NÖHÜ Müh. Bilim. Derg. / NOHU J. Eng. Sci., 2025; 14(4), 1471-1487
Niğde Ömer Halisdemir Üniversitesi Mühendislik Bilimleri Dergisi
Niğde Ömer Halisdemir University Journal of Engineering Sciences
Araştırma makalesi / Research article
www.dergipark.org.tr/tr/pub/ngumuh / www.dergipark.org.tr/en/pub/ngumuh

The impacts of distribution practices on sustainability in urban transformation projects

Kentsel dönüşüm projelerinde dağıtım uygulamalarının sürdürülebilirliğe etkileri

Mehmet Bak[1,*], Nihal Tekin Ünlütürk[2]

[1] *Talas Municipality, Urban Transformation Directorate, 38280, Kayseri, Türkiye*
[2] *Erciyes University, Geomatics Engineering Department, 38030, Kayseri, Türkiye*

Abstract

Urban transformation projects aim to increase the resilience of cities to disaster risks while promoting social, economic and spatial development. The success of such projects depends on fair and sustainable approaches that ensure physical transformation and social justice. However, inequities in distribution, particularly the unfair allocation of entitlements, undermine the social acceptance and long-term sustainability of these initiatives. Value-based distribution models that take into account the market value of both existing and new properties, can promote fairer representation of right holders. This study evaluates the effectiveness of a value-based distribution model designed to ensure fair representation of stakeholders. The model is developed and applied to two neighbourhoods (Harman and Mevlana) in the Talas district of Kayseri, Türkiye. In this article, the implementation of the model is demonstrated using distribution scenarios developed specifically for the Mevlana neighbourhood. The main objective is to enable the beneficiaries to participate in the project with minimal or no financial debt. Each scenario is comparatively analysed based on equity, transparency and financial feasibility. The results show that the value-based model promotes equitable distribution, reduces financial burden and improves social sustainability. This approach provides a valuable reference for future urban transformation projects in Türkiye.

Keywords: Urban transformation, Disaster resilience, Value-based distribution, Fair sharing of property, Sustainability

Öz

Kentsel dönüşüm projeleri, şehirlerin afet risklerine karşı dirençlerini artırmayı ve sosyal, ekonomik ve mekânsal gelişimlerini desteklemeyi amaçlamaktadır. Bu tür projelerin başarısı, fiziksel dönüşüm ile birlikte sosyal adaleti de sağlayan adil ve sürdürülebilir yaklaşımlara bağlıdır. Ancak, özellikle hak sahipliklerinin adaletsiz biçimde belirlenmesi gibi dağılımdaki eşitsizlikler, bu girişimlerin toplumsal kabulünü ve uzun vadeli sürdürülebilirliğini zayıflatmaktadır. Hem mevcut hem de yeni taşınmazların piyasa değerini dikkate alan değer temelli dağıtım modelleri, hak sahiplerinin daha adil bir biçimde temsil edilmesini sağlayabilir. Bu çalışma, paydaşların adil temsiline olanak tanıyan değer bazlı bir dağıtım modelinin etkililiğini değerlendirmektedir. Model, Kayseri ili Talas ilçesindeki iki mahalleye (Harman ve Mevlana) uygulanmak üzere geliştirilmiştir. Bu makalede, modelin uygulaması Mevlana Mahallesi için özel olarak geliştirilen dağıtım senaryoları üzerinden gösterilmektedir. Çalışmanın temel amacı, hak sahiplerinin projeye asgari düzeyde ya da hiç borç yüklenmeden katılımını sağlamaktır. Her bir senaryo; eşitlik, şeffaflık ve finansal fizibilite kriterlerine göre karşılaştırmalı olarak analiz edilmiştir. Elde edilen sonuçlar, değer bazlı modelin adil dağılımı teşvik ettiğini, finansal yükü azalttığını ve sosyal sürdürülebilirliği güçlendirdiğini ortaya koymaktadır. Bu yaklaşım, Türkiye'deki gelecekteki kentsel dönüşüm projeleri için değerli bir referans sunmaktadır.

Anahtar kelimeler: Kentsel dönüşüm, Afetlere dayanıklılık, Değer bazlı dağıtım, Mülkiyetin adil paylaşımı, Sürdürülebilirlik

1 Introduction

Urban transformation is a comprehensive process that improves problematic urban areas economically, physically, and socially [1]. Urban centers, defined as unhealthy urban areas, old industrial areas, disaster-prone areas, squatter settlements, and conservation areas are the focus of urban transformation projects [2-5]. The aim is to make these areas usable again and to restructure them according to the principles of sustainable urbanization. Urban transformation projects are not limited to the renewal of the physical environment but also include multidimensional objectives such as diversifying economic activities, increasing spatial efficiency, and strengthening social structures [6,7]. This comprehensive approach requires fundamental principles such as sustainability, inclusivity, and long-term planning [8-11].

Urban transformation projects emerged in the 19th century as a response to the problems caused by industrialization and

* Sorumlu yazar / Corresponding author, e-posta / e-mail: bakmehmet@gmail.com (M. Bak)
Geliş / Received: 20.03.2025 Kabul / Accepted: 16.09.2025 Yayımlanma / Published: 15.10.2025
doi: 10.28948/ngumuh.1662206

urbanization. Rapid population growth in cities, irregular development, and inadequate infrastructure in the wake of the Industrial Revolution necessitated extensive transformation projects in unhealthy urban areas [12,13]. A significant example from this period is the projects led by Baron Haussmann in Paris, where narrow and irregular streets were transformed into wide boulevards to solve the physical problems of the city and develop modern infrastructure systems [14]. In the 20th century, especially after the Second World War, urban transformation projects gained considerable momentum. In countries such as Germany and Great Britain, cities were rebuilt after the war's destruction using modern architectural principles and a strengthened infrastructure [15]. At the same time, projects known as "urban renewal" in the United States aimed to revitalize city centers, but also brought with them social problems such as the displacement of low-income groups [16]. Since the 1960s, urban transformation projects have been characterized by measures to increase social welfare and reduce inequalities [17]. In the 1970s, economic development came to the fore, while real estate development and investment-oriented projects increased in the 1980s. In the 1990s, issues such as community partnerships and social sustainability came to the fore, and since the 2000s, environmental sustainability has been at the center of urban transformation processes [14].

The experience of urban transformation in Türkiye can be divided into four basic periods based on historical, political and economic conditions. These are the periods from 1923–1950, 1950–1980, 1980-2000 and the 2000s to the present. In the early years of the Republic, cities were re-planned by the state. In this process, urban restructuring was considered a spatial extension of the construction of a modern nation-state [18]. While Municipal Law No. 1580 of 1930 formed the basis of modern municipalism [19], the problem of squatting was indirectly addressed with the first amnesty laws No. 5218 and 5431 of 1948 and 1949 [20].

In the period after 1950, there was a strong migration from the countryside to the cities, which led to an uncontrolled spread of squatter settlements in the urban peripheries [21-24]. During this period, the squatter settlements were converted into housing complexes [25]. The Squatters Act No. 775 of 1966 put the production of squatter housing on a comprehensive legal basis for the first time. In the same period, multi-storey housing and co-operatives were promoted by Law No. 634 on Condominiums (1965) and Law No. 1163 on Cooperatives (1969). However, amnesty laws such as 6188 and 6785 made squatter settlements permanent instead of encouraging conversion [19,20]. After 1980, the economic structure in Türkiye changed radically and the intervention of the state in the city was redefined. During this period, urban transformation policies changed to a market-orientated structure and projects based on public-private partnerships became widespread [21,26,27]. With the Mass Housing Law No. 2985 enacted in 1984, Housing Development Administration of the Republic of Türkiye (TOKİ) was established, and Law No. 2981 on the Amnesty of Development Plans, which came into force in the same year, resulted in an amnesty for squatters and unlicensed buildings and became an instrument to legitimise property problems instead of planned urbanisation. The Zoning Law No. 3194, which came into force in 1985, gave municipalities the power to draw up plans, while the Expropriation Act No. 2942 regulated the possibilities of intervening in private property for reasons of public interest [18]. In the 1990s, under the influence of globalisation and in line with European Union norms, efforts to protect historic areas and legalise informal settlements came to the fore [28]. Early participatory transformation projects such as the Ankara Dikmen Valley Urban Transformation Project emphasised the involvement of residents [29]. In the 2000s, urban transformation policies in Türkiye gained momentum due to the discourse on disaster risk and physical collapse, and the transformation processes were given a more centralised and overarching structure [29]. Accordingly, Law No. 5104 issued in 2004 for the North Ankara Entrance Urban Transformation Project created a legal basis for large-scale applications based on cooperation between the central and local governments. Metropolitan Municipality Law No. 5216, enacted in the same year, gave metropolitan municipalities the power to implement transformation projects; Article 73 of Municipality Law No. 5393, enacted in 2005, gave municipalities the power to declare and implement urban transformation areas. Law No. 5366 on the "Renovation and Protection of Dilapidated Historical and Cultural Immovable Property" also evaluated historical areas as part of the conversion process. Law No. 6306 on the Transformation of Areas at Disaster Risk, which came into force in 2012, enabled implementation at the parcel level, while the powers of TOKİ were further expanded through various additional regulations [19]. The laws created a legal basis for transformation processes during this period. Transformation projects generally focused on the renovation of buildings and disaster risk reduction and neglected long-term, comprehensive approaches [29].

Major disasters in Türkiye have shown that comprehensive approaches are the only way to accelerate and properly manage urban transformation processes. The 1999 Marmara earthquake, for example, highlighted the inadequacies and safety deficiencies of the existing building stock and led to a focus on disaster-oriented urban transformation projects. The Kahramanmaraş earthquakes of 2023 [30] also underlined the urgent need to rehabilitate risky structures and build more resilient cities. As mentioned, various laws were enacted to prevent disasters and create a safer living environment. Although the legal framework regulating urban transformation projects in Türkiye provides a comprehensive structure in theory, in practice, there are still problems, such as legal inconsistencies, a lack of qualified personnel, and coordination problems. Various methods have been developed to regulate urban transformation projects' financing and contracting processes. Transfer of development rights, real estate certificates, and mortgage bonds are important methods in Turkish legislation, such as Law No. 3194 on Development, Law No. 6362 on Capital Markets, and Law No. 4721 on the Turkish Civil Code.

