

The Social Tenure Domain Model framework: Lessons and opportunities from a decade of experiences in the country applications

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SUMMARY:

The Social Tenure Domain Model (STDM) is an innovative concept developed into a model and a tool to address the challenges in land tenure recordation, particularly in developing countries. The concept re-engineers land tenure system requirements in a pro-poor manner and supports the integration of multiple datasets and spatial units in representing people-to-land relationship. The concept is transformed to a model and a tool to support countries with very little cadastral coverage in urban and rural contexts, post-conflict, informal settlement and customary tenure settings. It has been a decade of development, customization and practical application of STDM in different countries and contexts with different partners. This experience has resulted in numerous iterations of the use cases, language requirements, and appropriate localization in about ten (10) countries. It is high time to reflect and encapsulate the experience and lessons learned on the tool.

The tool underpins the conceptual approach of the continuum of land rights approach and the Fit-For-Purpose Land Administration (FFP LA) principles towards securing land and property rights for all, particularly for the poor, women and the vulnerable. It is seen as a vehicle to raise awareness on land tenure security, organize poor communities towards addressing their land and settlement issues and as an instrument for better land tenure security and better livelihoods. A strong cohort of users is established globally in the land sector supported by GLTN partners and country partners. Similarly, a robust change is witnessed in the transformation of the legal framework and institutional practices, particularly in Uganda, Nepal, the Democratic Republic of Congo and Namibia, as influenced by the use and application of the STDM tool. In addition, the STDM-based Land Information System (LIS) established and operationalized has elicited huge interest from land departments in formal land administration contexts. The tool is gaining traction in the formal context where no other alternatives exist.

This paper will capture the experience and lessons learned in developing and implementing STDM as a concept, model and tool. It builds from the lessons learnt in different countries, from the user point of view to that of technical users and professionals. These resultant developments have led to the emergence of fit-for-purpose country strategies and capacity-building plan at the country for

rollout of STDM approaches. It will also reflect on the next steps, priorities, and how the tool development and implementation process could be better managed institutionally.

The Social Tenure Domain Model

The Social Tenure Domain Model (STDM) is an innovative concept developed into a model and a tool to address the challenges in land tenure recordation, particularly in developing countries. The concept proposes a pro-poor land recording system/ solution to address the problem of conventional land registration systems. The pro-poor approach is not synonymous in many developing countries due to the complexity of legal and technical requirements. Thus, many people in the poor segment of society cannot access and benefit from tenure security through formal land registration. There are many reasons for this; for instance, customary tenure is widespread and not formally recognized or registered, and informal land tenure systems are prevalent outside the law. The concept re-engineers land tenure system requirements in a pro-poor manner and supports the integration of multiple datasets and spatial units in representing the people-to-land relationship. It allows recognition of simple records as proof of land rights in the broader land governance approach, where various spatial unit types are considered and documented in the presence of local communities. This can be varied across different use cases in the informal context in urban and rural areas to support land administration.

STDM tool for land administration

The concept is transformed to a model and a tool to support countries with very little cadastral coverage in urban and rural contexts, post-conflict, informal settlement and customary tenure settings. The tool has been tested and implemented under different settings following a popular methodology of community participation which local authorities or the national government may support. The tool was first tested in 2009 in Ethiopia (Lemmen C, et al., 2009) and provided an opportunity for further development and testing. To date, the tool has improved after many contexts of testing and iterative development, attracting local governments and other professional bodies to recognise and implement it. The tool is being used in over ten (10) countries in the informal context, rural land tenure and land use approaches and natural resource management (Antonio et al., 2020). (What does this mean for STDM? Has the tool transformed from the original intention since its invention? What does it mean in the future? These are some of the issues this paper will attempt to evaluate after a decade of development and testing, more so giving insights into the future development of the tool.

