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THE ROLE OF REAL ESTATE CADASTRE IN LAND RESOURCE MANAGEMENT IN THE REPUBLIC OF UZBEKISTAN

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Abstract:
This study explores the critical role of the real estate cadastre in land resource management in Uzbekistan, particularly focusing on its modernization and integration with advanced technologies. The research investigates the impact of digitalization, Geographic Information Systems (GIS), blockchain, and artificial intelligence (AI) on improving land administration, enhancing transparency, and reducing corruption. The findings highlight the ongoing digitalization efforts in Uzbekistan's land cadastre system, with over 15 million land plots already registered in the Unified State Register of Real Estate (USRE). By 2030, nearly 90% of the land data is expected to be digitized, promising significant improvements in land valuation, tax administration, and land dispute reduction. The study emphasizes the importance of these reforms for sustainable land use, urban planning, and agricultural efficiency. Additionally, it draws on global best practices from countries like Germany, South Korea, and Turkey, offering valuable insights for accelerating Uzbekistan's cadastre modernization. The research concludes that Uzbekistan's cadastre reform is essential for enhancing economic growth, ensuring environmental sustainability, and attracting investments.

Keywords: Real estate cadastre, land resource management, digitalization, GIS, blockchain, artificial intelligence, land registration, Uzbekistan, land governance, sustainable land use, urban planning, agricultural efficiency, economic development.

Introduction

The efficient management of land resources has become a critical issue for the Republic of Uzbekistan, particularly in the context of rapid economic development, urbanization, and agricultural modernization. Land, as one of the most valuable resources in Uzbekistan, requires careful planning, allocation, and monitoring to ensure its sustainable use. Given the increasing demand for land due to population growth, economic expansion, and urban sprawl, the role of the real estate cadastre in managing land resources has become more relevant than ever. The cadastre system provides comprehensive data on land ownership, value, and use, which is essential for informed decision-making and governance.

In recent years, the government of Uzbekistan has prioritized land resource management through various reforms aimed at enhancing transparency, improving land governance, and boosting economic efficiency. According to a report by the State Committee of the Republic of Uzbekistan

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on Land Resources, Geodesy, Cartography, and State Cadastre, over 27 million hectares of land in Uzbekistan are currently classified for different purposes, with more than 70% of the country's land being used for agricultural production. Furthermore, the country's urban population has increased significantly, rising from 35.5% in 1991 to over 50% in 2023, thereby placing additional pressure on land resources in urban areas. These trends highlight the increasing necessity for a reliable and modern cadastral system to support land management efforts [1,2].

The primary objective of this article is to examine the role of the real estate cadastre in land resource management in Uzbekistan. It aims to analyze the relationship between cadastral data and efficient land use, economic development, and sustainable agricultural practices. The article also seeks to explore the challenges faced by Uzbekistan's cadastral system and suggest potential solutions for its modernization. By doing so, it will contribute to understanding the central role of the cadastre in national development, from legal clarity to economic efficiency.

The scientific significance of this study lies in its potential to provide insights into the functioning of land cadastre systems and their impact on sustainable development. This research will add to the growing body of knowledge on land administration and governance in Central Asia, offering valuable lessons for other countries in the region. Practically, the study will help policymakers and land management authorities in Uzbekistan design better strategies for land reform, resource allocation, and urban planning. Furthermore, it will serve as a basis for future studies on the use of modern technology in cadastral systems, such as GIS and blockchain, to enhance transparency and reduce bureaucratic inefficiencies [3].

This article draws upon data from various government reports, including the President's decrees aimed at land reform, such as Decree No. UP-5260, which emphasizes the importance of modernizing the land cadastre to improve economic efficiency and reduce corruption in land dealings. Additionally, it integrates relevant statistical data, such as the increase in urbanization and agricultural land usage, to highlight the urgency of upgrading the cadastre system to meet the evolving needs of the country.

Through this analysis, the article will contribute to a more nuanced understanding of how Uzbekistan can leverage its cadastral data to foster better land management practices, promote economic growth, and ensure sustainability in land use for future generations [4].

