

ASSESSING REAL ESTATE VALUATION PERCEPTIONS: A CASE STUDY OF ISPARTA MUNICIPALITY STAFF

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ABSTRACT:

Real estate valuation holds significant importance for local governments and the real estate sector alike. For municipalities, this process is particularly crucial, influencing a wide array of decisions from tax collection to land-use planning. This study investigates how personnel within a local government perceive real estate valuation, with the aim of uncovering the key factors they believe shape property values. Such insights can empower municipalities to formulate more informed and effective real estate policies. To this end, a survey was conducted among 432 employees of Isparta Municipality. The analysis reveals that the participants identify several critical criteria for valuation: infrastructure and security, the property's location, local population density, access to essential services and education, the socioeconomic status of the area, and proximity to entertainment and social facilities. Among these, infrastructure and security emerged as the most important factor. Conversely, proximity to entertainment and social facilities was perceived as the least influential criterion.

Keywords: Real Estate Valuation, Perception Level, Isparta Municipality.

RECEIVED: 29 May 2025

ACCEPTED: 26 November 2025

DOI:

<https://doi.org/10.5281/zenodo.18057104>

CITE

Çelik, A., Çelikkaya, S., (2025). Assessing Real Estate Valuation Perceptions: A Case Study of Isparta Municipality Staff. *European Journal of Digital Economy Research*, 6(2), 103-121.
<https://doi.org/10.5281/zenodo.18057104>

Research Paper



1. INTRODUCTION

Real estate constitutes a critical asset class for economic development and valuation management. Its significance is amplified by the unique characteristics of real estate markets. Unlike more fluid markets such as equities, real estate often lacks continuous, transparent trading between buyers and sellers to establish clear prices. Consequently, decisions regarding real estate portfolios frequently rely on subjective valuation rather than observable market prices (Adetiloye and Eke, 2014).

The valuation of real estate—the process of estimating the value at which a property would trade on a specific date—serves as a fundamental activity for a wide range of stakeholders. The purposes for which valuations are required are diverse, encompassing purchase and sale transactions, transfers, tax assessments, expropriation, inheritance settlements, and securing financing for investment (Pagourtzi et al., 2003). For municipalities, in particular, accurate real estate valuation is a cornerstone activity with wide-ranging implications, from ensuring fair tax collection and effective land-use planning to guiding infrastructure development and urban regeneration projects.

The perception of how real estate valuation is conducted holds considerable importance for both the real estate sector and local governments. While the process is influenced by numerous objective factors, the subjective understanding and interpretation of these factors by individuals involved can significantly impact the accuracy and reliability of the final valuation. A sound, widely shared perception among stakeholders can foster confidence in valuation outcomes, leading to more consistent and transparent market transactions. Conversely, if appraisers or key decision-makers operate with inaccurate or unclear perceptions, the resulting valuations may be flawed, potentially leading to significant economic losses, misallocation of public resources, and legal disputes.

For municipal personnel, whose roles may involve aspects of planning, taxation, permits, or public works, the level of understanding regarding valuation principles can directly influence local governance. Personnel with a clearer perception can contribute to more accurate tax rolls, better-

informed zoning decisions, and more efficient infrastructure projects. A lack of knowledge, however, could negatively affect municipal revenues through inaccurate assessments or lead to suboptimal project prioritization. Furthermore, public trust in local government can be bolstered by transparent and consistently applied valuation practices.

This study aims to investigate these perceptions at the local government level. Its primary objective is to determine the perception levels regarding property valuation among the employees of Isparta Municipality. The study seeks to identify what these personnel consider to be the critical factors and criteria in the valuation process. The subsequent section presents a review of relevant literature on real estate valuation methods and related studies, followed by the methodology, analysis, and findings of the survey conducted with municipal staff.

2. LITERATURE REVIEW

The academic and professional discourse on real estate valuation is extensive, encompassing a wide range of methodologies, theoretical critiques, and contextual applications. This body of literature provides the foundational concepts and evolving debates pertinent to understanding valuation perceptions.

A fundamental starting point is the examination of valuation methods themselves. Pagourtzi et al. (2003) provide a concise overview, categorizing methods into traditional and advanced groups. Traditional methods include regression models, comparables, cost, income, profit, and contractor approaches. Advanced methods extend to artificial neural networks (ANNs), the hedonic pricing method, spatial analysis, fuzzy logic, and ARIMA models. This classification underscores the progression from established techniques toward more complex, data-driven models.

Several scholars have critiqued and sought to refine traditional valuation frameworks for better capturing market realities. Born and Pyhrr (1994) argue that traditional models, which often stabilize cash flow variables and assume efficient markets, fail to account for economic cycles. They propose a cycle valuation model that integrates real estate supply and demand cycles, equilibrium price cycles, and property life cycles, demonstrating a significant impact on asset value compared to

trend-driven models. Mooya (2016) offers a broader theoretical revision. Drawing on heterodox economic theory, new institutional economics, and critical realism, the author critiques standard neoclassical valuation theory and proposes an alternative framework to explain persistent market issues like price bubbles, anchoring bias, and valuation under uncertainty.

The integration of non-traditional factors into valuation has also been a key research area. Warren-Myers (2012) critically analyzes the relationship between sustainability and market value, concluding that existing research has yet to provide clear, normative guidance for valuers to consistently incorporate sustainability attributes into practice. This highlights a gap between theoretical recognition of sustainability's importance and its practical application in valuation.

The adoption of advanced statistical and computational techniques represents a significant trend in valuation research. Worzala et al. (1995) applied neural network technology to residential sales price prediction, comparing it to multiple regression analysis. Their findings, based on data from Fort Collins, Colorado, did not show neural networks to be a superior tool at that time and cautioned about issues like result inconsistency across software packages. Hoesli, Jani, and Bender (2006) employed Monte Carlo simulations to incorporate parameter uncertainty into valuations, using empirical data to construct probability distributions. Their results showed that simulation-derived values were generally close to hedonic values but were sensitive to assumptions about long-term interest and growth rates. Fuzzy logic, introduced to valuation by Bagnoli and Smith (1998), offers a way to handle qualitative attributes. By allowing set membership values between 0 and 1, it enables the grading of non-numeric factors, with the authors demonstrating its application to an income-producing property.

The comparative approach, a cornerstone of traditional practice, has also been subject to methodological enhancement. Cupal (2014) presents a detailed, advanced procedure for the comparative approach that incorporates statistical diagnostics and cluster analysis to improve the selection of comparable properties, addressing the challenge of market heterogeneity. Yeh and Hsu (2018) propose a "Quantitative Comparative Approach" that uses stepwise decomposition regression to estimate objective adjustment

coefficients, aiming to overcome the subjectivity inherent in the traditional method. Their empirical tests showed this approach outperformed classical hedonic price models and neural networks in accuracy.

