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Digital Transformation of the Turkish Cadastral System: A Comparative Analysis of the 2019–2023 and 2024–2028 Strategic Plans

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Abstract

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Digital transformation has become one of the key factors enhancing the effectiveness, accuracy, and quality of services in land administration and cadastral systems. This study aims to identify the trends in the transformation and development of the Turkish cadastral system by comparatively examining the 2019–2023 and 2024–2028 Strategic Plans of the General Directorate of Land Registry and Cadastre (GDLRC). Qualitative document analysis was employed as the research method, and the two strategic plans constituted the data sources. The data were evaluated using thematic content analysis and compared under five main themes: digital cadastral and spatial data infrastructure, electronic land registry and digital cadastral services, multidimensional cadastre and 3D spatial models, land valuation and value information systems, and institutional digital transformation and capacity. In addition, strategic objectives, performance indicators, and priority areas of activity were examined to identify similarities and differences between the two plans. The findings indicate that the 2019–2023 period prioritized the development of digital cadastral infrastructure, the expansion of electronic land registry services, and the establishment of data integrity between land registry and cadastral systems. In contrast, the 2024–2028 period places greater emphasis on integrated applications, including multidimensional cadastre, 3D city and building models, the integration of spatial data and cadastral base maps, land value information systems, and the transition to electronic land registry records. Overall, the study demonstrates that the Turkish cadastral system is moving from an approach primarily focused on developing existing digital infrastructure toward a more integrated digital transformation framework encompassing multidimensional cadastre, 3D spatial models, land valuation, and integrated information systems. By systematically evaluating the development of digital cadastral policies through a comparative analysis of strategic plans, the study provides recommendations for future implementation and research.

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Contribution to the field statement:

This study provides a systematic comparison of Türkiye's 2019–2023 and 2024–2028 cadastral strategic plans, revealing how digital transformation priorities have evolved. By examining five thematic areas, it identifies a shift from developing basic digital infrastructure and electronic services toward integrated systems for three-dimensional cadastre, spatial modelling, and property valuation, informing future policy and research.

Highlights:

- Two strategic plans reveal changing priorities in cadastral digitalisation.
- The newer plan gives greater emphasis to three-dimensional cadastre.
- Property valuation advances toward integrated information systems.
- Institutional capacity and archive preservation remain key priorities.

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1. Introduction

Rapid advances in digital technologies have led to significant transformations in land administration and cadastral systems, as in many other areas of public administration. Technologies such as Geographic Information Systems (GIS), remote sensing, cloud computing, three-dimensional (3D) modelling, big data analytics, and artificial intelligence have enabled cadastral services to become faster, more reliable, and more integrated. These developments have transformed not only technical processes but also approaches to property administration, spatial data sharing, urban planning, and sustainable land management.

The digital transformation of Land Administration Systems (LAS) enables land-related processes to be carried out more reliably, transparently, and efficiently. It contributes significantly to strengthening tenure security, reducing land-related disputes, supporting economic development, and achieving the Sustainable Development Goals. [1]. Cadastral systems constitute the fundamental data infrastructure for a wide range of public services, including spatial planning, taxation, expropriation, infrastructure investments, disaster management, and environmental sustainability, in addition to securing property rights. Therefore, countries seek to integrate their cadastral systems with digital technologies to provide more efficient, transparent, and user-oriented services.

Despite the widespread adoption of web-based applications in the real estate sector, conventional real estate websites are reported to remain largely limited to searches based on basic criteria in terms of property-related content and query functions. [2]. This situation highlights the need for more advanced spatial query and analysis methods.

Land can play a significant role in real estate markets, particularly in developing cities, due to its legal development rights. Owing to its potential for high returns, reliability, and ability to retain its value over the long term, land is considered one of the preferred investment options compared with financial instruments such as foreign currencies and stocks. [3]. Studies in the field of digital real estate have shown that information and communication technologies, data collection technologies, data networking tools, and digital decision-support systems play an important role in the transformation of the real estate sector. [4]. In recent years, 3D cadastre, spatial data infrastructures, and property valuation systems have emerged as prominent research topics in the international land administration literature.

In Türkiye, cadastral services are administered by the General Directorate of Land Registry and Cadastre (GDLRC). In recent years, the institution has aimed to accelerate the digital transformation of the cadastral system through initiatives such as TAKBIS, MEGSIS, Web Land Registry, 3D city models, digital building applications, and land valuation infrastructure.

The digital transformation of the cadastral system in Türkiye has extended beyond the development of spatial information systems to include the digitalization of institutional services through applications such as Web Land Registry, TARBIS, parcel inquiry services, electronic archives, and 3D cadastre. In this process, the General Directorate of Land Registry and Cadastre (GDLRC) has made significant progress toward digitalization, while emerging technologies such as blockchain and the Internet of Things may also be integrated into land administration in the future. [5]. This digital transformation process has extended beyond spatial data production and online services to encompass electronic document management and digital archiving practices. Within the scope of the Electronic Land Registry and Cadastre Application Project implemented by the General Directorate of Land Registry and Cadastre (GDLRC), significant steps have been taken to digitize physical archives, establish standardized electronic document management processes, and develop an institutional digital archive infrastructure. [6]. In the development of GIS-based systems, considering users' needs and expectations and designing user-friendly interfaces are regarded as important components of user-oriented service delivery [7]. Strategic plans are used as an important management tool in the digital transformation processes of public institutions. They are key policy documents that define an institution's medium- and long-term objectives, priorities, performance indicators, and resource allocation. Therefore, examining strategic plans provides an opportunity to assess an institution's digital transformation vision, priorities, and changes over time.

