

From LISSU to e-GIS: Revisiting Three Decades of GIS Implementation for Land-Use Planning and Management in Lagos, Nigeria

Review Article | Volume 1 | Issue 4 | 2026 | Article Number: 013

Accepted: 18 August 2026 | Published: 10 September 2026 | ISSN: 2979-8582 (Online)



Crossref : <https://doi.org/10.67693/BJCR-JCARJQGB>



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Abstract

The implementation of Geographic Information Systems (GIS) in Lagos has passed through several projects, institutional arrangements and technological generations. Yet the central problem has remained remarkably consistent: how to convert a technically promising system into a dependable part of land-use planning and management. This critical narrative review revisits the Lagos experience from the Land Information System Support Unit (LISSU), through the Lagos State Planning Information Centre (LASPIC) and the Lagos State Geographic Information System (LAGIS), to electronic title processing and the enterprise e-GIS programme launched publicly in 2024. Earlier papers written between 2001 and 2014 are treated as historical evidence and examined alongside current research on digital land administration, spatial data infrastructure and public-sector digital transformation. Official accounts show important progress in record digitisation, electronic titles, state-wide mapping, inter-agency GIS units and online land services. However, there is little independent post-implementation evidence on cadastral completeness, planning integration, service performance, local access or the continued use of shared data across agencies. The Lagos experience indicates that technology alone has never been the main limitation. Project continuity, representative piloting, data custodianship, professional capacity, workflow redesign and public accountability have been more persistent concerns. The paper argues that the present e-GIS phase should be judged by its contribution to everyday planning decisions rather than by the visibility of its portal or equipment. A durable implementation agenda is proposed around coverage, interoperability, institutional responsibility, local service delivery, performance measurement and continuous professional learning. These lessons are relevant to other rapidly urbanising cities where repeated digital projects have not always produced sustained institutional change.

Keywords: Geographic Information Systems, Land-Use Planning, Land Administration, Spatial Data Infrastructure, Digital Transformation, Lagos, Nigeria

1. INTRODUCTION

Land-use planning is fundamentally concerned with location. The planner needs to know where development is taking place, the use to which land is being put, the relationship between a proposed development and an approved plan, and the extent to which infrastructure and environmental conditions can support further growth. These questions become more difficult in a large and rapidly changing city where formal and informal development occur side by side, public records are held by different institutions and decisions made in one agency have consequences for several others. Lagos presents this condition in a particularly demanding form.

The attraction of geographic information systems (GIS) to Lagos was therefore never based on technology for its own sake. GIS offered a means of bringing parcels, planning schemes, development applications, infrastructure, environmental constraints and administrative boundaries into a common spatial environment. Properly implemented, such a system could improve the preparation of plans, land allocation, development control, property registration, infrastructure coordination and public access to planning information. The early expectation was understandable. The difficulty was how to sustain the system after procurement, consultancy and the first demonstration had ended.

This concern appeared clearly in the review of the Land Information System Support Unit (LISSU) in 2001. The system had established an important technical base, but it also revealed weaknesses in continuity, staff preparation, data standards, networking and organisational responsibility. The pilot location was comparatively orderly and did not fully represent the fragmented tenure, informal occupation and deficient records found across much of Lagos (Dekolo, 2001). A subsequent paper on local-authority implementation placed organisational learning, management support, user participation and evaluation alongside hardware and software (George & Dekolo, 2004). The argument in both papers was not that GIS was unsuitable for Lagos. Rather, a system introduced as a project could not be expected to become an institution without changes in the way public organisations produced, shared and used information.

The technological setting has changed considerably since those papers were written. Lagos has moved through computer-generated title documents, electronic document management, digital mapping, specialised GIS units and a public-facing land administration portal. The first set of electronic title documents hosted on the e-GIS platform was signed in September 2022 after land files had reportedly been sorted, merged, scanned and indexed (Lagos State Ministry of Justice, 2022). In January 2024, the state launched an automated portal for land searches and applications, including Governor's Consent, certified true copies and government surveys (Channels Television, 2024). A ministerial briefing in 2025 also reported state-wide orthophoto and LiDAR mapping, GIS units in ministries, departments and agencies (MDAs), regional service arrangements and an expanding enterprise geospatial programme (ThisDay Newspapers, 2025). These are substantial developments, especially when placed against the condition of land information at the beginning of the period.