Previous studies have shown that although these methods contribute to urban transformation projects in theory, they have significant limitations in practice. For example, the transfer of development rights has found limited application due to inadequate legal and institutional infrastructure; real estate certificates have not caught on due to lack of investor confidence and market liquidity; and mortgage bonds are considered vulnerable to economic fluctuations and do not provide sustainable financing for projects [31]. In the various laws governing urban transformation projects, procurement practices vary depending on the type and purpose of the project, leading to inconsistencies due to a lack of standardization. Furthermore, the inability to accurately and fairly calculate the economic value of real estate leads to inequalities between stakeholders and undermines social justice. These shortcomings in the allocation processes do not meet stakeholders' social and economic expectations, which increases public dissatisfaction and negatively affects the success and acceptance of urban transformation projects.

Ensuring a fair, transparent and sustainable distribution of ownership in urban transformation projects is crucial for increasing social acceptance and the success of implementation. In this context, Gökçe and Salalı [32] propose a distribution model based on the principle of equivalence. They argue that beneficiaries should suffer neither gain nor loss during the transformation process and emphasise the need for value-based redistribution. Similarly, Kaşlıköse and Aksu [33] show that value-based distribution leads to more equitable outcomes compared to traditional methods and emphasise the efficiency of mass appraisal approaches in large-scale projects, but also point to challenges related to data infrastructure and legal compatibility. Demir and Yılmaz [34] emphasize the demand for transparent delineation of roles and responsibilities among stakeholders, warning that limited participation and information deficits lead to resistance and implementation difficulties. In line with this, Gervan et al. [35] through their case study of the Ayazma neighborhood, analyse the outcomes of zoning implementations and show that urban transformation practices conducted under Article 18 of Zoning Law No. 3194 created substantial gains for right holders; however, the classification of different ownership groups caused ambiguity in the allocation process. Liu et al. [36] underscore the importance of equitable benefit sharing among stakeholders in urban transformation and propose a game-theoretic model wherein the bargaining process between developers and beneficiaries can be balanced using a symmetric information-based Nash equilibrium. Within this framework, the state assumes a key role in facilitating information flow and regulating bargaining power. In a similar effort, Kandaloğlu [37] criticizes the arbitrariness and lack of systematic approaches in property redistribution practices in Turkey and introduces a model grounded in the principle of "value coefficient equality," emphasizing the need to integrate residents of squatter areas without dispossession. Addressing implementation-based injustices, Bayrak and Yalpır [38] present a hybrid Cobb-Douglas regression model applied in Meram, a district of Konya in Türkiye, where each property is assessed based on its legal and physical attributes, achieving a 98% accuracy rate. This model supports a more objective and equitable distribution while reducing time and cost in large-scale projects. Similarly, Güngör and İnam [39] argue that area-based proportional deduction methods result in value disparities and property losses post-transformation, advocating for valuation models that consider legal and physical characteristics for more equitable outcomes. In the same vein, N. Enver Ülger [40] highlights the inadequacy of conventional zoning practices in densely built environments and asserts that market value should replace parcel area as the primary distribution metric, calling for a value-based model rooted in the equivalence principle. This approach also offers an alternative to expropriation-based methods, which often generate legal and social conflicts. Birol Alas [41], in his case study of Zeytinburnu, proposes the simplification of participation value calculation using statistical methods, demonstrating the possibility of a more rational, efficient, and trust-enhancing system. His work further supports the significance of value-based distribution models in terms of both financial and social sustainability. Akkaya [42] argues that individual building-related refurbishment measures are often ineffective, while collective projects face negotiation problems between stakeholders. To overcome this, he proposes a Delphi-based expert model that emphasises transparency and fairness. Although the model is not a quantitative assessment tool, it is oriented towards value-based approaches by incorporating socially and economically based distribution criteria. Public institutions are emphasised as key actors in ensuring legitimacy and broad acceptance. All these studies reveal the necessity of developing value-based, calculable, stakeholder-participatory and legally based distribution models.

As emphasized above, allocation processes are crucial to the success of urban transformation projects. These processes must ensure the protection of existing rights and the equitable distribution of new rights under the new regulations. Law No. 6306 and its accompanying regulations govern these processes, including the allocation of new independent units to right holders in the transformation areas and the resolution of differences between land values and construction costs through mathematical modelling. However, concerns about the fairness of the allocation, fears of property loss, and mistrust between the parties complicate these processes and damage public acceptance of the projects. This emphasizes the need for a fair and sustainable value-based distribution model. In determining the value of right holders' assets, the concept of value is not only an economic exchange tool but also a critical component in creating a fair distribution mechanism [40]. Article 12 of Law No. 6306 provides the legal basis for determining property values and economic compensation mechanisms. However, this provision is often inadequately applied in practice, leading to arbitrary approaches. This article states that property values are determined based on comparable prices and physical characteristics. The value of real property is also influenced by location, accessibility, and environmental characteristics, collectively referred to as

"valuation parameters." Considering these parameters forms the basis for a fair allocation process and ensures economic equity among stakeholders [43-45].

In this study, value-based scenarios were developed to address the shortcomings of current allocation practices in urban transformation areas. They were applied to two different transformation areas in the Talas district of Kayseri. The study aims to minimize economic inequalities by calculating real property values fairly and transparently for stakeholders. The methodology applied in this study demonstrates a functional and sustainable allocation approach and shows that the legal framework can be implemented effectively and fairly for the stakeholders. In summary, the results of this study will increase interest in urban transformation projects by creating a fair and transparent allocation system, increasing participation, and facilitating the transformation process. This research contributes to the literature in three main ways. First, it operationalizes the often-theorized principle of equivalence through a value-based allocation model, offering an alternative to area-based or fixed-ratio approaches. By minimizing stakeholder debt and aligning property rights with real market values, the model enhances procedural fairness. Second, through scenario-based comparative analysis, the study introduces a practical framework for evaluating the financial and social impacts of different distribution strategies, bridging the gap between normative equity and real-world feasibility. Third, by applying the model to a real urban transformation case in Talas, Kayseri, the research grounds theoretical discussions in a local context and provides a replicable approach for local governments. In this respect, the study not only expands the academic discourse on equitable urban transformation but also offers a practical decision-support tool for implementation in similar contexts.

2 Project area

To plan the urban transformation healthily, detailed data collection and analysis studies were carried out on the application area. In addition to technical information such as the status of building and land owners, building type, number of floors, number of independent sections, owners of inherited independent sections, owners of utilized independent sections, total construction area and status of development, data on the economic, social, geographical, demographic, historical, educational, and cultural status of the people and society in the area were also evaluated. All this information was collected and analysed to properly plan and implement urban transformation projects. Within this framework, two separate application areas for urban transformation and development projects were determined in Mevlana and Harman neighbourhoods of Talas district in Kayseri province, with the decision of the Council of Ministers in line with the proposal of Talas Municipality. This study covers 22 blocks and 126 independent units within the area in question and affects 222 beneficiaries. Below, you will find detailed information about the project areas.

2.1 Harman Project area

With the decision of the Council of Ministers, the project area for urban transformation and development (Figure 1a) was determined, which is located within the boundaries of the Harman neighborhood of Talas district in Kayseri province. The area is located southeast of Kayseri city center and south of Talas district center and lies between Erhan Street and Atatürk Boulevard (Figure 1b). To carry out the projects in a more organized, controlled, and effective manner, the area was divided into three separate phases. The first phase, "Phase-1", is the subject of our study and has an area of approximately 12,395 square meters (Figure 2). The project area comprises 11 buildings with ground + 2 floors and 66 independent units. It has old and unstable structural features that endanger public health. A flat ground structure dominates this area, which is densely used as a residential area. The area is located at the foothills of Ali Mountain, next to the Talas Conservation Development Plan border and close to the main transportation axes. The infrastructure and superstructure work in the project area has largely been completed, and the transport links have been well developed. The work area where the project will be carried out is within the scope of the development plan at a scale of 1/1000, a commercial-residential area.

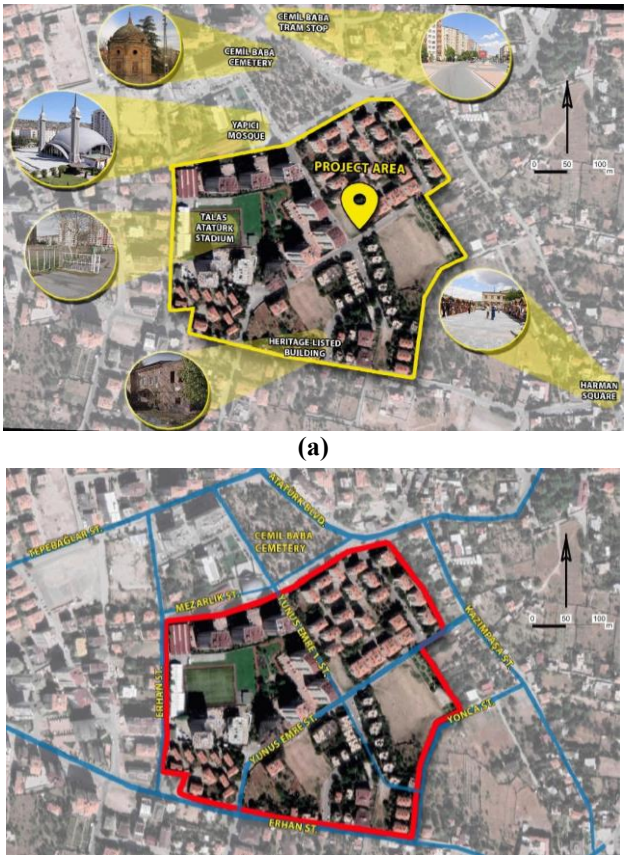


Figure 1. (a) Harman project area (b) Its primary transportation axes

Figure 2. Harman project area, phases

2.2 Mevlana Project area

The urban transformation project area (Figure 3a), which is located within the boundaries of the Mevlana neighborhood of Talas district in Kayseri province, was determined by the decision of the Council of Ministers according to the proposal of Talas Municipality. The project area, which is also the study area, covers an area of approximately 1.99 hectares and is located in the triangle of Halef Hoca Street, Mehmet Timuçin Street, and Velioğlu Street, west of the city center of Kayseri and north of the center of Talas district (Figure 3b).