UN-Habitat and the Global Land Tool Network (GLTN) coordinated and promoted the development work until STDM was popular among GLTN partners through country applications. The broad experiences of partners immensely contributed to the enhancement of the tool through testing, feedback, and feature request. For over ten (10) years, the tool is tested in informal contexts, customary and refugee contexts working with Civil Society groups, providing a foundation for

incorporating land issues in the social development sector. As a result, STDM methodology and data catalysed interventions broadly through elaborate and verifiable results, providing a conspicuous vision for the people beyond land tenure challenges (Antonio et al., 2013; Antonio, 2015). For instance, using the tool in an informal context brought other demands that integrated land tenure, land use planning settlement and neighbourhood upgrading.

STDM contributions in the land industry

The land industry has depended on professional practices in the technical processes, particularly land administration in land registration, valuation, and cadastre. Notably, the sector is primarily guided by formal legal, technical and institutional practices, sometimes too complex to change. Technical expertise involving surveyors and registered agencies in documentation and demarcation of land rights in the cadastral work is prioritised. This conventional land administration approach is mainly considered too rigid and complex due to procedural aspects in the underlying requirements which are not participatory. The land sector has not transformed entirely to adopt paradigm shift and disruptive practices in the land tenure ladder and the concepts of social tenure. Despite technological advances, many developing countries continue to work with formal land administration systems and large population cannot access the services.

These challenges necessitated a soft thinking approach in land administration closing the land tenure gap in a pro-poor manner and integrating participatory governance. This promoted the development of the STDM conceptual approach and, later on, the technological development in a practical approach simplifying procedures and cost implications in documenting land rights (Augustinus et al. 2010). This needed to address the delivery of land tenure security, which has been identified as weak in many developing countries (Africa Union, 2010). These developments have applied action learning and vigorous testing by GLTN to provide a more functional and practical solution targeting applications at the organisation and grassroots levels. Working with grassroots organisations enabled using STDM in several contexts, including customisation to suit specific requirements. The success of these adaptations proved STDM tool is inclusive, appropriate, affordable and fully functional at any level in the land industry.

Additionally, the tool has shown the ability to document all relationships between people and land independently from the level of formalisation or legality of those relationships. Hence, STDM has provided complementary solutions to existing land administration to gain relevance to the government. The pro-poor aspect responded to the complex and layered rights in the context of customary, refugees and informal systems (Lemmen 2007). It enabled the recordation of secondary rights, gaining interest from land professionals and local government. GLTN's experiences in Namibia under implementing the Flexible Land Tenure Act (FLTA) and Uganda land Policy on issuing Certificate of Customary Occupancy (CCO) was successful with STDM. Also, the Fit-For-Purpose land administration system in the Democratic Republic of Congo and Nepal has demonstrated a vital role for the tool in changing land policy and laws to facilitate closing the land tenure gap quickly.

b. From the conceptual approaches of STDM: The decade of experience and learning

The past decade of STDM work has demonstrated a strong significance to land administration and fulfilling the Sustainable Development Goal (SDG). It has promoted access to information for to all planning, tenure security and service for the poor as anticipated in the conceptual design (Augustinus et al. 2006). All use cases have prioritised setting up participatory processes in data generation, validation and management within a localized database. Similarly, the same data is being shared with local authorities and updated as required. The level of access to information is open to all, enabling the consultative process of diagnosing priority issues at the local level. This provides access to critical information for interventions essential for development agendas normally tailored to specific topics in a community or region. For instance, issues related to access to land for women (SDG Goal 5 on Gender Equality), reducing poverty (SDG Goal 1: No Poverty), zero hunger (SDG Goal 2: Zero Hunger) and sustainable urbanisation (SDG Goal 11: Sustainable Cities and Communities) have are integrated and captured in the survey processes.