Nevertheless, the presence of digital infrastructure does not settle the GIS implementation question. A portal may be functioning while the records behind it remain incomplete, or an agency may have a GIS unit without integrating spatial evidence into its routine decisions. Other issues include disagreement among several organisations that may be connected to the GIS servers over which dataset is authoritative. Digital transformation research has consistently distinguished the introduction of technology from the wider changes in processes, responsibilities and public value that give technology institutional meaning (Mergel et al., 2019; Vial, 2019). This distinction is especially important in land administration, where legal rights, planning restrictions, survey records and development decisions must be consistent enough to support both public action and private confidence.

The question addressed in this paper is therefore not whether Lagos has acquired more advanced GIS technology. It clearly has. The concern is whether three decades of implementation have produced an operating arrangement capable of supporting land-use planning and management beyond the life of individual projects and political administrations. What lessons from LISSU, LASPIC and LAGIS remain relevant to the e-GIS programme? Which earlier constraints have been reduced, and which have merely assumed a digital form? More importantly, what evidence should be available before the current programme is regarded as institutionally successful?

These questions may not be limited to GIS implementation in Lagos alone. Many cities in developing countries face rapid peripheral growth, informal land markets, weak records, fragmented mandates, and pressure to demonstrate modernisation through visible digital projects. The long Lagos experience provides an unusual opportunity to examine continuity across successive systems. It also makes possible a more balanced reading of implementation: one that recognises genuine progress but does not confuse a launch, portal or control room with the transformation of planning practice.

2. REVIEW ORIENTATION AND EVIDENTIAL BOUNDARIES

This paper adopts a critical narrative review. It is not a fresh institutional survey and does not present new interviews, transaction records or user analytics. The historical evidence is drawn principally from five Lagos-focused works prepared between 2001 and 2014: the appraisal of LISSU; a paper on implementing GIS in local authorities; the Lagos State Nigerian Institute of Town Planners GIS workshop paper; the paper on GIS education and training; and the assessment of spatial data infrastructure for planning agencies. A later paper on the geospatial requirements of managing the Lagos megacity was also considered. These publications are useful because they recorded the problems, expectations and proposals associated with GIS at different stages of implementation (Dekolo, 2001; Dekolo & Oduwaye, 2005, 2011, 2014; George & Dekolo, 2004). They are used as historical sources and not as evidence of present institutional conditions.

The earlier record was updated through targeted searches of scholarly publisher platforms, institutional repositories and official sources. Search combinations covered GIS implementation, digital land administration, spatial data infrastructure, public-sector digital transformation, fit-for-purpose land administration, data governance, Lagos land services and African geospatial institutions. Priority was given to peer-reviewed articles, United Nations and other intergovernmental frameworks, Lagos State legislation and identifiable official accounts. News reports were retained only where they documented a dated public announcement or attributed a claim to a named government official. Material available up to August 2026 was considered.

The method has important limitations as highlighted here. No independent operational audit of the Lagos e-GIS programme was located, and publicly available information is stronger on facilities, launches and stated achievements than on outcomes. It is possible to verify that electronic title documents were introduced and that a public portal was launched. It is not possible, from those announcements alone, to determine what proportion of cadastral and registry records is complete, how consistently the portal is used, whether inter-agency workflows are sustained, or how the system has affected development-control decisions. Consequently, current government claims are reported as claims, while questions requiring field investigation are identified explicitly.

The review also avoids a simple comparison of old and new technology. The 2001 system operated under conditions that differ greatly from those of cloud services, mobile data capture, application programming interfaces and contemporary remote sensing. A direct technological comparison would have little value. What can be compared more meaningfully are the institutional requirements: continuity, representative

coverage, data responsibility, user participation, professional capacity, workflow integration and evaluation. It is at this level that the Lagos experience has remained most instructive.

3. THE EARLY IMPLEMENTATION EXPERIENCE

3.1 LISSU And The Problem Of A Successful Demonstration

LISSU represented an important attempt to organise land-related information within a GIS environment. Its work included a pilot database, mapping and orthophotography, and it demonstrated that digital spatial information could support land administration in Lagos. For a government then working largely with paper records and disconnected departmental files, this was not a minor achievement. The project created awareness, introduced new technical possibilities and provided a reference point for later initiatives.

Yet the same project exposed a weakness that would reappear in different forms. The pilot could demonstrate that the technology worked without establishing that the organisation could continue to make it work. Intended users were located in different offices, effective networking was limited, and much of the technical knowledge remained associated with external support or a small number of staff. When that support receded, the system lacked the institutional depth required for routine use (Dekolo, 2001).