(a)

(b)

Figure 3. (a) Mevlana project area (b) Its primary transportation axes

This area consists of 10 buildings with a first floor + 2 floors and 60 independent units; all buildings are old and must be renovated. The properties in the project area have been assessed as residential use. The area has no commercial use, has a flat land structure, and is located west of the Halef Hoca cemetery. The project area is an area with old buildings in the form of a compound. The area is located near the roads and transportation facilities, which are pretty well-developed. The infrastructure and development work has already been completed. The area where the project is to be carried out is within the scope of the development plan at a scale of 1/1000, residential structure area.

3 Method

The basic principle of the method to be applied in this study is to ensure fair distribution according to the principles of equality and justice in urban transformation projects currently being implemented or planned for the future in the Talas district of Kayseri province by using a mathematical distribution model. With this method, the values of the existing properties and the projects to be realized were calculated, and value-based distribution scenarios were prepared. These scenarios were used to determine how new properties or other rights would be distributed based on the existing properties and the projects to be built. In this way, the aim was to ensure that right holders could benefit from the project with no or minimal debt. This approach ensured that the right holders' rights were determined, distributed, and protected fairly and transparently. In addition, a solution to ownership issues was developed by considering current legislation. The study begins with the determination of the property's current value, the investment value, and the current value coefficient. It continues with the phases of feasibility studies, project preparation, and valuation. In the final phase, suitable distribution criteria and scenarios are developed for the right holders, and then the value coefficients for the project are calculated. This method is based on the principle of equality between the right holders' current value coefficient and the project's value coefficient. The implementation of the value-based distribution model ensures that urban transformation projects are implemented sustainably by long-term plans. In this way, a more stable structure is created by preventing the random and unplanned distribution of property.

3.1 Distribution method

The distribution model is used to fairly distribute the rights of the urban transformation area (m² or value) to independent units (projects) that will be implemented in the same area or other regions. This mathematical model makes it possible to determine the share of contractors and beneficiaries as well as the share of the administration depending on the costs it will spend on infrastructure and social projects. The model enables the successful implementation of architectural and technical projects, economic and social transformation processes, and land use plans. This approach was approved and implemented by the Talas City Council as an implementing ordinance. In this way, the loss of rights of beneficiaries who do not reach an

agreement has been prevented, property-related problems have been solved, and obstacles in the urban transformation process have been minimized by supporting the current legislation. In this way, the process is completed faster and more effectively. The structure of the distribution model is shown in the following figure (Figure 4).

The distribution model is outlined in Figure 4, and the model is fixed. The current values (participation value), urban transformation parameter (conversion parameter), cost, feasibility and project share calculations, and project value (value of independent sections to be produced) form the basis of the model. The participation value of each property is determined according to specific parameters, and the share ratios of the participants are calculated using the feasibility analysis. Architectural projects are then prepared, a project valuation is carried out, and the right holders' rights are distributed to the independent unit of the project using the transformation coefficients. In summary, right holders' shares in the application area are evaluated, the values of these shares are determined, and the independent sections in the new project are distributed fairly. The urban transformation process created with the distribution applications is shown in Figure 5 under the main headings. It shows the process that begins with determining urban transformation areas, preparing feasibility and land use plans, creating architectural, technical, and social projects, and completing urban transformation with the distribution model.

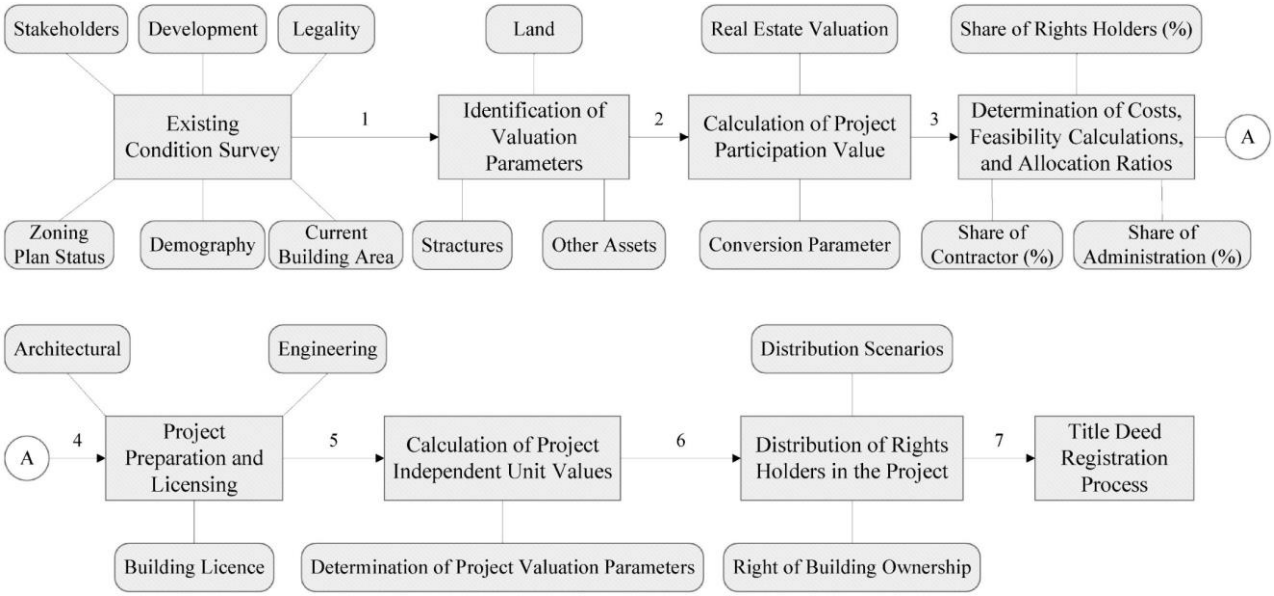


Figure 4. Distribution model

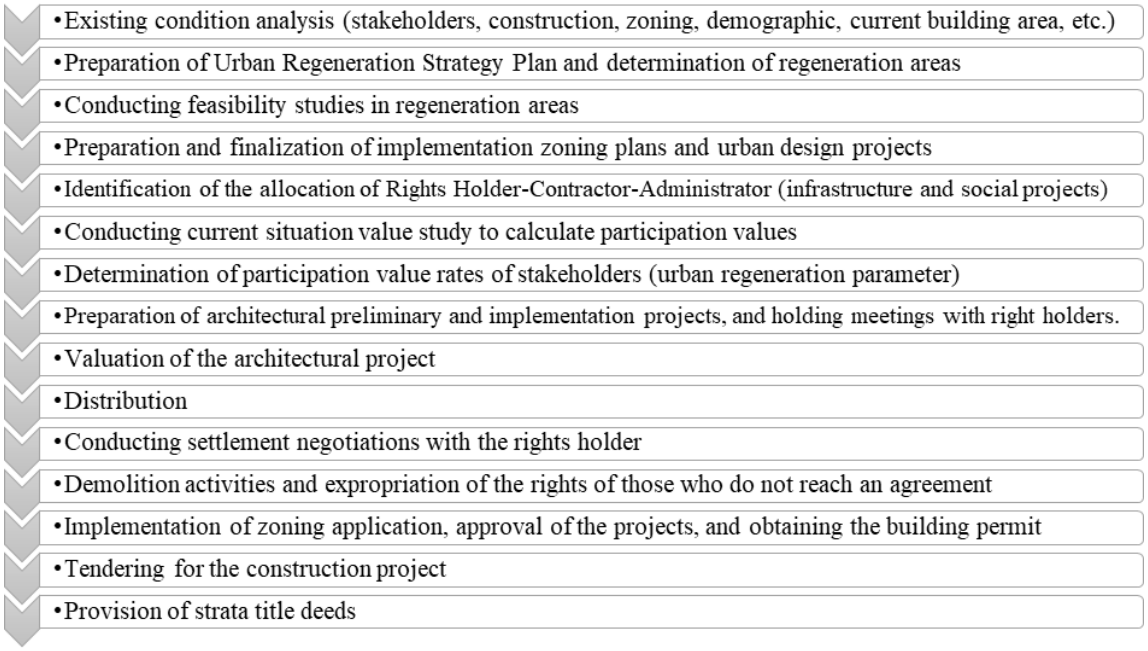


Figure 5. Urban transformation process

The distribution process can be carried out in parcel, block, or regional application areas. The priority in this process is to agree with the right holders. The model will accelerate the transformation process by preventing urban transformation projects from being halted due to ownership issues or the process dragging on for years. The areas of application of urban transformation vary depending on the presence of licensed and unlicensed structures (legality), zoning status, and property type. Although a similar mathematical model is used for each area, which is determined by considering these characteristics, there are differences in the parameters and distribution models used in calculating the participation value. This study was carried out in legally subdivided areas consisting of independent sections with a development plan and a strata title. Information on the valuation parameters and standards of the properties in such areas and the participation values and distribution parameters of the projects to be prepared are explained below.

3.1.1 Value-based model

Real estate appraisal is the independent and impartial determination of the value of a property, real estate project, or associated rights and benefits at a specific time. Accurate and reliable valuation is essential for protecting individual rights. The key terms in the valuation process are based on the International Valuation Standards (IVS) 2006 and IVS 2013-2017. The study uses the term “independent unit” to encompass legally constructed independent sections as well as illegally constructed or planned units. Widely accepted analysis methods serve as reference points, particularly in mass appraisal studies, and are applied with auxiliary models when necessary [46].

As these methods reflect the real estate market as a whole in the region concerned, they provide information on the development of purchase and sale prices [47]. In this way, real estate valuation processes have become more systematic, consistent, and objective. When applied in urban transformation, the value-based model is considered an effective method that establishes legitimate relationships between the right holders, the contractor, and the administrator. This model has been used to determine the participation values of strata titles in urban transformation areas and to calculate the distribution value (project valuation). In practice, the properties' land and structure values (participation values) are considered investment costs as part of the contractor's expenses in return for the projects to be built.

The model is based on the provision of the income to which the contractor is entitled in return for the realization of the project. This income is made available to the contractor in the application areas in two ways: firstly, through cash payment and, secondly, by allocating the corresponding construction or land area. The allocated building or land area lies within the boundaries of the same region. This approach balances the interests of the right holders and the contractors, creating a fair structure. Thanks to the model used in the project, the participation and distribution values were determined, and the implementation processes were completed. The effective implementation of the project depends on calculating the correct investment costs and establishing a consensus between the parties. In this context, some basic concepts must be clarified to properly understand the model. These concepts are the goodwill parameters and coefficients that directly impact the property's value and are explained in detail below.

