



Research Article

AHP-Based Location Selection for Tourism Facilities In-Depth Analysis with Numerical Data

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Abstract: This study aims to identify the most suitable location for a new hotel in Antalya using the Analytical Hierarchy Process (AHP), a multi-criteria decision-making method. The main motivation of the study is to demonstrate how AHP can be effectively applied to tourism structure selection problems in the absence of prior architectural studies on the subject. The study hypothesizes that AHP provides a rational and objective approach in hotel location selection, making it an effective tool for determining the most appropriate alternative. Unlike previous studies emphasizing strategic tourism planning, this research focuses on the physical site selection process and illustrates the step-by-step application of AHP. Hotel investments should consider not only current conditions but also long-term development plans. In this context, AHP is applied to assess and rank three alternative locations based on four main criteria obtained from databases. The method involves constructing comparison matrices, calculating criterion weights, and analyzing the consistency ratio to ensure reliability. The analysis results revealed that Side, with a score rate of 38%, was the most suitable hotel location according to the determined criteria, followed by Konyaaltı (32%) and Göynük (30%). It was observed that transportation accessibility favored Konyaaltı, plot size favored Göynük, while environmental quality and proximity to the sea favored Side. The findings indicate that AHP is a useful and reliable tool for hotel location decisions, offering meaningful guidance for both investors and urban planners. The study demonstrates the value of using structured and quantitative methods when planning sustainable and efficient tourism investments. By presenting an approach that can be repeated in similar studies, this research contributes to a better understanding of multi-criteria decision-making in architectural and tourism-focused site selection.

Keywords: Analytical hierarchy process, Decision making, Location selection Tourism facilities

Turizm Tesisleri için AHP Tabanlı Konum Seçimi Sayısal Verilerle Derinlemesine Analiz

Öz: Bu çalışma, çok kriterli bir karar verme yöntemi olan Analitik Hiyerarşi Süreci (AHP) kullanılarak Antalya'da yeni bir otel için en uygun lokasyonun belirlenmesini amaçlamaktadır. Çalışmanın temel amacı, konuyla ilgili daha önce yapılmış mimari çalışmaların bulunmaması durumunda AHP'nin turizm yapı seçimi problemlerine nasıl etkili bir şekilde uygulanabileceğini göstermektir. Çalışma, AHP'nin otel lokasyon seçiminde rasyonel ve objektif bir yaklaşım sağladığını ve bu sayede en uygun alternatifin belirlenmesinde etkili bir araç olduğunu varsaymaktadır. Turizm planlamasına odaklanan önceki çalışmalardan farklı olarak, bu araştırma fiziksel lokasyon seçim sürecine odaklanmakta ve AHP'nin adım adım uygulanmasını göstermektedir. Otel yatırımları yalnızca mevcut koşulları değil, aynı zamanda uzun vadeli gelişim planlarını da dikkate almalıdır. Bu bağlamda, veritabanlarından elde edilen dört ana kritere göre üç alternatif lokasyonu değerlendirmek ve sıralamak için AHP kullanılmıştır. Yöntem, karşılaştırma matrisleri oluşturmayı, kriter ağırlıklarını hesaplamayı ve güvenilirliği sağlamak için tutarlılık oranını analiz etmeyi içerir. Analiz sonuçları, belirlenen kriterlere göre en uygun otel lokasyonunun %38'lik bir puan oranıyla Side olduğunu, bunu Konyaaltı (%32) ve Göynük (%30)'ün izlediğini ortaya koymuştur. Ulaşım erişilebilirliğinin Konyaaltı'nı, arsa büyüklüğünün Göynük'ü, çevre kalitesinin ve denize yakınlığın ise Side'yi tercih ettiği görülmüştür. Bulgular, AHP'nin otel lokasyon kararları için yararlı ve güvenilir bir araç olduğunu ve hem yatırımcılar hem de şehir plancıları için anlamlı bir rehberlik sunduğunu göstermektedir. Çalışma, sürdürülebilir ve verimli turizm yatırımları planlanırken yapılandırılmış ve nicel yöntemlerin kullanılmasının değerini ortaya koymaktadır. Benzer çalışmalarda

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tekrarlanabilecek bir yaklaşım sunarak, bu araştırma mimari ve turizm odaklı alan seçiminde çok kriterli karar vermenin daha iyi anlaşılmasına katkıda bulunmaktadır.

