

Electronic Land Registration: A Re-Engineering of Land Administration in Jamaica (14046)

Wayneworth G. HAMILTON and Christopher S. MCPHERSON, Jamaica

Keywords: Reengineering, Electronic Registration System, Land Administration Domain Model, Digitalisation

SUMMARY

The Government of Jamaica (GOJ) aims to modernise land administration systems as a key part of its e-government objectives. The Electronic Registration Project (eTitles) supports the GOJ's goals for transparency, efficiency, and economic growth through digital governance. This initiative is a fundamental component of the National Land Agency's broader digital transformation programme under the Ministry of Economic Growth and Job Creation (MEGJC). The ambitious plans of the NLA are expected to improve land registration processes through computerised and automated systems designed to enable online access to all land records, digital submission of survey files, automated checking and certification of survey plans, electronic land registration applications, and an enhanced customer service experience (Government of Botswana, 2011).

According to Tembo et al. (2014), the transition from the current state to e-registration will face challenges. These include outdated legislation, the condition of the digital juridical cadastre, duplication in workflows, siloed operations across various sectors of the NLA, geodetic reference issues, human resource capacity constraints, and change management. Critical success factors for eTitles include overcoming the cultural hurdle of proprietors holding a physical record of land interests being replaced by a digital file, authenticating this digital file, and addressing the perceptions of key stakeholders.

Williamson and Ting (2001) offered an insightful approach to the Jamaican venture, proposing that a conceptual model of choice should be grounded in the social fabric of the operating environment, shaped by factors such as technology and urbanisation. The consultant, FUJITSU Caribbean (Jamaica) Limited, conducted a comprehensive review of the NLA's processes, systems, workflow, operators, and infrastructure to prepare an inception report. This report, together with a scoping activity involving the Land Titling and Survey Agency (LTSA) in British Columbia, Canada, and a detailed future projection, will be integrated to define the project scope.

Dale and McLaughlin (1999) noted that Land Registration Systems serve as a methodology for safeguarding proprietary rights, outlining the conditions and extent of land

rights, as well as the alienation and transfer of property rights. The re-engineering of Jamaica's Land Registration system will be enthusiastically adopted to address current challenges. The planned e-Titles system will bring both challenges and opportunities.

1.0 INTRODUCTION

According to Hammer and Champy (1993), reengineering can be broadly defined as a fundamental rethink and radical redesign of business processes to generate significant improvements in critical contemporary performance metrics, such as service delivery standards, quality and cost.

Tuladhur (2003) disaggregated this definition to provide an insightful perspective on the current operational reality, the future state, and the rules, assumptions, principles, and processes required to realise this quantum leap. The initial thrust of this approach was to develop an understanding of the “fundamental rethinking” required. The consultant, who was onboarded to Jamaica's Electronic Registration System, conducted an extensive investigation into the operations of the Surveys and Mapping Division, the Land Titles Division, the Land Valuation Division, and the support services provided by the Business Services Division. This research scope encompassed all operational workflows and nuanced procedures that addressed the fundamental questions of the delivery process and the rationale for the various methods.

The analysis of these processes by the NLA Technocrats and the Consultant provided an exploratory look at the tacit rules and assumptions that undergirded the business operations. According to Tuladhur (2003), these rules and assumptions are typically obsolete, erroneous or inappropriate. The NLA reality is premised on adjudication, surveying, and registration, with each pillar having distinct legal requirements and workflows, rules, and assumptions. The analysis indicated that duplicates and bottlenecks existed within each pillar. The siloed approach necessitated this reality over several decades. The current approach was deemed no longer capable of efficiently determining, describing and registering proprietary rights.

The archaic nature of the NLA's business processes required a “radical redesign” that amounted to an entirely novel approach rather than superficial modifications. Tuladhur (2003) argued that the registration system in Nepal was designed for fiscal purposes; however, the requirements have since evolved to require greater security of tenure and easier access to land to more effectively stimulate the land market. It is conceivable that this paradigm shift in requirements required a degree of radicalism to fulfil the new requirements.