The choice of pilot area was equally significant, since carrying out such an assignment in a planned government scheme with clearer records was easier to map and organise than the mixed-tenure and informal areas that constituted much of the city. However, a pilot should do more than produce an attractive result. It should reveal the conditions that the eventual system must survive. If the most difficult land records, conflicting claims and unplanned neighbourhoods are excluded, the system is tested against a simplified version of the planning problem. What appears to be technical success may therefore postpone the more serious questions of coverage, adjudication and updating.

This point has gained renewed relevance. Recent World Bank analysis of 101 economies found that cadastral and registry coverage had a stronger association with reported land-access outcomes than the sophistication of digital public services, although digital services were associated with transparency and interoperability with faster property transfers (Srinivasan et al., 2026). The implication for Lagos is direct. A well-designed portal can improve access to records already within the system; it cannot, by itself, compensate for land and interests that remain outside dependable cadastral and registry coverage. The early weakness of an unrepresentative pilot is now the wider problem of incomplete digital coverage.

3.2 From Land Records To Planning Information

The Lagos GIS discussion widened by the middle of the 2000s. The Nigerian Institute of Town Planners workshop paper considered the use of GIS in plan preparation, development management, environmental monitoring, infrastructure and related planning functions. It also reflected on the Lagos State Planning Information Centre (LASPIC) as part of a broader planning information environment (Dekolo & Oduwaye, 2005). This was an important movement away from the assumption that a land-information project would automatically meet the needs of planning.

Land administration and land-use planning are closely related, but they are not interchangeable. A title or parcel record describes an interest in land and its spatial extent. Planning must additionally address present use, permissible use, density, access, infrastructure capacity, environmental constraints, development standards and the cumulative effects of individual decisions. A parcel may be correctly registered and still be developed contrary to an approved scheme. Conversely, a planning authority may have a good land-use plan but be unable to enforce it where parcel and ownership information is inaccessible. The value of GIS lies partly in bringing these records into a relationship that can support actual decisions.

The period also drew attention to the diversity of users. Senior officials require policy indicators and summaries, while development-control officers need current schemes, parcel information, application histories and inspection records. Surveyors, land officers, planners, infrastructure agencies and local service offices work at different points in the information chain. A system designed around a single technical unit is unlikely to meet these varied needs. The 2004 local-authority paper therefore proposed an evolutionary and participatory approach in which users helped to define requirements and the system was reviewed as experience developed (George & Dekolo, 2004).

This was more than an argument for consultation. It recognised that the requirements of a planning GIS cannot be completely known before users begin to work with it. The first version should be sufficiently useful to support a real task, but flexible enough to incorporate lessons from practice. This approach also reduces a familiar danger in public-sector technology projects: specifications prepared mainly by consultants or senior managers may describe an ideal system while overlooking the informal procedures through which work is actually completed.

3.3 LAGIS And The Unresolved Infrastructure Question

LAGIS brought a new scale and visibility to digital land administration in Lagos. It provided a stronger base for mapping, land information and the management of title processes, while later work identified its potential contribution to the broader requirements of a megacity (Dekolo & Oduwaye, 2011). The central question was how a specialised land-information system could become infrastructure for planning and other public services rather than remain a largely sectoral application.

A study of land registration in Lagos later confirmed that GIS was already being used within the land sector, although the extent of use and the links required across departments remained limited (Alagbe & Ojo, 2021). This is an important distinction. The existence of GIS within an agency does not establish that the same information is available at the points where plans are prepared, development proposals are assessed or building activity is monitored.

An assessment of planning institutions in 2014 reported persistent constraints involving long-term vision, standards, data quality, cost, management support, legal and policy conditions, professional capacity, training and awareness (Dekolo & Oduwaye, 2014). Those findings belong to their period and cannot be carried forward automatically. They are nevertheless valuable because they identify the conditions against which later enterprise arrangements should be assessed.

Spatial data infrastructure is not achieved simply because several datasets are stored on a server or displayed through the same viewer. It requires agreed custodians, common identifiers, standards, metadata, update procedures, access rules and arrangements for resolving disagreement. The African guidelines for national spatial data infrastructure similarly define SDI as a combination of technologies, policies and institutional arrangements that makes spatial data available and usable across organisations (United Nations Economic Commission for Africa [UNECA], 2022). In Lagos, the relevant information is produced by several bodies, including the Lands Bureau, the Office of the State Surveyor-General, physical planning and building-control institutions, environmental and infrastructure agencies, land-use charge institutions and local government structures. The continuing usefulness of an enterprise system depends on how these bodies maintain their part of the whole.