The aim of this study is to comparatively analyze the 2019–2023 and 2024–2028 Strategic Plans of the General Directorate of Land Registry and Cadastre (GDLRC) to identify the priorities, trends of change, and future strategic directions of the digital transformation process of the Turkish cadastral system. A qualitative document analysis method was employed, and strategic objectives, targets, performance indicators, and policy areas related to digitalization were evaluated through thematic content analysis. In this way, the study aims not only to provide a current and systematic assessment of the digital transformation of the cadastral system in Türkiye but also to establish a guiding framework for future strategic plans and international comparative research.

2. Material and Method

In this study, document analysis, a qualitative research method, was employed to identify trends in the development and transformation of the Turkish cadastral system's digital transformation process.

Document analysis is a scientific research method based on the systematic collection, examination, evaluation, and analysis of written and visual documents that constitute the primary sources of research data. [8]. Accordingly,



this study is based on a comparative examination of two consecutive strategic plans of the General Directorate of Land Registry and Cadastre (GDLRC).

Cadastre (GDLRC). Both documents were selected as the main research materials because they contain the institution's strategic objectives, targets, performance indicators, and priority areas of activity related to digital transformation. The strategic plans provide a comprehensive and appropriate dataset for assessing changes over time in digital cadastral applications, spatial data management, and institutional transformation policies.

The strategic plans used in the study were obtained from the official website of the GDLRC. The documents were examined in detail, and all content related to the digital transformation process was included in the analysis. Accordingly, strategic objectives, strategic targets, performance indicators, activities, information technologies, digitalization initiatives, spatial data management, 3D cadastre, land valuation systems, electronic land registry and cadastral services, and institutional development were evaluated as research data.

The data obtained were evaluated using the document analysis method. During the analysis process, objectives, targets, and statements related to digital transformation in both strategic plans were first identified and systematically coded, and similar content was classified under common themes. Subsequently, the identified themes were comparatively examined across the two strategic plans to reveal similarities, differences, and trends in change between the two periods.

In the study, codes related to digital transformation were classified into five main themes based on their similarities. These themes were identified as digital cadastral and spatial data infrastructure, electronic land registry and digital cadastral services, multidimensional cadastre and 3D spatial models, land valuation and value information systems, and institutional digital transformation and capacity. Within each theme, the objectives, targets, performance indicators, and activities included in the strategic plans were evaluated together. Strategic statements associated with each theme were then compared to analyze the similarities, differences, and digital transformation trends between the 2019–2023 and 2024–2028 Strategic Plans.

The research process was conducted in five stages. In the first stage, the strategic plans to be included in the scope of the study were identified and the relevant documents were obtained. In the second stage, the strategic plans were examined in detail to identify objectives, targets, and statements related to digital transformation. In the third stage, the identified statements were coded, and similar content was classified under common themes. In the fourth stage, the two strategic plans were compared using thematic content analysis. In the final stage, the findings were interpreted to identify trends in the transformation and development of the Turkish cadastral system. The coding framework for the digital transformation themes is presented in Table 1.

Table 1. Framework of Digital Transformation Themes

Main Theme	Scope
Digital Cadastre and Spatial Data Infrastructure	Coordinate system, authoritative digital data, cadastral production/completion, forests and unregistered areas, MEGSIS, digitization of archival data
Electronic Land Registry and Digital Cadastral Services	Electronic land registry transactions, Turkish Land Registry System, TAKBIS, land registry integration, integration of electronic documents and identity information
Multidimensional Cadastre and 3D Spatial Models	Multidimensional cadastre, 3D city models, 3D building models, integration with cadastral base maps, infrastructure and marine cadastre
Land Valuation and Value Information Systems	Property valuation maps, property–value integration, value information center, mass valuation model
Institutional Digital Transformation and Capacity	Information Technology infrastructure, human resources, training, archive management, physical service facilities, international engagement, and institutional capacity

2.1. Digital Cadastre and Spatial Data Infrastructure

Digital cadastre and spatial data infrastructure are addressed in both strategic plans through objectives aimed at ensuring that cadastral data are up-to-date, accurate, and accessible. However, a comparison of the two plans reveals changes in the scope and nature of these priorities. The 2019–2023 Strategic Plan primarily focused on establishing a single coordinate system throughout Türkiye, achieving authoritative digital cadastral data, and eliminating unregistered areas. In the 2024–2028 Strategic Plan, these objectives are complemented by the completion of cadastral activities, the improvement of MEGSIS, and the scanning and integration of cadastral archival data into the system.