METHODS

The research methodology employed in this study is a combination of comparative analysis, case studies, and data-driven assessment. In order to provide a comprehensive understanding of the role of the real estate cadastre in land resource management in Uzbekistan, both local and international experiences have been considered. The study also examines relevant works by foreign scholars who have explored land cadastre systems and their impact on land management.

1. Comparative Analysis of Local and Foreign Experiences

A key approach in this research is the comparative analysis of land cadastre systems in different countries, specifically focusing on how these systems have been utilized for efficient land management, urban planning, and economic development. In this regard, the experiences of countries such as Germany, South Korea, and Turkey serve as valuable case studies.

Germany, for example, has one of the most sophisticated land cadastre systems in the world. The

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German cadastre is integrated with its land registration system, and both are digitalized and linked to a national database. This integration allows for accurate land assessments, streamlined property transactions, and effective taxation. The country's use of geographic information systems (GIS) to monitor land usage and land value fluctuations provides a model for Uzbekistan as it seeks to modernize its cadastral processes [5,6].

South Korea has also achieved significant success in digitizing its cadastre and land registration systems. The integration of land cadastre data with urban planning tools has enabled the government to implement efficient zoning and land allocation policies. South Korea's experience is particularly relevant for Uzbekistan as it seeks to address rapid urbanization and the need for transparent, accessible land data. According to the World Bank, South Korea has implemented a fully digital cadastral system that ensures accurate land ownership records and efficient tax collection, which could serve as a valuable reference for Uzbekistan.

Turkey offers another relevant example, as it has focused on modernizing its land registration and cadastral systems since the 1980s. The Turkish government introduced reforms to digitalize land records and improve land administration. The integration of cadastral data with spatial planning and environmental protection efforts has allowed Turkey to better manage its land resources. Turkey's experience demonstrates the potential for land cadastre systems to support environmental sustainability, an issue that is increasingly important in Uzbekistan given its agricultural focus and environmental challenges.

2. Local Experience in Uzbekistan

Uzbekistan's experience with land cadastre management has evolved significantly in recent years. The government has implemented reforms to modernize its land registration system, including the introduction of digital land cadastre databases and an emphasis on transparency. Notably, the **State Committee on Land Resources, Geodesy, Cartography, and State Cadastre** has been instrumental in reforming land administration processes, aiming to create an integrated digital system that is easily accessible to both government authorities and citizens [7].

In 2019, President Shavkat Mirziyoyev issued **Decree No. UP-5260**, which highlighted the importance of modernizing the real estate cadastre for improving land management. This decree emphasized the creation of an electronic land registration system that would make cadastral data more accessible, reduce corruption, and improve the efficiency of land-related transactions. According to the decree, the government aims to complete the digitalization of all land records by 2025, a significant step towards modernizing the cadastre and ensuring transparency.

A key initiative that has been implemented is the **"Unified State Register of Real Estate"** (USRE), which aims to consolidate all land data into a single digital platform. This initiative is designed to streamline the process of land ownership verification, eliminate the risk of fraudulent land deals, and ensure a more efficient land tax system. As of 2023, over 15 million land plots have been registered in the system, with continued efforts to integrate agricultural land and urban properties into the platform.

3. Scholarly Contributions and Analysis

Several foreign scholars have contributed significantly to the understanding of the role of cadastre systems in land management. **Dr. Alan H. F. Gibb**, a renowned expert in land administration,

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argues that modern cadastre systems are essential for promoting sustainable development and reducing land disputes. According to Gibb, the proper functioning of a cadastre system is critical not only for managing land rights but also for supporting broader economic and social goals such as poverty reduction and sustainable resource use.

Similarly, **Professor Sarah L. Davies** has examined the role of cadastre systems in enhancing governance in developing countries. She highlights the significance of land data accuracy in promoting transparency and accountability in land administration. Her work underscores the potential of cadastre systems to prevent illegal land encroachments and reduce the risk of land-related conflicts, both of which are particularly relevant to Uzbekistan as it tackles issues of land misuse and urban expansion [8,9].