3.1.2 Determination of goodwill parameters and coefficients

According to the Turkish dictionary, goodwill value is a fee received from surrounding property owners based on property valuation in a developing area [48]. Under the Capital Markets Board of Türkiye (CMB) Real Estate Certificates Communiqué, goodwill value is an additional fee for differences in block, floor, frontage, or material of independent units [49]. These rules ensure fair valuation of unit differences and transparent application of goodwill prices [41,50]. Determining "goodwill criteria" in urban transformation projects is crucial for fair real estate valuation. Goodwill reflects value differences based on demand and preference, making uniform conditions for all independent units unrealistic. It is essential for residential and employment sites. Accurate goodwill calculation ensures fair property distribution and is a key element in urban transformation. Conducting these calculations within a legal framework minimizes subjective influence.

Although there is no universally accepted standard for determining goodwill coefficients, they are typically based on empirical criteria such as view, sunlight exposure, floor level, elevator access, and neighborhood characteristics [43]. In this study, these coefficients were also derived empirically using expert opinion, a real estate valuation company licensed by the Capital Markets Board of Türkiye (SPK), field observations, and local market data. To ensure that even minor differences between property attributes were fairly evaluated, the sensitivity of some coefficients was expressed at a thousandth precision level (e.g., 0.001). This high level of precision allowed factors such as floor location, façade orientation, and spatial characteristics to be accurately reflected in the allocation process, contributing significantly to transparency, proportionality, and the persuasion of right holders. The goodwill parameters identified in the study were approved by the Talas Municipal Council and supported by relevant legal provisions, despite the absence of a standardized approach to goodwill calculations. In this way, a legal basis was created for the goodwill parameters to be used in urban transformation projects in the Talas district and carried out under the municipality's responsibility.

As a result of the studies carried out to determine the goodwill parameters, the essential elements that directly affect the value of independent units can be listed as follows: Total interior area, land size, development and ownership, location, age of the building, building type (e.g., single-family house or apartment), construction material (reinforced concrete, wood, steel) and differences in interior and exterior insulation and decoration [51]. It has also been

shown that the story height has no fixed effect on the goodwill value [52]. While high stories initially increase in value, this effect decreases as the height of the building increases. In addition, buildings with low stories generally have a higher goodwill value than high-rise buildings. When building stories are categorized, low stories are valued with lower coefficients [53]. Although high floors generally have a higher goodwill value, the top floors do not provide additional value. The research results show that houses in large areas with high floors and good views are sold at higher prices. In addition, homes located near public transportation stations have additional goodwill value. The effect of the floor variable on prices is not linear; prices initially increase, and a decrease can be observed on a particular floor [54]. The goodwill parameters and coefficients ensure that the participation and distribution value, which is one of the most important steps in the application of urban transformation, is determined. The process begins with collecting comparable data in the project area and its surroundings. Inconsistent comparative data that does not match the general structure is reviewed and sorted, and the raw square meter (m²) unit price is calculated by sorting accordingly. Then, the goodwill multiples of each independent unit are multiplied by this raw sqm unit price to determine the original sqm unit value, which increases or decreases the property's value. In the final stage, this value is multiplied by the size of the independent unit to arrive at the property's final value. This final value is also used as the participation and distribution value.

Goodwill coefficients for Harman and Mevlana neighborhoods were determined based on location, frontage, and zoning status. Properties with more frontages had higher coefficients, ranging from 0.00 for single frontage to 0.03 in Harman and 0.04 in Mevlana for four frontages. Corner parcels had 0.02 (Harman) and 0.01 (Mevlana), while no-frontage properties had -0.02 in both neighborhoods. For road connections, Atatürk Boulevard and Halef Hoca Street provided the highest coefficients (0.10), while Mezarlik and Velioğlu Streets had 0.05. Conservation areas lowered goodwill by -0.05. Commercial zones had 0.08 (Harman) and 0.10 (Mevlana), while hotel zones had 0.07. Private sports/social facility areas had a minor effect (0.02), and park/road areas were neutral (0.00). In mixed-use zones, coefficients ranged from 0.03 to 0.05.

Goodwill coefficients for buildings depended on physical and environmental attributes. Strata title deeds contributed 0.050, thermal insulation 0.020, and elevators 0.030. Floor levels had 0.040 (mezzanine), 0.020 (upper), and 0.000 (ground floor). Larger floor areas decreased goodwill, from 0.000 (≤89m²) to -0.050 (>145m²). Interior insulation added 0.020, while heating types ranged from 0.030 (central) to -0.050 (stove). For views, avenue-facing buildings had 0.030, street-facing 0.020, and garden-facing 0.000. Materials also impacted goodwill: steel doors (0.005), PVC windows (0.005), aluminium windows (0.003), and shingle roofs (0.005). Flooring types varied, with parquet (0.006) being the highest. Enclosed balconies added 0.005, and buildings on Atatürk Boulevard received 0.020. More facades increased goodwill, from 0.020 (two facades) to 0.040 (four facades). South-facing buildings received 0.010.

For residential floors, coefficients ranged from 0.00 (ground floor) to 0.06 (8th-10th floors). More frontages and balconies increased goodwill, while north-facing frontages had negative effects (-0.04 full, -0.02 partial). For commercial areas, larger spaces had decreasing goodwill (-0.06 for 281.30m²). More facades increased coefficients from 0.00 (single) to 0.09 (four-sided). Facade width also mattered, with coefficients rising from 0.00 (≤5m) to 0.12 (≥20m). Commercial parking frontage had 0.00, while 15m road frontage added 0.05.

The goodwill multiplier is determined when calculating the value of an independent unit. For this purpose, the relevant goodwill parameters are taken, and the following operations are applied. Each goodwill parameter either increases or decreases the gross price per m² of the leading property. However, if the total effect of these parameters is calculated by direct multiplication, a compound effect such as the "goodwill of goodwill" may occur, resulting in an excessive increase or decrease. In particular, when goodwill parameters that provide only an increase or decrease come together, a change may occur at higher rates than expected [40]. To avoid this situation, the goodwill coefficients of the relevant independent unit for the building and the goodwill coefficients of the relevant property for the land are added to the reference value of 1.00. This way, the goodwill multiple of the relevant independent unit for the building is calculated. In this way, the goodwill multiplier for the land and the building is determined. Land value is calculated first to determine the values of the independent units. In this process, the raw value of the land (unit) is multiplied by the goodwill multiplier determined based on its characteristics. This value is multiplied by the property area to obtain the total land value, which is divided in proportion to the land shares of the independent units. The value of the structure is then calculated. At this stage, the goodwill multiplier determined according to the characteristics of the independent unit is multiplied by the value of the building unit, and the result is multiplied by the area of the independent unit to obtain the building value. Suppose the values of the trees and walls located on the boundaries of the land in the project area do not belong to a specific legal owner. In that case, they are divided in proportion to the land share of the independent unit and added to the corresponding value. As a result of all these steps, all the values found are added up, and the final value of the independent units is determined.

T_a: base land unit value, C_{sl} and C_{sb}: goodwill multiplier, P_a: land share D_a: land value (Equation 1-4);

$$D_a=T_a\times C_{sl}\times P_a \quad (1)$$

T_y: base building unit value, A_k: enclosed usable area, and D_y: building value;

$$D_y=T_y\times C_{sb}\times A_k \quad (2)$$

D_d: wall value, D_{ag}: tree value, and D_v: other assets value;

$$D_v=D_d+D_{ag}+\ldots \quad (3)$$

is expressed using the equation. The total value of the independent unit (D_t) is the sum of all values.

$$D_t=D_a+D_y+D_v \quad (4)$$

3.1.3 Participation value

The participation and distribution values of independent units form the basis of the value-based method, which forms the basis for urban transformation projects. As the rights acquired with the participation value will replace the assignment in the title deed in property transfers, the right holders must accept them. It is crucial for the success of the urban redevelopment project that the participation value is determined relatively and that all right holders accept this value in the project area as part of the legitimization process. The procedure for determining the participation value is based on the determination and knowledge of the factors, variables, and the corresponding parameters of the goodwill value that influence the value to calculate the participation value. Therefore, the independent units' participation value was calculated considering the relevant goodwill parameters and coefficients in section "*Determination of goodwill parameters and coefficients*". As the independent units are condominiums, no areas prevent development. 12 groups were determined for the goodwill parameter land and 22 for the goodwill parameter building. These parameters are specific to this study and may be increased or decreased in other project areas. The duality of the valuation concepts grouped as legal and current status value by the Turkish Association of Appraisers (TAA, in Turkish TDUB) has been eliminated by determining this value. The participation value is calculated as in (Equation 5) and corresponds to the total value of the independent entity (TPV).

$$TPV=D_t \quad (5)$$

3.1.4 Project sharing ratios and distribution parameter

The distribution model calculates and includes the "Independent Unit Total Value" of each independent unit. In the study, all independent units that are in shared ownership are considered as a single unit. In contrast, for units in common ownership, the values are calculated in proportion to the land shares of the right holders. The value of each unit in the parcel, block, or region where the application is conducted is expressed as the participation value (PV_i). The total value of all independent units is expressed as (TPV) (Equation 5). A right holder who is involved in an urban transformation project and learns the participation value will want to know what distribution value they can agree on and what they will receive in return for this value, be it in money or area. The first step in this process is to calculate the participation rates in the application region at the start of the project. These calculation allows the determination of the contractor's and beneficiaries' share and the administration's share in response to the costs it will spend on infrastructure and social projects. The contracts are prepared and signed with the right holders according to the rates determined (Figure 5). When calculating the distribution rates, criteria such as construction, costs, marketing, distribution structures of independent sections, and how the properties in the project are divided between the right holder, the contractor, and the administration are taken into account. The ratio of the right holders (% value) is multiplied by the total project value or the total construction area. Thus, the distribution amount to be left to the right holders is determined in terms of value and construction area. In the following equation (Equation 6), the Participation Value Rate (PVR) and distribution parameter of each independent unit (d_i) are calculated by dividing the participation value of each independent unit (PV_i) by the total participation value (TPV).

$$PVR=d_i=\sum_{i=1}^{i=n}\frac{PV_i}{TPV} \quad (6)$$

The distribution value is calculated by calculating the values of the independent units formed by the license individually and determining the project value. The sum of these values is the total project value. In addition, the total construction area of the independent units is the total project area. The contractor who will carry out the project and to whom the work is tendered receives his share in return for the expenses and costs he has incurred, taking into account his profit in return for the land or the price of the work he has done. The construction costs and the contractor's profit are determined as a ratio and included in the distribution. The percentage to be distributed to the beneficiaries from the total project is determined by multiplying the total value of the project and the project area using the equations below (Equations 7-10). P_t: total project value, P_y: contractor share, P_s: administration share (social and infrastructure projects), and P_h: right holders project value:

$$P_h=P_t-(P_y+P_s) \quad (7)$$

A_t: total project area, H_p: share of right holders (%), and A_h: project area of right holders:

$$A_h=A_t\times H_p \quad (8)$$

P_h: right holders project value, d_i: conversion parameter, and a right holder's entitlement value E_d;

$$E_d=P_h\times d_i \quad (9)$$

A_h: project area of right holders and a right holder's entitlement area E_a;

$$E_a=A_h\times q_i \quad (10)$$

is expressed by the equation.