The primary focus of the 2019–2023 Strategic Plan regarding digital cadastral infrastructure was to establish a single coordinate system throughout Türkiye and achieve authoritative digital cadastral data within this unified coordinate system. In addition, the plan adopted an approach aimed at completing cadastral coverage by ensuring that no unregistered areas remained.

In the 2024–2028 Strategic Plan, the objectives related to digital cadastral infrastructure are addressed within a more comprehensive framework. While the objective of establishing a single coordinate system throughout Türkiye and achieving authoritative digital cadastral data is maintained, the plan also envisages completing cadastral activities in areas and units where cadastre has not yet been completed, conducting cadastral studies related to forest areas, and improving MEGSIS through the scanning and integration of cadastral archival data.

From this perspective, although there is a fundamental continuity between the two plans, the scope of the digital cadastral infrastructure expanded during the 2024–2028 period. While the 2019–2023 period emphasized objectives aimed at establishing the basic cadastral infrastructure, such as a single coordinate system, authoritative digital cadastral data, and the elimination of unregistered areas, the 2024–2028 period added elements such as completing cadastral activities, improving MEGSIS, and transferring archival data into the digital environment. Thus, the approach to digital cadastral infrastructure evolved from merely creating digital data toward the systematic improvement of existing cadastral data and its integration into institutional information systems.

Overall, the 2019–2023 Strategic Plan focuses on establishing and standardizing the fundamental components of the digital cadastral infrastructure, whereas the 2024–2028 Strategic Plan emphasizes expanding the scope of this infrastructure, completing existing cadastral activities, and transferring archival data into digital systems. This shift indicates that the GDLRC's approach to digital transformation in the cadastral domain has evolved from establishing basic digital infrastructure toward improving existing data and enabling its more effective use within institutional information systems. The codes identified under this theme were comparatively evaluated based on the objectives and targets included in both strategic plans, and the trends in change between the two periods are presented in Table 2.

Table 2. Comparative Findings on Digital Cadastre and Spatial Data Infrastructure in the 2019–2023 and 2024–2028 Strategic Plans

Sub-code	2019–2023	2024–2028
Single Coordinate System	Establishing a Single Coordinate System Throughout Türkiye and Achieving Authoritative Digital Data in the Same Coordinate System	Establishing a Single Coordinate System Throughout Türkiye and Achieving Authoritative Digital Data
Completion of Cadastral Coverage	Elimination of Unregistered Areas	Completion of cadastral activities in areas where cadastre has not yet been completed; completion of cadastral activities related to forest areas
MEGSIS and Cadastral Data	-	Improvement of MEGSIS; scanning and transfer of cadastral archival data
Digital Cadastral Data	Achieving Authoritative Digital Data	Achieving Authoritative Digital Data
Digitization of Cadastral Archives	-	Scanning and Integration of Cadastral Archival Data into the System

2.2. Electronic Land Registry and Digital Cadastral Services

Electronic land registry and digital cadastral services constitute one of the key areas addressed in both strategic plans within the digital transformation process of the General Directorate of Land Registry and Cadastre (GDLRC). The comparative analysis shows that the 2019–2023 Strategic Plan prioritized expanding the provision of land registry services through electronic means, ensuring interoperability between TAKBIS and the Land Registry, and transferring land registry transaction documents into electronic form. In the 2024–2028 Strategic Plan, this approach is continued and further developed toward the advancement of the Turkish Land Registry System and the transition to an electronic land registry, thereby establishing a more systematic structure.

In the 2019–2023 Strategic Plan, one of the main objectives concerning electronic land registry services was to increase the number of land registry transactions conducted electronically in order to provide faster, higher-quality, and more accessible services. In addition, the plan aimed to ensure interoperability between TAKBIS and the Land Registry and to classify, transfer, and share land registry transaction documents in electronic form. These objectives indicate the adoption of an approach focused on conducting land registry services electronically and managing land registry and cadastral information more effectively through information systems.



In the 2024–2028 Strategic Plan, the approach to electronic land registry services is addressed under the objective of developing the “Türkiye Tapu” System and transitioning to an electronic land registry. In this context, the plan aims to develop the Türkiye Tapu System by transferring land registry transaction documents into electronic form and to complete the missing Turkish Republic Identification Numbers that can be identified in TAKBIS. Thus, the approach initiated in the previous period toward improving electronic land registry services and managing land registry records in a digital environment is continued.

A comparison of the two strategic plans reveals both a fundamental continuity and an expansion in the scope of electronic land registry services. While the 2019–2023 period emphasized increasing electronic land registry transactions, ensuring interoperability between TAKBIS and the Land Registry, and transferring land registry documents into electronic form, the 2024–2028 period advanced this approach toward a more integrated structure through the development of the Türkiye Tapu System and the objective of transitioning to an electronic land registry. Therefore, from the perspective of digital transformation, the main shift between the two periods can be characterized as a transition from expanding electronic services toward developing a more integrated land registry system based on an electronic land registry.

Overall, the 2019–2023 Strategic Plan focuses on expanding electronic land registry services and improving interoperability among existing information systems, whereas the 2024–2028 Strategic Plan emphasizes the development of the Türkiye Tapu System and the transition to an electronic land registry as a further stage of electronic land registry services. This development indicates a shift in the GDLRC’s digital transformation approach from electronic service delivery toward an electronic land registry and an integrated land registry system. The codes identified under this theme were comparatively evaluated based on the objectives and targets included in both strategic plans, and the findings are presented in Table 3.

