The Conceptual Framework for Implementing eLAS Towards Sustainable Land Administration: Systematic Literature Review

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This paper presents a comprehensive framework for implementing electronic Land Administration Systems (eLAS) aimed at fostering sustainable land governance. Through a systematic literature review, the authors identify critical challenges such as institutional readiness, stakeholder engagement and technological infrastructure. The conceptual framework emphasizes the importance of inclusivity, ensuring marginalized communities benefit from digital transformation. By aligning eLAS implementation with global aspirations for social equity and environmental stewardship, this study serves as a vital roadmap for policymakers and practitioners, highlighting that successful integration transcends mere technological upgrades, driving profound shifts towards sustainable development.

Introduction

- **Context of Study:**
  - Rapid digital transformation impacting various sectors, including land administration.
  - Traditional systems face challenges: inefficiencies, corruption and lack of transparency.

- **Significance of eLAS:**
  - Electronic Land Administration Systems (eLAS) offer solutions to modern governance challenges.
  - Potential to streamline processes, enhance data accuracy, and improve governance.

- **Research Objective:**
  - Conduct a systematic literature review to develop a robust conceptual framework for eLAS implementation.

- **Focus Areas:**
  - Addressing institutional readiness, stakeholder engagement, and technological infrastructure.
  - Ensuring alignment with Sustainable Development Goals (SDGs) for equitable and sustainable outcomes.

LAS Frameworks

Frameworks	Overview
Fit-for-Purpose Land Administration (FFP-LA).	This framework emphasizes the need for land administration systems to be adaptable, affordable, and scalable. It promotes the use of technology to ensure that land administration is efficient and meets the needs of various stakeholders while supporting sustainable land management practices (Bridging, L. A. 2023).
Integrated Geospatial Information Framework (IGIF).	Developed by the United Nations Committee of Experts on Global Geospatial Information Management (UNGGIM), this framework provides guidance on integrating geospatial information into land administration systems, enhancing data accessibility and usability for sustainable development (Calzati, S., & van Loenen, B. 2023).
Land Governance Assessment Framework (LGAF).	While primarily an assessment tool, LGAF can guide the implementation of eLAS by identifying key governance issues and providing recommendations for integrating technology into land administration processes to enhance transparency and accountability (Mukhtarova, A. 2021).
Global Land Tool Network (GLTN).	This initiative promotes the use of innovative land tools, including eLAS, to improve land governance and administration. It focuses on developing tools that are inclusive and sustainable, ensuring that marginalized communities have access to land rights and information (Chigbu, U. E. & Antonio, D. 2020).
Digital Transformation Framework for Land Admin.	This framework outlines the steps and strategies for transitioning from traditional land administration systems to digital platforms, focusing on enhancing efficiency, accessibility, and sustainability in land management (Bennett, R. M. et al. 2024).
Open Data for Land Administration.	This framework promotes the use of open data principles in land administration, encouraging transparency and public access to land information through eLAS, which supports sustainable governance and community engagement (Okembo, C. et al. 2024)
Smart Land Administration (SLA).	This framework focuses on leveraging smart technologies, such as blockchain and artificial intelligence, in land administration systems to enhance efficiency, security, and sustainability in land management (Azadi, H. et. Al. 2023).