The Jamaican reality is not dissimilar, as the prevailing view is that the current cadastral, valuation, registration and business support services must be migrated to a new digital paradigm to meet the needs of a modern Jamaica and, more importantly, to support the future needs of a land administration system by the citizenry. The GOJ's investment must now deliver “significant improvements” that deliver a quantum leap in performance, quality and customer satisfaction for Jamaica's land administration system.

The quagmire to be successfully charted is the process that will deliver the desired digital transformation. A working definition of a process is an aggregation of activities that

require one or more inputs to generate an output of significant value to a customer (Hammer et al., 1993). The crux of reengineering is therefore to deliver a new approach in which routine elements should be automated. The inherent focus of reengineering is on processes rather than on functionality, leveraging existing technology to advance national development goals.

According to Erfa (2020), land administration must transition from the conventional to a digital base to propel national development goals. It is therefore necessary to migrate towards complete digitalisation of work such as systematic land registration. The NLA facilitates the digital submission of Cadastral Maps, which are digitally checked but revert to a paper-based state at the point of approval to enable the surveyor's signature. The file is then scanned to be vectorised and integrated into the National Cadastral Map. Cadastral Plans are submitted, checked and approved in a paper-based system. The file is scanned for archiving and vectorised to be entered into the National Cadastral Map.

2.0 METHODOLOGY OF REENGINEERING

According to Tuladhur (2003), the genesis of reengineering lies in exploring the potential of combining several jobs into one. The NLA operational reality indicated that several steps may be combined. Distinctive jobs and steps were identified that can be merged or reorganised within reengineering activities. The NLA operational mandate was disaggregated into vertical and horizontal processes. These processes have decision-makers at each stage overseeing the operatives within a rigid hierarchical structure. The vertical and horizontal processes must be combined wherever practicable to ideally eliminate, or at least reduce, the seemingly non-value-adding activities. The combined approach is projected to be characterised by efficiency, cost-effectiveness, customer satisfaction and the empowerment of the operatives.

There is a glaring need within NLA processes to sequence activities to reflect a natural order that fosters stakeholder transparency. Additionally, the NLA operates on the premise that all inputs are processed identically to ensure a consistent output. The transformation will require a system comprising multiple versions of the same process, aligned with the nuanced requirements of different stakeholders or inputs. The critical component will be to maintain economies of scale to ensure the cost-effectiveness of a mass-deliverable system (Tuladhur, 2003).

In Jamaica, as in many developing countries, citizens typically travel to an NLA location to conduct land-related functions. This centralised approach is generally costly and arduous, which may contribute to the country's low land registration rate. The future requires a more decentralised approach that provides a public-facing customer interface to avoid the need to commute to NLA facilities.

The NLA processes are designed around check-and-certification steps, all of which are documented to support control mechanisms. These steps are structured to minimise nefarious activities rather than to enhance efficiency. The transformation will logically reduce these checkpoints and the physical recording of each step, thereby improving service delivery standards and cost-effectiveness (Tuladhur, 2003).

Antiquated processes in land administration systems typically rely on paper-based approaches. This reality requires the mass scanning of documents such as survey plans, caveat cards, and certificates of title. The NLA operations will require the digitalisation of records through scanning. This process will logically require establishing standards for the indexing and storage of information. Classically, increased digitalisation of land records will accentuate the need for robust accountability, document integrity, and data protection mechanisms. The scope of digitalisation includes approximately 106,00 Caveat Cards, 90,000 Bound Volume Titles, and 257,846 Loose-Leaf Titles.

The Electronic Registration System of Jamaica will require strong stakeholder engagement, public education and staff capacity-building. This scope of work requires public education, stakeholder consultation, staff training, and a major change-management operation. Another critical success factor is the establishment of clear and consistent rules of digitally regulating processes, both formally and materially.

According to Rahim et al. (2024), digital regulation has inherent benefits, including minimising fraud, eliminating duplicate certificates, improving cost-effectiveness, and ultimately reducing land disputes. Hamni (2012) postulated that land registration is an administrative function of the government to protect land rights. In a digital system, it is therefore necessary to maintain juridical and spatial data to provide evidence of land parcels and the rights pertinent to each spatial unit.