Table 3. Comparative Findings on Electronic Land Registry and Digital Cadastral Services in the 2019–2023 and 2024–2028 Strategic Plans

Sub-code	2019–2023	2024–2028
Electronic Land Registry Transactions	Increasing the number of land registry transactions conducted electronically to provide faster, higher-quality, and more accessible services	Development of the Türkiye Tapu System and Transition to an Electronic Land Registry
TAKBIS–Land Registry Interoperability	Ensuring interoperability between TAKBIS and the Land Registry	Completion of Missing and Identifiable Turkish Republic Identification Numbers in TAKBIS
Digitization of Land Registry Transaction Documents	Classification, digitization, and sharing of land registry transaction documents	Development of the Türkiye Tapu System through the Transfer of Land Registry Transaction Documents into Electronic Form
Electronic Land Registry	-	Development of the Türkiye Tapu System and Transition to an Electronic Land Registry
Land Registry and Cadastre Information Systems	Ensuring interoperability between TAKBIS and the Land Registry	Applications for the Development of the Türkiye Tapu System and TAKBIS

2.3. Multi-Dimensional Cadastre and 3D Spatial Models

Multi-dimensional cadastre and 3D spatial models represent one of the areas in which the direction of digital transformation differs most clearly between the two strategic plans. The comparative analysis shows that, in the 2019–2023 Strategic Plan, the objective related to multi-dimensional cadastre was addressed within the framework of map production for cadastral purposes, whereas in the 2024–2028 Strategic Plan, the transition to a multi-dimensional cadastral system and the creation of 3D city and building models were explicitly established as strategic objectives and targets.

The 2019–2023 Strategic Plan aimed to “complete map production for multi-dimensional cadastre purposes.” This objective indicates an orientation toward the production of multi-dimensional data beyond the existing cadastral structure. However, an examination of the other objectives and targets in the plan shows that the approach to multi-dimensional cadastre was not structured within a comprehensive framework, as in the 2024–2028 Strategic Plan, encompassing a multi-dimensional cadastral system, 3D city models, and 3D building models under a distinct objective.



In the 2024–2028 Strategic Plan, multi-dimensional cadastre is addressed directly at the strategic objective level. Under the objective of “Transitioning to a Multi-Dimensional Cadastral System,” the plan aims to integrate 3D city models with cadastral base data and establish a multi-dimensional cadastral system encompassing infrastructure and marine cadastre. During the same planning period, objectives such as establishing a single coordinate system throughout Türkiye, achieving authoritative digital data, completing cadastral activities in areas where cadastre has not yet been completed, and improving MEGBIS are also included as activities supporting the infrastructure of the multi-dimensional cadastral system.

In addition, the 2024–2028 Strategic Plan defines a separate objective for the creation of 3D city models and cadastral base data. Within this framework, aerial imagery is planned to be acquired for the production of 3D city models and/or orthophoto maps, together with the production of 3D city and building models. Thus, three-dimensional spatial models have become a prominent component of the strategic plan alongside the development of the multi-dimensional cadastral system.

A comparison of the two strategic plans reveals a significant expansion in the scope of multi-dimensional cadastre. While the 2019–2023 period aimed to complete map production for multi-dimensional cadastre purposes, the 2024–2028 period expanded this approach through more comprehensive objectives, including the establishment of a multi-dimensional cadastral system, the integration of 3D city models with cadastral base data, and the production of 3D city and building models. This change indicates that the GDLRC’s digital transformation approach in the cadastral domain is progressing from the development of digital cadastral data toward a multi-dimensional structure in which spatial data of different dimensions are integrated with the cadastral system.

Overall, while the 2019–2023 Strategic Plan addressed multi-dimensional cadastre within a specific target, the 2024–2028 Strategic Plan established multi-dimensional cadastre and 3D spatial models as more comprehensive and explicitly defined strategic objectives. The sub-codes identified under this theme were comparatively evaluated based on the objectives and targets included in both strategic plans, and the findings are presented in Table 4.

Table 4. Comparative Findings on Multi-Dimensional Cadastre and 3D Spatial Models in the TKGM Strategic Plans for 2019–2023 and 2024–2028

Sub-code	2019–2023	2024–2028
Multi-Dimensional Cadastre	Completion of map production for multi-dimensional cadastre purposes was targeted.	The objective of transitioning to a multi-dimensional cadastral system was established, with the establishment of such a system being targeted.
3D City Models	-	Aerial imagery acquisition was targeted for the production of 3D city models and/or orthophoto maps.
3D Building Models	-	The production of 3D city and building models was specified.
Integration with Cadastral Base Data	No explicit objective is specified.	The integration of 3D city models with cadastral base data was targeted.
Infrastructure and Marine Cadastre	-	The establishment of a multi-dimensional cadastral system incorporating infrastructure and marine cadastre was targeted.