PRISMA Methodology in Systematic Literature Review

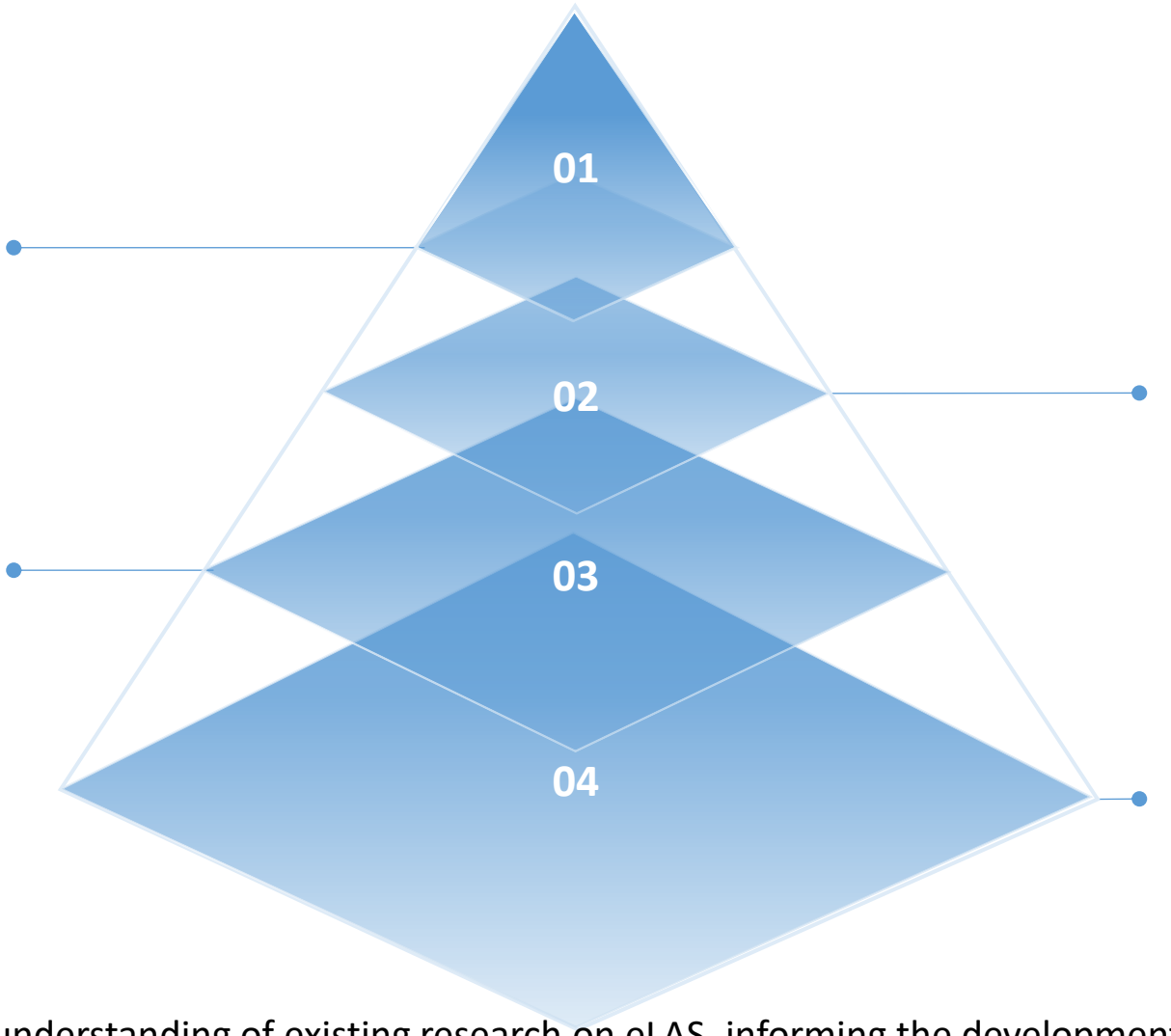
Purpose of PRISMA: To ensure a transparent and replicable process for conducting systematic literature reviews.

Planning the Review:

- Establish research questions and objectives.
- Define the scope of the review.

Screening and Reviewing Articles:

- Systematic search across multiple databases.
- Application of criteria to select relevant literature.



Inclusion and Exclusion Criteria:

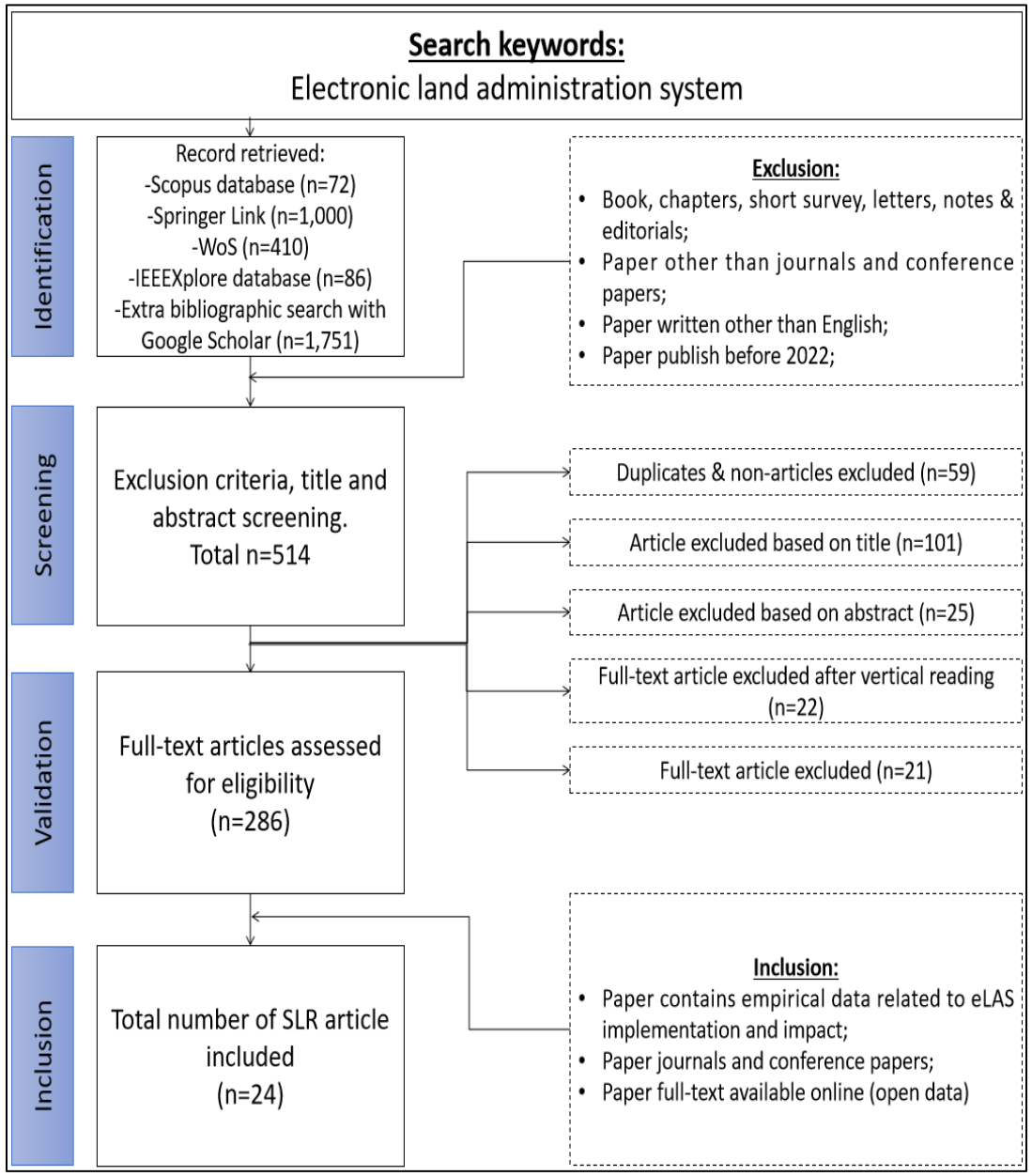
- Criteria set to filter relevant studies.
- Focus on empirical data related to eLAS implementation.

Data Synthesis:

- Summarization and analysis of selected studies.
- Visualization of extracted data to identify trends and gaps.

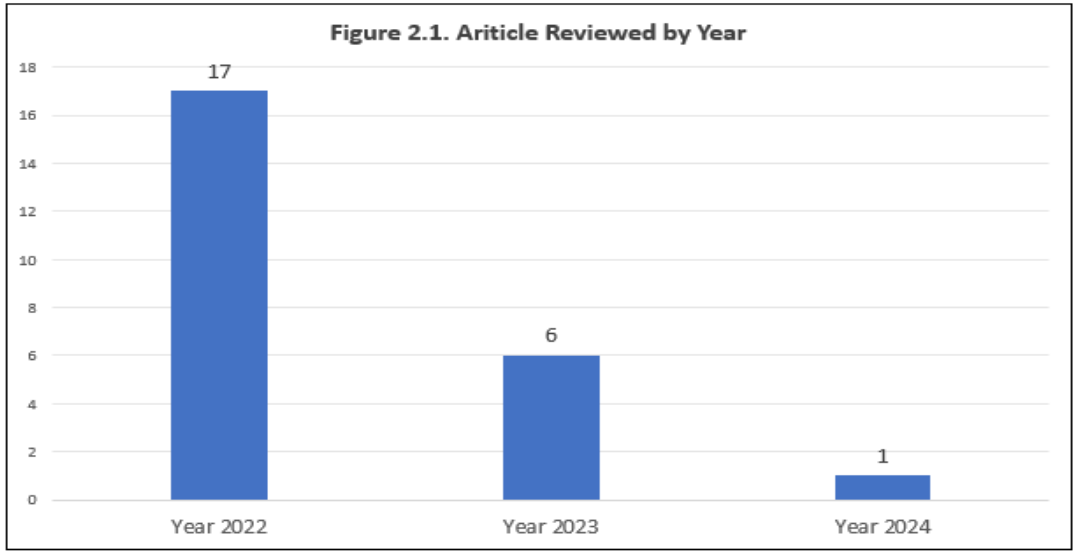
Outcome: Comprehensive understanding of existing research on eLAS, informing the development of a conceptual framework for sustainable land administration.