4 Application

4.1 Data acquisition

Fieldwork was conducted to obtain data on the urban transformation study areas in the Harman and Mevlana neighborhoods. In this regard, 62 of 66 independent units (detection success rate 94%) in the study area in the Harman Neighborhood were identified as the basis for evaluation studies, and 58 of 60 independent units (detection success rate 97%) in the study area in the Mevlana Neighborhood were identified (Table 1). The other independent units could not be identified for various reasons. The data identified for the study area are shown in Table 2 (GF: Ground Floor, NF: Normal Floor).

Table 1. Site identification – 1

Field Assessment Status of Urban Transformation Areas	*Harman*	*Mevlana*
Total Number of Independent Units	66	60
Number of Identified Independent Units	62	58
Number of Unidentified Independent Units	4	2
Identification Success Rate	94 %	97 %

Table 2. Site identification – 2

Urban Transformation Areas	*Harman*	*Mevlana*
Number of Parcels	3	10
Ownership Structure	Individual and Talas Municipality	Individual
Number of Buildings	11	10
Total Number of Independent Units	66	60
Total Number of Property Owners	142	80
Average Size of Independent Units	69.5 m² - 101.4 m²	119.11 m²
Construction Type	Reinforced Concrete	Masonry
Building Construction Years	1975 - 1987	1985
Building Heating System	Stove	Stove
Building Floor Distribution	B + GF + 2 NF	B + GF + 2 NF
Total Construction Area of the Building	4971.78 m²	7146.39 m²
Legality Status	Strata Title Deeds	Strata Title Deeds

4.2 Cost calculation and computation of project sharing ratios

Cost calculation is crucial for planning the project process and ensuring fair rights distribution. Apportionment rates and costs were based on criteria in Project Sharing Ratios and Distribution Parameter. All construction, infrastructure, social facilities, and related costs were analyzed. Depending on the study area's status, land, building, project management, expropriation, and financing costs may be included. The resulting total costs were compared with the value generated from the project area, and the participation rates of all parties involved were determined. The calculations used 2020 unit values for the Harman area and 2022 for Mevlana.

Architectural and application projects were prepared for the Harman and Mevlana Urban Transformation Areas. In Harman, two blocks were planned with 42 single-sided units of 101.50 m² and 88 double-sided units of 106.09 m², totaling 130 residential and seven commercial units. Mevlana included one block with 56 double-sided units of 138.15 m² and 28 single-sided units of 150.16 m², totaling 84 units. Projects in Harman were planned through construction contracts in return for apartments, while those in Mevlana were based on commitment. A construction company was selected per legislation, and the administration supported transformation by waiving its share for infrastructure and superstructure works. Participation rates are shown in Tables 3-4. Thus, the right holders' distribution areas and the distribution square meters/acquisition square meters of each right holder are determined.

Table 3. Actual sharing table for the Harman project area

Stakeholders	Distribution Ratio (%)	Distribution Area (m²)
Contractor	54.00	7483.44
Right holders	46.00	6905.80
Administration	0.00	0.00
Total	100.00	14389.24

Table 4. Actual sharing table for the Mevlana project area

Stakeholders	Distribution Ratio *(%)*	Distribution *Area (m²)*
Contractor	28.13	4047.55
Right holders	71.87	8589.37
Administration	0.00	0.00
Total	100.00	12636.92

4.3 Determining the participation value of rights holders and creating the distribution

The participation value for the right holders in the Harman and Mevlana Urban Transformation Areas was calculated by considering the parameters and coefficients for the goodwill value of land and buildings as well as the total area, characteristics, and other assets of the properties mentioned in section "*Determination of goodwill parameters and coefficients*". This calculated value forms the basis for the provisions made available to the right holders during the distribution phase and is important for securing participation in the project. In this context, the following tables (Tables 5-9) show the participation values and distributions of the independent units in the urban transformation areas (BB: Independent Unit; N: North, E: Easth, S: South, W: West).

Each building and independent unit has been uniquely identified. "Building ID" refers to the identifier assigned to each building, while "Unit Number" represents the individual units within those buildings. This structure allows for detailed analysis at both the building and unit levels. The "Unit Area (m²)" and "Value (TRY)" columns reflect the

current size and market value of the independent units. The "Participation Value Rate (PVR)" indicates each unit's share in the total participation value and serves as the basis for determining distribution priority and borrowing limits. The "Entitlement Area (m²)" represents the gross area a right holder is entitled to receive after transformation, based on their participation value, while the "Gross Distribution Area (m²)" indicates the actual area of the unit allocated from the project. "Unit Value (TRY)" reflects the market value of the distributed unit. The "Area Difference (m²)" shows the discrepancy between the entitlement area and the distributed area. A positive difference means the stakeholder received a larger area and is thus a debtor; a negative difference indicates the stakeholder received less and is therefore a creditor. "Debt Unit Value (TRY)" is the key indicator used for calculating debt or credit status. The debt amount is calculated by dividing the total value of the distributed project unit by its area. Conversely, the credit amount is determined by dividing the value of the current unit by the entitlement area.

Table 5. Participation value and distribution table for the Harman project area.

Current Status						*Distribution*					
Building ID	Unit			PVR	Entitlement Area (m²)	Unit Number	Frontage	Gross Distribution Area (m²)	Unit Value (TRY)	Area Difference (m²)	Debt Unit Value (TRY)
	Number	Area (m²)	Value (TRY)								
48	3	68.34	129961.05	0.0135	92.99	4	N	101.50	338309.57	8.51	3333.00
52	3	69.93	130930.56	0.0136	93.68	10	N	101.50	341659.17	7.82	3366.00
49	3	70.09	130960.32	0.0136	93.70	22	N	101.50	341659.17	7.80	3366.00
:	:	:	:	:	:	:	:	:	:	:	:
44	5	101.66	209098.76	0.0217	149.61	65	N-E	106.09	378119.63	-43.52	3564.00
Total	66	4971.78		1.00	6905.80						

Table 6. Participation value table for the Mevlana project area.

Building ID	Unit Number	Main Frontage	BB Area (m²)	BB Value (TRY)	PVR	Entitlement Area (m²)
9	1	N	118.31	220151.12	0.0151	129.39
8	1	W	118.44	227036.37	0.0155	133.44
5	2	E	118.44	231249.42	0.0158	135.92
:	:	:	:	:	:	:
10	2	S	121.76	232242.61	0.0159	136.50
Total	60		7146.39		1.00	

Table 7. Distribution table for the Mevlana project area, scenario 1.

Current Status						*Distribution*					
Building ID	Unit Number	Unit Area (m²)	Frontage	PVR	Entitlement Area (m²)	Unit Number	Frontage	Gross Distribution Area (m²)	Unit Value (TRY)	Area Difference (m²)	Debt Value (TRY)
9	1	118.31	ENW	0.0151	129.21	2	N	150.16	700000.25	20.95	97669.18
8	1	118.44	NWS	0.0155	133.25	5	S	150.16	749000.27	16.91	84349.39
8	5	118.54	NWS	0.0157	134.64	8	N	150.16	749000.27	15.52	77409.09
:	:	:	:	:	:	:	:	:	:	:	:
4	3	118.44	NWS	0.0182	156.18	63	NE	138.15	895160.32	-18.03	-30720.36
Total	60	7146.39		1.00	8589.37						

Table 8. Distribution table for the Mevlana project area, scenario 2.

Current Status						*Distribution*					
Building ID	Unit Number	Unit Area (m²)	Frontage	PVR	Entitlement Area (m²)	Unit Number	Frontage	Gross Distribution Area (m²)	Unit Value (TRY)	Area Difference (m²)	Debt Value (TRY)
9	1	118.31	ENW	0.0151	125.95	3	NE	138.15	759920.27	12.20	67087.69
8	1	118.44	NWS	0.0155	129.89	1	NW	138.15	772800.28	8.26	46189.09
5	2	118.44	NES	0.0158	132.30	4	SE	138.15	785680.28	5.85	33250.67
:	:	:	:	:	:	:	:	:	:	:	:
4	5	118.44	NWS	0.0182	151.87	79	NW	138.15	888720.32	-13.72	-23983.65
Total	60	7146.39		1.00	8589.37						

Table 9. Distribution table for the Mevlana project area, scenario 3.