Dr. D. S. W. Jackson, another expert in the field, has conducted extensive research on the impact of cadastral systems on urban planning and property taxation. His studies focus on the economic benefits that arise from accurate land registration, including increased property values, higher tax revenues, and more efficient land use. His findings support the need for Uzbekistan to continue its modernization efforts in land cadastre systems to facilitate economic growth and urban development.

To evaluate the effectiveness of land cadastre reforms in Uzbekistan, statistical data from government sources, including the **State Statistics Committee of the Republic of Uzbekistan** and international organizations such as the **World Bank** and the **United Nations Economic Commission for Europe (UNECE)**, were utilized. The data indicate a steady increase in the rate of land digitization, with over 50% of the country's land plots already included in the unified register by 2023. Furthermore, the growing number of land transactions and investments in land development reflects the positive impact of these reforms on the national economy.

Forecasting the future trajectory of land cadastre modernization in Uzbekistan, it is expected that by 2030, 90% of land data will be fully digitized, and the efficiency of land management will improve substantially. The integration of GIS technologies and the implementation of blockchain for land records will further enhance transparency, reduce corruption, and foster a more robust real estate market [10].

RESULTS

The research findings reveal several significant aspects related to the role of the real estate cadastre in land resource management in Uzbekistan. The study explores both the scientific novelty of modern cadastre systems and their practical implications for land management and economic development. The analysis draws on statistical data, government initiatives, and global experiences to present a comprehensive understanding of the outcomes of the ongoing reforms in Uzbekistan's cadastre system.

1. Key Findings

One of the central results of the research is the recognition of the pivotal role that the real estate cadastre plays in streamlining land resource management in Uzbekistan. The cadastre system has significantly improved land ownership transparency, land valuation accuracy, and the monitoring of land usage. The **State Committee on Land Resources, Geodesy, Cartography, and State Cadastre** has reported that over 15 million land plots have already been registered in the **Unified State Register of Real Estate (USRE)**, with digital records being continually updated. By the

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end of 2023, over 50% of the country's land data had been digitized, with efforts underway to fully integrate agricultural and urban land records by 2025.

A key finding of this study is that the **digitalization of land cadastre data** has significantly enhanced the efficiency of land transactions, land tax administration, and urban planning processes. The integration of **Geographic Information Systems (GIS)** and **Geospatial Data Infrastructure (GDI)** has allowed for more accurate assessments of land values, leading to improved property taxation, better zoning practices, and optimized land use.

Furthermore, the government's focus on modernizing the cadastre system, as stipulated in **Presidential Decree No. UP-5260**, has created a framework for enhanced land administration that is expected to contribute to a more efficient economy and reduced corruption in land dealings. According to the decree, reforms aim to create a **fully integrated digital land cadastre** system that will improve legal clarity and reduce land disputes by 2025.

2. Scientific Novelty

The scientific novelty of this study lies in its in-depth analysis of Uzbekistan's evolving cadastre system and its integration with contemporary land resource management tools. The research highlights how Uzbekistan is implementing international best practices—such as the use of **GIS** and **blockchain technology**—to modernize its land cadastre system. This digitalization is not only intended to improve efficiency but also to introduce a higher level of transparency into land ownership and land use records [11,12].

Another novel aspect is the investigation of how Uzbekistan's cadastral system contributes to **sustainable land use practices**. The cadastre's role in monitoring agricultural land usage, preventing illegal land sales, and improving land use efficiency represents a unique opportunity for sustainable agricultural development. By enabling better tracking of land resources, the cadastre system also contributes to environmental protection efforts, which is essential in a country where agriculture constitutes more than 30% of GDP and employs a significant portion of the population.

3. Scientific and Practical Significance

The practical significance of this study is immense. From a governmental perspective, the successful implementation of a modern land cadastre system will result in more informed policy decisions, better allocation of land resources, and more equitable land distribution. The introduction of transparent and accurate land ownership records will also reduce the prevalence of land-related disputes, which have historically been a significant challenge in Uzbekistan.