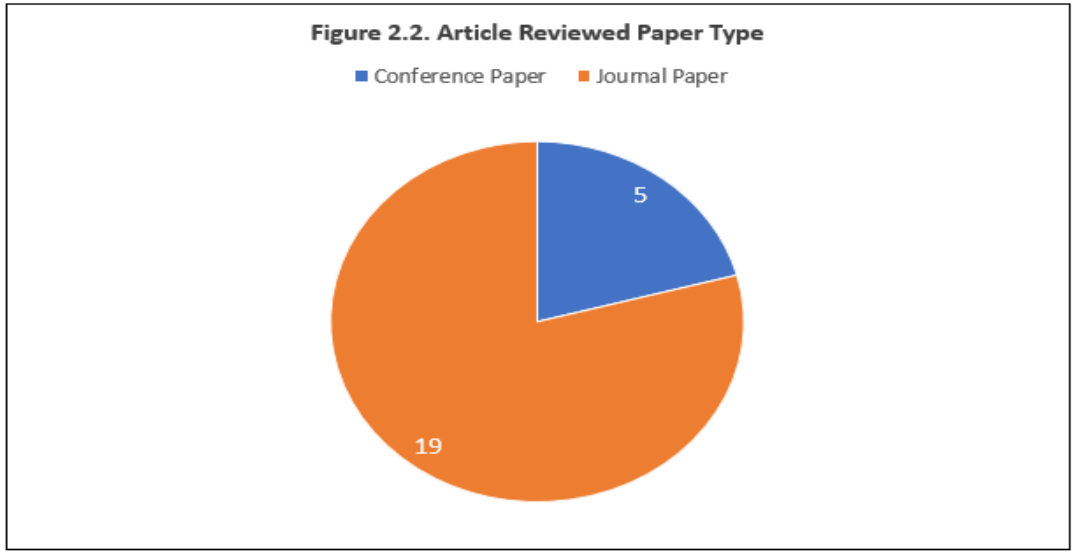
PRISMA Methodology in Systematic Literature Review