3.0 CHALLENGES OF E-REGISTRATION

A system designed to enhance public access and improve the stakeholder experience will invariably require a higher level of security. Sandberg (2010) postulated that the main challenge of e-registration stems from identifying parties to transactions and authenticating documents. The threat of cybercrime and electronic fraud is imminent. Jamaica has embarked on a robust data protection and cybersecurity agenda, including legislation, infrastructure and capacity building.

The Jamaican reality is characterised by legislation that does not align with the operational structure of electronic registration. Under the current legislation, digital signatures are not admissible in the surveying and registration processes. Digital signatures will be required for submissions by applicants and approvals by state technocrats; therefore, amendments will be necessary to support their use.

The use of digital signatures requires a secure element because the public has access to the legal cadastre. According to Tembo, Kampamba and Nkwae (2014), the Lantmateriet Offices in Sweden developed a comprehensive computerised land registration system that incorporated biometric signatures. The inherent challenge in the Swedish case study lies in the need for file authentication. Authentication was suggested by initialling each page of a document. Stakeholder engagement is vital in this regard, as the agreement of all stakeholders is required.

The Nepal case study proposed establishing a Department of Land Information and Archives (DoLIA) to underpin a national Land Information System. This approach was deemed ineffective due to the absence of standard data models, poor-quality data sources, limited technical capacity, unrealistic stakeholder expectations, and computerisation without an analysis of the current system (Tuladhar et al., 2002).

The cadastral system of Jamaica employs multiple standards of accuracy for urban and rural areas. Additionally, Jamaica transitioned from an imperial to a metric terrestrial reference framework, with technical implications for the compilation of the National Cadastral Map. According to Marra et al. (2017), an essential component of Land Administration is a map-based cadastre. This platform provides a spatial representation that enables the visualisation of parcel boundaries and conflicts between them. In Brazil, the lack of spatial representation of land, which did not cover most of the territory without overlaps and gaps, was described as a “hard limitation in Brazil” (Marra et al., 2017).

The National Cadastral Map of Jamaica is compiled and maintained by the NLA within a Geographic Information Systems (GIS) environment. Topological issues arising from gaps and overlaps can give rise to legal issues. The juridical cadastre records legal interests in land. The spatial record indicates ownership conflicts in which registration duality appears in the cadastre but may not exist in practice. This situation creates a conundrum between *de jure* and *de facto*.

A key legal issue in Jamaica is that the cadastre comprises registered and unregistered parcels, effectively combining the juridical and fiscal cadastres. The legislative instruments that underpinned these cadastres made no specific reference to one another. The topology of the spatial unit supporting land registration and conveyancing in a digital environment must be addressed to support the Electronic Registration Project.

The NLA has ten (10) divisions, which are the Adjudication Services Division (ASD), Business Services Division (BSD), Surveys and Mapping Division (SMD), Corporate Services Division (CSD), Corporate Legal, Land Valuation Division (LVD), Estate Management Division (EMD), Land Titles Division (LTD), Information and Communication Technology (ICT) and the Land Administration and Mapping Department (LAMMD).

Figure 1.0 illustrates the operational interdependencies within the division, which are fraught with duplication and repetitive steps. The siloed approach exacerbates these inefficiencies, as each division contains duplication and repetitive steps. This reality is causative of organisational issues that affect the overall service delivery standards of each branch and the entire NLA. The Surveys and Mapping Division, which is operating below efficiency levels due to numerous issues, underpins the NLA’s operations.