Anahtar Kelimeler: Turizm tesisleri, Lokasyon seçimi, Karar verme, Analitik hiyerarşi süreci

1. Introduction

Tourism is broadly defined as the movement of individuals to places outside their usual environment for purposes such as leisure, recreation, or exploration. As a multidimensional socio-economic phenomenon, tourism interacts with cultural, spatial, and technological developments and continues to evolve in parallel with changing global conditions. According to [Cohen \(1979\)](#), tourism involves visiting a destination at different times for activities such as vacation, entertainment, visiting family and friends, sports, or rest.

Historically, human mobility first emerged as a necessity for survival; however, with social and economic progress, travel gradually transformed into an activity driven by curiosity, cultural interest, and the desire for leisure. In recent decades, increasing welfare levels, improved transportation opportunities, and societies' growing interest in experiencing cultural and historical environments have significantly contributed to the expansion of tourism activities. This growth has also increased the demand for accommodation facilities, making hotel location selection a critical factor influencing building quality, user comfort, and overall satisfaction.

Hotel location selection has been widely studied as a complex multi-criteria decision-making problem, emphasizing the interaction between spatial, economic, and social factors ([Popovic et al., 2019](#); [Mahdi & Esztergár-Kiss, 2021](#); [Chou et al., 2008](#); [Ulucan, 2020](#)). Studies in this field reveal that factors such as accessibility, surrounding land use, infrastructure quality, environmental comfort, and user expectations significantly affect the success and sustainability of the selected site. [Popovic et al. \(2019\)](#) proposed a multi-criteria model integrating environmental and socio-economic indicators to ensure sustainable hotel development, while [Mahdi & Esztergár-Kiss \(2021\)](#) highlighted the importance of user perception and satisfaction under uncertainty through the fuzzy AHP method. Similarly, [Chou et al., \(2008\)](#) and [Ulucan \(2020\)](#) demonstrated that fuzzy-based approaches can effectively balance subjective preferences and quantitative data in site selection processes.

No building design is the same due to factors such as location, size, transportation, distance to cultural and historical texture, architectural texture of the environment, and program needs. While some of the factors that constitute building quality can be measured with quantitative methods, some are abstract concepts based on personal experience and interpretation. This study aims to identify the most suitable location for a new hotel in Antalya using a multi-criteria decision-making method. This method is known as the Analytical Hierarchy Process (AHP), which is defined as the evaluation of alternatives in multi-criteria decision-making problems where there are a finite number of options. According to [Dickson \(2004\)](#), defining the design process as the sum of the decisions taken by decision makers is not a frequently used method in the context of building quality. Design can be explained as a multi-criteria decision-making model when considered as an effective decision-making process, choosing the desired option among alternatives. [Timor \(2011\)](#) defines decision-making as choosing the most appropriate option among the given options. The proposed method is based on the principle that the criteria considered may differ when considering time, technology, possibilities and constraints, therefore different criteria should be determined for each design process ([Harputlugil, 2012](#)).

In this context, the present study examines hotel location selection in Antalya by evaluating based on spatial, environmental, and functional criteria. To support a systematic and transparent decision-making process, the Analytical Hierarchy Process (AHP) was employed. AHP enables the comparison of multiple criteria and alternatives through pairwise evaluations, allowing the determination of criterion weights and the ranking of site options. The method was applied step-by-step to identify the most suitable hotel location according to the defined criteria.