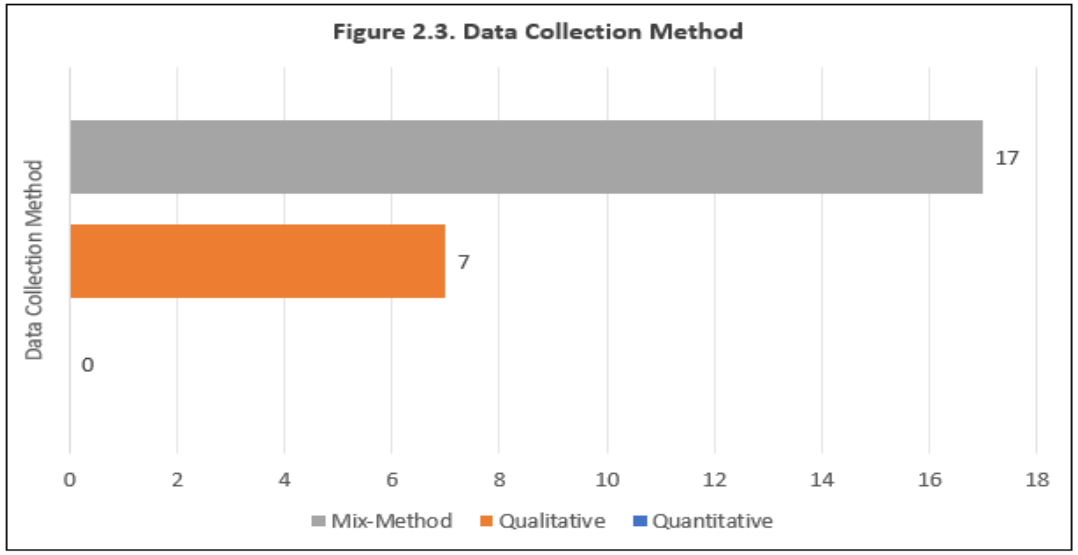


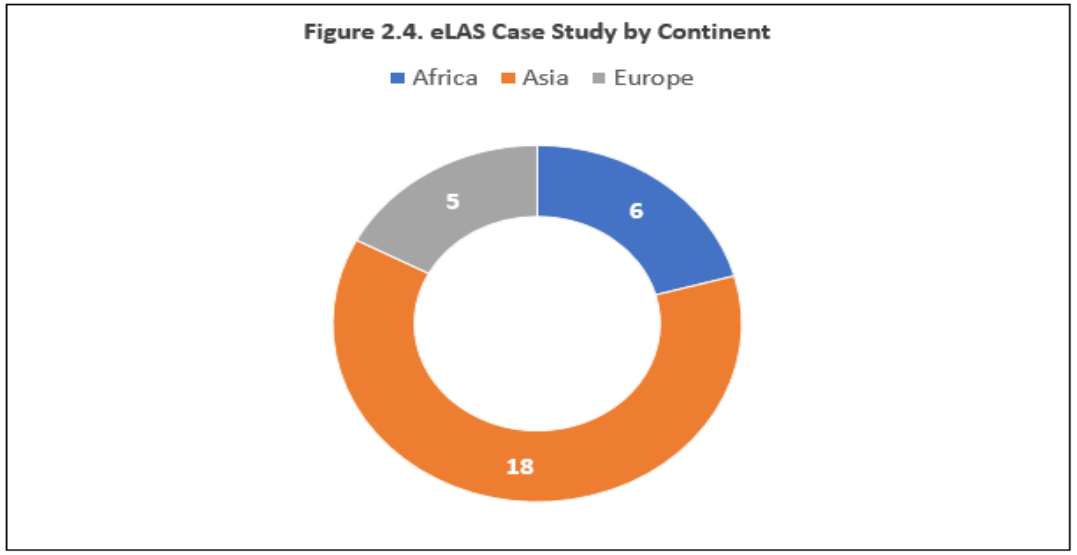
Inclusion	Exclusion
Published in the year 2022 to 2024	Published before year 2022
English language	Other than English language
Journals & conference papers	Book, thesis, chapters, notes, letters, editorials, short surveys & proceeding
Contains data and information related to eLAS implementation (Method, Concept, Framework, Techology, etc.), issues, challenges and best practices.	Not containing data and information about eLAS implementation, theoretical without empirical data collection and only engineering aspects about eLAS. General literature review articles.

General Review Articles Profiling









Data Analysis & Findings

What are issues and challenges arise when implementing eLAS? (RQ1)

Top three issues and challenges implementing eLAS		
Issues & Challenges	**Number of articles discuss**	**Percentage (%)**
Data	24	100
Policies & Legal Framework	18	75
Governance	17	71

1

Data Challenges

- **Data Quality and Integrity:** Concerns regarding the accuracy and reliability of existing land data.
- **Data Integration:** Difficulties in integrating datasets from various registers, especially during the transition from 2D to 3D land administration.
- **Standardization Issues:** Lack of a standardized methodology for updating and exchanging data, leading to inconsistencies.

2

Policies & Legal Framework Challenges

- **Incompatible Policies:** Existing legal frameworks may not align with new electronic systems, creating operational hurdles.
- **Regulatory Barriers:** Legal and institutional arrangements that restrict data sharing practices.
- **Need for Legislative Amendments:** Existing laws may require updates to accommodate electronic land administration systems.

3

Governance Challenges

- **Inter-Agency Collaboration:** Structural and organizational issues complicate collaboration between different agencies.
- **Capacity Limitations:** Insufficient capacity and resources to implement and manage eLAS effectively.
- **Bureaucracy and Corruption:** Bureaucratic processes and corruption can hinder the effective deployment of eLAS.