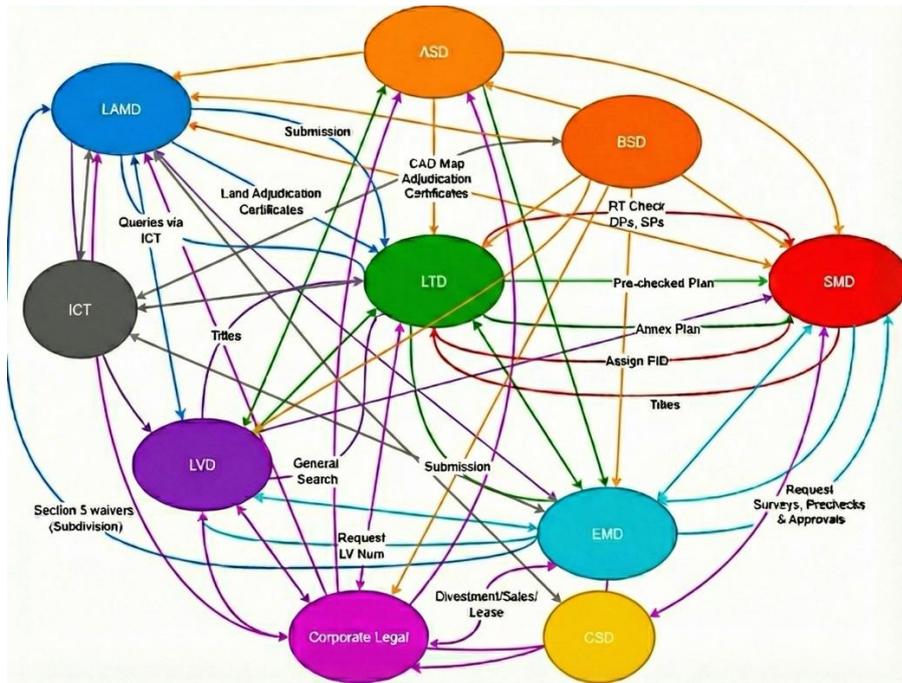


Figure 1.0. Operational Relationships among Division of the National Land Agency, Jamaica

The need to standardise NLA processes is a critical success factor for the implementation of the eTitles Project. A universal framework, such as the Land Administration Domain Model (LADM), is required to address this need. According to Friis-Hansen (2025), the LADM is an international standard (ISO 19152) that provides a universal framework for structuring land administration information, encompassing people, rights, responsibilities, and land parcels (2D/3D). The LADM facilitates interoperability and the efficient implementation of digital land management systems globally, particularly for linking stakeholders such as government agencies and private entities. Figure 2.0 illustrates the core relationships of the proposed LADM for the NLA.

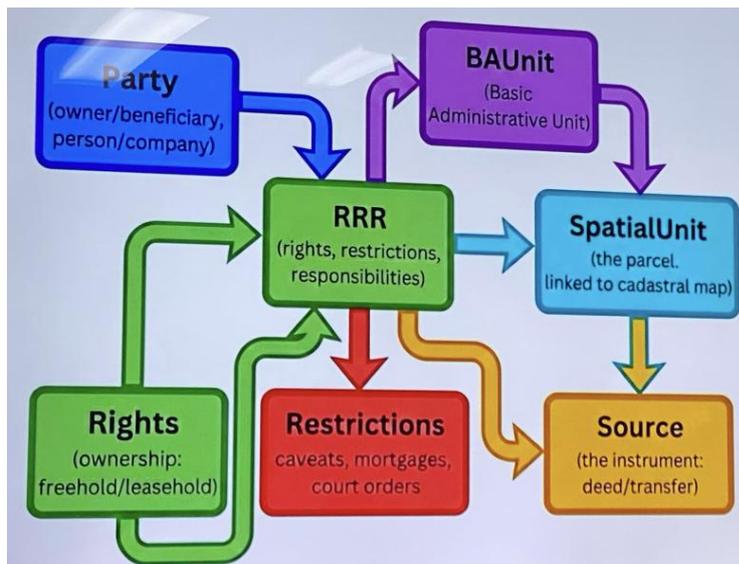


Figure 2.0 – LADM Core Relations

According to Marra et al. (2017), the LADM can represent the relationships shown in Figure 1.0, in which one spatial unit is the subject of possession rights and shares the same topological primitives in a Geographic Information System (GIS) as parcels of separate property rights. The obvious challenge is to address the topology issues, such as gaps and overlaps, that affect the National Cadastral Map.

One of the technical items that has been filtered down to the compilation of the National Cadastral Map is the multiple tiers of accuracy for cadastral surveying (urban and rural). This accuracy is a feature of the data collection and therefore warrants a review of the Land Surveyors Act and Regulations of Jamaica. The pace of registration is thought to be influenced by a number of causative factors, such as the relatively low number of Commissioned Land Surveyors (113), sporadic surveying, and the fixed boundary system in operation.

The legislation clearly states that Commissioned Land Surveyors and qualified assistants under their direct supervision are responsible for this scope of work. The Torrens System of Land Registration, which has operated in Jamaica since 1889, is based on a fixed-boundary system. This system is considered highly technical, accurate and expensive. The cost of surveying is believed to be a factor in the registration rate.