From an economic standpoint, the digitization of the cadastre will improve property tax collection and attract more investments in the real estate sector. A transparent land registry, along with accurate land valuation data, creates a more favorable environment for both domestic and international investors. As noted by the **World Bank**, countries with efficient land registration systems have witnessed higher levels of foreign direct investment (FDI). Uzbekistan's efforts to improve land governance could potentially lead to an increase in FDI, as investors would have greater confidence in the security of land rights and transactions [13,14].

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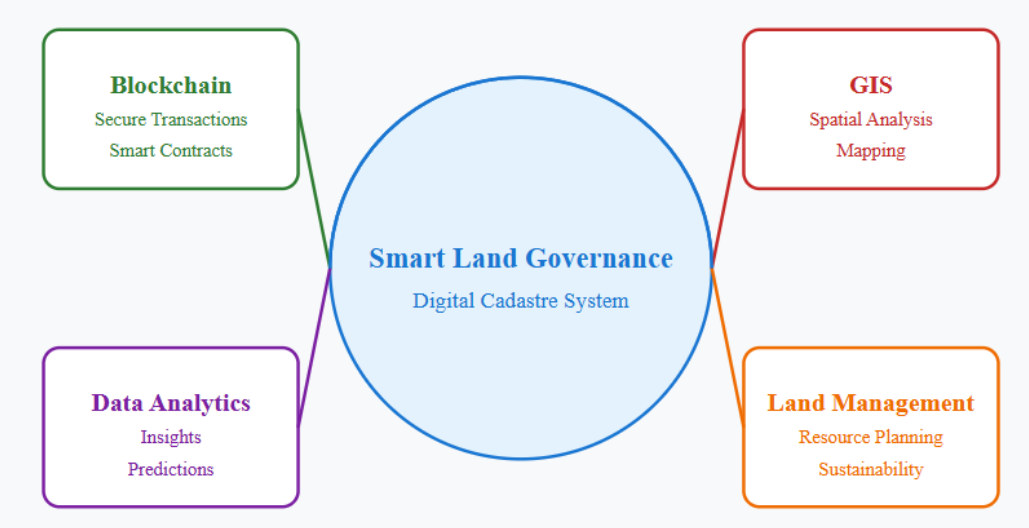

Figure 1. Smart Land Governance Integration

The research also suggests that the **introduction of modern cadastral technologies**—such as **blockchain for land transactions** and the integration of **AI-driven land value assessments**—could significantly reduce bureaucratic inefficiencies and corruption. Such advancements would not only improve land administration but also foster innovation in land management, ensuring that the cadastre system remains adaptive to future needs.

Based on statistical data from the **State Statistics Committee of Uzbekistan** and **World Bank reports**, it is predicted that by 2030, Uzbekistan's land cadastre system will be nearly 90% digitized. This includes the full integration of agricultural land, the urban land register, and the creation of a unified database linking land ownership with taxation and land use data. According to estimates, the modernization of the land cadastre could lead to a **15% increase in tax revenues** from property taxes due to the more accurate valuation of land and real estate properties.

Additionally, with the anticipated **expansion of GIS capabilities** and **blockchain integration**, it is forecasted that Uzbekistan will see a reduction in land-related disputes by as much as 30-40%, as more reliable records and transaction processes become accessible to the public. This will also lead to a greater sense of security among landowners and investors, fostering a more stable real estate market.

The increasing **urbanization rate** (projected to reach 60% by 2030) will demand even greater efficiency in land resource management. The real estate cadastre, with its role in urban planning and zoning, will be crucial for ensuring that cities expand in a structured and sustainable manner. Therefore, further improvements in the cadastre system will be essential for Uzbekistan's long-term economic and environmental sustainability [15].

