

# A Web-Based Object-Relational Cadastral Model for Kenya: The Case for Spatially Enabled Land Governance.

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**Key words:** Access to land; Cadastre; Digital cadastre; e-Governance; Land distribution; Land management; Real estate development; Spatial planning; Web\_based cadastre; Object-Relational database; Land Information Management; spatial data.

## SUMMARY

Harmonizing data into comprehensive cadastral models, such as Land Information Management Systems, is a mandatory requirement in developed countries, where such systems support the implementation of sustainable development needs. For example, Europe already has the Land Administration Domain Model [Lemmen, 2012] and Infrastructure for Spatial Information in the European Community (INSPIRE, 2007). Both models were developed to facilitate efficient spatial data access and sharing between the European nations and for ease of doing business. Accessible information on tenure systems is crucial for various needs; it supports sustainable economic and infrastructural development and interrelated spatial planning needs. It also supports resource and environment management for climate change and the associated disaster risk reduction.

Contrastingly, in most developing countries, several aspects of spatial data management are still missing. In most cases, land parcels are not registered, recorded, or spatially referenced to a specific geodetic datum. In the cases where spatial/and attribute data exist, their quality is poor and incomplete, and the land records kept in the registries are not up-to-date and do not represent the actual situation on the ground. Most spatial data are analog format, and the few computerized data are often improperly maintained.

A research project was initiated between the Technical University of Kenya and a Cooperative Society in Nairobi to develop a prototype Web-Based cadastral model for Kenya based on the Object-Relational model to solve this problem. The prototype used a web-centric solution, with data stored and managed centrally from an Object-Relational database (PostgreSQL/PostGIS) through implementing the Django framework as a back-end framework. Further interactive pages in the front end were developed using bootstrap4, HTML, JavaScript, and CSS. Consequently, it enabled users to view the land data in the system through their web browsers. The research, therefore,

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developed a Web-Based Application for Land Information Management where different users can log in and interact with the different land information attributes and spatial data for different needs.

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