2.4. Property Valuation and Property Value Information Systems

Property valuation and property value information systems represent one of the themes that has expanded significantly in scope between the two strategic plans. The comparative analysis shows that the 2019–2023 Strategic Plan focused on the creation of property valuation maps and their integration with property ownership information, whereas the 2024–2028 Strategic Plan developed this approach into a more systematic structure through the establishment of a Property Value Information Center integrated with the GDLRC’s information systems and the identification of an appropriate mass valuation model for Türkiye.



In the 2019–2023 Strategic Plan, property valuation was addressed under the objective of “Creating property valuation maps and integrating them with property ownership information.” Within this framework, the plan aimed to complete the legislative arrangements necessary for establishing a property valuation system and to create, update, and share valuation information integrated with property ownership data. These objectives indicate the adoption of an approach focused on linking property valuation information with ownership data and systematically generating valuation information.

In the 2024–2028 Strategic Plan, the approach to property valuation is addressed within a more institutional and systematic framework. Under the objective of “Creating Türkiye’s Property Valuation Maps,” the plan aims to establish a Property Value Information Center integrated with the GDLRC’s information systems and to determine an appropriate mass valuation model for Türkiye. Thus, the approach established in the previous period for generating property valuation information and integrating it with property ownership data is envisaged to be further developed during the 2024–2028 period through a centralized property value information structure and a mass valuation model.

A comparison of the two strategic plans reveals both fundamental continuity and an expansion in the scope of property valuation. While the 2019–2023 period emphasized the creation of property valuation maps, the integration of valuation information with property ownership data, and the updating and sharing of such information, the 2024–2028 period targeted the establishment of a Property Value Information Center and the determination of a mass valuation model. This change indicates that the approach to property valuation has evolved from merely generating valuation information and linking it with ownership data toward a more systematic structure integrated with information systems and equipped with mass valuation capabilities.

Studies concerning the consideration of property values in land readjustment processes also demonstrate the importance of valuation-based approaches in ensuring a fairer assessment of value differences among properties. [9]. Various studies emphasize that the area-based approach applied in land readjustment practices in Türkiye for many years may not always adequately reflect increases in property values, highlighting the need to transition toward a value-based approach. [10]. This approach provides a basis for developing a more data-driven land management framework based on the integrated assessment of spatial, ownership, and valuation information related to properties.

Overall, the 2019–2023 Strategic Plan emphasized establishing the fundamental components of the property valuation infrastructure and integrating them with property ownership information, whereas the 2024–2028 Strategic Plan aimed to further develop this infrastructure through an institutional Property Value Information Center and a mass valuation model. The sub-codes identified under this theme were comparatively evaluated based on the objectives and targets included in both strategic plans, and the changes in the field of property valuation between the two periods are presented in Table 5.

Table 5. Comparative Findings on Property Valuation and Property Value Information Systems in the TKGM Strategic Plans for 2019–2023 and 2024–2028

Sub-code	2019–2023	2024–2028
Property Valuation Maps	Creation of Property Valuation Maps	Establishment of a Property Value Information Center and Development of the Valuation System
Integration of Property Ownership and Valuation Information	Creation, Updating, and Sharing of Valuation Information Integrated with Property Ownership Data	Integration of the Property Value Information Center with the GDLRC information systems
Property Valuation System	Completion of the Legislative Arrangements Required to Establish a Property Valuation System	Determination of an Appropriate Mass Valuation Model for Türkiye
Property Value Information Center	No explicit objective for a Property Value Information Center is specified.	Establishment of a Property Value Information Center Integrated with the GDLRC Information Systems
Mass Valuation	No explicit objective is specified.	Determination of an Appropriate Mass Valuation Model for Türkiye

2.5. Institutional Digital Transformation and Capacity

Institutional digital transformation and capacity encompass elements such as human resources, information technology infrastructure, physical service facilities, archive management, and institutional activities that support the service delivery capacity of the General Directorate of Land Registry and Cadastre (GDLRC). The comparative



analysis shows that institutional capacity remained an important strategic area in both the 2019–2023 and 2024–2028 Strategic Plans, although some changes occurred in its sub-priorities between the two periods.

In the 2019–2023 Strategic Plan, five targets were defined under the objective of “Strengthening Institutional Capacity in Service Delivery.” These targets covered strengthening human resources in line with the institutional strategy, improving physical service facilities, continuously developing the information technology infrastructure in accordance with modern service standards, increasing the institution’s effectiveness and recognition at the international level, and centrally collecting archival documents of legal and historical value for classification, restoration, and conservation. This structure indicates that institutional capacity was addressed through the integrated dimensions of human resources, technology, physical infrastructure, archives, and institutional engagement.

In the 2024–2028 Strategic Plan, the objective of “Strengthening Institutional Capacity in Service Delivery” has also been retained. Under this objective, the plan aims to preserve archival documents of legal and historical value and transfer them to future generations, conduct training activities to improve the efficiency and quality of human resources, increase the institution’s effectiveness and recognition at the international level, and improve physical service facilities and enhance awareness of the services provided. Thus, the archival, human resources, physical service facilities, and international engagement dimensions included in the previous plan have largely been maintained.