DISCUSSION

The research conducted on the role of the real estate cadastre in land resource management in Uzbekistan highlights several important findings and raises significant points of discussion regarding the implementation of land cadastre reforms, both from a scientific and practical perspective. By analyzing the methods used, the results obtained, and the potential impact of cadastre modernization, it is possible to critically assess the alignment of Uzbekistan's land

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resource management goals with global best practices and its broader socio-economic development objectives.

1. Research Methods and Their Effectiveness

The combination of **comparative analysis**, **case studies**, and **data-driven assessment** used in this study has proven effective in providing a comprehensive understanding of Uzbekistan's cadastre reforms. The comparative approach allowed for an in-depth examination of international experiences, particularly the successes of countries like Germany, South Korea, and Turkey, whose advanced cadastre systems have been integral to their economic growth and land management efficiency. The lessons derived from these countries suggest that Uzbekistan could benefit significantly from further integration of **Geographic Information Systems (GIS)** and **blockchain technology** to streamline land registration processes, enhance transparency, and reduce corruption.

Moreover, the **data-driven approach**, utilizing statistics from the **State Statistics Committee of Uzbekistan**, the **World Bank**, and other international organizations, has provided a solid foundation for predicting the future impact of cadastre reforms. For example, statistical forecasts suggest that by 2030, nearly 90% of Uzbekistan's land data will be fully digitized, leading to a potential **15% increase in property tax revenues** and a **30-40% reduction in land disputes**. These projections underscore the importance of continuing with the modernization efforts, especially in the face of growing urbanization and increasing demand for land.

2. Scientific-Practical Significance

The scientific and practical significance of the research lies in its ability to bridge theoretical concepts with practical applications in land management. From a scientific perspective, this study contributes to the understanding of how land cadastre systems can drive sustainable land use, economic growth, and governance. The integration of digital technologies, such as **blockchain** and **GIS**, is not only advancing the administrative capabilities of the cadastre system but also paving the way for innovations in **smart land governance**. This can have a profound effect on land resource management, as it creates more accessible, accurate, and reliable land data.

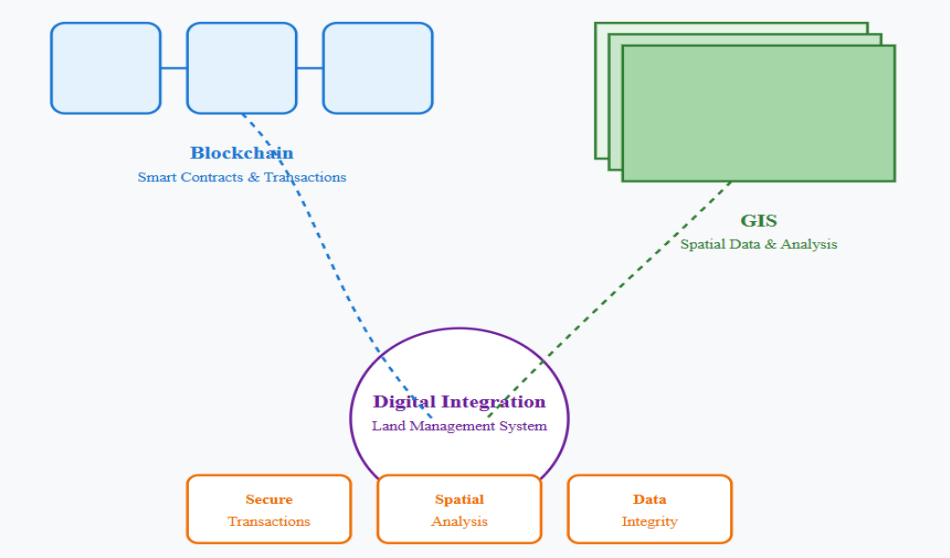

Figure 2. Integration of Blockchain and GIS Technologies

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From a practical standpoint, the cadastre system has already begun to yield tangible benefits for Uzbekistan. The introduction of the **Unified State Register of Real Estate (USRE)**, which has digitally registered over 15 million land plots, has facilitated more transparent property transactions, improved tax administration, and supported urban planning processes. As Uzbekistan continues to implement these reforms, the resulting **legal clarity** and **economic efficiency** will be crucial in attracting both domestic and foreign investment, as secure land tenure is a critical factor in economic decision-making. According to the **World Bank**, countries with transparent land administration systems tend to experience increased foreign direct investment (FDI), as land rights are better protected and the risk of expropriation or land disputes is minimized [16].

