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GeoValueIndex Definition for Valuation of Public Property Assets

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ABSTRACT

The places under the jurisdiction and possession of the State, the places under the common use of the public and the places reserved for the public service and the immovable properties under the private ownership of the Treasury are the State Property Assets under the administration and management of the State. Of these, the places registered to the public legal entity and whose use is for the public benefit are Public Property Assets. Treasury Assets constitutes 37.6% of Turkey's surface and contributes significantly to the national economy.Most of the university immovable properties under the Council of Higher Education (YÖK) are public property allocated for education. Each university manages its real properties itself. The university properties are accounted; forms are filled and submitted to the General Directorate of National Real Estate for preparation of condensed statement. The aim of the study is to create a value-based GeoValueIndex depends on the features of Mersin University Çiftlikköy Campus properties. Analytic Hierarchy Process (AHP) was used as the analysis method. The GeoValueIndex obtained with AHP will both replace the trace value and provide a basis for mass real estate valuation and provide a practical solution for converting real estate to current market values.

1. INTRODUCTION

State property; refers to all property subject to public law or private law belonging to the state and public legal entities. State properties are divided into treasury and public property assets. Treasury properties are the private property of the Treasury, which is the owner of the state legal entity and registered in the name of the "Treasury" in the land registry. Public property assets; are properties allocated for the public interest, registered on behalf of public legal entities, subject to public law. In order for an immovable property to be considered a public property, it must be owned by a public legal entity and allocated to the public interest (Arslan, 2017; Gözler and Kaplan, 2018; Hazine, 2007; Yüksekkaya, 2018).

The General Directorate of National Real Estate (MEGM) is in charge of the administration of state property (MEGM, 1995). Sale, barter, construction in return for land or floor, lease, preliminary permit and establishment of easement rights on the immovable properties owned by the Treasury; It fulfills the procedures of renting the places under the jurisdiction and disposal of the state, granting preliminary permit and usage permission, and decriminalization and evacuation (Hazine, 2007). While MEGM was affiliated to the Ministry of Treasury and Finance, it has been taken under the Ministry of Environment and Urbanization (ÇŞBme, 2020).

Places under the jurisdiction and disposition of the state (forest, coastal, sea, lake, etc.), common property used by the public (pasture, threshing floor, road, bridge, etc.), assets in the service of public institutions (school, hospital, police station, place of worship, cemetery, etc.) and treasury property assets (immovable properties) vary in type. Showing them on cadastral maps and recording them in the land registry also differ (Kadastro, 1987).

Turkey area of 780 043 km^2 (HGM, 2020) is 37.6% of the assets that constitute the Treasury. There are three

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types of treasury immovable properties portfolios: registered, under the jurisdiction and disposal of the State, and associated immovable properties. The registered areas are 267264.46 km^2, the places under the rule and disposition of the state are 19268.71 km^2 and the attached areas are 6391.98 km^2. Registered immovable properties privately owned by the Treasury; Forests, fields, lands, plots, vineyards, gardens, buildings, commons, water and aquaculture areas, mining and quarry areas, historical and cultural areas, coastal and embankment areas and other areas are classified according to their types and the number and surface area are given separately (MEGM, 2020).

Large campus areas are reserved for Council of Higher Education (Anayasa, 1982), which have public legal personality, far from city centers. The majority of the land used by the university campuses is allocated from the Treasury land and is public property. Provincial, district, neighborhood, area, type, value, etc. of immovable properties for public financial management and control. Forms containing the information are filled and submitted to MEGM. MEGM prepares condensed statement according to these forms (Kamu Kayıtları, 2006). Here, value is an important criterion and the accounting of immovable properties is kept. A study was carried out to facilitate the transactions in terms of value of the immovable properties located in the Mersin University Çiftlikköy Campus. The aim of the study is to create a value-based GeoValueIndex based on the geographic and attribute data of university immovable properties. Criteria are determined under five main headings consisting of title deed, parcel, land, location and usage information of the immovable properties. Data pertaining to each criterion were collected and edited. Analytic Hierarchy Process (AHP) method was used to create an index. The produced GeoValueIndex will both replace the trace value and provide a basis for mass real estate valuation and provide a practical solution for converting real estate to current market values.