Research has also delved into the behavioral and sentiment-driven aspects of valuation. Clayton, Ling, and Naranjo (2009) investigate the role of investor sentiment in commercial real estate valuation, finding that sentiment influences pricing even after controlling for fundamentals like rent growth and risk premiums. Similarly, Wyman, Seldin, and Worzala (2011) call for a new or expanded paradigm that moves beyond efficient market theories, advocating for models that consider the diverse actors and behaviors in real estate markets, drawing from complexity theory to explain value formation.

The spatial dimension of value has been profoundly impacted by Geographic Information Systems (GIS). Wyatt (1997) developed a GIS-based property information system to analyze spatial influences, such as accessibility, on property value. By creating value maps, the research demonstrated how a quantitative spatial analysis could enhance an appraiser's understanding of local market factors and aid in selecting comparables, building on the foundational idea that location is the primary value determinant (Goodall et al., 1972).

A substantial segment of the literature focuses specifically on the Turkish context, reflecting local regulatory, methodological, and market developments. Several master's theses have explored foundational and applied aspects. Öztürk (1985) conducted an early study on real estate valuation. Later works examined specific methods: Sezgin (2010) investigated valuation methods and alternatives for Treasury-owned real estate; Yılmaz (2019) emphasized core concepts, standards, and provided a sample application using common approaches; and Üngüt (2017) explored the general principles and common practices within the global and Turkish valuation climate.

Other Turkish studies have focused on specific models and factors. Khamrabaeva (2020) applied the Hedonic Price Model to determine factors affecting housing prices in Bursa, concluding that environmental factors were as influential as physical ones. Akyol (2017) conducted a study in Istanbul's Kağıthane district to determine a regional capitalization rate for use in valuation,



highlighting the area's development potential. Özbay (2010) introduced the Analytical Hierarchy Process (AHP) as a multi-criteria decision-making method for use in real estate valuation projects.

The intersection of valuation with urban policy and digitization has also been explored. Karabaş (2010) examined the value-based method as an alternative to area-based equality in urban transformation, analyzing the Bayrampaşa project. Değirmenciler (2008) addressed problems in Turkey's technical and legal valuation infrastructure, recommending the adoption of international standards and GIS-based value maps for effective urban land management. More recently, Karadağ (2024) examined the impact of digitalization, including big data, artificial intelligence, and blockchain, on accelerating and improving the accuracy of the appraisal process.

Further studies have considered the professional and organizational context of valuation. Şahin (2010) created a resource on appraisal methods and examined the training process and practices of licensed firms in Ankara. Üreten (2007) outlined factors affecting value, methods used in developed countries, and analyzed the development of Real Estate Investment Trusts (REITs) in Turkey. Köse (2023) studied the relationship between organizational culture and organizational commitment within real estate appraisal companies, finding a positive correlation but noting complexities in the regression analysis.

Finally, the critical issue of incorporating broader value concepts is addressed in the Nigerian context by Babawale and Oyalowo (2011). Their survey of property appraisers revealed a growing awareness of sustainability but a tendency to define it in social rather than economic or environmental terms, underscoring the global challenge of mainstreaming comprehensive sustainability into valuation practice.

This comprehensive review illustrates the multifaceted nature of real estate valuation research, spanning from core methodological debates to the adoption of new technologies and the integration of contextual socioeconomic factors—all of which inform the framework for investigating professional perceptions of the valuation process.

3. A STUDY ON THE DETERMINATION OF THE PERCEPTION LEVELS OF ISPARTA MUNICIPALITY EMPLOYEES ABOUT REAL ESTATE APPRAISAL

This section presents the analysis and findings derived from a survey administered to personnel of Isparta Municipality. The survey was designed to gauge the employees' perception levels regarding real estate valuation, aiming to identify the criteria they consider influential in the valuation process.

3.1. Research Methodology

The primary objective of this study is to determine the perception level of real estate valuation among municipal staff and to identify the key criteria they associate with this process. To achieve this, a survey method was employed to gather data directly from the employees of Isparta Municipality.

The survey instrument consisted of two main parts. The first part collected demographic information about the participants. The second part utilized a 5-point Likert scale (where 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, and 5 = Strongly Agree) to measure agreement with various statements concerning factors influencing real estate value.

As of the survey date, the total population (N) of personnel in Isparta Municipality was approximately 1950. The minimum required sample size was calculated using the formula

$$n = \frac{Nt^2pq}{d^2(N-1) + t^2pq}$$

where $*p*$ (probability of occurrence) and $*q*$ (probability of non-occurrence) were set at 0.5, $*t*$ was the theoretical t-value for a 95% confidence level, and $*d*$ was the margin of error (0.05). This calculation yielded a minimum sample size of approximately 321 individuals.

To ensure robust representation, the survey was distributed via snowball sampling to a total of 432 municipal personnel. This final sample size exceeds the calculated minimum, thereby adequately representing the population and allowing for reliable statistical inference. The collected data were analyzed using the SPSS Statistics package program to generate the findings discussed in the following sections.

3.2. Analysis of Research Data and Findings

The data obtained from the 432 completed surveys are analyzed and presented below under thematic subheadings.



3.3. Demographic Statistics

The demographic profile of the respondents provides essential context for interpreting the perception data. The distribution of participants by gender, age, education, and workplace is summarized in Tables 1 through 4.

Table 1. Distribution of Participants by Gender

Gender	Frequency	Percentage
Woman	132	30.6%
Male	300	69.4%
Total	432	100.0%

It is seen in Table 1 that the sample is predominantly male (69.4%), which may reflect the overall gender distribution within the municipality's workforce or the specific departments engaged with the survey. This demographic characteristic is considered in subsequent hypothesis testing to examine potential gender-based differences in perception.

Table 2. Distribution of Participants by Age

Age	Frequency	Percentage
30 years old and under	76	17.6%
31-44	248	57.4%
45 years and older	108	25.0%
Total	432	100.0%

It is shown in Table 2 that the majority of respondents (57.4%) are within the 31-44 age bracket, representing the core working-age group. This suggests that the data largely reflects the perceptions of experienced, mid-career personnel. The distributions of younger (≤ 30) and older (≥ 45) employees are roughly balanced, allowing for meaningful age-based comparisons.

Table 3 depicts that educational attainment among respondents is high, with 77.8% holding at least an undergraduate degree. This indicates a generally well-educated sample, which could influence the complexity and nuance of their perceptions regarding valuation criteria. The presence of

postgraduate (9.3%) and high school (22.2%) cohorts allows for examining the impact of educational level on perceptions.