Marra et al. (2017) argue that technology can be a propellant force in data collection, as in Brazil, where data are archived in classes. The principle is that Class A is produced by credentialed professionals with technical liability. Class B is produced by the technocrats of Class A, in addition to public servants designated by a public institution. Finally, Class C comprises the officers of Classes A and B, in addition to the citizenry in the form of crowdsourced data. The methods across the classes include conventional cadastral surveying, Global Navigation Satellite Systems (GNSS), photogrammetry, topographic surveying, remote

sensing with web interfaces, and low-threshold technology devices such as tablets and smartphones.

The legislation in Jamaica prevents an expedition into these experiences. No provision is made in the legislation for the citizenry to supply spatial data, and the registration system excludes photogrammetry and topographic surveying from the work required to produce a cadastral deliverable. The accuracy requirements will constitute a technical barrier to the introduction of low-threshold devices, such as mobile phones and tablets, in the realm of describing the spatial unit. The decision has to be made with respect to a tiered compilation based on data acquisition, and the methodologies of the survey will be a robust discourse among stakeholders. Summarily, there is no legal basis to implement these changes.

4.0 DIGITALISATION IMPLICATIONS

The legislation governing registration in Jamaica will require amendments to facilitate the Electronic Land Registration System. According to Rahim et al. (2024), a digital signature identifies the signer of an electronic document. In Indonesia, through the Balai Sertifikasi Elektronik (BSre), a digital certification centre, electronic certificates with 2-Factor Authentication ensure that only the certificate owner can open the digital document.

In contrast, paper-based certificates are printed on paper and feature a hologram with the appropriate logo. This format is less secure because it can be duplicated without the specific codes present in the digital version. The digital paradigm requires robust backup and recovery centres, as well as robust data protection mechanisms, which must be rooted in legislation.

The genesis of electronic registration is data collection, followed by processing and presentation. The deliverables are subject to validation processes and are given a digital stamp. The authority approving and stamping these files may incur legal consequences.

CONCLUSION

Digitalisation is a global government priority across various e-government services. Jamaica has recognised the need to include land registration within this priority. To realise this component, the entrenched practices of land administration must be re-engineered. This process includes a disaggregated view of what exists, redevelopment of these elements, the infusion of a robust change management structure, amendments to legislation, and public education.

The required technical, legal and cultural changes appear to be an equitable trade-off for greatly enhanced automated services that will meet service delivery standards. This process aims to add new levels of efficiency and improve the customer experience in securing tenure, formalising property rights, incorporating land information, facilitating conveyancing, and generally strengthening the land market economy.

A critical component of the delivery methodology for this ambitious project is a Land Administration Domain Model (LADM). The agenda is encircled by challenges, including the authentication of documents by digital signatures and data protection. However, the experience

is painted with bright optimism, as this project will enhance security, eliminating fraud and inefficiency that have eroded stakeholder confidence.

References

- Dale, P. & McLaughlin, J. (1999). *Land Administration*, Oxford University Press. Oxford
- Friis-Hansen, L. (2025). *Two New Publications: The Land Administration Domain Model – An Overview, and LADM in the Classroom*. FIG Publication 84.
- Government of Botswana (2011). *Botswana’s National e-government Strategy*. Government Printer.
- Hammer, M. & Champy, J. (1993). *Reengineering corporation. A manifesto for business revolution*. Harper Business, New York.
- Hamni, L.B. (2012). *Legal Protection of Land Rights Certificate Holders*
- Marra, T., Barbosa, K., Oliveira, O. & Oliveira, E. (2017). *Improving Land Administration in Brazil: Re-Engineering Cadastre Using LADM*. *Responsible Land Governance: Towards an Evidence-Based Approach*. Annual World Bank Conference on Land and Poverty. Washington, D.C., March 2017
- Tembo, E., Nkwae, B., Kampamba, J. (2014). *Land Administration in a Digital Environment*. FIG Congress 2014.
- Tuladhar, A.M. (2003). *Reengineering Cadastre and Land Registration Systems and Business Opportunities*.
- Tuladhar, A.M., BC, K. R. & Budhathoki, N. N.R. (2002). *Towards Strategic Planning For Building Land Information Systems (LIS) In Nepal*. Presented paper at Asian Remote Sensing conference (ACRS2002), Kathmandu, Nepal.
- Rahim, S.N., Husni, L. & Arba, A. (2024). *Legal Implications of the Use of Digitalization of Online Land Registration*. *Path of Science*. Vol. 10. No.5
DOI: 10.22178/pos.104-12
- Sandberg, H. (2010). *Real Estate E-Conveyancing: Vision and Risks, Information and Communication Technology Law 101*.

