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Investment Project Siting And Valuation Based On Land Cadastre

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Abstract

The article substantiates an integrated model for applying land cadastre information as an evidence-based decision-making mechanism in the siting and evaluation of investment projects, incorporating legal, spatial, and economic components. Within the proposed model, the legal status of land parcels, registration validity, rights-restrictions-responsibilities, compliance with territorial planning documents, proximity to infrastructure, market value, and risk factors are consolidated into a unified algorithm. The research methodology is based on normative legal analysis, comprehensive due diligence of land parcels and investment objects using cadastral and registry data, spatial compatibility assessment through GIS-based criteria, and calibration of valuation results using market, income, and cost approaches in accordance with mass appraisal standards. As a result, an indicator system and risk registry were developed following the sequence "screening - legal verification - spatial compatibility - value/profitability - final decision," accompanied by practical recommendations aimed at enhancing investment security.

Keywords: Land cadastre, investment projects, land parcel selection, legal restrictions, spatial analysis, economic valuation, investment attractiveness, integration of cadastral data, sustainable territorial development.

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1. Introduction

In the practice of selecting sites for the placement of investment projects, one of the most common systemic errors is that a land parcel is initially chosen because it appears "cheap" or "convenient," after which the project timeline is extended or its profitability declines due to legal restrictions, inconsistencies in permitted land use, conflicts in official registries, high engineering and utility connection costs, and violations of territorial planning requirements; as a result, investment risks are determined to a greater extent by the "quality of land-related information" rather than by purely financial indicators. In Uzbekistan, guarantees in the field of investments and investment activity, the protection of investor rights, and the principles of stability are закреплены at the regulatory level, and the effective functioning of these guarantees largely depends on the state registration of real property rights and the transparency of information within land relations [1]. Since the Law "On State Cadastres" defines the land cadastre and cadastral information as a reliable data base for public administration and economic decision-making, the use of cadastral data as a "primary identifier" in investment siting constitutes a scientifically and practically justified solution [2].

Purpose of the Study. The purpose of this study is to develop a legally, spatially, and economically integrated model, together with a practical algorithm and a system

of indicators, for the siting and evaluation of investment projects based on land cadastral information.

Research tasks are:

– to standardize the scope of comprehensive legal due diligence of land parcels and investment objects;

– to develop a block of criteria for assessing spatial compatibility, including infrastructure, zoning regulations, and restricted areas;

– to align valuation procedures under the market, income, and cost approaches with mass appraisal standards;

– to propose a risk register and a final decision-making index based on integrated assessment.

The research was carried out within three interrelated methodological blocks. Regulatory and legal analysis, conceptual modeling and valuation with calibration.

1. Regulatory and legal analysis. Based on the requirements of the Land Code, an analysis was conducted of land categories, intended land use, and restrictions related to permitted uses, including conditionally permitted types [3]. The legal validity of rights registered in the state registry under the Law on State Registration of Real Property Rights, as well as the stability of transactions and associated investment guarantees, was substantiated [4]. Within the framework of PD-6061, issues of institutional redistribution and reduction of conflicts of interest in the system of land accounting and state cadastre maintenance were interpreted as factors enhancing investment transparency [5].

2. Conceptual Model. The concept of rights-restrictions-responsibilities and the relationships among "party-right-spatial unit-source" were adopted as a methodological framework within the LADM (ISO 19152-1:2024), since this approach allows the integration of legal and spatial data to be represented in a verifiable format [6].

3. Valuation and Calibration. In mass appraisal, principles of data quality, model selection, segmentation, and result verification were incorporated into the valuation block based on the IAAO 2025 standards [7]. Professional requirements related to mass appraisal (USPAP Standards 5-6) were applied as criteria for formal reporting and methodological consistency [8].

As a result, a practical algorithm for "Cadastral-Based Investment Siting" was developed. The algorithm consists of five stages:

Stage 1. Screening (Preliminary selection):

– Cadastral number, area, land category, and intended land use;

– Compliance of the project function with territorial planning;

– Initial "exclusion" criteria: prohibited uses, categorical incompatibility, or absence of rights [3].

Stage 2. Legal due diligence:

– Type of right (ownership/lease/perpetual use, etc.) and right holder;

– Registration in the state registry;

– Rights-restrictions-responsibilities: easements, protected zones, prohibitions/restrictions, obligations;

– In case of disputes, a risk scenario is prepared based on mechanisms for pre-litigation or court resolution [4], [9].