Table 3. Distribution of Participants According to Educational Status

Educational Status	Frequency	Percentage
High school	96	22.2%
Undergraduate	296	68.5%
Postgraduate	40	9.3%
Total	432	100.0%

Table 4. Distribution of Participants According to Where They Work

Place of Work	Frequency	Percentage
Town hall	312	72.2%
Outside the City Hall	120	27.8%
Total	432	100.0%

As seen in Table 4, most participants (72.2%) are based in the central municipal building. This group likely includes administrative, planning, and managerial staff whose work is more directly tied to policy and valuation-related decisions. The 27.8% working outside the main hall may represent field personnel, whose practical, on-the-ground experience could shape a different perspective on the factors affecting property value.

3.4. Descriptive Statistics of the Scale

The core of the analysis lies in the responses to the 30 Likert-scale statements. Table 5 presents the descriptive statistics (minimum, maximum, mean, standard deviation) for each item, revealing which criteria participants deem most and least important.

**Table 5.** Descriptive Statistics of Participants' Responses to the Scale Statements

Expressions included in the Scale	Minimum	Maximum	Average Value	Standard Deviation
The view of the real estate is important.	1.00	5.00	3.9907	1.04200
The proximity of the property to the city center is important.	1.00	5.00	3.8519	1.08835
The proximity of the property to educational institutions is important.	1.00	5.00	3.9537	1.03205
The proximity of the property to health institutions is important.	1.00	5.00	3.9352	1.04002
The proximity of the property to the entertainment center and shopping mall is important.	1.00	5.00	2.8981	1.19504
Technical infrastructure is important for real estate.	1.00	5.00	4.4722	0.76414
Road infrastructure is important for real estate.	1.00	5.00	4.5556	0.72520
Water infrastructure is important for real estate.	1.00	5.00	4.5556	0.76262
Electrical infrastructure is important for real estate.	1.00	5.00	4.6111	0.69246
Sewerage infrastructure is important for real estate.	1.00	5.00	4.5926	0.73415
Natural gas infrastructure is important for real estate.	1.00	5.00	4.5926	0.74668
Social infrastructure (social facilities, market areas) is important for real estate.	1.00	5.00	4.0370	0.92328
Proximity to recreation areas and parks around the property is important.	1.00	5.00	3.5463	1.17502
Proximity to the entertainment areas around the property is important.	1.00	5.00	2.7315	1.13666
It is important to have knowledge about infrastructure for real estate.	1.00	5.00	4.3426	0.76054
Security is important for real estate.	1.00	5.00	4.4722	0.78806
Proximity to transportation facilities is important for real estate.	1.00	5.00	4.4722	0.81127
The population density around the Estate is important.	1.00	5.00	3.6481	1.10106
The population growth around the Estate is significant.	1.00	5.00	3.5278	1.05934

Expressions included in the Scale	Minimum	Maximum	Average Value	Standard Deviation
The income level of the people around the Real Estate is important.	1.00	5.00	3.2222	1.22111
The number of rooms in the property is important.	1.00	5.00	4.1944	0.82263
The number of toilets and bathrooms in the property is important.	1.00	5.00	3.9815	1.01022
The facade of the property is important.	1.00	5.00	4.3519	0.78637
The sun exposure of the property is important.	1.00	5.00	4.4259	0.78505
The plan of the real estate is important.	1.00	5.00	4.4907	0.72727
The floor where the property is located is important.	1.00	5.00	4.2407	0.82727
It is important to have an elevator in the property.	1.00	5.00	4.2315	0.89967
The heating system of the property is important.	1.00	5.00	4.5278	0.72679
The real estate's risk certificate is important.	1.00	5.00	4.5926	0.74668
The age of the building is important.	1.00	5.00	4.4815	0.83409

Analysis of Table 5 reveals the statements with which participants agreed most strongly. The mean scores provide a clear hierarchy of perceived importance. The criteria with the highest mean scores (all >4.55) are **Electrical infrastructure (4.61)**, **Sewerage infrastructure (4.59)**, **Natural gas infrastructure (4.59)**, and the **Real estate's risk certificate (4.59)**. This strongly indicates that municipal employees prioritize fundamental, practical, and legal-security aspects of a property. The emphasis on core utilities (electrical, water, sewer, gas) underscores a perception that a property's basic functionality and connection to essential services are paramount to its value. The high rating of the risk certificate highlights a significant concern for safety and regulatory compliance, likely reflecting the professional context of the respondents who must consider legal and liability issues.

Conversely, the criteria with the lowest mean scores are **Proximity to entertainment areas (2.73)** and **Proximity to entertainment centers and shopping malls (2.90)**. This suggests that,

within the framework of municipal duties and personal perception, recreational and lifestyle amenities are considered secondary or luxury factors that exert a weaker influence on property valuation compared to infrastructural and safety fundamentals. This finding may reflect a pragmatic, rather than aspirational, view of what constitutes property value among public sector employees.

Other notable high-scoring items include the **Heating system (4.53)**, **Building plan (4.49)**, and **Security (4.47)**, reinforcing the focus on tangible building quality, design efficiency, and safety. Moderate importance is given to locational factors like proximity to **Education (3.95)** and **Health institutions (3.94)**, and **Property view (3.99)**, while socioeconomic factors like the **Income level of neighbors (3.22)** and **Population growth (3.53)** received relatively lower emphasis.



3.5. Analysis of Research Data and Findings

Reliability of the Scale

The internal consistency of the survey instrument—the degree to which all items measured the same underlying construct of valuation perception—was assessed using Cronbach's Alpha coefficient.

Table 6. Reliability Results of the Scale

	Cronbach's Alpha Value
Scale Reliability	0.949

The calculated Cronbach's Alpha value of 0.949, as shown in Table 6, indicates an exceptionally high level of internal reliability for the 30-item scale. According to conventional psychometric standards, a value above 0.9 is considered excellent. This result strongly suggests that the items on the scale are consistently measuring a unified concept—the respondents' perceptions of factors important to real estate valuation—and that the collected data is highly reliable for subsequent analysis.

Prior to conducting parametric tests, it is necessary to examine whether the data follows a normal distribution. This was assessed by calculating the skewness (which measures asymmetry) and kurtosis (which measures the "tailedness") of the distribution for each scale item.