A comparison of the two strategic plans reveals significant continuity in terms of institutional capacity. Human resources, physical service facilities, preservation of archives, and international engagement were maintained as core components of institutional capacity in both planning periods. However, while the 2019–2023 Strategic Plan included the continuous development of information technology infrastructure in accordance with modern service standards as a specific target, the 2024–2028 Strategic Plan does not include a separate target concerning IT infrastructure under the same objective. In contrast, the 2024–2028 period more explicitly defines training activities aimed at improving the efficiency and quality of human resources.

In terms of archive management, both continuity and a shift in approach can be observed between the two periods. While the 2019–2023 period focused on centrally collecting, classifying, restoring, and conserving archival documents, the 2024–2028 period emphasized the proper preservation of archival documents of legal and historical value and their transfer to future generations. This indicates that archive management has evolved from physical organization and conservation activities toward a more sustainable approach focused on the long-term preservation and transfer of archival records.

Overall, the 2019–2023 and 2024–2028 Strategic Plans largely maintain the core components of institutional capacity, although their priorities differ. While the development of information technology infrastructure was explicitly identified as an important component of institutional capacity in the 2019–2023 period, the 2024–2028 period places greater emphasis on the quality and efficiency of human resources, training activities, archive preservation, and the continuity of institutional service capacity. In this context, institutional digital transformation should be considered not only in terms of technological infrastructure development but also in conjunction with strengthening the human resources and institutional capacity required to ensure the sustainability of digital services. The sub-codes identified under the theme of institutional digital transformation and capacity were comparatively evaluated based on the objectives and targets included in both strategic plans, and the findings are presented in Table 6.

Table 6. Comparative Findings on Institutional Digital Transformation and Capacity in the TKGM Strategic Plans for 2019–2023 and 2024–2028

Sub-code	2019–2023	2024–2028
Human Resources	Strengthening Human Resources in Line with the Institutional Strategy	Conducting Training Activities to Improve the Efficiency and Quality of Human Resources
Information Technology Infrastructure	Continuous Development of Information Technology Infrastructure in Accordance with Modern Service Standards	No separate target concerning information technology infrastructure is specified under this objective.
Physical Service Facilities	Development of Physical Service Facilities and Enhancement of Service Awareness	Development of Physical Service Facilities and Enhancement of Service Awareness
Archive Management and Preservation	Centralization of Archival Documents of Legal and Historical	Proper Preservation of Archival Documents of Legal and Historical Value and Their Transfer to Future Generations



Value, Including Their Classification, Restoration, and Conservation		
International Engagement and Recognition	Increasing the Institution's International Effectiveness and Recognition	Increasing the Institution's International Effectiveness and Recognition
Institutional Service Capacity	Strengthening Institutional Capacity in Service Delivery	Strengthening Institutional Capacity in Service Delivery

3. Discussion

This study comparatively examined the 2019–2023 and 2024–2028 Strategic Plans of the General Directorate of Land Registry and Cadastre (GDLRC) and identified a significant shift in the direction of the digital transformation of the cadastral system in Türkiye between the two periods. The findings show that, during the 2019–2023 period, digital transformation primarily focused on the digitization of existing cadastral data, the development of cadastral and land registry information systems, the expansion of electronic land registry services, and the strengthening of basic digital infrastructure. In contrast, the 2024–2028 period introduced broader and more advanced strategic directions, including the transition to a multi-dimensional cadastral system, the development of three-dimensional city and building models, the establishment of property value information systems, and the determination of a mass valuation model. Nevertheless, in terms of institutional capacity, elements such as human resources, physical service facilities, archive management, and institutional engagement remained important throughout both planning periods.

This transformation is to some extent consistent with current approaches in the field of international land administration. In particular, the Cadastre 2014 and Cadastre 2034 visions developed by the International Federation of Surveyors (FIG) emphasize the development of cadastral systems in response to changing societal, technological, and land administration needs. The findings of this study indicate that the objectives in the 2024–2028 Strategic Plan concerning the transition to a multi-dimensional cadastral system, the creation of three-dimensional city and building models, and the development of a property value information system are broadly consistent with this transformation trend, which extends beyond the traditional two-dimensional structure of cadastral systems. However, it would be more appropriate to state that these strategic directions share a similar orientation with international visions in terms of broader development trends, rather than suggesting that they correspond to these visions on a one-to-one basis.

Similarly, a study conducted on North Macedonia evaluated the existing cadastral system within the framework of the Cadastre 2034 vision and considered this approach fundamental to planning the future transformation process. The study emphasizes that identifying deficiencies in the existing system and developing forward-looking transformation strategies are critical for the transition toward modern cadastral systems [11].

A SWOT analysis conducted on Türkiye evaluated the strengths and weaknesses, as well as the opportunities and threats, of the existing cadastral system within the framework of the Cadastre 2034 vision. The study recommended completing cadastral renewal activities, ensuring alignment with international standards, and adopting a strategic planning approach [12].

Similarly, a study conducted in Poland indicates that, although the cadastral system has been modernized based on international standards, the success of digital transformation depends not only on updating legislation but also on improving data quality and effectively implementing standards in practice [13]. These findings demonstrate that digital cadastral transformation should be supported not only by the development of technological infrastructure but also by the creation of reliable, up-to-date, and standardized spatial data.