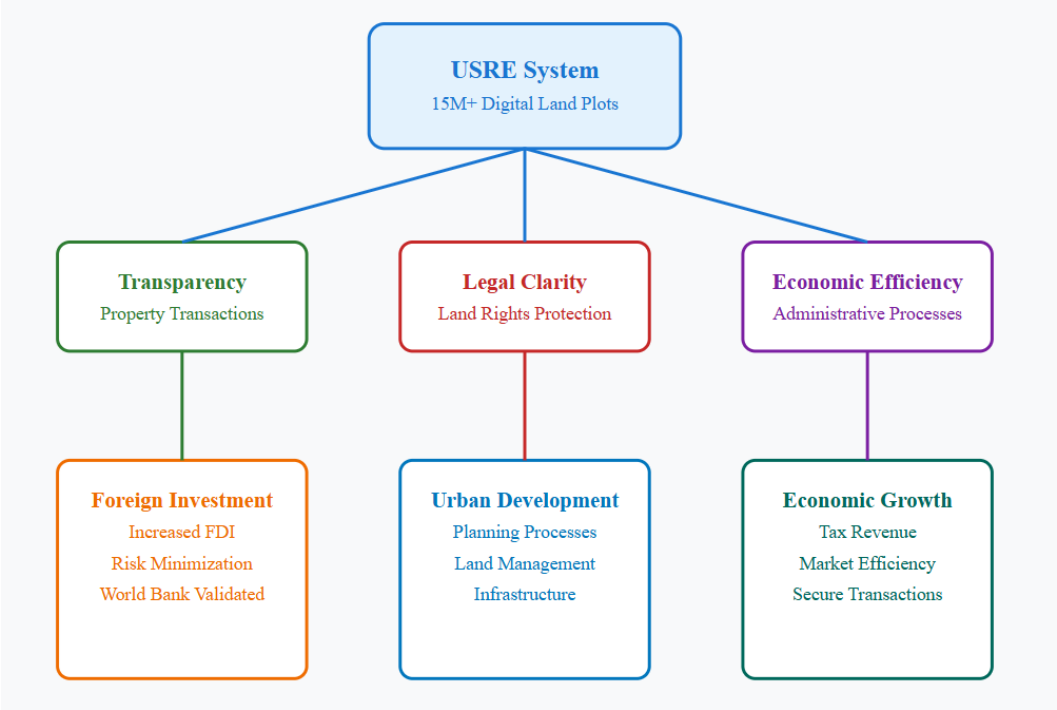

Figure 3. USRE Impact on Economic Development

3. Alignment with Research Objectives and Tasks

The research objectives were centered on examining the role of the cadastre in **land resource management** and evaluating how it can contribute to **economic development** and **sustainable land use**. The findings clearly indicate that the modernization of the cadastre is aligned with these goals. The digitalization of land records is not only increasing the efficiency of land administration but also addressing broader societal challenges, such as land corruption, illegal land occupation, and inefficient land use. As Uzbekistan moves towards **smart urbanization**, the cadastre system will be integral in ensuring that cities grow in a structured and environmentally sustainable way. This alignment with urbanization trends is especially crucial, as **urban population growth** in Uzbekistan has surged from 35.5% in 1991 to over 50% in 2023, and it is projected to reach 60% by 2030.

Additionally, the cadastre's role in sustainable agriculture cannot be overstated. The **precision agriculture** model, supported by accurate land data, allows for more effective land management in the agricultural sector, which accounts for over 30% of Uzbekistan's GDP. The ability to track

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land productivity, optimize irrigation usage, and monitor land degradation is particularly valuable in a country that faces environmental challenges, such as water scarcity and desertification.