The difficulty is not unique to Lagos. African SDI experience has repeatedly been constrained by fragmented mandates, limited policy support, inconsistent funding and uneven technical capacity. Current global work has consequently moved beyond the idea of SDI as a static data repository towards a federated geospatial ecosystem embedded in digital public infrastructure and public service delivery (Agrawal,

2025). The language may be new, but the institutional message is familiar: data will not remain useful merely because it has once been collected.

4. THE ENTERPRISE E-GIS PHASE

4.1 Electronic Records And Title Processing

The move from deteriorating paper files to electronic document management addressed one of the most visible weaknesses of the earlier period. Lagos State reported that land files used in processing title documents had been sorted, merged, scanned, indexed and digitised before the first electronic titles hosted on the e-GIS platform were signed in September 2022 (Lagos State Ministry of Justice, 2022). Digital preservation, indexing and document security can reduce physical deterioration and make retrieval more efficient. They also create the possibility of tracing the history of a transaction more consistently than fragmented paper files allow.

There is, however, an important distinction between the image of a document and the structured land information needed for planning. Scanning preserves what is on the paper; it does not automatically reconcile duplicate interests, correct survey geometry, establish a common parcel identifier or connect a title to a current planning designation. Data conversion is therefore not complete when the last file is scanned. It is complete only when the legal, spatial and administrative relationships required by the operating workflow are sufficiently reliable for use.

The experience of Ghana is relevant. Its two-decade transition towards a digital land information system improved service delivery and accountability, but analogue and digital processes continued to coexist. Further progress remained dependent on divisional integration, workflow change, funding, data quality, communication and implementation of the supporting legal framework (Ansah et al., 2024). This comparative case is useful for Lagos because it shows that the period immediately after digitisation is not the end of institutional learning. It may be the stage at which unresolved manual practices become more visible.

4.2 The 2024 Public Portal

The launch of the automated land administration portal in January 2024 marked a significant change in the relationship between the system and the public. The launch account stated that applicants could search, verify and apply for land titles, including Governor's Consent, request a government survey and obtain a certified true copy without relying entirely on physical visits to the Lands Bureau (Channels Television, 2024). The portal was also presented as an instrument for reducing delay, limiting unofficial intermediation, improving transparency and supporting collaboration among government agencies.

These are legitimate objectives. A public portal can make requirements clearer, record when an application entered the system, reduce repeated visits and provide data on where a transaction is delayed. It may also widen access for applicants outside the immediate administrative centre. Yet the benefits depend on the full transaction, not the front page. An application that begins online but returns repeatedly to undocumented manual checks has not become a digital service in the substantive sense. Similarly, an applicant who cannot understand the requirements, upload the necessary evidence or obtain assistance may experience a new form of exclusion rather than improved access.

Digital transformation of land administration is therefore concerned with the movement of the whole sector from paper-based service towards responsible digital operation, including the legal, organisational, financial and human conditions required to sustain it (Food and Agriculture Organization of the United Nations [FAO], United Nations Economic Commission for Europe [UNECE], & International Federation of Surveyors [FIG], 2022). In practice, this means that the portal should be assessed together with

back-office processing, inspection, payment, correction of records, professional judgement, notification, appeal and final delivery.

The available Lagos evidence is not yet sufficient for such an assessment. Public sources document the launch and the services intended, but no independent study was located on completion rates, processing times, rejected applications, system availability, user satisfaction or differences in access among locations and social groups. This absence is not evidence of failure. It indicates that the next stage of the programme requires an evaluation framework capable of demonstrating what has changed in the experience of applicants and officers.

4.3 Reported Enterprise Expansion In 2025

The 2025 ministerial account presented a wider enterprise programme. It reported that the e-GIS initiative began in 2016, that the e-GIS Office was formally established in 2021, and that the programme included the integration of key agencies, state-wide mapping using orthophoto and LiDAR products, GIS units in MDAs, distribution of geospatial toolsets, a regional outlet and other sectoral applications (ThisDay Newspapers, 2025). If sustained, these components could provide a stronger institutional base than the isolated installations of the earlier period.

The significance of state-wide imagery and elevation data extends beyond land registration. Current base mapping can support scheme review, flood-risk assessment, transport planning, infrastructure design, building monitoring and the identification of development outside approved areas. The creation of GIS units in MDAs can also reduce the distance between a central technical office and the agencies that produce or use operational information. However, decentralised units will add value only where there is a common architecture and continuing responsibility for updates. Otherwise, the enterprise arrangement may reproduce the former pattern of separate departmental datasets, now with more advanced equipment.