In many contexts, the technical development of the tool directly enables the implementation of the Continuum of Land Rights (CLR) and the Fit-For-Purpose Land Administration (FFP LA) approach (UN-Habitat,2008; Enemark 2014; Enemark 2017). This is made possible by the methodology used and its flexible customisation aspects, enabling the recording of complex and layered rights in customary and informal systems. Notably, this results in strategic formulation of localised solutions along these approaches integrating the lessons learnt for future customisation and development of FFP LA country strategies. At the formal level, this has created opportunities for rethinking land policies and laws to accommodate flexible recording of various options of land rights. It sheds light that STDM will be able to run parallel to the formal land information systems in the interim to record informal rights before they are fully recognised in the law.

In addition, the tool has transformed local communities capacity in land rights, use, and applicable local regulations through sensitisation, awareness building and technical training on Geographic Information Systems (GIS) and database management. This has transformed them from users to producers of information in designing survey tools, using handheld devices to collect and process data in the STDM tool. The beneficiaries fully own the methodologies and data, demonstrated in data analysis and reporting using the STDM tool. This shows a strong sense of ownership and perception change because they can present and defend the data to local authorities on pending interventions. This is witnessed in Kenya under the Kenya Informal Settlement Improvement Programme (KISIP) for settlement upgrading and tenure regularisation processes. Hence, the full approach has effectively closed the gap between professionals, local users, and communities to engage in interventions and developments.

History of STDM tool development

The continuum of land rights concept emerged around 1999 and became a foundation stone for many of the GLTN tools including the Social Tenure Domain Model (STDM). The concept emerged due to the limitations of the dominant land administration approach to land tenure and of the systems administering it, particularly in developing countries where large portions of land remain untitled (UN-Habitat/GLTN, 2019). Given that the cadastral parcel dataset conventionally remains the core data set in modern land information system to which other attributes are linked, this means that all those areas outside of the cadastre are outside of the land information system. Where there is no, or little land information, with the attributes linked to it, this might mean that there is no, or insufficient management of the land in these areas (Augustinus, 2005). This reality highlighted a key underlying problem where conventional land information systems could not serve non-cadastral areas adequately. The cadastral data modelling work by Oosterom et al. (2004) led to the development of the STDM conceptual model which was reviewed and finalized in 2008.

STDM describes the relationship between people and land whereby it strives to support all forms of land rights, social tenure relationships and, possibly overlapping claims to land, that are found in areas where regular registration of land rights is not the rule. It makes it possible to put into a system rights which are not registered rights, nor registerable, that are claims, that need to be adjudicated both in terms of the ‘who’, the ‘where’ and the ‘what’ type. The focus is on recordable rights (or social tenure relationships) but this does not imply that real rights cannot also be included. Figure 1 below shows the core conceptual model of STDM:

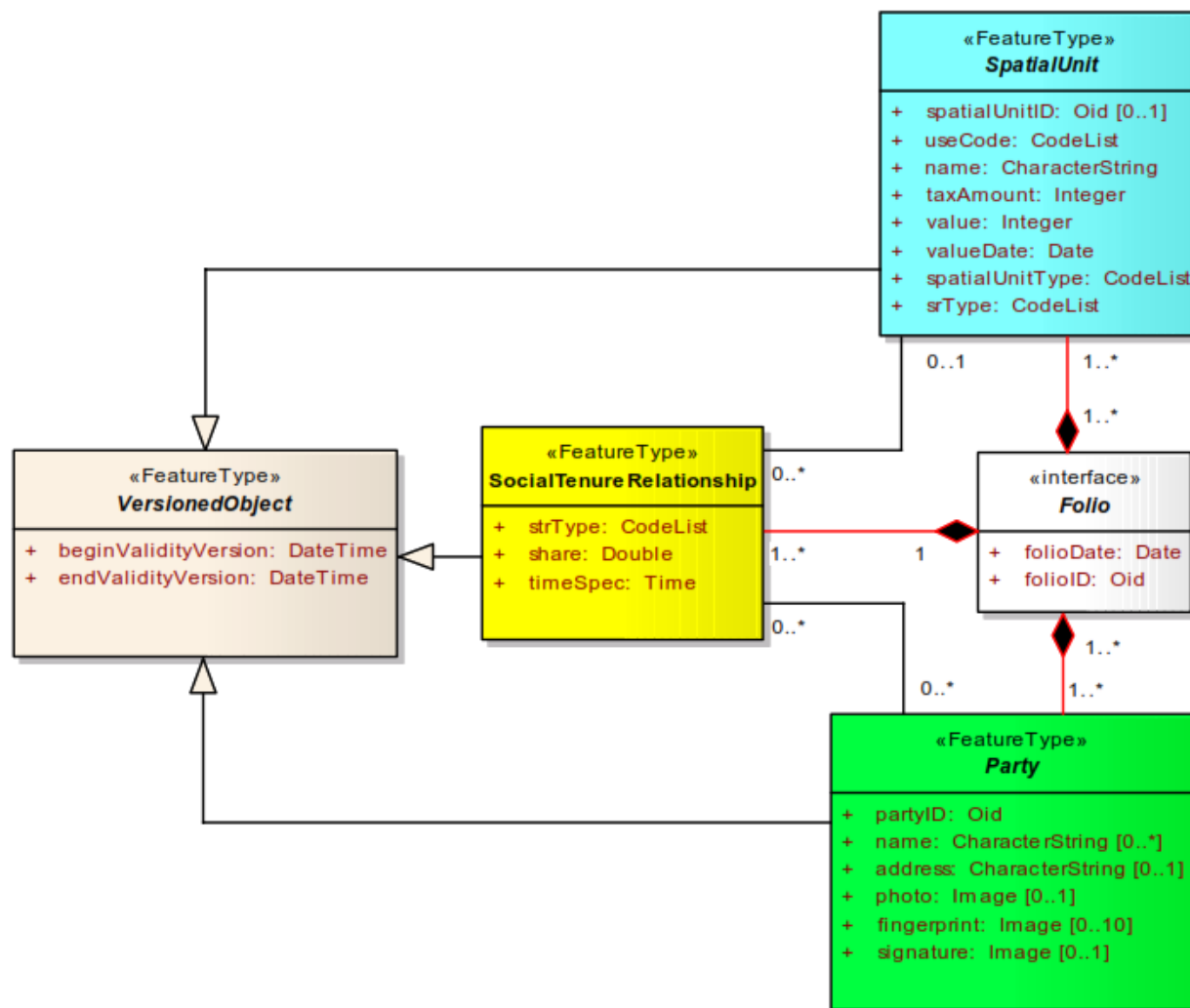


Figure 1: Core conceptual model of STDM (Source: Lemmen, 2008)

The conceptual design was followed by functional and technical designs respectively; this included a prototype software package for testing the conceptual data model and corresponding data management workflows.

STDM is designed to support the recordation of all forms of land rights along the continuum of land rights, all types of rights holders and all kinds of land and property objects or spatial units regardless of the level of formality (FIG, 2013). According the Augustinus and Lemmen (2011), the concept makes it possible to bring the social element into land administration by:

- Acknowledging other non formal tenure arrangements;
- Opening options for innovative and incremental approaches to improving tenure security;

- Bridging the gap between informal systems and formal systems that emphasize titles;
- Unpacking existing social tenures;
- Giving a snap-shot of the ‘people-to-land‘ relationship at any given time; and,
- Informing the land administration activities about the actual situation on the ground.

STDM can be applied in the design of the Fit-For Purpose Land Administration legal and regulatory framework by recognizing legitimate rights and recording the corresponding evidence of rights in a local or national register . For the non-formal rights, the state can assess whether, and to what extent, these rights are legal or can be made legal over time.

One of the key principles of STDM is to ensure that its implementation is fast, affordable and highly participatory when it comes to the identification and recordation of boundaries of spatial units, which may ultimately contribute to building a nation-wide spatial framework through a continuum of accuracy, tools and techniques and primary mappers as illustrated in figure 2 below.