Current Status						*Distribution*					
Building ID	Unit Number	Unit Area (m²)	Frontage	PVR	Entitlement Area (m²)	Unit Number	Frontage	Gross Distribution Area (m²)	Unit Value (TRY)	Area Difference (m²)	Debt Value (TRY)
9	1	118.31	ENW	0.0151	129.39	3	NE	138.15	759920.27	8.76	48174.16
8	1	118.44	NWS	0.0155	133.44	1	NW	138.15	772800.28	4.71	26353.44
5	2	118.44	NES	0.0158	135.92	4	SE	138.15	785680.28	2.23	12710.20
:	:	:	:	:	:	:	:	:	:	:	:
10	2	121.76	ESW	0.0159	136.50	29	S	150.16	812000.29	13.66	73888.59
Total	60	7146.39		1.00	8589.37						

5 Results

As a result of the study, value-based distribution scenarios were developed and implemented for the Mevlana neighborhood, while the Harman neighborhood was included in the analysis only for comparative assessment. To ensure fair distribution, increase project participation, and balance the financial burden, a 'Maximum Borrowing Rate' limit has been set as follows: 15% for owners with a freehold area over 100 m², 20% for those with a freehold area between 50 m² and 90 m², and 30% for owners with a freehold area under 50 m². This way, owners with large amenity areas were encouraged to borrow less. In contrast, owners with smaller amenity areas were given more flexible borrowing options, supporting the overall financial sustainability of the project. In the urban transformation application areas, each beneficiary's calculated tenure square meters were compared with the gross usable area of the independent unit under the project distributed to that beneficiary, and positive or negative differences were calculated. The right holder with a distributed gross area smaller than the claim area is considered a “creditor," the “credit unit value" obtained by dividing the claim value in TRY by the claim area is used to calculate the total claim. The goodwill unit value of the independent unit distributed from the project is used as the “Borrowing Unit Value.” In this framework, the general status of the owner's claims in the distribution table (Table 6), which is determined by sorting the participation value rate of the right holders in the Harman Urban Transformation Area, the claim area, the floor, Frontage characteristics, and values of the independent units formed in the project, as shown in Table 10-11.

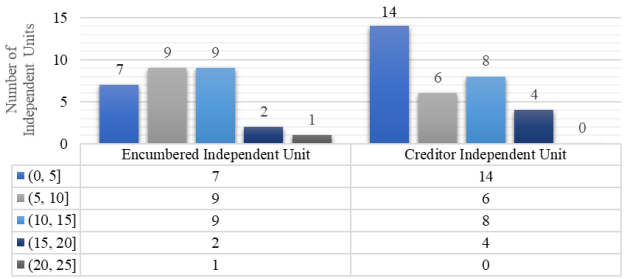
In the first distribution scenarios carried out in the Mevlana Urban Transformation Area, a value-based distribution scenario was developed for independent sections, and the distribution was based on the order of participation rates of the existing independent sections and the valuation order of the independent sections to be created. In the second scenario, distribution groups for independent sections were created, and a distribution scenario was developed. The distribution was created by creating groups based on the goodwill value, the size of the area of use, and the value of the independent units. In the third scenario, distribution groups were created for independent sections based on the number of receivables, and a distribution scenario was developed. Independent units with high exposure were identified by improving the second distribution scenario, and residential buildings with similar floors and frontages were distributed. When the distributions of the independent units carried out in the first and second scenarios were compared, it was found that the number of loans and receivables was higher in the first scenario than in the second scenario. When the distribution considering the criteria of floor, usable area, and value of existing and to-be-built independent sections was carried out, it was found that the maximum loan amount decreased by approximately 21% and the maximum receivable amount decreased by approximately 28%. In the distribution according to the third scenario created by improving the second scenario, the loan-to-value status of 24 houses remained in the range of 10m² - 15m² for three houses, 5m² - 10m² for five houses, and 0m² - 5m² for 16 houses. A comparison of the results obtained with the three different scenarios showed that the third scenario delivered more effective results (Figure 6-7).

Table 10. Debt-credit table for the Harman project area.

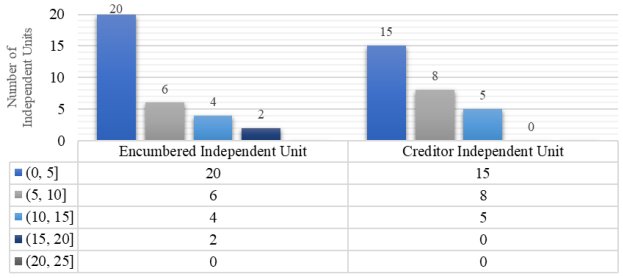
Level	Total Debt	Average Debt (m²)	Debt Type
I	34.68	2.67	Low Debt
II	299.84	7.89	Medium Debt
III	125.78	10.48	High Debt
	Total Receivables	**Average Receivables (m²)**	**Receivable Type**
IV	-72.50	-4.83	Low Receivable
V	-387.80	-38.78	High Receivable
Total	0.00		

Table 11. Agreement rate of right holders for the Harman project area.

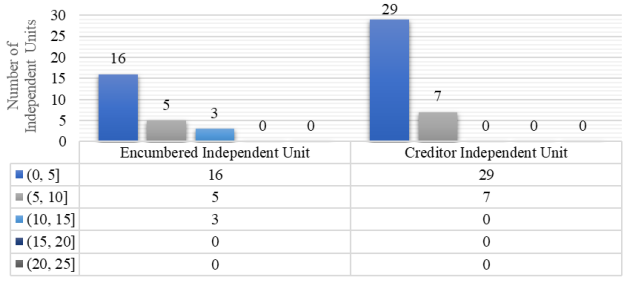
Total Number of Building	66
Total Number of Right Holders	142
Total Number of Settled Apartments	61
Total Number of Unsettled Apartments	5
Settlement Rate	92.42 %



(a)



(b)



(c)

Figure 6. Distribution scenarios for the Mevlana project area (a) Scenario 1 (b) Scenario 2 (c) Scenario 3

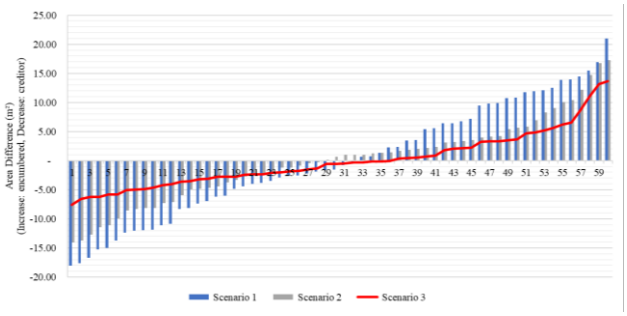


Figure 7. Comparison of distribution scenarios for the Mevlana project area.

6 Discussion

This study proposed and tested a value-based distribution model aimed at minimizing stakeholder debt and ensuring fair allocation in urban transformation projects. The findings revealed that Scenario 3, which prioritized equity in distribution and minimized debt burden, achieved the most balanced and sustainable outcomes. These results align with several previous studies in the field while also introducing notable differences in terms of method and implementation logic.

Gökçe and Salalı [32] emphasized that rights holders should neither gain nor lose from urban transformation and advocated an equivalence-based approach. The results of this study support that argument by showing that equity-oriented distribution scenarios can reduce social resistance and foster acceptance by minimizing financial obligations for stakeholders. Similarly, Kaşlıköse and Aksu [33] demonstrated that value-based models are more equitable than traditional methods, particularly when mass appraisal techniques are employed. Although this study does not directly use mass appraisal, its scenario-based structure and debt minimization approach aims to operationalize justice through value-informed allocation. Kandaloğlu [37], with a strong legal and technical focus, proposes a model based on the principle of 'value coefficient equality'. Both studies share a common concern about the need to protect vulnerable stakeholders, particularly those living in informal settlements, from dispossession. Ülger [40] also pointed out the insufficiency of conventional zoning in densely built areas, suggesting that market value rather than parcel area should be used as a reference for allocation. Our study reaffirms this position by demonstrating that value-based distribution can be made operational through clearly defined debt thresholds and stakeholder-oriented scenarios. Methodologically, Bayrak and Yalpır [38] applied a hybrid Cobb-Douglas regression model to estimate property values with 98% accuracy, aiming to increase objectivity in the distribution process. While our model shares the same goal of enhancing fairness through quantifiable, comparable property data. Similarly, the study conducted by Birol Alas [41] emphasized the importance of simplifying value calculations to enhance efficiency and build stakeholder trust. These objectives were also achieved within our scenario-based framework. Alongside the study by Liu et al. [36], which proposes a game theory model based on the Nash equilibrium for benefit sharing, this study also recognizes the importance of balancing stakeholder interests through fair and transparent mechanisms. In summary, the findings support the consensus in the literature that values-based, transparent and participatory allocation systems are essential to ensure fairness, build stakeholder trust and enable successful implementation. The proposed model contributes to the field by offering a replicable method aimed at ensuring fairness in transformation practices.

In this context, Article 13 of Law No. 6306 states that the price of the existing properties of the right holders (land, independent and permanent rights registered in the Land Registry, and independent sections registered in the Housing Registry by Article 704 of the Turkish Civil Code) shall be deducted from the construction cost of the new apartment or workplace to be offered to the owners, and if the price is insufficient, the right holders shall be obliged to pay the difference [55]. On the other hand, Article 6 of the said Law and the provisions of Articles 15 and 15/A of the Implementing Regulation state that the right holders who do not consent determine the value of these shares by considering only their land shares and auctioning them [56]. Moreover, in most projects where both public and private sector right holders cooperate in the urban transformation

implementation areas, only the land share is considered, and the structures are ignored. The land shares are only taken into account here in connection with the size of the area and are subject to a distribution calculation in the projects to be created. In the application we carried out in our study, the right holders' rights were determined relatively. For this purpose, the market values of the parcels and the values of the independent sub-areas in the project to be created were determined and evaluated in the distribution calculation. The most important point in the valuation of the existing properties, as shown in Figure 5, is that in the event of an amendment to the land use plan in favor of the right holders in the application area, the completion of this amendment must be awaited. This is because, in any subsequent court proceedings, the question will be whether or not this amendment has been taken into account. In addition, it would be right to reach an agreement with the right holders by considering the revenues that may be generated by this amendment to the plan and the potential revenues of the right holders. Article 13 of Law No. 6306 states that only the current situation shall be considered in the valuation of the existing land of the right holders. On the other hand, an amendment to the land use plan to be made in the application area has the potential to significantly increase the property's value. As the increase in value that may occur with the plan change may directly impact the right holders' income, it is therefore of great importance to wait for the completion of the plan changes when valuing properties. For example, renovations such as an increase in the number of floors or a change in the purpose of use can significantly increase the value of a property. If this situation is ignored, it may result in the rightful owners transferring their current properties at a price below the actual value, leading to complaints. In order to carry out a fair procedure, the possible increases in value resulting from the change in the land use plan must be considered. This will ensure that the agreement to be reached between the rightful owners and the competent institutions is more transparent and balanced. In this context, Article 13 of Law No. 6306 should be revised to make the property valuation process fairer. The direct consideration of renovation plans in the property value will protect the economic interests of the rightful owners and contribute to a more sustainable and prosperous progress of urban transformation projects. Our study was conducted with all these frontages in mind. Even though properties with risky building status have no economic value, they may create some market value if their location, usable area, and current condition are considered. Therefore, not only the land portion but also the value of the building should be included in the calculations. The fact that the structure has reached the end of its economic life or has been classified as at risk does not mean that this value is zero. In this context, it would be appropriate to improve Article 6 of Law No. 6306 and Articles 15 and 15/A of the implementing regulation.