Remote sensing has also become increasingly useful for land administration, particularly for updating base information and identifying physical change over wide areas, although legal recognition, accuracy, institutional acceptance and integration with cadastral processes remain important limitations (Bennett et al., 2021). The availability of new imagery in Lagos should therefore be accompanied by a clear procedure for converting observed change into a verified planning or land-administration record.

The public account also needs to be read with appropriate caution. It records government-reported achievements and intended functions; it is not an independent audit of coverage, accuracy, interoperability or use. There remains a need to know the date, specification and update cycle of core datasets; the agencies actively maintaining shared layers; the extent to which planning and building-control workflows consume the same parcel and address records; and the arrangements for public, professional and restricted access. These are the matters that determine whether an enterprise GIS is operating as infrastructure.

5. WHAT HAS CHANGED, AND WHAT REMAINS UNCERTAIN

Land records	Dispersed and deteriorating paper records; limited pilot coverage	Files reportedly scanned, indexed and connected to electronic title workflows	Completeness, legal reconciliation, parcel linkage and coverage of informal and privately held land
Public access	Specialist and mainly back-office installations	Online searches and applications for specified land services	Successful completion rates, accessibility, assisted access, user cost and complaint resolution

Mapping	Restricted pilot coverage and difficulty maintaining current information	State-wide orthophoto and LiDAR mapping reported	Accuracy, date, licensing, update cycle and routine use in planning decisions
Institutional arrangement	Consultant dependence, weak continuity and disconnected users	Dedicated e-GIS Office and GIS units reported across MDAs	Stable staffing, budgets, custodianship, succession and evidence of inter-agency updating
Planning integration	Land records insufficiently connected to plan preparation and development control	Integration with physical planning and other agencies stated as an enterprise objective	Shared identifiers and live workflows linking titles, schemes, permits, inspection and enforcement
Evaluation	Limited continuous appraisal	Digital transactions create the possibility of auditable performance data	Published service indicators, independent data-quality checks and planning-outcome evaluation

The table shows that Lagos has moved beyond the technical setting described in 2001. It also shows why the current programme should not be assessed through a simple success-or-failure label. Some earlier deficiencies have been addressed materially. Others can only be judged when operational evidence is available. Five issues deserve particular attention.

5.1 The Project-Institution Gap

The most consistent lesson is that public-sector GIS can survive technically without becoming part of ordinary institutional practice. Earlier projects relied heavily on external support, special funding and a small group of committed officers. Contemporary enterprise systems may reduce some of this dependence, but they also introduce new reliance on vendors, proprietary platforms, cloud services and specialised integration knowledge. If the state cannot maintain the data model, understand the configuration, replace trained staff and negotiate future changes, dependence has not disappeared; it has become less visible.

Campbell and Masser (1995) observed that effective GIS implementation involves changes in organisational responsibilities and relationships rather than acquisition alone. More recent adoption research reaches a comparable conclusion. Organisational support, resources, social conditions and perceived usefulness influence GIS adoption, but individual acceptance cannot explain whether a system becomes embedded in practice (Alzahrani et al., 2024). Bawa's (2024) activity-theory study of land management is especially relevant because it places the technology among actors, rules, divisions of labour and expected outcomes. Officers may be technically competent and still return to the former procedure when the new workflow is not authorised, rewarded or accepted by collaborating agencies.

Institutionalisation is therefore seen when the system continues under routine budget conditions, when responsibilities survive staff movement, and when the correction of data is part of normal work rather than a special exercise. The e-GIS programme should be protected from becoming another named project whose capacity declines when attention shifts elsewhere.

5.2 Coverage And The Quality Of The Digital Record

The early concern about the representativeness of the LISSU pilot has become more important as the system expands. Lagos contains formal schemes, excised areas, family lands, government acquisitions, informal subdivisions and rapidly changing peri-urban settlements. A digital record that covers the most

orderly parts of this landscape may still leave planning agencies with inadequate evidence where growth is fastest and disputes are more likely.

Fit-for-purpose land administration offers a practical response. It emphasises methods that are flexible, inclusive, affordable and capable of incremental improvement, rather than delaying useful coverage until the most technically sophisticated standard can be achieved everywhere (Chigbu et al., 2021; Koeva et al., 2021). The approach should not be misunderstood as acceptance of poor-quality data. It requires that the quality be appropriate to the decision, clearly described and improved through a planned process.