Biographical Notes

Wayneworth G. Hamilton earned a Bachelor of Science Degree with First Class Honours in Surveying and Geographic Information Sciences and a Master of Science Degree in Built Environment from the University of Technology, Jamaica, in 2012 and 2015, respectively.

Wayneworth is a recipient of the prestigious University of Technology, Jamaica 60th Anniversary Outstanding Alumni Award for Service to University and Country (2019) and the Distinguished University of Technology, Jamaica Alumnus Award in 2023.

Wayneworth has over 25 years of experience in Land Surveying. He attained the professional status of Commissioned Land Surveyor in Jamaica in 2016 and is also a Chartered Surveyor, being a Member of the Royal Institution of Chartered Surveyors (MRICS).

He has lectured at the University of Technology, Jamaica, in the School of Building and Land Management, at the associate and baccalaureate levels in Land Surveying and Geographic Information Sciences, and at the graduate level in the Master of Science in Built Environment Programme, from 2016 to 2021.

Wayneworth G. Hamilton is a transformational leader with vision and interpersonal skills to inspire and foster growth and development. He served as Director of Survey and Mapping in the Turks and Caicos Islands from November 1, 2022, to January 19, 2025. Wayneworth took up the role of Senior Director of the Surveys and Mapping Division of the National Land Agency of Jamaica on February 3, 2025.

Wayneworth Hamilton is the Chairman of the Land Surveyors Board of Jamaica and of the Land Surveying and Geographic Information Sciences (LSGIS) Course Advisory Committee at the University of Technology, Jamaica. He is a member of the Directing Council of SIRGAS. He is Jamaica's Representative on the United Nations Group of Experts on Geographical Names and the designated focal point for Jamaica on the United Nations Global Geospatial Information Management (UN-GGIM) Subcommittee on Geodesy.

Contacts

Mr. Wayneworth Hamilton
Survey and Mapping Division
23 ½ Charles Street
Kingston
Jamaica
+1(876) 285-0336
wayneworth.hamilton@nla.gov.jm
www.nla.gov.jm

Christopher McPherson holds a Bachelor of Science in Geographic Information Systems and Computer Cartography and a Master of Business Administration from the University of Maryland. Christopher is the Senior Director of the Business Services and Information Communication Technology Division at the National Land Agency, Jamaica. Christopher is also the Program Manager of the landmark Electronic Registration (eTitles) Project at the National Land Agency (NLA).

Christopher McPherson has provided strategic oversight to several high-profile boards and agencies, including Chairman of the Central Wastewater Company (a subsidiary of the National Water Commission); Board Member of the Cannabis Licensing Authority; and Director of Jamaica Promotions Corporation (JAMPRO).

Christopher McPherson is a seasoned professional with extensive experience in Geographic Information Systems (GIS) and a proven track record across the Information Technology, Mining and Transportation sectors. He is deeply committed to team management, instructional facilitation, and leveraging data-driven analysis to solve complex organisational challenges.

Christopher McPherson has successfully implemented and managed specialised technology solutions, established rigorous quality assurance protocols, and led the implementation team for a comprehensive driving mentorship training programme.

Contacts

Mr. Christopher McPherson
Business Services Division
23 ½ Charles Street
Kingston
Jamaica
+1(876) 997-3110
christopher.mcperson@nla.gov.jm
www.nla.gov.jm

Publication Rights

By submitting this full paper to the conference organisers, we agree to give FIG - International Federation of Surveyors the right to publish our paper in the FIG 2026 proceedings on the FIG website without compensation and further to give FIG the right to include the paper in the FIG Surveyors' Reference Library and further in the FIG Journal if selected for this purpose.