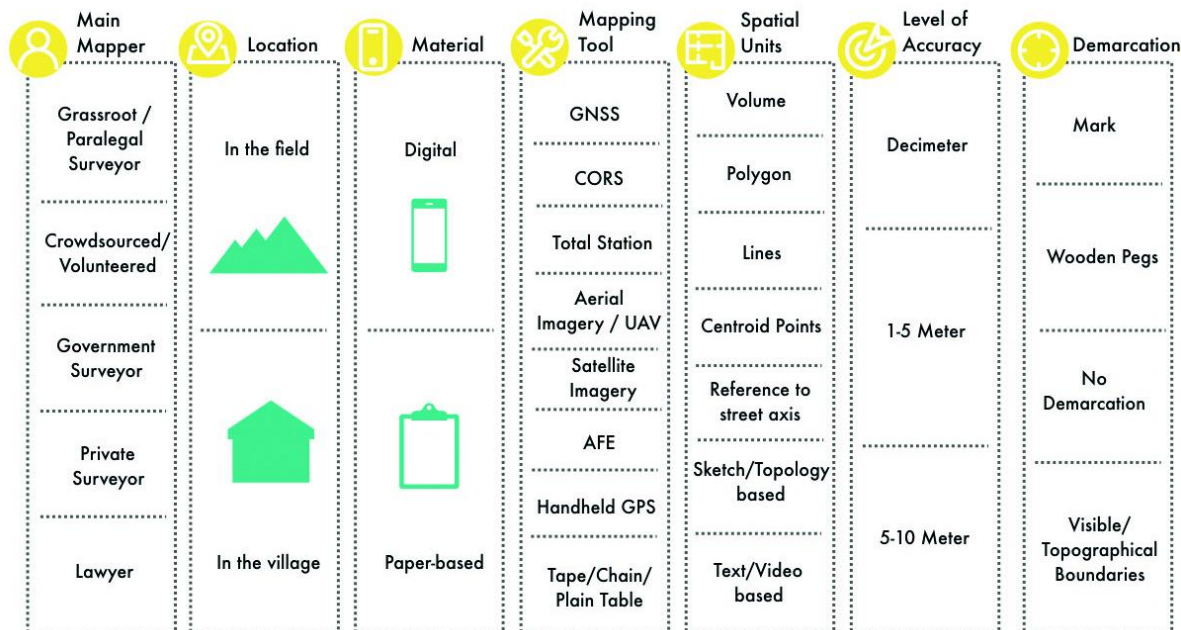


Figure 2: Modern spatial data acquisition approaches for a pro-poor cadastre (Adapted from Lemmen, et al., 2020)

In order to ensure that a comprehensive national spatial framework is built, which includes the application of STDM, there needs to a paradigm shift in the role of land surveyors and a change in conventional approaches for surveying. For instance, this can include a participatory process of adjudication managed by locally trained land officers acting as trusted intermediaries while the land professionals (including surveyors) can manage the overall process of building the spatial framework.

Relevance to global technological trends and growth

The STDM tool is a desktop-based application which is designed to fully comply with the conceptual model in figure 1 above. It brings together mature and stable open-source software projects through a consistent, easy-to-use interface, which allows non-specialized users to define and manage tenure information, visualize spatial units as well as support the creation of reports.