For Lagos, this suggests a differentiated but connected strategy. High-precision cadastral records may be essential for particular legal transactions, while planning and service-delivery tasks may initially require broader parcel, occupancy, address and development information that can be improved over time. Metadata should indicate origin, date, method, accuracy and restrictions so that officers understand what each layer can support. The 2026 World Bank findings reinforce the priority: coverage and interoperability should be strengthened before assuming that additional front-end digital services will resolve land-access constraints (Srinivasan et al., 2026).

5.3 Interoperability And Data Custodianship

Interoperability is often presented as a technical problem of formats and software. In Lagos, it is equally a question of authority. Who is permitted to create a parcel, correct an address, amend a planning zone or confirm that a road reservation remains valid? Which agency has responsibility for notifying others when a record changes? What happens when the survey, title and planning records do not agree? Without answers, digital connection may transmit inconsistency more quickly without resolving it.

The United Nations Integrated Geospatial Information Framework identifies governance, law and policy, finance, data, innovation, standards, partnerships, capacity and communication as connected strategic pathways (United Nations Committee of Experts on Global Geospatial Information Management [UN-GGIM], 2023). The Framework for Effective Land Administration similarly places people, accountability and inclusion within land-information reform (UN-GGIM, 2020). These frameworks are relevant because they resist the treatment of technology as an independent pathway.

A workable Lagos arrangement need not place every dataset under one office. A federated system may be more appropriate, provided that each core dataset has a recognised custodian, agreed quality requirements, a trigger for updating, a common identifier where relationships are required, and a procedure for resolving disputes. Recent NSDI research also favours federated governance and outcome-based geospatial ecosystems over a single static repository (Agrawal, 2025). The central e-GIS Office would then provide standards, catalogues, shared services, quality assurance and coordination, while the originating agencies remain responsible for maintaining information produced through their statutory work.

5.4 Capacity As An Organisational Responsibility

Training was identified as a missing link in the Lagos and African GIS experience two decades ago. The problem was not only the number of people who could operate software. It included the absence of GIS understanding among managers, planners and other professionals who were expected to commission work, interpret results and make decisions. The issue remains, although the required competencies are wider. Contemporary planning organisations need skills in data governance, metadata, privacy, interoperability, spatial analysis, web services, remote sensing, quality assurance and the responsible use of automated methods.

Capacity is not built by isolated workshops alone. Staff require access to the system, responsibility for real tasks, technical support and a progression route through which competence is retained. Managers also need

enough understanding to distinguish an impressive visualisation from evidence that can support a statutory decision. Universities and professional bodies can contribute through continuing professional development, applied studios, independent evaluation and courses that link GIS to planning law and administrative practice.

The organisational setting remains decisive. Where officers are trained but not assigned to relevant duties, competence is quickly lost. Where a system is managed almost entirely by vendors, public officers may become users of menus rather than custodians of institutional knowledge. Documentation, mentoring, succession and transfer of technical knowledge should therefore be written into implementation agreements and annual work programmes.

5.5 Local Access And The Risk Of Digital Exclusion

Land-use planning is experienced at the local level, even when the platform is state-wide. Applicants seek information about a parcel, submit development proposals, receive inspections and respond to enforcement within particular communities. If the enterprise system is strong at the centre but weak at local service points, informal workarounds will continue. The reported plan for regional e-GIS outlets is consequently important, but its value will depend on staffing, connectivity, authority and the range of transactions that can be completed without returning to the central office.

The digital portal should also be assessed from the position of users who do not complete their applications successfully. Limited digital confidence, unreliable connectivity, inaccessible document requirements and the cost of professional assistance can affect participation. Smart-city research in developing countries has shown that fragmented authority, limited skills, inadequate infrastructure and exclusion can undermine technology-led reform even where the technical ambition is strong (Tan & Taeihagh, 2020). Assisted digital access is therefore not a temporary concession. It is part of an inclusive service arrangement.

6. TOWARDS A DURABLE LAGOS GEOSPATIAL OPERATING ARRANGEMENT

The next stage of implementation requires less emphasis on another project name and greater attention to the way geospatial information is governed across the planning system. Six related actions arise from the evidence.

6.1 Define The Planning And Public-Service Outcomes

Implementation should begin with the decisions and services that the system is expected to improve. These may include reducing the time required to verify a parcel, identifying conflicting land records earlier, checking development proposals against approved schemes, monitoring encroachment on rights-of-way, coordinating infrastructure investment and making planning information easier to understand. Each outcome requires a baseline, responsible institution, target, evidence source and review date.