Another notable finding of the study is that multi-dimensional cadastre and three-dimensional spatial models are addressed more comprehensively in the 2024–2028 Strategic Plan than in the previous period. While the 2019–2023 Strategic Plan targeted the completion of map production for multi-dimensional cadastre purposes, the 2024–2028 Strategic Plan, under the objective of “Transitioning to a Multi-Dimensional Cadastral System,” targeted the integration of three-dimensional city models with cadastral base data, the establishment of a multi-dimensional cadastral system incorporating infrastructure and marine cadastre, and the production of three-dimensional city and building models. This indicates that the cadastral system in Türkiye is moving toward a more advanced structure that is not limited to the management of two-dimensional cadastral data but also incorporates spatial data of different dimensions and three-dimensional models. This direction is broadly consistent with developments in the international literature aimed at enabling cadastral systems to manage three-dimensional spatial relationships and complex property structures more effectively. Therefore, the increased emphasis on multi-dimensional cadastre and three-dimensional spatial models in the 2024–2028 Strategic Plan can be regarded as an important strategic direction for expanding the technological and functional scope of the cadastral system in Türkiye.



A study conducted in Australia and New Zealand indicates that the successful implementation of three-dimensional digital cadastral systems requires not only the development of technological infrastructure but also the updating of legal regulations, the restructuring of institutional workflows, and the establishment of common standards to ensure interoperability among institutions. [14].

A significant development can also be observed between the two strategic plans in terms of the property valuation system. In the 2019–2023 period, property valuation was primarily addressed through activities related to valuation maps and the creation and updating of valuation information integrated with property ownership data. In contrast, the 2024–2028 Strategic Plan established more comprehensive targets, including the establishment of a Property Value Information Center, the integration of properties into the system, the creation of valuation maps, and the development of a mass valuation model. This indicates that property valuation activities have evolved from individual data and infrastructure initiatives toward a more integrated and institutionalized property value information system. Addressing property valuation together with cadastral and other spatial information also points to a strategic orientation toward the systematic management of property value information alongside ownership information in land administration.

In terms of institutional digital transformation and capacity, both continuity and shifts in priorities can be observed between the two strategic plans. In the 2019–2023 Strategic Plan, the continuous development of information technology infrastructure in accordance with modern service standards was explicitly established as a target, while strengthening human resources, improving physical service facilities, and preserving archives were also identified as key components of institutional capacity. In the 2024–2028 Strategic Plan, training activities aimed at improving the efficiency and quality of human resources, the preservation and transfer of archival documents of legal and historical value to future generations, the improvement of physical service facilities, and the enhancement of the institution's international effectiveness were targeted. These findings demonstrate that the sustainability of digital transformation depends not only on technological infrastructure but also on strengthening human resources and institutional capacity.

A study conducted in Afghanistan similarly emphasizes that digital cadastral transformation is not limited to the development of information technology infrastructure; qualified human resources, institutional capacity, and sustainable financing are also critical to the successful implementation of modern land administration systems [15].

This finding is also consistent with recent studies in the international literature. A study conducted in Burkina Faso reports that the digitalization of cadastral processes encompasses the digitization of surveying documents, parcel data, building records, and archives. However, the study indicates that the mismatch between digital transformation objectives and available resources, together with the lack of coordination among institutions, limits the effectiveness of the process. It further emphasizes that technological solutions alone are insufficient to address structural challenges and that successful digital transformation requires strengthening institutional capacity and fostering collaboration among stakeholders. [16].

This study demonstrates that the approach adopted in the digital transformation of the Turkish cadastral system during the 2019–2023 period, which was primarily based on digitization, the development of core information systems, and the expansion of electronic services, has evolved during the 2024–2028 period toward a more comprehensive framework encompassing multidimensional cadastre, three-dimensional city and building models, real estate valuation, and the enhancement of institutional capacity. The principal contribution of the study lies in systematically revealing the changes in the priorities emerging within the scope of digital transformation through a thematic content analysis comparing two consecutive strategic plans of the General Directorate of Land Registry and Cadastre (TKGM). The findings are expected to contribute to the formulation of future strategic plans, the development of digital cadastral policies in Türkiye, and comparative research examining land administration approaches across different countries.

4. Conclusion and Recommendations

In this study, the 2019–2023 and 2024–2028 Strategic Plans of the General Directorate of Land Registry and Cadastre (TKGM) were comparatively examined using qualitative document analysis and thematic content analysis, with the aim of identifying emerging trends in the digital transformation of the Turkish cadastral system. The findings indicate that the scope of digital transformation has expanded between the two strategic planning periods. During the 2019–2023 period, the primary priorities included the development of digital cadastral infrastructure, ensuring access to accurate digital data, completing cadastral coverage, expanding electronic land registry transactions, and strengthening information technology infrastructure. In contrast, during the 2024–2028 period, more advanced applications, such as multidimensional cadastre, three-dimensional city and building models, a real estate valuation information system, and mass valuation, have emerged as prominent strategic priorities.