It is important to develop specific standards to increase the sustainability of urban transformation projects and the resilience of cities. In determining the valuation of at-risk structures in project areas, it would be appropriate to determine the value of the at-risk structure using the goodwill parameters and coefficients to be determined in the urban transformation process rather than market buy/sell values. To this end, a “Demolition Materials and Building Properties Valuation Survey” was conducted as part of the study with a total of 10 demolition contractors operating in various regions of our country who have obtained Y1-Y2-Y3 approval certificates under the “Regulation on the Classification and Record Keeping of Contractors” [57]. The results are shown in the following figures (Figure 8-9).

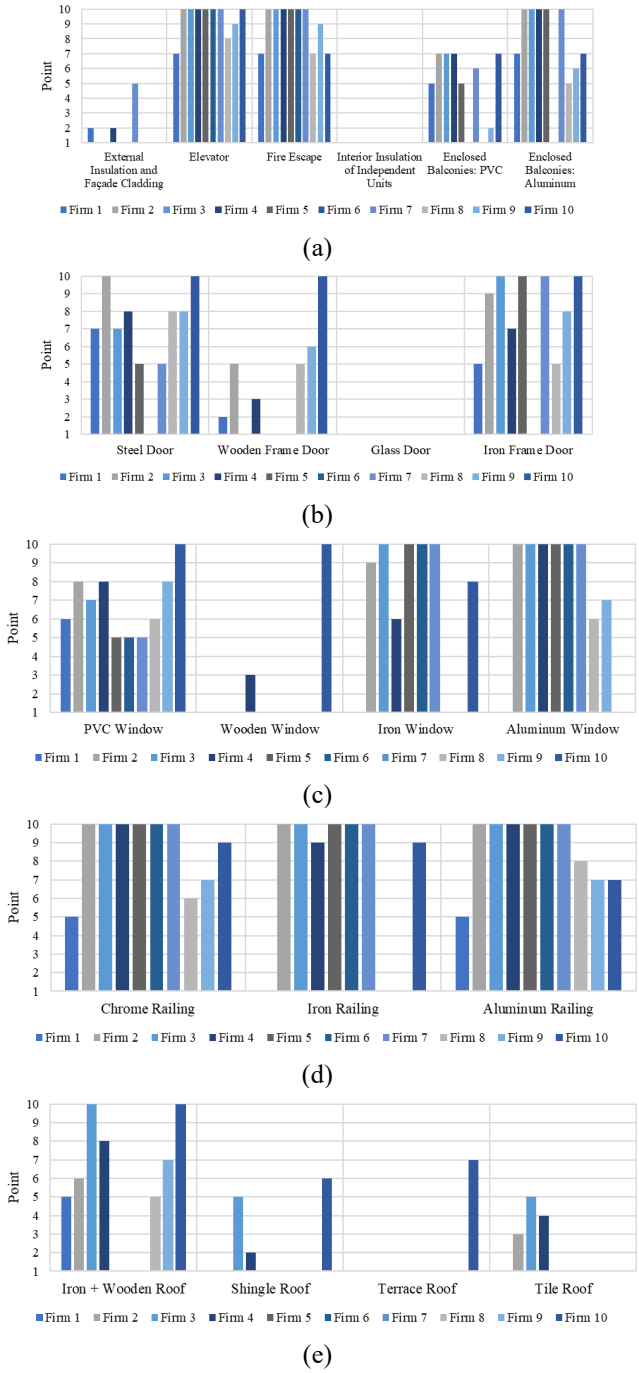


Figure 8. Destruction materials, building properties evaluation results (a) Building properties (b) Door types (c) Window types (d) Stair railings (e) Roof coverings

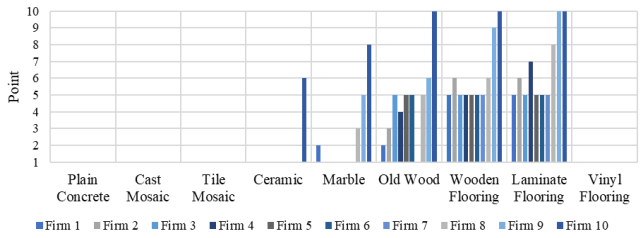


Figure 9. Destruction materials and building properties evaluation results: Ceiling coverings

The demolition companies rated the economic and functional value of the material and structural features listed in the figures above, which are also considered goodwill parameters, on a scale of 1 (very low) to 10 (very high). Each parameter was rated by all participants, and those that were consistently rated 1 were excluded from the charts for clarity. The results of the survey were used to assess the consensus among the participants. For example, among the door types, the "Iron Frame Door" received a high score (median 8.5, standard deviation (std) 3.03), while the "Glass Door" was rated lowest by all participants. Among the window types, the "PVC Window" also stood out with a high mean score (8.7) and a median of 10.0, while the "wooden window" was rated poorly and showed high variability in the ratings std 2.59), indicating disagreement among the participants. For stair railings, "Chrome Railing" was both highly and consistently preferred (mean 9.2; std 1.55). In terms of roof coverings, the "Shingle" and "tile" types were the most popular, although there were considerable differences in opinion. In terms of floor coverings, Marble (mean 8.7, median 9.0) and Laminate Flooring (mean 8.4) were very popular, while "Concrete" (mean 2.3) and "Marley" (mean 2.9) were less popular.

When examining the ratings of contractors from multiple regions here, some parameters are valuable or worthless. Furthermore, a parameter valuable for companies operating in different regions of our country is either less valuable or not valuable for another region. Therefore, this approach should be considered when developing valuation standards, and separate goodwill parameters and coefficients should be established for each region of our country. Since the valuation to be made in this way expresses a value in the context of urban transformation rather than the traditional market value of real estate purchases and sales, it will ensure that the right holders' claims to the new project are pretty determined based on the internal dynamics of urban transformation projects and reflect a more specific and localized value. This approach will create a more sustainable and harmonious transformation process for contractors and right holders. To ensure that the property valuation processes are fair and transparent, the TAA should set and put these standards on a legal basis with the "Regulation on Valuation Principles for Urban Transformation Projects." The valuation procedures should consider criteria such as the properties' goodwill coefficients and equity values and ensure a balanced distribution between the right holders and the contractors. In addition, it is important to have public real estate in the application areas to prevent the right holders from relocating, seeking temporary accommodation, and causing other possible grievances. Prioritizing project implementations on these properties will help prevent the victimization of right holders. This approach will contribute to faster and smoother completion of the projects and enable successful management of the transformation process with social support.

Furthermore, transformation projects should not be left to the decisions of technocrats and politicians alone. The process should be implemented with a governance approach that includes the participation of all stakeholders - right holders, the local population, the private sector, and public institutions. Dialog and cooperation between stakeholders facilitate the resolution of disputes and bring a broader societal consensus to the transformation processes [58]. If the public administration prioritizes meeting the infrastructural and social needs of the region in urban transformation projects, this will support the social sustainability of the projects. The ability of the public administration to waive its share when necessary to offset project costs will also accelerate the transformation processes. These processes must be carried out transparently and with the consent of all stakeholders. Using the tendering method in selecting contractors will increase trust between the parties while ensuring cost efficiency. Consequently, strategic planning, a transparent evaluation process, and a strong governance approach should serve as a foundation to ensure the sustainability of urban transformation projects. These approaches will help increase cities' resilience and enable effective management of both the social and economic dimensions of transformation projects.

Acknowledgment

We would like to thank the Municipality of Kayseri Talas for providing the dataset, the editor, and the reviewers for their valuable opinions and evaluations of our article. We would also like to thank the Proofreading & Editing Office of the Dean for Research at Erciyes University for the copyediting and proofreading service for this manuscript.

Conflict of İnterest

No potential conflict of interest was reported by the author(s).

Similarity rate (iThenticate): %5

References

[1] E. Ilıcalı and F.H. Giritli, Measuring the environmental performance of urban regeneration projects using AHP methodology. AZ, 17, 123–142, 2020. https://doi.org/10.5505/itujfa.2020.24445.

[2] A. Carter and P. Roberts, Strategy and partnership in urban regeneration. In: Roberts, P., Sykes, H., & Granger, R.(Eds.), Urban Regeneration. 2nd Ed. Sage, pp. 44–67, London, 2017.

[3] M. Omidipoor, M. Jelokhani-Niaraki, A. Moeinmehr, A. Sadeghi-Niaraki and S.M. Choi, A GIS-based decision support system for facilitating participatory urban renewal process. Land Use Policy 88, 104150