1.1. Importance of the study

The purpose of this study is to demonstrate how the AHP method can be applied in determining the most suitable location for a hotel structure planned to be built in Antalya. Antalya was selected as the study area because it is one of the most significant tourism centers in the Mediterranean region, hosting millions of visitors annually and showing continuous spatial expansion in accommodation investments.

Choosing the right location in hotel investments is a critical factor in terms of the sustainability, profitability and customer satisfaction of the business. Choosing the wrong location can extend the payback period of the investment and negatively affect the success of the business. Today, multi-criteria decision-making (MCDM) methods are accepted as effective tools that enable rational decisions to be made in complex and multivariate processes. However, it is seen that these methods are not used sufficiently in the context of hotel location selection. While similar studies generally focus on tourism planning and investment strategies, (Dredge et al., 2016; Dredge, 2014; Ghosh & Siddique, 2018; Hall, 2008; Pastras & Bramwell, 2013), this research differs in that it applies a systematic and quantitative methodology directly to the physical site selection process in a region where tourism dynamics and spatial development interact intensively. This study aims to fill this gap in the literature by showing how the Analytical Hierarchy Process (AHP) method can be applied in the hotel location selection process.

The hypothesis of the study is that AHP, one of the multi-criteria decision-making methods, is an effective method in determining the most suitable alternative by providing a rational and objective approach in hotel location selection.

2. Method

In decision-making processes, incorporating human judgment plays an important role, as the evaluation of alternatives and the perceived importance of criteria may vary from one individual to another (Dündar & Fatih, 2008). The Analytical Hierarchy Process (AHP) addresses this variability by providing a structured and systematic framework that facilitates efficient multi-criteria decision-making.

The Analytical Hierarchy Process (AHP), which was put forward by Myers & Alpert (1997) in 1968 and developed as a model by Saaty (1980) in 1977, is a method that helps solve the decision-making problem by assigning importance values according to decision elements, options and criteria (Saaty & Vargas, 2006; Yılmaz & Surat, 2015). AHP can also be explained as a decision-making and estimation method that provides percentage distributions of decision points according to the criteria that are effective in decision making, used in the solution of the decision hierarchy. The method is based on the principle of one-to-one comparison of both the criteria that affect the decision and the importance values of the decision points in terms of these criteria, using a previously determined comparison table. As a result, the differences in importance values constitute the percentage distribution on the decision points. This method is used in many fields such as environmental decision analysis, health, resource facilities, economy, planning, marketing, accounting, energy policies, education, architecture, engineering, tourism (Allal et al., 2022; Eryürük et al., 2022; Kahveci, 2021; Kangas, 1994; Lee et al., 1995; Seçme, 2022; Yılmaz & Surat, 2015; Zahedi, 1986) business, industry, and organization location selection.

The method has been used in various areas such as; Yılmaz & Surat (2015), in determining the most suitable ecotourism activity for a specific place; Davras and Karaatli (2014), in the supplier selection process in hotel businesses; Altunkasa & Alim (2018), in the evaluation of city squares; Harputlugil (2012), in measuring and increasing the quality of architectural design in the process of obtaining a building; Serdar (2008), in the selection of supermarket establishment locations; Doloi (2010), in determining the factors affecting employee productivity in the construction sector from a managerial perspective; Alhazmi & McCaffer (2000) and Paek et al. (1992), in the selection of design and construction proposals.

The Analytical Hierarchy Process (AHP) creates a model for each problem consisting of a goal, criteria, possible sub-criteria and options. It is a general method used for complex or difficult to understand problems (Saaty & Vargas, 2006; Saaty, 1980). It is structured in four stages: creating a decision hierarchy, making pairwise comparisons, determining the superiority of the elements, logical and numerical consistency. In the decision-making process, which is the most important stage of the

decision-making problem, it is determined which criteria will be evaluated and what the options are (Figure 1).