2. MATERIAL AND METHOD

2.1. Study Area

İmmovable properties belonging to Mersin University (MEU) are located in Mersin city and district centers in parts. There are approximately 200 immovable properties within the boundaries of Çiftlikköy Campus, the largest part. The average altitude of the campus area from mean sea level is 133 meters and it is located at 36^o 47 'Latitude and 34^o 31' Longitude (Fig. 1).

Mersin University is responsible for the administration and management of the private properties it owns and the allocated immovable properties in their use. The management of the immovable properties located within the boundaries of Çiftlikköy Campus includes transactions such as expropriation of privately owned real estates, changes in their type and renting them out.

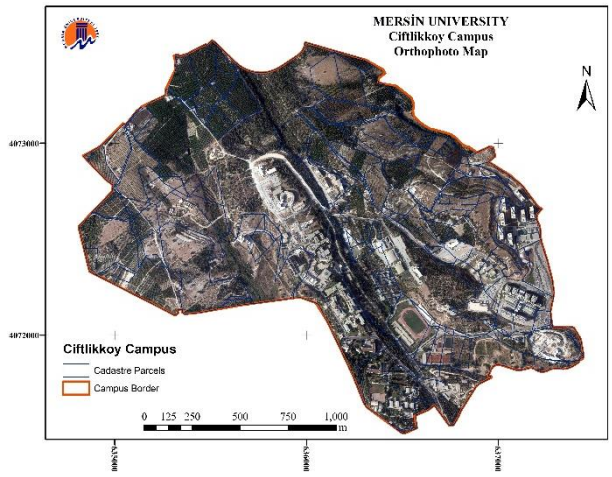

Figure 1. MEU, Ciftlikkoy Campus

2.2. Criteria of Mass Real Estate Valuation

Whether real estate is a state property or a private property, there are many criteria that affect its value. Topographic, hydrographic, geological and spatial features are among the criteria that do not change. Approximately 500 national and international literature reviews have been made, and 301 criteria for the land property type have been extracted Unel, (2017) and Unel & Yalpir, (2019). Legal, Physical, Spatial and Local are grouped under main headings and as a result of the criterion reduction, the criteria that affect the value the most have been found. Considering these criteria, the criteria for the valuation of public property assets have been investigated.

The criteria for the immovable properties within the boundaries of MEU Çiftlikköy Campus, which are among the public properties, have been determined based on the cadastral parcels. The immovable properties between the urban and rural areas, the agricultural areas are land; the places where the university buildings are located are in plot quality. Therefore, when determining the criteria, the features of the immovable properties and the trees, pools and buildings on them were taken into consideration (Table 1).

Table 1. Criteria of MEU properties

A. REGİSTER FEATURES	B. PARCEL FEATURES	C. LAND FEATURES	
1. Type **2.** Area **3.** Owner **4.** Ownership (Full-Shared)	**1.** Location on the Block (Corner-Inter.) **2.** Geometric shape **3.** Access to Road **4.** The number of frontage **5.** Length of the frontage **6.** Technical Infrastructure	**Topography** **1.** Elevation **2.** Slope **3.** Aspect **Geology;** **4.** Geology	**Hydrography** **5.** Frontage Length of Water Line **6.** Distance of Water Line **7.** Length of Water Road
D. LOCATİON FEATURES		**E. USAGE FEATURES**	
1. Distance to Main Road **2.** Distance to City Centre **3.** Distance to Mediterranean Sea	**4.** Distance to Shopping Centre **5.** Distance to Green Area **6.** Distance to Power Distribution Lines	**Building** **1.** Total Building Area **2.** Usage Type **Vegetation** **3.** Tree Type	**Water** **4.** Pool Area **5.** Pool Type

In addition to these, there are the property number, province, district, neighborhood, block and parcel numbers in the General Directorate of Land Registry and Cadastre (TKGM in Turkish) system, which includes the address information of the property.

Criteria such as the number of floors of the building, building age, number of trees and tree age also affect the value significantly. However, as it requires time, cost and effort to access these data, they could not be included in the operations in this study.