This approach changes the meaning of success. System uptime and the number of scanned files remain useful technical indicators, but they do not reveal whether planning decisions are quicker, more consistent or more accountable. The 2025 global NSDI assessment argues that geospatial infrastructure should be connected to sectoral outcomes such as permitting, service delivery, environmental management and public trust (Agrawal, 2025). Lagos should make this connection explicit.

6.2 Establish A Coverage And Data-Improvement Programme

A transparent inventory is needed for the core datasets that support land administration and planning. For each dataset, the inventory should state geographic coverage, date, positional and thematic quality, legal status, custodian, update procedure, access condition and known gaps. Priority should be given to the areas

where planning pressure, informal development and record uncertainty are greatest, rather than only to locations where conversion is easiest.

Improvement should be incremental and documented. A record need not be perfect before it becomes useful, but officers must know its limitations. Where title, survey and planning information conflict, correction should follow a defined process and leave an auditable history. In this way, everyday transactions can gradually improve the common record instead of producing another layer of unrecorded exceptions.

6.3 Connect Complete Workflows, Not Only Databases

The relationship between land registration, planning approval, building control, infrastructure and environmental regulation should be mapped from beginning to end. The exercise should identify repeated data entry, waiting points, unofficial exchanges, duplicated inspections and decisions that occur outside the system. Only then can integration be designed around the work rather than around organisational charts.

Some checks may be automated, particularly where a parcel can be compared with an approved scheme, acquisition boundary, road reservation or hazard layer. Professional judgement must nevertheless remain visible and accountable where planning considerations cannot be reduced to a rule. The Lagos State Urban and Regional Planning and Development framework, including the 2019 amendment, remains the legal setting within which digital procedures must operate (Lagos State Government, 2019). Automation should clarify compliance with that framework, not create a parallel administrative process.

6.4 Assign Custodians And Formalise A Federated Governance Structure

Each core dataset should have an institutional custodian and an identified data steward. A state geospatial governance body may provide policy direction, while a technical secretariat supports standards, catalogues, identifiers, access services and quality assurance. The arrangement should include the Surveyor-General, land administration institutions, physical planning and building-control agencies, infrastructure and environmental bodies, local service structures, academia and relevant professional organisations.

Not all information should be open. Personal and legally sensitive data require protection, while planning schemes, public facilities, road reservations, addresses and other reference layers may have a strong case for wider access. A tiered access model can distinguish open public information, professional services, authorised government data and restricted personal records. Clear licensing and audit trails are preferable to the informal restriction of data that officers may then exchange through uncontrolled copies.

6.5 Publish Performance And Assurance Information

Digital transactions make continuous evaluation possible. A concise public scorecard could report portal availability, processing times, backlog, incomplete applications, correction of conflicting records, geographic coverage, age of key datasets, complaints, appeals and user satisfaction. The indicators should be interpreted together. Faster processing is not an improvement where legal or planning checks have been weakened, and a high volume of approvals is not evidence of good planning where approved schemes are disregarded.

Periodic independent review is also necessary. Universities, professional bodies and other qualified institutions can examine data quality, workflow performance, user experience and planning outcomes without taking over the statutory responsibilities of government. The aim is not to search for failure. It is to identify where public investment requires adjustment before weaknesses become embedded.

6.6 Preserve Institutional Knowledge And Professional Learning

The history of GIS in Lagos shows the cost of institutional memory that remains with individuals. Technical documentation, system architecture, data dictionaries, decision logs, training materials and unresolved issues should form part of the programme record. Vendor contracts should include knowledge transfer and access to the documentation necessary for future maintenance and change.

Professional learning should equally be continuous. Different levels of competence are required for data stewards, analysts, planners, managers, local officers and system administrators. Training should be linked to assigned work and assessed through actual outputs. Staff movement and retirement should trigger succession arrangements before critical knowledge is lost.

7. DISCUSSION

The Lagos record demonstrates that GIS implementation is not a linear movement from paper to digital government. It is a recurring negotiation between technology and institutions. LISSU established that digital land information was possible, but also showed the limits of a consultant-dependent and narrowly tested system. LASPIC widened the concern to planning information and the diversity of users. LAGIS provided a stronger land-administration base, while the later SDI debate exposed the need for standards, shared responsibility and inter-agency coordination. The e-GIS phase has now brought electronic titles, public-facing transactions, wider mapping and enterprise structures into the same institutional landscape.

This development should be recognised. It would be inaccurate to describe the present system as a simple repetition of LISSU. The scale, technology, public visibility and reported organisational reach are different. At the same time, several early lessons remain because they concern how public institutions work. A system still requires representative coverage, continuity after project support, staff who can use and govern it, users who can influence its design, and evidence through which performance is reviewed. Technology has altered the available solution; it has not removed these requirements.