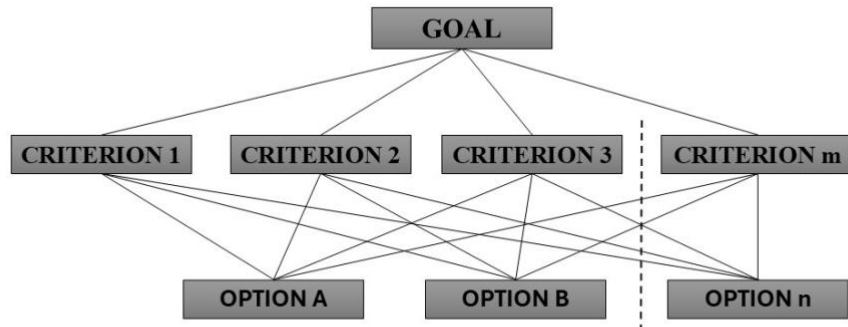


Figure 1. An example analytical hierarchy structure (Saaty, 2005).

Pairwise comparison is made with a 1-9 scoring system according to the value table given in Table 1. In the solution of the problem, firstly pairwise comparison matrices are created, and priority values of the criteria are found. For example; according to the importance value table in Table 1, while the importance value of criterion a for criterion b is 3 in the matrix, the importance of criterion b for criterion a is written as $1/3$. Dividing the values of each column by the total of that column and dividing the row totals of these values by the number of elements in the row gives the priority value. The consistency rate is important in pairwise comparison and a consistency rate less than 0.1 shows that the decision mechanism is correct. A consistency rate greater than 0.1 shows the inconsistency or error of the decision maker in the comparisons (Ünal, 2011).

Table 1. AHP pairwise comparisons value table (Sitorus et al., 2019)

	Value Definitions	Explanation
1	Equally important	Two factors are equally important
3	Slightly more important	One factor is slightly more important than another
5	Quite important	One factor is quite important than another
7	Very important	One factor is definitely more important than another
9	Extremely important	Intermediate values are used when consensus is necessary in judgment
2, 4, 6, 8	Intermediate values	Two factors are equally important

Finally, after determining the weights of the criteria and alternatives, these values are multiplied to obtain the overall priority score for each option. The alternative with the highest resulting score represents the most suitable choice within the location selection problem (Oral et al., 2021).

3. Materials

This study examines the factors that are effective in choosing the location of tourism structures and determines the priorities of these factors with the model created. First of all, comprehensive literature research was conducted on the method and alternatives and options were created on the subject, and the appropriate establishment location was determined according to the importance values.

In the study, hotel location options were presented from three different tourism regions within the borders of Antalya province, where tourism activities are most intense in Türkiye (Figure 2). The study areas were selected from regions that differ from each other. Side is a destination where cultural and historical tourism is prominent; Konyaaltı is an important center in terms of city tourism due to its distance to Antalya city center; Göynük is a region where nature and luxury tourism are prominent. In order to evaluate the options, four criteria were determined from the literature: transportation, land size, distance to the sea and the architectural environment (Kundakçı et al., 2015).