In selecting the right combination of tools for the STDM software, it was important to ensure that these underlying tools incorporated the latest and most relevant technologies and standards, while at the same time ensuring that they adhered to GLTN's core values i.e. affordability, scalability, and pro-poor (Antonio, et al., 2014). During the tool selection process, the following criteria was used:

- a. They had to be based on free and open source software (FOSS) meaning no costs related to the acquisition, licensing and upgrade;
- b. The core platform had to be GIS-based as one of the core entities of the STDM is 'spatial units' – these are geometry objects (or textual descriptions) that can either be in LADM's 2D or 3D representations (ISO, 2012). The role of GIS as the core framework of the tool enables the linkage and visualization of the spatial units with regard to land tenure; land and property taxation; planning and management of utilities such as water, sewerage, electricity, telecommunication; and linkages to existing forms of land-use;
- c. The platform had to provide an extensible framework which enabled it to be customized using the Python scripting language which has the advantage of using English-like syntax, improved productivity, portability and availability of extensive libraries;
- d. Finally, the system has to be scalable with regard to storage and performance, as well as interoperable with the most commonly used spatial and aspatial data exchange formats.

Based on this criteria, PostgreSQL, PostGIS were selected to provide the spatial database backend with STDM developed using Python as a QGIS plugin.

While the core objective of the STDM tool is to provide a platform through which "people-to-land" relationships can be recorded, its functional design of STDM is informed by a convergence of the following:

1. Internal peer review and recommendations by the GLTN Secretariat;
2. Feedback received by participants during awareness and training events on the use and application of the tool;
3. Assessment of the realities on the ground during the customization of STDM in different contexts as post-disaster, post conflict, settlement upgrading, customary land etc.;

4. Relevant technological trends and innovations that are people-centric such as the increased use of mobile devices, aerial photographs or satellite imagery for data collection, adjudication and verification.

Figure 3 below summarizes relationship of the processes that help inform the functional design of STDM.



Figure 3: Processes that inform the functional design of the STDM tool (Source: GLTN, 2023)

The contributions of STDM in various case studies

The first use case of STDM tool started in Ethiopia and was done by the University of Twente (ITC) in 2009. This demonstrated a functional use case of transforming the model to software to promote land recordation for first registration (Lemmen,2009). Indeed this development provided an implementation approach and technical design upon which the tool prototyping was possible. It also offered an opportunity for identifying particular elements and attributes in data generation and mapping, including combining multiple datasets to cater to different needs in unregistered areas. UN-Habitat through the Global Land Tool Network took over the development of the tool based on the prototype design in early 2010 and enhanced it through testing using open source packages. The Global Land Tool Network tested the ‘second’ prototype in 2012 in an urban context in

Uganda. This use case demonstrated the diversity of STDM role beyond tenure to offer opportunities for integrating land use planning and service delivery in the data generation process.

The overall value of STDM in GLTN work meant affordability, scalability, simplicity and sustainability. Essentially, gradual improvement to suit different context from the first prototype in Uganda spread to over 100 settlements in different municipalities mobilising community engagement, awareness building, technical training on the tool and data generation using participatory approaches and data fed into the STDM database. The successes of the tool caught the attention of local authorities and found that the data generated valuable insights in diagnosing gaps in community development. Indeed, the authorities provided oversight in the methodologies, promoting the interest of other municipalities. Despite these notable successes, the tool was nascent and promising, with many enhancements amidst rapid development due to growing demand (Antonio et al. 2014).

The tool appealed many stakeholders at the local level, municipality officials and professionals because it provided a direct link for engaging with the community in data generation and identifying the needs to inform planning and land tenure issues. It demonstrated variations in perceptions regarding community priorities in relation to land tenure, access to services and opportunities for livelihood improvements. Therefore, community development officers, planners and resource persons at the local level found this tool resourceful for its spontaneous results and acted as a yardstick of diagnosing community needs based on data. Hence, the tool transformed to a comprehensive toolbox to support land governance and inclusive planning in an informal context (Stanfield et al., 2017)