The recent international evidence strengthens this interpretation. Land-administration modernisation studies identify policy, legal alignment, data quality, governance, financial sustainability and user orientation as connected elements rather than independent technical choices (Jahani Chehrehbargh et al., 2024a, 2024b). The Ghana experience shows that manual and digital processes can coexist for a considerable period, even where institutional mandates are clear (Ansah et al., 2024). Fit-for-purpose practice in Africa emphasises coverage and incremental improvement, while the World Bank's 2026 analysis warns against placing sophisticated digital services on an incomplete cadastral foundation (Chigbu et al., 2021; Srinivasan et al., 2026). Taken together, these studies support a cautious but constructive reading of Lagos.

The practical test is whether spatial evidence has become ordinary in planning work. Can an officer examine a current parcel, approved scheme, development history, infrastructure condition and relevant restriction without sending several informal requests? Can a record disagreement be referred through an established procedure? Can an applicant understand the stage reached and the reason for delay? Can a manager identify where the service is failing from the data produced by the workflow? These outcomes are less visible than a launch event, but they reveal whether the system has become institutionally useful.

The paper also raises a broader issue for developing-country cities. Digital transformation is sometimes pursued as a visible sign of administrative modernity, while the less visible work of record reconciliation, legal adjustment, staff development and inter-agency cooperation receives weaker attention. This imbalance can produce a sophisticated interface resting on fragile institutional foundations. Lagos has the experience and technical base to avoid that outcome, provided that the present programme is treated as a

continuing operating reform rather than a completed installation.

8. RESEARCH PRIORITIES AND LIMITATIONS

There is now a need for empirical research that moves beyond implementation announcements. First, a transaction study should compare processing time, repeated work, exceptions and completion outcomes across selected land services before and after the 2024 portal. The analysis should distinguish applications that were completed entirely through the intended workflow from those that required manual intervention.

Second, a cadastral and planning-data audit should cover formal schemes, informal settlements and rapidly changing peri-urban locations. Such an audit would establish whether the areas most in need of planning attention are adequately represented, the degree to which parcel, title and planning records correspond, and the frequency with which officers encounter information that is outdated or disputed.

Third, selected applications should be traced across the Lands Bureau, Surveyor-General, physical planning, building control and relevant infrastructure institutions. This would show where data moves successfully across agencies and where staff continue to depend on static copies, informal contacts or repeated entry. An organisational network study could complement the workflow analysis by identifying who actually produces, corrects, authorises and uses the information. User research should include unsuccessful applicants, residents who need assisted access, professionals who submit applications regularly and frontline officers who respond to incomplete records. Portal users who complete a service successfully are important, but they provide only part of the experience. The study of digital inclusion should also consider connectivity, language, disability, cost and the availability of regional support.

Finally, there is a need to assess planning outcomes. It is not enough to know that land transactions are processed electronically. Research should examine whether current spatial data has improved conformity with approved plans, protection of rights-of-way, identification of hazardous development, infrastructure coordination and the management of peri-urban growth. These are the public planning purposes that ultimately justify the investment.

The limitations of the present paper must be restated. It relies on historical publications, peer-reviewed research, legal material and publicly available institutional accounts. No primary operational data were available, and the review cannot confirm the internal performance of the e-GIS programme. Its contribution is to place current developments within the longer Lagos implementation history, identify what is supported by evidence and set out the questions that a proper post-implementation evaluation should answer.

9. CONCLUSION

Lagos has travelled a considerable distance from the period of LISSU. Land records have been digitised, electronic title processes introduced, a public portal launched and an enterprise geospatial programme extended across several government functions. These developments create opportunities for land administration and planning that were not technically or institutionally available at the beginning of the period. Nevertheless, three decades of experience show that GIS does not become sustainable because the technology has improved. The decisive issues are whether the records cover the places and interests that matter, whether agencies maintain and share authoritative information, whether officers can use the system in real work, whether the public can complete services fairly, and whether performance is measured openly. These were present in the earlier implementation debate and remain relevant to the e-GIS phase.

The current programme should therefore be regarded as the beginning of a service and institutional phase, not the conclusion of implementation. Coverage must be expanded and improved; workflows connected; custodians and data stewards assigned; local access strengthened; performance published; and professional

learning retained within government. If these arrangements are sustained, the Lagos e-GIS can move beyond the history of successive projects and become part of the ordinary machinery of land-use planning and management. That is the more demanding achievement, and it is the one by which the present investment should ultimately be judged.

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