2019.https://doi.org/10.1016/J.LANDUSEPOL.2019.104150.
[4] F. Dişkaya and Ş. Emir, AHP-TOPSIS Bütünleşik Yaklaşımıyla Deprem Riski Tabanlı İstanbul İli Kentsel Dönüşüm Öncelik Sıralaması. Afet ve Risk Dergisi, 4, 203–223 2021. https://doi.org/10.35341/afet.983105.
[5] E. Köktürk and E. Köktürk, Türkiye'de kentsel dönüşüm ve Almanya deneyimi, in: TMMOB (The Union of Chambers of Turkish Engineers and Architects). Chamber of Survey and Cadastre Engineers, 11th Turkish Scientific and Technical Mapping Symposium, pp. 2–6, Ankara, 2007.
[6] N. Carmon, Three generations of urban renewal policies: analysis and policy implications. Geoforum 30, 1999. https://doi.org/10.1016/S0016-7185(99)00012-3.
[7] S.S. Fainstein, Mega-projects in New York, London and Amsterdam. In: Int J Urban Reg Res, 2008. https://doi.org/10.1111/j.1468-2427.2008.00826.x.
[8] P. Healey. Urban Regeneration and the Development Industry, Reg Stud, 25, 1991. https://doi.org/10.1080/00343409112331346327.
[9] A. Adair, J. Berry and S. McGreal, Financing Property's Contribution to Regeneration, Urban Studies, 40, 1065–1080 2003. https://doi.org/10.1080/0042098032000074326.
[10] H. Wang, Q. Shen, B. Tang, C. Lu, Y. Peng and L. Tang, A framework of decision-making factors and supporting information for facilitating sustainable site planning in urban renewal projects. Cities 40, 44–55 2014. https://doi.org/10.1016/j.cities.2014.04.005.
[11] M. Andersson, Unpacking metropolitan governance for sustainable development. Eschborn: Deutsche Gesellschaft Für Internationale Zusammenarbeit (GIZ) GmbH, 2015.
[12] A.B. Murphy, Paris, Capital of Modernity. Annals of the Association of American Geographers, 96 2006. https://doi.org/10.1111/j.1467-8306.2006.00510_4.x.
[13] T. Salihoğlu, A.N. Albayrak and Y. Eryılmaz, A method for the determination of urban transformation areas in Kocaeli. Land Use Policy 109, 105708, 2021. https://doi.org/10.1016/J.LANDUSEPOL.2021.105708.
[14] A. Colantonio and T. Dixon, Urban Regeneration & Social Sustainability: Best Practice from European Cities. Wiley-Blackwell, 2011. https://doi.org/10.1002/9781444329445.
[15] A.T. Row and J. Jacobs, The Death and Life of Great American Cities. Yale Law, J 71, 1962. https://doi.org/10.2307/794509.
[16] D. Harvey, The urban experience Blackwell, (1989).
[17] P. Roberts and H. Sykes, Urban regeneration: a handbook. Sage, 1999.
[18] M. Yaman, Türkiye'de Kentsel Dönüş (tür) me Uygulamaları Sosyo-Politik Bir Yaklaşım. MKM Yayınları, Bursa, 2012.
[19] H.T. Şengül, 1920'den günümüze: Türkiye'de toplumsal yapı ve değişim. Phoenix Yayınları, Ankara, 2012.
[20] İ. Tekeli, Türkiye'de yaşamda ve yazında konutun öyküsü (1923-1980). Tarih Vakfı Yurt Yayınları, 2012.
[21] A. Topal, G.L. Yalman and Ö. Çelik, Changing modalities of urban redevelopment and housing finance in Turkey: Three mass housing projects in Ankara. J Urban Aff, 41, 630–653, 2019. https://doi.org/10.1080/07352166.2018.1533378.
[22] K.S. Biehl, Migration, urban space and diversity: a case from Istanbul. Insight Turkey 16, 55–63, 2014.
[23] A. Öcü, The politics of the urban land market in Turkey: 1950–1980. Int J Urban Reg Res, 12, 38–64, 1988. https://doi.org/10.1111/j.1468-2427.1988.tb00073.x.
[24] S. Cengiz, E. Atmiş and S. Görmüş, The impact of economic growth oriented development policies on landscape changes in Istanbul Province in Turkey. Land Use Policy, 87, 104086, 2019. https://doi.org/10.1016/j.landusepol.2019.104086.
[25] A. Ataöv and S. Osmay, Türkiye'de kentsel dönüşüme yöntemsel bir yaklaşım, 2007.
[26] N. Özbilen and N. Zeren Gülersoy, Urban Development and Planning Transformation Process Assessment of Real Estate Ownership Rights: Transfer of Development Rights Planning Implementation Tool, Journal of Planning 23, 172–180, 2016.
[27] H. Wang, B. Ran and Y. Li, Street-level collaborative governance for urban regeneration: How were conflicts resolved at grassroot level?. J Urban Aff, 46, 1723–1743,(2024). https://doi.org/10.1080/07352166.2022.2133725.
[28] S.F. Schaller, Public–private synergies: Reconceiving urban redevelopment in Tübingen, Germany. J Urban Aff, 43, 288–307, 2021. https://doi.org/10.1080/07352166.2018.1465345.
[29] N. Kandaloğlu, Urban Regeneration And A Distribution Model Proposal. Ph.D. Thesis, İTÜ Institute of Science and Technology, Department of Geomatics Engineering, 2012.
[30] R. Schmitt, M. Herman, W. Barnhart, K. Furlong and H. Benz, The 2023 Kahramanmaras, Turkey Earthquake Sequence. 2023. https://earthquake.usgs.gov/storymap/index-turkey2023.html Accessed 6 March 2025.
[31] O. Mataracı, H. Haznedar, N. Şahin and Ş. Bayraktar, Kentsel Dönüşümde Alternatif Bir Yöntem: İmar Hakkı Transferi. In Proceedings of the 16th Turkey Mapping Science Technology Congress, Ankara, Turkey, 3–6 May 2017.
[32] D. Gökce and V. Salalı, Kentsel Dönüşümde "Eşdeğerlik" İlkesinin Önemi. Süleyman Demirel Üniversitesi Fen Bilimleri Enstitüsü Dergisi, 18, 55–65, 2014. https://dergipark.org.tr/tr/pub/sdufenbed/issue/20803/221992.

[33] S. Kaşlıköse and O. Aksu, Kentsel dönüşüm alanlarında taşınmaz değerleme yöntemleri karşılaştırılması. Türkiye Arazi Yönetimi Dergisi 6, 94–107, 2024. https://doi.org/10.51765/tayod.1473571.
[34] H. Demir and A. Yilmaz, Measurement of urban transformation project success using the analytic hierarchy process: Sulukule and Tepeüstü-Ayazma case studies, Istanbul. J Urban Plan Dev 138, 173–182, 2012.
[35] A. Gervan, H. Demir and A. Yılmaz, Kentsel dönüşüm projelerinde mülkiyet kazanimlarinin ekonomik analizinin ayazma kentsel dönüşüm projesi örneğinde incelenmesi (economic analysis for change of ownership in urban renewal projects based on ayazma renewal project case), HKMO 14, 2013.
[36] G. Liu, L. Wei, J. Gu, T. Zhou and Y. Liu, Benefit distribution in urban renewal from the perspectives of efficiency and fairness: A game theoretical model and the government's role in China. Cities, 96, 102422, 2020. https://doi.org/10.1016/J.CITIES.2019.102422.
[37] Nihat Kandaloğlu, Kentsel Dönüşüm. Yazarın Kendi Yayını, İstanbul, 2016.
[38] E. Bayrak, S. Yalpir, Real estate valuation in urban regeneration application; case study of Konya. Selcuk University Journal of Engineering, Science and Technology. 5, 96–103, 2017. https://doi.org/10.15317/Scitech.2017.73.
[39] R. Güngör and Ş. İnam, Value-based application in urban area design studies. Arabian Journal of Geosciences, 14, 1637, 2021. https://doi.org/10.1007/s12517-021-07980-w.
[40] N.E. Ülger, Türkiye'de arsa düzenlemeleri ve kentsel dönüşüm. Nobel Yayın Dağıtım, 2010.
[41] B. Alas, Toplu konutlarda şerefiye düzeltmelerinin regresyon analizi ile incelenmesi. Kent Akademisi, 10, 396–412, 2017.
[42] D. Akkaya, Kamu kurumları aracılığıyla kent merkezlerinde yapılan kentsel dönüşüm uygulamalarında hak sahipliği dağılımı için bir model önerisi. Doktora Tezi, YTÜ Fen Bilimleri Enstitüsü, 2018.
[43] E. Köktürk, E. Köktürk, Taşınmaz değerlemesi: Taşınmaz hukuku-İmar hukuku-Değerleme yöntemleri. Seçkin Yayıncılık, 2016.
[44] SPK, Gayrimenkul Sertifikalari Tebliği (VII-128.2). Resmi Gazete, 2013. https://www.mevzuat.gov.tr/File/GeneratePdf?mevzuatNo=18553&mevzuatTur=Teblig&mevzuatTertip=5 (accessed December 1, 2024).
[45] UDS Konseyi, Uluslararası Değerleme Standartları, Norwich: Uluslararası Değerleme Standartları Konseyi. 2017.
[46] N.E. Ülger, Kentsel Arazi Düzenlemesi: Kentsel Dönüşüm. YEM Yayın, 2023.
[47] A. Açlar and V. Çağdaş, Taşınmaz (Gayrimenkul) Değerlemesi. TMMOB Harita ve Kadastro Mühendisleri Odası, 2. Baskı, Ankara, 2008.
[48] T. Sözlük, Türkçe sözlük. Dil Derneği Yayınları, 9, 1999.
[49] Capital Markets Board of Türkiye (CMB), Communiqué on Real Estate Certificates (VII-128.2), https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=18553&MevzuatTur=9&MevzuatTertip=5, Türkiye, 2013.
[50] N. ERDEM, Türkiye İçin Bir Taşınmaz Değerleme Sistemi Yaklaşımında Temel Veri Yönetimi. Geomatik, 2, 66–85, 2017. https://doi.org/10.29128/geomatik.307850.
[51] A. Büyükduman, İstanbul ölçeğinde konut fiyatlarının gelişimi ve konut fiyat endeksi oluşturma denemesi: 1988-2012. Doktora Tezi, İstanbul Üniversitesi Sosyal Bilimler Enstitüsü, Türkiye, 2014.
[52] S.K. Wong, K.W. Chau, Y. Yau, A.K.C. Cheung, Property price gradients: the vertical dimension, Journal of Housing and the Built Environment 26 (2011) 33–45.
[53] S. Conroy, A. Narwold and J. Sandy, The value of a floor: valuing floor level in high-rise condominiums in San Diego. International Journal of Housing Markets and Analysis, 6, 197–208, 2013.
[54] L.H.T. Choy, S.W.K. Mak and W.K.O. Ho, Modeling Hong Kong real estate prices. Journal of Housing and the Built Environment, 22, 359–368, 2007.
[55] The Law of Transformation of Areas under the Disaster Risks, https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6306&MevzuatTur=1&MevzuatTertip=5, Türkiye, 2012.
[56] The Regulation on the Implementation of Law of Transformation of Areas under the Disaster Risks, https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=16849&MevzuatTur=7&MevzuatTertip=5, Türkiye, 2012.
[57] Regulation on the Classification and Registration of Construction Contractors, https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=31301&MevzuatTur=7&MevzuatTertip=5, Türkiye, 2019.
[58] U. Doğan, M. Koçak Güngör, B. Bostancı and N. Yılmaz Bakır, GIS Based Urban Renewal Area Awareness and Expectation Analysis Using Fuzzy Modeling. Sustain Cities Soc, 54, 101945, 2020. https://doi.org/10.1016/j.scs.2019.101945.