The 2019–2023 Strategic Plan is characterized by a strong emphasis on objectives aimed at establishing and developing the digital cadastral infrastructure. The transition to a unified coordinate reference system, ensuring access to accurate digital data, completing map production for multidimensional cadastral purposes, expanding



electronic land registry transactions, and strengthening information technology infrastructure were among the key priorities of this period. Ensuring compatibility between the Land Registry and Cadastre Information System (TAKBİS) and the land registry system, together with the digitization of documents related to land registry transactions, also emerged as important steps toward strengthening the digital service infrastructure.

The 2024–2028 Strategic Plan, in contrast, demonstrates that the digital infrastructure established during the previous period is being expanded through more advanced applications. Under the objective of transitioning to a Multidimensional Cadastre System, the plan envisages the integration of three-dimensional city models with cadastral base maps, the transition to a unified coordinate reference system, the further development of MEGSİS, and the integration of cadastral archival data into the system. In addition, objectives such as the development of the Turkish Land Registry System, the digitization of land registry transaction documents, the establishment of a Real Estate Valuation Information Center, the development of a mass valuation model, and the production of three-dimensional city and building models demonstrate the expanding scope of digital transformation.

When the two periods are evaluated together, the findings suggest that the strategic orientation reflects continuity and expansion rather than a sharp departure. While the 2019–2023 period focused on the digitization of the existing cadastral and land registry infrastructure, the development of information systems, and the strengthening of electronic services, the 2024–2028 period builds upon this foundation by incorporating multidimensional cadastre, three-dimensional models, and real estate valuation systems. This indicates that digital cadastral transformation in Türkiye is not limited to the digitization of existing data, but is progressively moving toward a more integrated and multidimensional land information infrastructure.

In terms of institutional capacity, there is substantial continuity between the two strategic plans. The development of human resources, strengthening of information technology infrastructure, improvement of physical service facilities, preservation of archival documents, and enhancement of international engagement have remained important priorities in both periods. Therefore, the sustainability of digital transformation depends not only on the development of technological infrastructure but also on the concurrent strengthening of qualified human resources, institutional capacity, and reliable data management.

The main contribution of this study is its comparative examination of two consecutive strategic plans of the General Directorate of Land Registry and Cadastre (TKGM) from the perspective of digital transformation, thereby revealing changes in strategic priorities within a thematic framework. The study jointly evaluates digital cadastral infrastructure, electronic land registry and digital services, multidimensional cadastre and three-dimensional models, real estate valuation, and institutional capacity. In this respect, the study contributes to a comprehensive assessment of strategic policy documents concerning the digital transformation of the cadastral system in Türkiye.

In line with the research findings, it is recommended that future strategic planning periods focus on expanding the scope of multidimensional cadastral applications, enhancing the integration of three-dimensional city and building models with cadastral data, and ensuring the effective nationwide implementation of the real estate valuation information system. In addition, maintaining objectives related to the unified coordinate reference system, accurate digital data, cadastral updating activities, and the development of electronic archival infrastructure remains essential for ensuring the currency and accuracy of cadastral data. Strengthening data integrity and interoperability among different information systems should also be regarded as a priority for the sustainability of the digital cadastral infrastructure.

In the field of real estate valuation, it is important to further develop the Real Estate Valuation Information Center, ensure the up-to-date and reliable management of real estate valuation data, and effectively implement a mass valuation model appropriate for Türkiye. The integrated management of cadastral and real estate valuation data may contribute to strengthening the information infrastructure for land administration and enhancing decision-support mechanisms. In terms of sustaining institutional capacity, efforts should extend beyond technological investments to include the development of qualified human resources, the continuation of training activities, and the ongoing preservation of archival assets.

This study is limited to the 2019–2023 and 2024–2028 Strategic Plans of the General Directorate of Land Registry and Cadastre (TKGM). Future studies could conduct comparative analyses with cadastral strategies adopted in different countries, examine the extent to which the targets established in strategic plans have been achieved, and evaluate the relationship between planned objectives and implementation outcomes using empirical field data. In addition, jointly examining the implementation levels of multidimensional cadastre, three-dimensional city and building models, and real estate valuation systems could contribute to a more detailed understanding of the outcomes of digital cadastral transformation in Türkiye.

In conclusion, the strategic plans of the General Directorate of Land Registry and Cadastre (TKGM) demonstrate that digital transformation within the Turkish cadastral system has expanded over time in both scope and sophistication. While digital cadastral infrastructure, electronic land registry services, and information technology capacity were prominent priorities during the 2019–2023 period, multidimensional cadastre, three-dimensional city and building models, and real estate valuation systems emerged as more prominent strategic priorities during the 2024–2028 period. Nevertheless, human resources, archival management, physical service facilities, and institutional capacity have remained important throughout both periods. Within this framework, the sustainability of Türkiye's digital cadastral transformation depends not only on integrating emerging technological and spatial



applications with the existing digital infrastructure, but also on the concurrent development of strong institutional capacity, qualified human resources, and sustainable data management practices.

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Hasan Çevik: Research idea, methodology, examination of strategic plans, coding, analysis, tables, initial draft

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The authors declare no conflicts of interest.

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