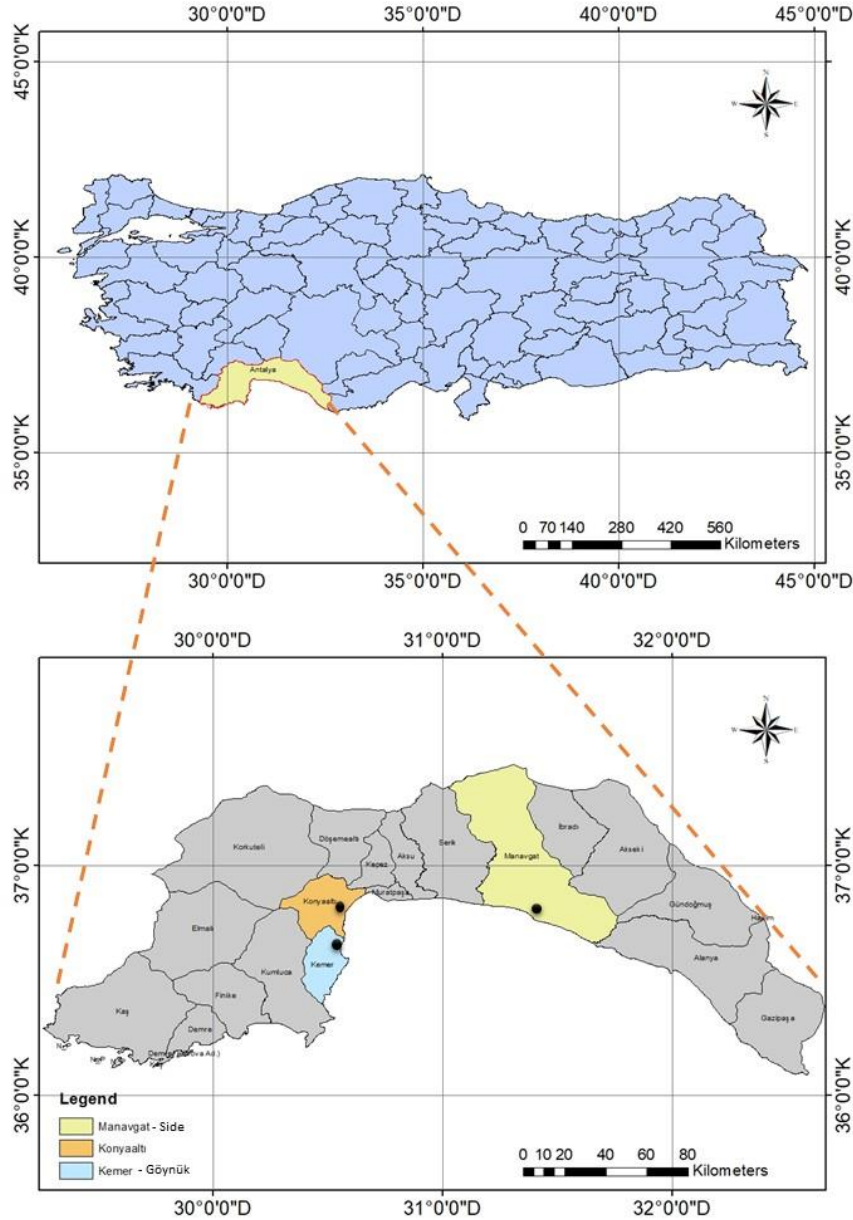


Figure 2. Location map of location options.

Table 2 shows the characteristics of the alternatives according to the determined criteria. Alternatives from different coastal areas and with different qualities were selected because they provided different data in line with the purpose of the research. Because the goal here is not to generalize according to the analysis data, but to reveal special situations related to the study.

Table 2. Characteristics of alternatives

	Alternative-1 (Side)	Alternative-2 (Konyaltı)	Alternative-3 (Göynük)
Land size (m ²)	18.000	6.600	38.000
Architectural Environment	Hotel region	Residential region	Residential and hotel region
Distance to the sea (m)	600	40	150
Distance to Antalya City (km)	60	5	30
Distance to Antalya Airport (km)	50	21	45

4. Creating The Hierarchical Structure

There are some stages for a decision problem to be defined with the analytical hierarchy process. First, the decision-making problem is divided into sub-problems according to a hierarchical order in order to be more easily understood and defined. Clear and understandable criteria suitable for the purpose of the study and sub-criteria for these criteria are determined. As seen in Figure 3, the main goal is at the top of the hierarchical structure. The decision alternatives are at the bottom (Saaty & Vargas, 2006).