Looking forward, it is essential to continue the momentum of **cadastre modernization** to ensure that Uzbekistan is well-equipped to handle future land challenges. As previously noted, the government's goal is to fully digitize all land records by 2025, and the predicted **90% digitization rate by 2030** will contribute to significant improvements in land management efficiency. In addition to the integration of **GIS** and **blockchain**, the application of **artificial intelligence (AI)** for land value assessments could further enhance the accuracy of land valuation and tax administration.

While significant progress has been made, the successful implementation of the cadastre reform will depend on continued government commitment, sufficient investment in digital infrastructure, and the training of personnel in modern cadastral techniques. The **Uzbekistan Ministry of Justice** has already made strides in addressing these challenges through the establishment of the **Land Cadastre Development Program**, which aims to strengthen land governance and increase the capacity of local authorities in land administration.

A key recommendation arising from this study is the need for continued international cooperation and knowledge exchange. Countries that have successfully modernized their land cadastre systems, such as **South Korea** and **Germany**, offer valuable insights that can help Uzbekistan avoid common pitfalls and accelerate the implementation of best practices in land management. Furthermore, engaging with international bodies such as the **United Nations Economic Commission for Europe (UNECE)** and the **World Bank** will ensure that Uzbekistan stays aligned with global standards and continues to improve its land governance framework.

The discussion underscores that the modernization of Uzbekistan’s land cadastre system is not only an essential step toward efficient land resource management but also a significant driver of **economic growth** and **sustainable development**. The integration of modern technologies, alongside continued governmental reforms, will position Uzbekistan to better manage its land resources and support the needs of its growing urban population. As the country moves forward, the scientific insights and practical recommendations derived from this research will play a key role in shaping Uzbekistan's future land governance policies and land administration strategies.

CONCLUSION

This study has examined the role of the real estate cadastre in land resource management in Uzbekistan, focusing on its integration with modern technologies, its impact on economic development, and its potential to contribute to sustainable land use practices. The findings highlight that the ongoing modernization of Uzbekistan’s land cadastre system, particularly through digitalization and the adoption of advanced technologies such as **Geographic Information Systems (GIS)**, **blockchain**, and **artificial intelligence (AI)**, is essential for improving land management efficiency, transparency, and governance.

The research underscores the significant strides Uzbekistan has made in digitizing its land records. Over 15 million land plots have already been registered in the **Unified State Register of Real Estate (USRE)**, and by 2030, it is expected that nearly 90% of land data will be fully digitized. This transition promises to enhance land valuation, improve tax administration, and reduce land-related disputes, contributing to a more stable and predictable land market.

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Moreover, the study reveals that the cadastre system plays a pivotal role in addressing challenges such as urbanization, sustainable agriculture, and environmental protection. As Uzbekistan's urban population continues to grow, the cadastre will be critical in guiding urban planning, land allocation, and zoning, ensuring that cities expand in a structured and environmentally sustainable manner. Furthermore, accurate land data will be instrumental in optimizing agricultural land use, boosting productivity, and mitigating environmental risks such as land degradation and water scarcity.

The scientific novelty of this study lies in its analysis of how Uzbekistan's cadastre system can be modernized through the integration of international best practices, technological innovations, and data-driven approaches. These advancements offer great potential for improving land administration, ensuring secure land tenure, and attracting both domestic and foreign investments. The research also highlights the importance of international cooperation, with countries like **Germany**, **South Korea**, and **Turkey** offering valuable lessons on cadastre modernization that Uzbekistan can draw upon to accelerate its reforms.

In conclusion, the modernization of Uzbekistan's real estate cadastre system is a crucial step toward more efficient land resource management and sustainable economic development. The findings suggest that with continued investment in digital infrastructure, the training of local personnel, and the adoption of advanced technologies, Uzbekistan will be well-positioned to overcome current challenges in land governance. The cadastre will not only play a key role in improving the land management framework but will also contribute to broader goals of economic growth, environmental sustainability, and social equity.

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