Table 7. Skewness and Kurtosis Values of Responses to the Expressions in the Scale

Expressions included in the Scale	Skewness Value	Kurtosis Value
The view of the real estate is important.	-1.218	1.030
The proximity of the property to the city center is important.	-.918	-0.030
The proximity of the property to educational institutions is important.	-1.078	.612
The proximity of the property to health institutions is important.	-.914	0.080
The proximity of the property to the entertainment center and shopping mall is important.	.165	-1.131
Technical infrastructure is important for real estate.	-2.038	5.967
Road infrastructure is important for real estate.	-2.615	9.516
Water infrastructure is important for real estate.	-2.585	8.411

Electrical infrastructure is important for real estate.	-2.847	11.426
Sewerage infrastructure is important for real estate.	-2.727	9.634
Natural gas infrastructure is important for real estate.	-2.671	8.993
Social infrastructure (social facilities, market areas) is important for real estate.	-1.140	1.298
Proximity to recreation areas and parks around the property is important.	-.405	-.953
Proximity to the entertainment areas around the property is important.	.503	-.770
It is important to have knowledge about infrastructure for real estate.	-1.810	5.492
Security is important for real estate.	-2.194	6.291
Proximity to transportation facilities is important for real estate.	-2.424	7.516
The population density around the Estate is important.	-.611	-.445
The population growth around the Estate is significant.	-.614	-.257
The income level of the people around the Real Estate is important.	-.063	-1.154
The number of rooms in the property is important.	-1.580	3.672
The number of toilets and bathrooms in the property is important.	-1.157	.921
The facade of the property is important.	-1.861	5.185
The sun exposure of the property is important.	-2.066	5.918
The plan of the real estate is important.	-2.367	8.487
The floor where the property is located is important.	-1.561	3.514
It is important to have an elevator in the property.	-1.471	2.366
The heating system of the property is important.	-2.501	9.017
The real estate's risk certificate is important.	-2.671	8.993
The age of the building is important.	-2.351	6.696

Table 7 presents the skewness and kurtosis values for all 30 items. For a sample size greater than 100, Mayers (2013, p. 53) suggests that skewness and kurtosis values between -3.29 and +3.29 indicate an approximation of normality. The results reveal significant deviations. For instance, items related to core infrastructure (e.g., Electrical infrastructure: Skewness = -2.847, Kurtosis = 11.426) show high negative skewness (meaning

responses are clustered toward the "Agree" end of the scale) and very high positive kurtosis (indicating a sharply peaked distribution with heavy tails).

Conversely, items like proximity to entertainment areas show near-zero skewness and negative kurtosis, suggesting a flatter distribution. Since the values for the majority of items fall outside the suggested ± 3.29 range, it is concluded that the data does not conform to a normal distribution. This finding necessitates the use of non-parametric statistical tests (Mann-Whitney U, Kruskal-Wallis) for hypothesis testing, as they do not require the assumption of normality. To reduce the dimensionality of the 30 variables and identify the underlying latent constructs guiding participants' perceptions, an Exploratory Factor Analysis (EFA) was performed. The suitability of the data for EFA was first confirmed.

Table 8. Kaiser-Meyer-Olkin (KMO) and Bartlett Test Results

Test	Value
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.918

Test	Value
Bartlett's Test of Sphericity	Approx. Chi-Square = 12313.835
Significance (p-value)	0.000

As shown in Table 8, the KMO measure of 0.918 is classified as "marvelous," indicating that the patterns of correlation between items are compact and highly suitable for factor analysis. Furthermore, Bartlett's Test of Sphericity was significant ($p = 0.000 < 0.05$), rejecting the null hypothesis that the correlation matrix is an identity matrix. This confirms that there are sufficient significant correlations among the variables to proceed with EFA.

The factor analysis, using Principal Component Analysis with Varimax rotation, extracted six factors with eigenvalues greater than 1. Some items with low communalities or cross-loadings were excluded to achieve a clearer factor structure. The final solution, explaining 74.73% of the total variance, is presented in Table 9.

Table 9. Exploratory Factor Analysis Results of the Scale

Factors	Factor Loading	Eigenvalue	Variance Explanation Rate (%)	Reliability
FACTOR 1: Infrastructure and Security		9.860	33.999	0.964
Sewerage infrastructure is important for real estate.	0.911			
Natural gas infrastructure is important for real estate.	0.900			
Road infrastructure is important for real estate.	0.891			
Electrical infrastructure is important for real estate.	0.889			
Water infrastructure is important for real estate.	0.888			
The plan of the real estate is important.	0.742			
Technical infrastructure is important for real estate.	0.737			
The heating system of the property is important.	0.720			

Factors	Factor Loading	Eigenvalue	Variance Explanation Rate (%)	Reliability
It is important to have knowledge about infrastructure for real estate.	0.713			
The real estate's risk certificate is important.	0.674			
It is important to have an elevator in the property.	0.673			
The age of the building is important.	0.670			
Proximity to transportation facilities is important for real estate.	0.651			
The floor where the property is located is important.	0.628			
Security is important for real estate.	0.556			
Social infrastructure (social facilities, market areas) is important for real estate.	0.522			
FACTOR 2: Location of the Property		3.474	11.980	0.775
The facade of the property is important.	0.707			
The sun exposure of the property is important.	0.679			
The proximity of the property to the city center is important.	0.658			
The view of the real estate is important.	0.513			
FACTOR 3: Population Density		2.313	7.977	0.910
The population growth around the Estate is significant.	0.869			
The population density around the Estate is important.	0.838			
FACTOR 4: Access to Services and Training		2.292	7.903	0.810
The proximity of the property to educational institutions is important.	0.809			
The proximity of the property to health institutions is important.	0.777			

Factors	Factor Loading	Eigenvalue	Variance Explanation Rate (%)	Reliability
FACTOR 5: Socioeconomic Status		1.882	6.489	0.697
The income level of the people around the Real Estate is important.	0.755			
The number of rooms in the property is important.	0.560			
The number of toilets and bathrooms in the property is important.	0.520			
FACTOR 6: Proximity to Entertainment and Social Amenities		1.850	6.380	0.745
The proximity of the property to the entertainment center and shopping mall is important.	0.865			
Proximity to the entertainment areas around the property is important.	0.784			

Factor 1: Infrastructure and Security. This is the dominant factor, explaining 33.999% of the variance and comprising 17 items with high reliability ($\alpha=0.964$). It aggregates all core utility infrastructures (sewerage, gas, road, electrical, water), technical knowledge, building features (plan, heating, elevator, floor, age), security, transportation access, and the risk certificate. This factor represents a comprehensive dimension where practical usability, safety, and legal compliance are perceived as interconnected and fundamental to value.

Factor 2: Location of the Property. This factor (11.980% variance, $\alpha=0.775$) includes the property's facade, sun exposure, proximity to the city center, and view. It captures aesthetic and orientational aspects of a property's specific site and positioning.

Factor 3: Population Density. This factor (7.977% variance, $\alpha=0.910$) is defined solely by the perceived importance of population density and population growth around the property. It reflects a demographic dimension of the neighborhood context.

Factor 4: Access to Services and Training. This factor (7.903% variance, $\alpha=0.810$) links proximity to educational institutions and health institutions.

It highlights the value placed on access to essential public services.

Factor 5: Socioeconomic Status. This factor (6.489% variance, $\alpha=0.697$) combines the income level of surrounding people with physical attributes of the property (number of rooms, toilets, and bathrooms). This suggests a perception where the social status of a neighborhood is associated with the size and amenities of the housing stock.