Data Analysis & Findings

What is the framework used to implement eLAS? (RQ2)

	Conceptual Framework	Brief Description
Technology	SDI-Based	Emphasizes the organization, access and sharing of spatial data. Focus on standards, interoperability and development of spatial data infrastructure (SDI) to support land administration.
	Land Information System (LIS)-Based	Focuses on the collection, storage, processing, and dissemination of land-related information. The concept hovers over data about land parcels, ownership, land use and other related information..
	GIS-Based	Uses spatial analysis and mapping tools to manage and analyze geographic data. Useful for integrating various layers of information related to land administration.
	Blockchain-Based	Exploring the use of blockchain technology to secure and manage land-related transactions. Provide transparency and variability of land records.
	Web-based & Mobile	Emphasizes the development of mobile and web applications for user-friendly access to land information. Supports remote and remote access to land administration services.
	Cloud-computing	Leveraging cloud-based infrastructure and services for storage, processing and access to land-related data. Offers scalability and accessibility advantages.
Governance	Cadaster-Based/ LADM	Focus around cadastral data, which includes information about land parcels, their boundaries and ownership rights. Usually used for registration and property management.
	Enterprise Design	Provides a comprehensive view of the organization, including its business processes, data, applications and technology. Ensure alignment between the land administration system and the overall organizational or business structure.
	SOA	Service Oriented Architecture (SOA) is focuses on designing the land administration system as a set of interrelated services. Promote modularity, scalability and reusability of system components.
	Land Governance-Based	Combining legal, institutional and organizational aspects of land administration. Dealing with issues related to land ownership, land rights and land use planning.
	Risk Management-Based	Focusing on identifying and mitigating risks associated with the implementation of the land administration system. Address issues related to data security, system reliability and legal compliance.

Data Analysis & Findings

How will using framework to implement eLAS help? (RQ3)

Positive Impact

- **Improved Efficiency.**
- **Enhanced Transparency.**
- **Better Data Management.**
- **Stakeholder Engagement.**
- **Capacity Building.**
- **Adaptability and Scalability.**

Negative Impact

- **Implementation Challenges.**
- **Resource Intensity.**
- **Technological Dependence.**
- **Data Privacy Concerns.**
- **Potential for Inequity.**

Conceptual Framework Implementing eLAS Toward Sustainable Land Administration

- Various conceptual frameworks can be used, and the choice depends on the needs, context and specific goals of the land administration system to ensure that eLAS can be optimized for use in achieving the specific goals that have been set.

- From this study, conceptual framework utilizes a four-dimensional framework for implementing the eLAS have being discovered that includes the following dimensions:

    - **Technological Dimension:** Focuses on the technological infrastructure required for eLAS, including the integration of blockchain technology to enhance data security and transparency.
    - **Organizational Dimension:** Addresses the organizational structures and processes necessary for effective implementation, including stakeholder engagement and management.
    - **Legal and Regulatory Dimension:** Considers the legal frameworks and regulations that need to be established or modified to support the adoption of eLAS and blockchain technology.
    - **Socio-Economic Dimension:** Examines the socio-economic factors that influence the acceptance and success of eLAS, including public awareness, education, and the economic implications for users and stakeholders.

Conceptual Framework Implementing eLAS Toward Sustainable Land Administration

1
Technological

- Infrastructure
- Data Management
- Interoperability
- Security Measures
- User Interface & Expireance
- Emerging Technologies

2
Organizational

- Governance Structure
- Change Management
- Stakeholder Engagement
- Capacity Building
- Organizational Culture
- Policy & Regulatory Framework
- Performance Monitoring & Evaluation

3
Legal & Regulatory

- Legal Framework for Land Rights
- Regulatory Compliance
- Data Protection & Privacy Laws
- Legislation on Electronic Transaction
- Dispute Resolution Mechanisms
- Inteoperability with existing LEgal System
- Policy Development
- Stakehoder Consultation

4
Socio-Economic

- Equity & Access to Land
- Comunity Engagement & Participation
- Economic Impact Assessment
- Job Creation & Capacity Building
- Social Cohesion & Stability
- Sustainable Land Use Practice
- Access to Information & Services
- Monitoring & Evaluation