Role in land use and land tenure improvement

The continued implementation of STDM tool by GLTN provided a lot of experience in informal settlements working with partners in various contexts in Kenya, Uganda, Zambia and Philippines. Its value in awareness building, mobilisation, validation and verification processes tapped to the development agenda in poor urban areas and integrated livelihood and household demographics and was deemed relevant to planning and social development. The requirements in each context focused on land tenure as the foundation integrating access to services, livelihood and housing. The tool database was then elaborated to serve a range of requests from different users in different sectors. Most importantly, the database was generated from a highly customizable interface where users defined required questions and data in a user-friendly interface without technical or Information Technology (IT) skills. It became popular framework for developing land information systems managing various data both spatial and non-spatial. Through this framework, the tool supported neighbourhood upgrading in Colombia (GLTN, 2014) and informal settlement upgrading in Kenya (Oumar et al., 2017). The experiences gained resulted in further development

of the STDM tool and strengthening ties among GLTN partners working in informal settlements. STDM became popular as a tool of choice in promoting land tenure, housing and service delivery in slums.

Promoting recognition of informal land tenure where not provided in the legal framework was a big challenge with the government. The capacity-building approaches given to the local institutions on STDM and related land governance training has facilitated discussion with key stakeholders in government appreciate the gaps and possible innovations to accommodate them in the law. STDM demonstrated using the data that it promoted recognition of rights for all, including women and youth. The community were able to manage the technology and intervention role using the data to negotiate for recognition. Hence the tool provide a platform for learning, exchange, dialogue and has progressed to national recognition of these approaches in all use cases of STDM supported by GLTN.

Role in Cadastral digitization and development: Formal contexts

The success of STDM in some countries has been reform in the conventional approaches in land administration to integrate Fit-For-Purpose approaches in the implementation. This approach demonstrates success for STDM in breaking the technical orientation of land administration to a social-technical approach. Consequential implications of this approach can be seen in revising the land policy document to integrate FFP LA approaches, customary land tenure and other local tenure documentation contexts. This has been witnessed in the Democratic Republic of Congo (DRC), which took 3 years to draft, formulate and validate a progressive land policy document cognizant of STDM methodologies in customary context and integration of customary tenure. Similar experiences informed by STDM methodologies include the case of Nepal and Uganda where existing laws and policies have been implemented due to STDM flexible approach.

More importantly, land policy development is accompanied by a country FFP LA country strategy stipulating the contextual requirements for recording and documenting different land tenure options. Similarly, Nepal, Uganda and DRC have developed and validated the FFP LA country strategy for upscaling the initiatives from completed pilot work In abilit to address tenure insecurity quickly. The role of STDM in these contexts has been to demonstrate alternative approaches articulated in participatory methodology. Capacity development to stakeholders in land departments has motivated the adoption of the FFP LA strategies and STDM.

Integration with other technologies and tools

The development of STDM has steadily remained an open-source platform that has released the source code to the public for use and enhancement. GLTN seeks to make the tool accessible as a framework for customisation and extension to serve various applications. GLTN is getting inputs from other developers, users and partners on key improvement and request required in the

framework. These requests have been considered case by case due to complexity requirements and application demands. So, GLTN has considered key integration of the core framework of STDM with the following technologies:

- a. Integration with mobile computing to support handheld data collection with smartphones and GPS devices.
- b. Integration in the web technology for a large organisation with centralised database
- c. Spatial analysis and CoGO tools for non-expert users

Recommendations and conclusion:

The roadmap for STDM is broad and seeks to provide a competitive role in land administration through innovative solutions interoperable with other technologies and tools in a simplistic approach. It will require support from partners in the field to continue sharing their requests and possible use cases for prioritisation. Also, it will require working with other developers and open-source projects to promote contributions and support from a wide user community. Moreso, GLTN hopes professional bodies can support the integration of the tool in to government work

In future, the tool would provide an interface for integration with other technologies deemed relevant by users. For instance, it is possible to explore linkage with the distributed systems around blockchain solutions and cloud computing. This would also enable STDM to work with big data platforms, customised open portals, and tap into data intelligence for integrated reporting and monitoring of outcomes. These solutions will be assessed and tested before public access to ensure the system remains user-friendly, simple and intuitive.

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