Factor 6: Proximity to Entertainment and Social Amenities. This factor (6.380% variance, $\alpha=0.745$) includes both proximity to entertainment centers/shopping malls and general entertainment areas. It isolates recreational and leisure accessibility as a distinct, separate dimension from other locational features.

The mean scores for these derived factors, shown in Table 10, allow for a direct comparison of their perceived importance.

The ranking of factor means in Table 10 quantitatively confirms the earlier observations from descriptive statistics. **Infrastructure and Security (Factor 1)** stand out with the highest mean score (4.45), solidifying its status as the most critical perceived dimension of real estate valuation among the municipal staff. **Location (Factor 2)** follows as the second most important.



In contrast, **Proximity to Entertainment and Social Amenities (Factor 6)** has a decisively lower mean score (2.81), confirming it is perceived as the least important criterion. This structured, six-factor model provides a validated framework for testing differences in perceptions across demographic groups in the subsequent hypothesis tests.

Table 10. Information on Dimensions to be Used in Analyses

Factors Obtained from the Real Estate Valuation Scale	Average Value of Dimensions	Standard Deviation of Dimensions
Factor 1: Infrastructure and security	4.4543	0.63078
Factor 2: Location of the property	4.1551	0.72310
Factor 3: Population density	3.5880	1.03495
Factor 4: Access to services and training	3.9444	0.94962
Factor 5: Socioeconomic status	3.7994	0.81357
Factor 6: Proximity to entertainment and social amenities	2.8148	1.04113

Hypothesis Tests and Test Results Created in the Research

This section presents the formal hypotheses developed to examine how perceptions of real estate valuation vary according to employee demographics. As the data violated the assumption of normality (see Table 7), non-parametric tests were employed. The Mann-Whitney U Test was used for comparisons between two independent groups (e.g., gender), and the Kruskal-Wallis Test was used for comparisons among three or more groups (e.g., age, education). A correlation analysis was conducted to examine relationships between the valuation factors themselves. The formulated hypotheses and their test results are detailed below.

H1 Main Hypothesis: The perception levels of municipal employees about real estate valuation differ according to the gender of the employees. The Mann-Whitney U Test was used to test H1, with results presented in Table 11.

The results indicate a nuanced relationship between gender and perception. For three factors—**Population status** and **Access to services and training**—the significance values ($p > 0.05$) lead to the rejection of H1, meaning perceptions

on these dimensions do not statistically differ by gender.

Table 11. Mann-Whitney U Test Results for H1 Hypothesis

Factor Dimensions	Gender	Average Rank	Materiality Value (p)	Hypothesis Test Result
Infrastructure and security	Woman	256.80	0.000	Acceptance
	Male	198.77		
Location of the property	Woman	260.68	0.000	Acceptance
	Male	197.06		
Population status	Woman	228.20	0.184	Rejection
	Male	211.35		
Access to services and training	Woman	233.05	0.060	Rejection
	Male	209.22		
Socioeconomic status	Woman	255.29	0.000	Acceptance
	Male	199.43		
Entertainment and social opportunities	Woman	198.74	0.045	Acceptance
	Male	224.31		

However, for the other four factors, H1 is accepted ($p < 0.05$). Examining the average ranks reveals the direction of these differences. Female respondents have a statistically significant higher average rank for **Infrastructure and security**, **Location**, and **Socioeconomic status**. This suggests that female municipal employees, on average, assign greater importance to these fundamental, safety, and socio-structural criteria in property valuation. Conversely, male respondents have a higher average rank for **Entertainment and social opportunities**, indicating they perceive proximity to such amenities as a more significant valuation factor than their female colleagues do.

H2 Main Hypothesis: The perception levels of municipal employees about real estate valuation vary according to the ages of the employees. The Kruskal-Wallis Test was used to test H2, with results shown in Table 12.

Table 12. Kruskal Wallis Test Results for H2 Hypothesis

Factor Dimensions	Age Range	Average Rank	Materiality Value (p)	Hypothesis Test Result
Infrastructure and security	Ages 30 and under	245.87	0.077	Rejection
	31-44	209.92		
	Ages 45 and over	210.94		
Location of the property	Ages 30 and under	223.34	0.354	Rejection
	31-44	220.82		
	Ages 45 and over	201.76		
Population status	Ages 30 and under	218.18	0.007	Acceptance
	31-44	229.50		
	Ages 45 and over	185.46		
Access to services and training	Ages 30 and under	184.71	0.000	Acceptance
	31-44	237.47		
	Ages 45 and over	190.72		
Socioeconomic status	Ages 30 and under	203.03	0.576	Rejection
	31-44	219.18		
	Ages 45 and over	219.83		
Entertainment and social opportunities	Ages 30 and under	229.76	0.004	Acceptance
	31-44	227.15		
	Ages 45 and over	182.72		

Age-related differences in perception are not uniform across all valuation factors. H2 is rejected for **Infrastructure and security, Location, and Socioeconomic status** ($p > 0.05$), indicating that perceptions on these core and structural factors are consistent across age groups. For the remaining three factors, H2 is accepted. The average ranks show a clear pattern: employees in the **31-44 age bracket** have the highest average rank for **Population status and Access to services and training**. This suggests that mid-career personnel place the greatest emphasis on neighborhood demographics and proximity to schools and hospitals. Furthermore, both the youngest (≤ 30) and the 31-44 groups show higher concern for **Entertainment and social opportunities** compared to the oldest group (≥ 45), whose average rank is notably lower. This may reflect differing lifestyle priorities or life stages among the age cohorts.

H3 Main Hypothesis: The perception levels of municipal employees about real estate valuation vary according to the education level of the employees.

The Kruskal-Wallis Test was used to test H3, with results presented in Table 13.

Table 13. Kruskal Wallis Test Results for H3 Hypothesis

Factor Dimensions	Educational Status	Average Rank	Materiality Value (p)	Hypothesis Test Result
Infrastructure and security	High school	184.58	0.000	Acceptance
	Undergraduate	213.34		
	Postgraduate	316.50		
Location of the property	High school	180.08	0.000	Acceptance
	Undergraduate	217.72		
	Postgraduate	294.90		
Population status	High school	175.58	0.000	Acceptance
	Undergraduate	214.55		
	Postgraduate	329.10		
Access to services and training	High school	230.67	0.029	Acceptance
	Undergraduate	206.82		



Factor Dimensions	Educational Status	Average Rank	Materiality Value (p)	Hypothesis Test Result
	Postgraduate	254.10		
Socioeconomic status	High school	158.67	0.000	Acceptance
	Undergraduate	223.23		
	Postgraduate	305.50		
Entertainment and social opportunities	High school	216.75	0.739	Rejection
	Undergraduate	218.34		
	Postgraduate	202.30		

Educational attainment appears to be a strong differentiator of perception for most valuation factors. H3 is rejected only for **Entertainment and social opportunities** ($p > 0.05$), meaning perceptions on this factor are statistically similar across all education levels. For the other five factors, H3 is accepted. A consistent, stepwise pattern is evident in the average ranks: **Postgraduate** respondents consistently have the highest average rank, followed by **Undergraduate (Undergraduate)**, and then **High school** respondents. This indicates that higher levels of formal education are associated with assigning *greater* importance to factors like **Infrastructure and security**, **Location**, **Population status**, **Access to services and training**, and **Socioeconomic status**. This finding suggests that advanced education may foster a more comprehensive or nuanced understanding of the multifaceted criteria that underpin property value.