2.3. Analytic Hierarchy Process

The Analytic Hierarchy Process (AHP) method, which is one of the Multi-Criteria Decision Analysis (MCDA), is very useful in making decisions about complex problems. "The most creative task in making a decision is to choose the criteria that are important for that decision. In AHP it is arranged these criteria, once selected, in a hierarchic structure descending from an overall goal to criteria, subcriteria and alternatives in successive levels." (Saaty, 1990).

To make a decision in an organized way it should be applied the decision into the following steps (Saaty, 2008);

1. Define the problem and determine knowledge kind.
2. Structure the decision hierarchy (goal and criteria).
3. Construct a set of pairwise comparison matrices.
4. Weigh criteria with calculations.

AHP method is used to solve complex problems in many different topics such as site selection (Jelokhani-Niaraki & Malczewski, 2015; Rahmat et al., 2016), city planning (Peng & Peng, 2018), landslide susceptibility mapping (Kayastha et al., 2013), sinkhole susceptibility mapping (Orhan et al., 2020), valuation criteria weighting (Bender et al., 2000; Kauko, 2003; Kryvobokov, 2005; Yılmaz, 2010; Unel, 2017), mortgage credit risk evaluating (Ferreira et al., 2014) etc. Moreover, An innovative structure of AHP has developed to capture the relationship between various levels of activities contributed by people to society (Saaty & Shang,, 2011).

3. RESULTS

The most complex part in mass real estate valuation is the criteria that make up the properties of real estates. These criteria that affect the immovable values are; it varies from country to country, from region to region, from person to person. At the same time, there are many criteria affecting the market value of the real estate. Especially citizens, appraisers, contractors, real estate agents, etc. can be given as an example (Ünel, 2017).

The hierarchical structure of the AHP method produces solutions by simplifying the complexity by listing the criteria from the main heading to the subtitles. It both weighs the criteria and provides the opportunity to rank in order of importance. Criteria for main titles and sub-headings can be compared with binary comparisons.

While creating the paired comparison matrix of the main topics (Table 2), the results of the previous surveys were used. By performing row and column operations of AHP method, weight calculation step (Saaty, 1987) was started.

Table 2. Pairwise comparison matrix of the main criteria

	A. Register	B. Parcel	C. Land	D. Location	E. Usage
A. Register	1	3	4	2	2
B. Parcel	1/3	1	2	1/3	1/3
C. Land	1/4	1/2	1	1/5	1/5
D. Location	1/2	3	5	1	1
E. Usage	1/2	3	5	1	1

The weights of the main headings of register, parcel, land, location and usage features, which form the first part of the hierarchy, have been calculated. The second part of the hierarchy is the sub-criteria, and after calculating their weights, they are multiplied with each other. The weights of the criteria are listed in descending order. The total weight should be 1 (1.0032). However, due to the rounding, numbers are seen in the 3rd and 4th digit of the decimal point.

As the public property owner (0.1727), MEU has been evaluated as Treasury, Forest and Private ownership and it is seen in the weights that it is of great importance in terms of value in parallel with the right to save as the university wants. Again, there are different structures for education, culture, sports, accommodation and food and beverage areas within the campus area. Construction costs vary depending on the variety of use. Based on this, Building Usage Type (0.1189) is the second important criterion. The ownership structure (0.0973), which indicates the full and shareholding status that affects the use of the real estate, is also of third importance. Contrary to these; frontage length and distance of water line, length of water road (0.0038); in parcel, the number of frontage and length of the frontage (0.0029) is seen to have the smallest weights.

4. CONCLUSION

It is of great importance to know the values of the state assets such as treasury, forest, pasture, coastal in a transparent and accountable way and to make optimum decisions within the borders of the country. Value consists of the combination of property properties. Collecting data on immovable properties, storing them by recording, organizing and preparing them for analysis in standard format requires serious labor.

GeoValueIndex was created by taking into account features of land, structure, trees and other facilities on Mersin University Çiftlikköy Campus. The index has brought an easier, faster and more practical solution to the accounting of university immovable properties as public assets. In continuation of the study, GeoValueIndex Map is going to be generated by visualizing the index.

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