources and the Presidential Technical Committee on Land Reform (PTCLR). The stakeholders must be identified for a proper method for technology integration in the Nigerian Land administration system to be identified.

- Implementation
  - Advocacy and Awareness

A sizable portion of the populace in Nigeria does not have formal education. Official Land Administration System (LAS) documentation contains information that the uneducated community cannot understand. The internet is the quickest way to spread knowledge and awareness through webpages and mobile applications. In Nigeria, there is relatively little information about LAS that can be found online. Online resources for Land Administration

laws, rules, and regulations are scant or non-existent. Most of the state agencies within the Land Administration do not maintain their own websites for communication; those that do, tend to concentrate on marketing their projects. In recent times, massive compulsory land acquisition, demolition of structures, desilting, fraud, conflicts over land between communities, and other land-related social crisis are the results of a lack of information and awareness in Nigeria. Adequate awareness of land administration with the use of information technology is required to reduce these unpleasant circumstances. Thus, there has been a strong push for the use of technology like Land Resource Manager and the Geodata Cadastral Database, which should raise awareness of land matters to both the educated and uneducated on different levels of land administration sectors.

- Evaluation and review

The evaluation and review are important stages in the process. The policy must be evaluated to determine if it is appropriate. If this plan would still not work, the planning phase must be repeated to improve the plan.

5 DISCUSSION

The present state of technology integration and awareness of cutting-edge technologies in land administration within Nigeria is significantly lacking. Nigeria's procedures for managing and administering land are intricate and time consuming (Thontteh and Omirin, 2015). According to Fateye et al. (2020), it can be inferred that the functioning of land administration is primarily characterised by a rudimentary approach, heavily reliant on manual labour rather than advanced technological systems. However, the country's technological limitations, in addition to institutional and legal issues, present significant barriers. This diminished institutional and legal structure elucidates the potential reinforcement of the sluggish adoption of land administration technologies in Nigeria. To integrate technology into land administration, institutional setup, broad privatisation, responsive land reform, sufficient training, and general legislation are essential (Babalola, 2022). If land records have been fully digitised, a variety of space-specific variables may be associated with them. It is important to consider the significant initial and ongoing expenses that typically accompany the adoption of new technologies (Abolade et al. 2018). However, establishing a technology-based land administration system is complicated, particularly in nations such as Nigeria where digital mapping (geometric) data are scarce. Owing to its inherent issues, the manual method of maintaining land records in most of the nation's land registers can no longer be supported in this era of information revolution (Obayomi, n,d). Nigeria must quickly digitise its land records and create a national land information system or service to achieve sustainable development. These measures guarantee tenure security, prevent land disputes, promote the development of organised land markets, and boost the government's ability to generate revenue (Akeh and Mshelia, 2016). An automated land management tool, or digital cadastre, is required for rapid access to cadastral information and smooth land transactions. Timely, accurate, and high-quality data are necessary for land administration by employing technological tools such as GIS, LIS, and Blockchain technology

to digitise land records. Henceforth, it is imperative to not only augment the cognition pertaining to innovative technologies in land administration systems, but also foster their utilisation. However, to effectively explore the difficulties associated with incorporating technology into Nigeria's land administration system, it is necessary to investigate whether similar challenges have arisen in other contexts, and if so, how they have been resolved. Although this study does not conduct a comparative analysis or explicitly refer to global experiences, recognising the potential for shared challenges opens up avenues for future research. This raises important questions about the applicability of the study's findings beyond the Nigerian context, and it becomes crucial to evaluate the scalability of the results to determine whether the insights provided are unique to the national landscape or relevant to scholars and practitioners in the broader field of land administration globally. Adopting a nuanced perspective promotes a more comprehensive understanding of the study's implications and facilitates cross-cultural knowledge exchanges.

6 CONCLUSION

The guidelines provided in the FELA have proven beneficial for evaluating technology integration into Nigeria's land administration. However, there are significant challenges that need to be addressed in this regard. These challenges primarily stem from the lack of a cohesive framework for land administration, which can be attributed to the Land Use Act (LUA). Additionally, the land administration sector faces various other issues such as insufficient remuneration, lack of technical expertise in new technologies, limited baseline data, unfavorable working conditions, non-transparent procedures, lengthy waiting periods, reliance on manual methods, inadequate record-keeping practices, and a prevailing lack of trust among customary landowners. To address these challenges, it is highly recommended to implement a unified land administration system by developing a standardised land administration Domain Model (LADM) and Social Tenure Domain Model (STDM) is highly recommended. LADM can facilitate the gradual enhancement of cadastres, including both geographical and other components, and support cadastral needs that are suitable for fit for purpose. In addition, LADM can address the issue of excessive government databases and minimise the significant data duplication that currently plagues the system. However, the STDM may be used to document land rights and provide tenure security by implementing alternative methods for documenting land rights.

Likewise, enhancing the effectiveness of existing legislation, particularly the Land Use Act, through significant modifications and strict implementation, is crucial to address instances of dishonesty, protraction, and misconduct within the land administration system. The desire to use technological advancements to address land-related concerns has prompted a switch from a conventional approach to a technology-driven land administration system. This research highlights the significant importance of innovation, finance, partnerships, capacity and education, and legal and policy frameworks in technology integration in Nigeria's land administration system, in line with FELA. This study also provides a prerequisite for exploring the integration of technology in land administration across the country. Further research is

recommended to evaluate the effectiveness of various technology applications in Nigeria's land administration system and their impact on operations. A comprehensive understanding of these factors is essential to address these challenges and facilitate a smooth transition to a modern and efficient land administration system in Nigeria.

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BIOGRAPHICAL NOTES

Opeyemi Ajayi earned an MA in Economics and Business Administration from Euroakadeemia University, Estonia. He also earned an MSc in Construction and Real Estate Management from HTW Berlin-University of Applied Sciences, Germany, and an MEng from Metropolia University of Applied Sciences, Finland. He is a doctoral researcher at Aalto University Finland. His research interests are Blockchain technology, Land management, Land Registration System and Land Administration.

Dr. Kirsikka Riekkinen, assistant professor of real estate economics, specialised in land management, at Aalto University (Finland), School of Engineering, Department of Built Environment since 2018. The position is jointly funded by Aalto University and National Land Survey of Finland.

PhD Oluwafemi Adekola has a doctoral degree and is a postdoctoral researcher in the department of Built Environment at Aalto University Finland.

CONTACTS

MSc, MEng, MA Opeyemi Ajayi
Doctoral researcher at Aalto University, Finland
0076 AALTO FINLAND
+358468492126
Email: opeyemi.ajayi@aalto.fi

Assistant Professor Kirsikka Riekkinen

National Land Survey of Finland/ Aalto University School of Engineering Department of Built Environment
PO Box 12200
0076 AALTO FINLAND
Email: kirsikka.riekkinen@aalto.fi

PhD Oluwafemi Adekola
Postdoctoral researcher
Aalto University School of Engineering Department of Built Environment.
0076 AALTO FINLAND
Email: oluwafemi.adekola@aalto.fi