H4 Main Hypothesis: The perception levels of municipal employees about real estate valuation vary depending on where they work. The Mann-Whitney U Test was used to test H4, with results shown in Table 14.

Table 14. Mann-Whitney U Test Results for Hypothesis H4

Factor Dimensions	Place of Work	Average Rank	Materiality Value (p)	Hypothesis Test Result
Infrastructure and security	Town hall	217.96	0.694	Rejection
	Outside the City Hall	212.70		

Factor Dimensions	Place of Work	Average Rank	Materiality Value (p)	Hypothesis Test Result
Location of the property	Town hall	215.40	0.765	Rejection
	Outside the City Hall	219.37		
Population status	Town hall	221.53	0.165	Rejection
	Outside the City Hall	203.43		
Access to services and training	Town hall	216.32	0.960	Rejection
	Outside the City Hall	216.97		
Socioeconomic status	Town hall	220.94	0.228	Rejection
	Outside the City Hall	204.97		
Entertainment and social opportunities	Town hall	217.50	0.784	Rejection
	Outside the City Hall	213.90		

For all six valuation factors, the significance values are greater than 0.05. Therefore, the main hypothesis H4 is rejected in full. This result indicates that the workplace location—whether within the main municipal building or in an external office—does not lead to statistically significant differences in how employees perceive the importance of various real estate valuation criteria. This suggests a shared organizational culture or a common professional perspective on valuation that transcends specific work site locations within the municipality.

H5 Main Hypothesis: There is a significant relationship between real estate valuation factors. A Pearson correlation analysis was conducted to test the interrelationships between the six derived factors. The results are presented in Table 15.

Table 15. Correlation Test Results for Hypothesis H5

		F1	F2	F3	F4	F5	F6
F1	Correlation Value	1	.670 **	.474 **	.477 **	.568 **	.181 **
	P Value		.000	.000	.000	.000	.000
	N	432	432	432	432	432	432
F2	Correlation Value	.670 **	1	.437 **	.489 **	.572 **	.251 **
	P Value	.000		.000	.000	.000	.000
	N	432	432	432	432	432	432
F3	Correlation Value	.474 **	.437 **	1	.343 **	.504 **	.347 **
	P Value	.000	.000		.000	.000	.000
	N	432	432	432	432	432	432
F4	Correlation Value	.477 **	.489 **	.343 **	1	.396 **	.316 **
	P Value	.000	.000	.000		.000	.000
	N	432	432	432	432	432	432
F5	Correlation Value	.568 **	.572 **	.504 **	.396 **	1	.334 **
	P Value	.000	.000	.000	.000		.000
	N	432	432	432	432	432	432
F6	Correlation Value	.181 **	.251 **	.347 **	.316 **	.334 **	1
	P Value	.000	.000	.000	.000	.000	
	N	432	432	432	432	432	432

(Note: F1=Infrastructure/Security, F2=Location, F3=Population Density, F4=Access to Services, F5=Socioeconomic Status, F6=Entertainment/Social)

The correlation matrix in Table 15 reveals that all pairwise correlations between the six factors are statistically significant ($p = 0.000 < 0.01$), leading to the acceptance of H5. This confirms that the various dimensions of valuation perception are interrelated, not independent.

The strength of these relationships varies. The strongest correlation exists between **F1 (Infrastructure and Security)** and **F2 (Location of the Property)** ($r = 0.670$). This suggests that employees who emphasize the importance of core utilities and safety also tend to strongly value the specific locational and orientational attributes of a property. Other notable positive correlations exist between **F2 (Location)** and **F5 (Socioeconomic Status)** ($r = 0.572$) and between **F1 (Infrastructure/Security)** and **F5** ($r = 0.568$). These relationships paint a picture of interconnected perceptions where fundamental property quality, its position, and the surrounding social environment are seen as linked components of value.

The weakest, though still significant, correlation is between **F1 (Infrastructure/Security)** and **F6 (Entertainment/Social)** ($r = 0.181$). This low

correlation reinforces the earlier finding that entertainment amenities are perceived as a distinct and relatively less connected dimension compared to the core cluster of infrastructure, location, and socioeconomic factors.

CONCLUSION

This study has undertaken a systematic investigation into the perception levels of Isparta Municipality employees concerning real estate valuation, successfully identifying and ranking the critical factors that shape their professional judgment. The analysis, grounded in data from 432 respondents, reveals a coherent internal consensus that prioritizes tangible, fundamental, and security-related criteria, while also uncovering significant variations in perception linked to demographic characteristics. The paramount importance assigned to infrastructure and security forms the bedrock of the municipal perspective. This factor, which amalgamates core utilities, technical building features, safety, and legal documentation like risk certificates, resonates deeply with established valuation principles emphasizing functional utility (Pagourtzi et al., 2003). Yet, it extends this tradition by intrinsically

linking physical soundness with legal-compliance and safety, suggesting that for local government practitioners, a property's value is inseparable from its habitability and regulatory standing. This holistic view aligns with calls in the literature for more integrated approaches to valuation that account for complex, interlocking factors (Wyman et al., 2011), and it mirrors practical concerns raised in the Turkish context about the necessity of robust technical and legal frameworks for effective urban management (Değirmenciler, 2008; Karadağ, 2024). Conversely, the relatively low importance accorded to proximity to entertainment and social amenities presents a revealing counterpoint. While hedonic pricing models and consumer-facing market analyses often attribute value to such lifestyle features, the municipal viewpoint appears more pragmatic and perhaps more aligned with long-term urban vitality than transient market trends. This divergence highlights a potential area for dialogue between municipal planners, who prioritize essential services and infrastructure, and market appraisers, who must capture the full spectrum of buyer preferences. It underscores the importance of context in valuation perception; what is paramount for a taxing authority or planning body may differ from what drives individual investment decisions. Furthermore, the strong statistical correlation uncovered between the infrastructure/security factor and the location factor suggests that municipal staff do not view these elements in isolation. Instead, they perceive a synergistic relationship where a prime location's value is contingent upon—and amplified by—reliable infrastructure and safety, and vice-versa. This interconnected understanding supports the need for valuation models that can capture these synergies, moving beyond additive checklists to more systemic evaluations.