Stage 3. Spatial compatibility (GIS criteria):

– Road network and logistics access;

– Proximity to engineering and utility infrastructure (equivalent connection cost);

– Intersection with sanitary and ecological zones;

– Classification of natural hazards (floods, steep slopes, erosion indicators) as "suitable/limited/unsuitable."

Stage 4. Valuation (Value and profitability):

– Market approach: comparison based on analogous transactions;

– Income approach: rental flow and capitalization;

– Cost approach: preparation and infrastructure expenses;

– In portfolio or multi-object selection, results are calibrated according to IAAO 2025 mass appraisal standards [7] and documented in compliance with USPAP Standards 5-6 [8].

Stage 5. Final decision (Integrated index). The final decision is made according to the logic of "legal compliance × spatial compatibility × economic efficiency," where if legal compliance equals zero (unregistered rights, prohibitions, or incompatible use), the parcel is rejected regardless of the other indicators, since investment guarantees fundamentally depend on legal certainty [1], [4].

The minimal system of indicators presented below is designed to standardize the process of selecting land parcels for investment projects, reduce subjective decision-making, and integrate legal, spatial, and economic factors into a single analytical model. Practice shows that in investment project evaluations, individual factors are often prioritized, and the legal stability, spatial compatibility, or economic efficiency of a land parcel is not systematically analyzed. As a result, investment risks are misjudged and project efficiency declines.

This set of indicators is proposed as a simplified yet scientifically grounded model for the comprehensive assessment of investment land parcels and projects, enabling the harmonization of cadastral data, spatial planning documents, and economic valuation metrics. Because the indicators are structured in blocks corresponding to procedural stages, they serve as stepwise filters in investment decision-making, helping to identify unsuitable land parcels at an early stage. Table 1 presents the minimal system of indicators designed to standardize investment site selection.

Table 1.

Integrated system of legal, spatial, and economic indicators used in investment project selection

Block	Indicator	Description	Measurement (Example)
Legal	H1 - Registration Status	Existence and conflict-free status of the right in the registry	0/1
Legal	H2 - Rights-Restrictions-Responsibilities pressure	Share and strength of restrictions	0-100
Spatial	F1 - Infrastructure proximity	Distance to roads/utilities and connection cost	points/score
Spatial	F2 - Zoning compliance	Intersection with sanitary/ecological zones	0/1/2
Economic	I1 - Liquidity	Number of comparable transactions, price dispersion	index
Economic	I2 - Profitability proxy	NPV/IRR scenarios or capitalization	index

This system of indicators provides a minimal yet sufficient information base for evaluating investment projects and serves as a methodological foundation for subsequent stages of in-depth economic modeling and spatial optimization.

Maintaining rights-restrictions-responsibilities as a "single registry" in accordance with the LADM framework enables consistent linking of data, allowing legal risks to be interpreted in relation to spatial units and source documents in a verifiable manner [6]. Moreover, improving the consistency of information between the cadastre and the registry enhances investment transparency and strengthens market confidence [2], [5].

2. Discussion

The practical advantage of the proposed approach is that it does not base land selection solely on "location" or "price" criteria; rather, it integrates legal guarantees, spatial compatibility, and economic efficiency into a single decision-making chain. As a result, the decision transforms from a "subjective choice" into an "auditable evidence-based" outcome. International recommendations also emphasize that the protection of land rights is a fundamental factor for investment incentives and market activity, making the reliability of cadastre and registration institutions a key determinant of the investment environment [10], [11]. The FAO VGGT approach further underscores that enhancing transparency and accountability in land governance, together with legal certainty and equitable management of resources, is a prerequisite for "sustainable investment" [12].

3. Conclusion

This study developed a legally-spatially-economically integrated model for siting and evaluating investment projects based on land cadastre data, accompanied by a stepwise algorithm and a system of indicators. Legal due diligence was prioritized as an exclusion criterion, spatial compatibility was scored based on infrastructure and zoning constraints, and valuation was calibrated in a verifiable manner according to IAAO 2025 and USPAP Standards 5-6 [7], [8]. Practical recommendations include: 1) Making the verification of rights-restrictions-responsibilities a mandatory standard in investment land selection. 2) Strictly applying the cadastral number as the unique identifier in the integration of cadastre, registry, and territorial planning documents. 3) Incorporating mass appraisal criteria into normative and practical procedures for portfolio-based projects [2], [6], [7].

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