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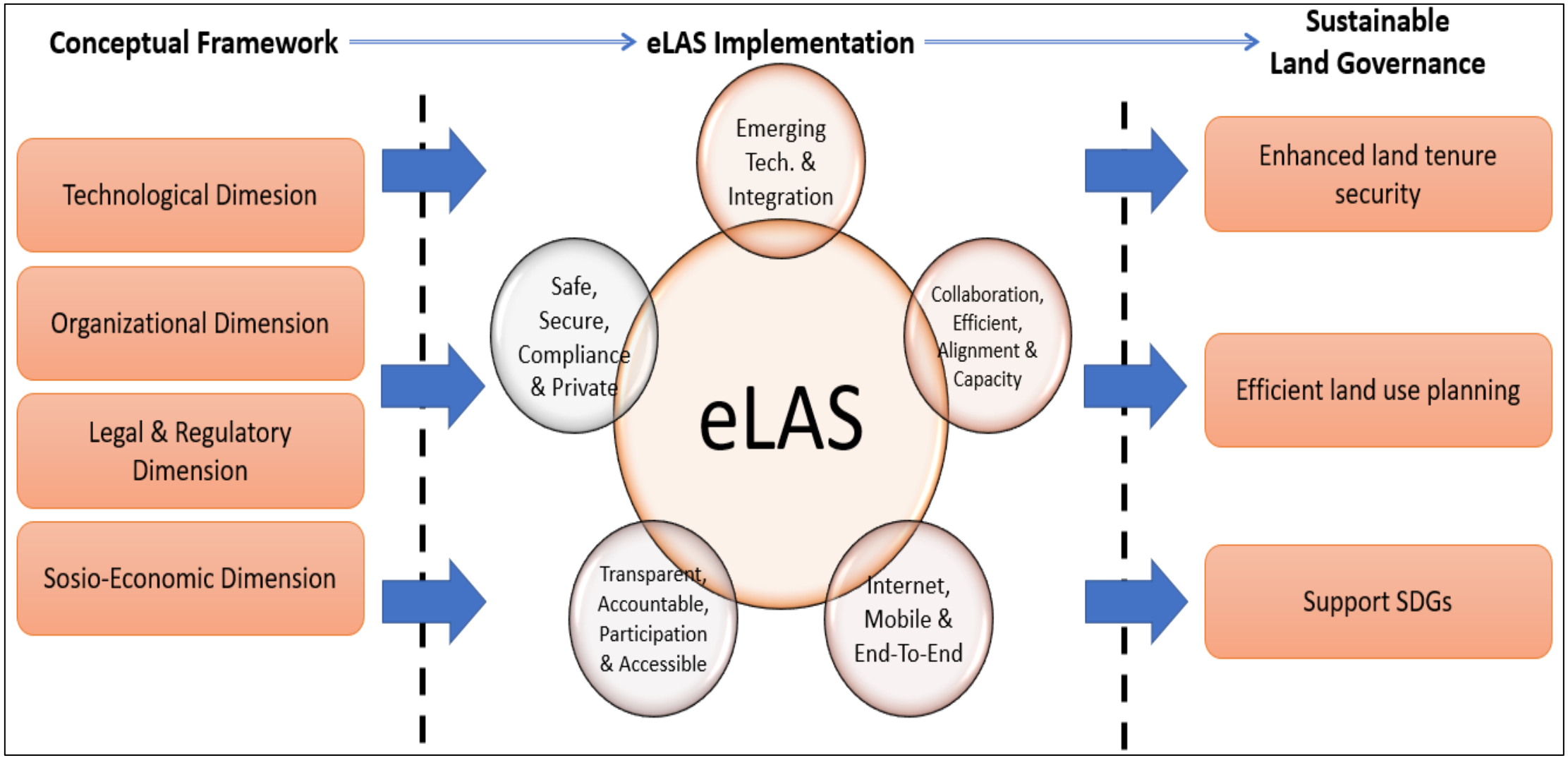

Conclusion

Critical Role of Digitalization:

The study emphasizes that digitalization is essential for achieving sustainable land administration, enhancing efficiency and transparency.

Framework Development:

A comprehensive conceptual framework is proposed to guide the implementation of eLAS, addressing key challenges and ensuring effective integration into existing systems.

Identified Challenges:

The systematic literature review reveals significant challenges, including data quality, policy inconsistencies and governance issues that must be overcome.

Contribution to SDGs:

The framework aligns with Sustainable Development Goals (SDGs), promoting equitable land administration and sustainable development practices.

Future Research Directions:

The findings highlight the need for further research on best practices and innovative solutions to enhance the effectiveness of eLAS in diverse contexts.

Stakeholder Engagement:

Successful implementation requires active involvement and collaboration among stakeholders to foster trust and ensure compliance with legal frameworks.

THANK YOU

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