The demographic analysis enriches this picture by demonstrating that perception is not monolithic. The finding that female employees place statistically greater emphasis on infrastructure, location, and socioeconomic status may reflect differentiated risk assessment, a more holistic view of community stability, or distinct professional experiences. The male respondents' higher valuation of entertainment amenities similarly invites further exploration into the social and experiential dimensions that shape professional judgment. The most striking and clear-cut demographic influence, however, is that

of education. The stepwise increase in the perceived importance of almost all valuation factors with higher educational attainment is a powerful testament to the role of formal training in shaping a sophisticated, comprehensive, and nuanced professional lens. This finding provides robust empirical support for the recurring emphasis in the literature on education and training as a cornerstone for improving valuation practice (Şahin, 2010; Değirmenciler, 2008). It strongly suggests that elevating the overall expertise of municipal staff through continuous professional development would directly enhance the quality and consistency of valuation-related decisions across the organization.

These insights culminate in significant practical implications and yield specific, actionable recommendations for Isparta Municipality and similar governing bodies. The clear internal consensus on priority factors provides a unique opportunity to codify this expert judgment into institutional practice. It is recommended that the municipality develop a formal Municipal Valuation Guideline Framework. This document would standardize the key factors for any valuation with municipal relevance, assigning appropriate weight to infrastructure, security, location, and access to essential services as identified in this study. To move from perception to precise application, this framework should advocate for the adoption of Geographic Information System (GIS) tools to create spatial value maps. This would allow for the objective analysis of location, accessibility, and service proximity, transforming qualitative "local knowledge" into transparent, quantifiable data, as demonstrated in prior research (Wyatt, 1997). To directly address the powerful influence of education level revealed in the study, a Comprehensive Professional Development Program should be instituted. This program must be tiered, offering foundational courses on valuation principles, legal frameworks (e.g., risk certificates), and traditional methods to all relevant staff. For highly educated personnel and managers, advanced modules should delve into contemporary challenges such as incorporating sustainability metrics into valuation—a noted gap both globally (Warren-Myers, 2012) and in developing contexts (Babawale & Oyalowo, 2011)—and leveraging emerging technologies like big data and AI in appraisal processes (Karadağ, 2024). Training should also cover behavioral economic insights and market cycle analysis to

foster a critical understanding of how sentiment and external shocks can impact value (Born & Pyhrr, 1994; Clayton et al., 2009).

Beyond formal guidelines and training, the municipality should foster interdisciplinary collaboration by creating cross-departmental committees for major projects involving valuation. This would integrate the engineering perspective on infrastructure, the planning perspective on location and zoning, and the financial perspective on taxation and value, ensuring the holistic perception evident in the survey data is reflected in holistic decision-making. Finally, to ensure these measures remain effective and relevant, the municipality should commit to ongoing research. This includes periodically replicating this perception study to track evolution and conducting comparative research with private-sector appraisers, developers, and academics. Such initiatives will benchmark municipal practices, identify emerging gaps, and foster an innovative culture that bridges the perceived divide between theoretical valuation models and the grounded, pragmatic needs of local governance. By implementing these recommendations, Isparta Municipality can systematically translate the valuable insights derived from its employees' perceptions into a structured, transparent, and professionalized approach to real estate valuation. This will not only enhance internal efficiency and consistency but also bolster public trust, support more equitable urban development, and strengthen the municipality's capacity to steward sustainable economic growth.

Furthermore, this study opens several avenues for meaningful future research that could deepen both academic understanding and practical application. A natural progression would be a comparative perception study between municipal employees in Isparta and those in other Turkish cities of varying sizes and economic profiles, such as a metropolitan center like Istanbul or a different regional capital. This would help determine whether the prioritization of infrastructure and security is a universal feature of municipal perception or if it varies with local market dynamics, disaster risks (e.g., earthquake zones), or administrative responsibilities. Extending this comparison to private-sector real estate professionals—including licensed appraisers, real estate agents, and developers—would be invaluable. Such research could quantitatively map

the potential perception gaps between public administrators and market practitioners, particularly regarding factors like entertainment amenities or sustainability, thereby identifying specific areas where municipal policies might benefit from closer market alignment or where professional training standards could be harmonized.

Another critical research opportunity lies in longitudinal study design. Replicating this survey following the implementation of targeted training programs or major policy shifts (e.g., new zoning regulations or a national building safety campaign) would provide empirical evidence on how professional perceptions evolve in response to intervention. This could measure the efficacy of training and policy communication strategies. Additionally, qualitative, in-depth interview or focus group studies with employees from different demographic and departmental backgrounds would richly complement the quantitative findings. Such research could uncover the underlying reasons why certain factors are prioritized—exploring the narratives, experiences, and institutional cultures that shape the statistical patterns observed here, particularly regarding the gender and education-based differences.

Finally, future research should actively explore the integration of technological and methodological advancements into the perceptual framework established here. For instance, studies could pilot and evaluate a decision-support system for municipal valuations that operationalizes the six factors identified, perhaps using the Analytical Hierarchy Process (AHP) as a structuring method (Özbay, 2010). Research could also investigate the specific barriers and pathways to incorporating sustainability metrics into municipal valuation practice, building on the global discourse (Warren-Myers, 2012) and initial awareness in developing contexts (Babawale & Oyalowo, 2011). Examining the perceived utility and trust in emerging tools like GIS-based value maps, automated valuation models (AVMs), and blockchain for property records among municipal staff would provide crucial insights for the successful digital transformation of public asset management (Karadağ, 2024; Wyatt, 1997). By pursuing these research directions, scholars and practitioners can collaboratively refine the science and practice of valuation, ensuring it remains robust, responsive, and relevant to the complex needs of modern local governance.



Acknowledgement:

This study is derived from the master's thesis titled "Investigating the Perception Level of Real Estate Valuation: An Application on Isparta Municipality Employees" employees".

REFERENCES

Adetiloye, K. A., & Eke, P. O. (2014). A review of real estate valuation and optimal pricing techniques. *Asian Economic and Financial Review*, 4(12), 1878–1893.

Akyol, C. (2017). Gayrimenkul değerlendirme yöntemlerinden piyasa kapitalizasyon yönteminin yeri ve önemi üzerine bir uygulama (Kağıthane ilçesi örneği) [A study on the place and importance of the market capitalization method among real estate valuation methods: An application on Kağıthane district] (Publication No. 483467) [Master's thesis, Okan University]. Council of Higher Education Thesis Center.

Babawale, G. K., & Oyalowo, B. A. (2011). Incorporating sustainability into real estate valuation: The perception of Nigerian valuers. *Journal of Sustainable Development*, 4(4), 21–34.

Bagnoli, C., & Smith, H. (1998). The theory of fuzzy logic and its application to real estate valuation. *Journal of Real Estate Research*, 16(2), 169–200.

Born, W., & Pyhrr, S. (1994). Real estate valuation: The effect of market and property cycles. *Journal of Real Estate Research*, 9(4), 455–485.

Büyükkaracığan, D. N. (2021). Modern methods approach in real estate valuation. Iksad Publishing House.

Clayton, J., Ling, D. C., & Naranjo, A. (2009). Commercial real estate valuation: Fundamentals versus investor sentiment. *The Journal of Real Estate Finance and Economics*, 38, 5–37. <https://doi.org/10.1007/s11146-007-9085-z>

Cupal, M. (2014). The Comparative Approach theory for real estate valuation. **Procedia - Social and Behavioral Sciences*, 109*, 19–23. <https://doi.org/10.1016/j.sbspro.2013.12.419>

Değirmenciler, E. (2008). Kentsel gelişim sürecinde Türkiye'de gayrimenkul değerlendirme sorunları ve çözüm önerileri [Real estate valuation problems and solution proposals in Turkey during the urban development process] (Publication No. 227008) [Master's thesis, Kocaeli University]. Council of Higher Education Thesis Center.

Goodall, M. R., Barry, J., & Westing, M. B. (1972). Public administration review: 1940 through 1969. *Public Administration Review*, 32(1), 52–57.

Hoesli, M., Jani, E., & Bender, A. (2006). Monte Carlo simulations for real estate valuation. *Journal of Property Investment & Finance*, 24(2), 102–122. <https://doi.org/10.1108/14635780610655076>

Karabaş, F. (2010). Kentsel dönüşüm uygulamalarında gayrimenkul değerlendirme yaklaşımının Bayrampaşa kentsel dönüşüm projesi kapsamında irdelemesi [An examination of the real estate valuation approach in urban transformation applications within the scope of the Bayrampaşa urban transformation project] (Publication No. 284458) [Master's thesis, Bahçeşehir University]. Council of Higher Education Thesis Center.

Karadağ, S. (2024). Gayrimenkul değerlendirme üzerinde dijitalleşmenin etkileri [The effects of digitalization on real estate valuation] (Publication No. 822344) [Master's thesis, İstanbul Esenyurt University]. Council of Higher Education Thesis Center.

Khamrabaeva, L. (2020). Gayrimenkul değerlendirme yöntemleri: Hedonik fiyat modeli üzerine bir uygulama [Real estate valuation methods: An application of the hedonic price model] (Publication No. 636944) [Master's thesis, Bursa Uludağ University]. Council of Higher Education Thesis Center.

Köse, H. (2023). Örgüt kültürü ve örgütsel bağlılık arasındaki ilişki: Gayrimenkul değerlendirme şirketleri üzerine bir çalışma [The relationship between organizational culture and organizational commitment: A study on real estate valuation companies] (Publication No. 794122) [Master's thesis, Giresun University]. Council of Higher Education Thesis Center.

Mayers, A. (2013). *Introduction to statistics and SPSS in psychology*. Pearson Education.

Mooya, M. M. (2016). *Real estate valuation theory: A critical appraisal*. Springer.

Özbay, Ö. (2010). Gayrimenkul değerlendirme projelerine AHP yöntemiyle bir yaklaşım [An approach to real estate valuation projects with the AHP method] (Publication No. 277694) [Master's thesis, Marmara University]. Council of Higher Education Thesis Center.

Öztürk, M. (1985). Emlak değerlendirme [Real estate valuation] (Publication No. 3871) [Master's thesis, Gazi University]. Council of Higher Education Thesis Center.

Pagourtzi, E., Assimakopoulos, V., Hatzichristos, T., & French, N. (2003). Real estate appraisal: A review of valuation methods. *Journal of Property Investment & Finance*, 21(4), 383–401. <https://doi.org/10.1108/14635780310483656>

Sezgin, V. (2010). Gayrimenkul değerlendirme yöntemleri ve Hazine'ye ait taşınmazların değerlendirmesinde alternatif yöntemler [Real estate valuation methods and alternative methods for valuing Treasury real estate] (Publication No. 282166) [Master's thesis, Gazi University]. Council of Higher Education Thesis Center.

Shiller, R. J., & Weiss, A. N. (1999). Evaluating real estate valuation systems. *The Journal of Real Estate Finance and Economics*, 18, 147–161. <https://doi.org/10.1023/A:1007754920115>

Şahin, D. (2010). Türkiye'de gayrimenkul değerlendirme yöntemleri, değerlendirme eğitimi süreci ve Türkiye uygulamaları (Ankara örneği) [Real estate valuation methods in Turkey, the training process in valuation, and practices in Turkey (Ankara example)] (Publication No. 279412) [Master's thesis, Gazi

University]. Council of Higher Education Thesis Center.

Üngüt, B. (2017). Gayrimenkul değerlendirme iklimi [Real estate valuation climate] (Publication No. 471615) [Master's thesis, Marmara University]. Council of Higher Education Thesis Center.

Üreten, A. (2007). Gayrimenkul değerlendirme yöntemleri ve gayrimenkul yatırım ortaklıklarında değer tespiti [Real estate valuation methods and value determination in real estate investment trusts] (Publication No. 211253) [Master's thesis, Gazi University]. Council of Higher Education Thesis Center.

Warren-Myers, G. (2012). The value of sustainability in real estate: A review from a valuation perspective. *Journal of Property Investment & Finance*, 30(2), 115–144.

<https://doi.org/10.1108/14635781211206887>

Worzala, E., Lenk, M., & Silva, A. (1995). An exploration of neural networks and its application to real estate valuation. *Journal of Real Estate Research*, 10(2), 185–201.

Wyatt, P. J. (1997). The development of a GIS-based property information system for real estate valuation. *International Journal of Geographical Information Science*, 11(5), 435–450. <https://doi.org/10.1080/136588197242248>

Wyman, D., Seldin, M., & Worzala, E. (2011). A new paradigm for real estate valuation? *Journal of Property Investment & Finance*, 29(4/5), 341–358. <https://doi.org/10.1108/14635781111150286>

Yeh, I. C., & Hsu, T. K. (2018). Building real estate valuation models with comparative approach through case-based reasoning. *Applied Soft Computing*, 65, 260–271. <https://doi.org/10.1016/j.asoc.2018.01.029>

Yılmaz, M. (2019). Gayrimenkul değerlendirme yöntemleri ve bir uygulama [Real estate valuation methods and an application] (Publication No. 547036) [Master's thesis, Marmara University]. Council of Higher Education Thesis Center.