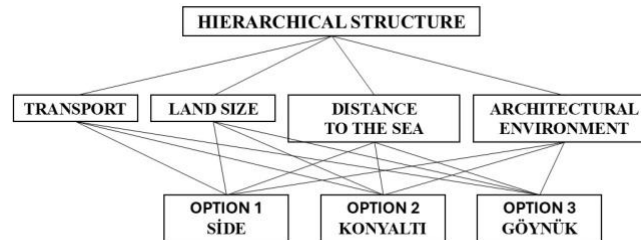


Figure 3. Hotel location selection hierarchy model.

The hierarchical structure helps to determine the basic elements of the problem while trying to prevent confusion. Pairwise comparisons constitute the second stage of AHP. This stage means comparing the determined criteria with each other and depends on the decision maker's judgment. At the end of the stage, the pairwise comparison weights are determined (Taherdoost & Brard, 2019). Pairwise comparison matrices of different criteria and alternatives are created as shown in Table 3 and Table 4. The value table in Table 1 is taken as basis while creating the matrix. Since the importance value of each criterion is equal according to itself, the value 1 is taken in diagonal matrices according to the value table. However, this value varies according to how much more important one criterion is compared to the other. For example, if the importance value of the w1 criterion is 5 according to the w2 criterion, the importance value of the w2 criterion according to the w1 criterion is 1/5.

Table 3. Pairwise comparisons matrix for criteria

	Transport	Land size	Distance to the sea	Architectural environment
Transport	w1/w1	w1/w2	w1/w3	w1/w4
Land size	w2/w1	w2/w2	w2/w3	w2/w4
Distance to the sea	w3/w1	w3/w2	w3/w3	w3/w4
Architectural Environment	w4/w1	w4/w2	w4/w3	w4/w4

Table 4. Pairwise comparisons matrix for alternatives

	Side	Konyaltı	Göynük
Side	w1/w1	w1/w2	w1/w3
Konyaltı	w2/w1	w2/w2	w2/w3
Göynük	w3/w1	w3/w2	w3/w3

The third, synthesis stage, involves the calculation of eigenvalues and eigenvectors and their normalization. The most commonly used normalization method is the division of each element in the column by the column total. According to the obtained value, the row total is taken and this value is divided by the number of elements in the row. Thus, the priority vector of each criterion is found (Saaty & Vargas, 2006).

The fourth and final stage is a consistency test in line with the decision made. While being consistent is a prerequisite for real thinking in problem solving, AHP does not require perfect consistency. Therefore, although it is impossible to be completely consistent, acquiring new information allows for some inconsistency. Testing consistency in every judgment mechanism eliminates this problem to some extent. The weighted total vector is obtained by multiplying the pairwise comparison matrix and the priority vector for it. Each element of this vector is divided by the corresponding priority value and the arithmetic averages of the values are calculated. This obtained value is called the maximum eigenvalue and is expressed as λ_{max} . The consistency indicator is calculated first with the formula numbered 1 given below, and then the consistency rate is calculated with the formula numbered 2 (Equation 1).

$$\text{Consistency Indicator} = \frac{\lambda_{max} - N}{n - 1} \quad (1)$$

$$\text{Consistency Rate} = \frac{\text{Consistency Indicator}}{\text{Random Rate}}$$

The random rate is taken according to the values given in Table 5 and used for 1-15 dimensional matrices. This means that the random rate can be calculated for matrices with a maximum of 15 dimensions. As the number of criteria increases, consistency decreases. As a result, a consistency rate less than 0.1 indicates that the matrices are consistent.

Table 5. Random indicators

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CONSISTENCY INDICATOR	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57	1.59

5. Findings

In this study, in order to determine the weight values of the important factors in the selection of tourism structure's locations, the evaluations and comparisons of the 'important factors in the selection of tourism structure's locations' were made as required by the AHP method. In these evaluations and comparisons, the importance levels given in Table 1 were used.

5.1. Comparison of alternatives according to criteria

In the first part of the problem solution, pairwise comparisons were made for 3 area alternatives, Side, Konyaltı and Göynük, selected in the Antalya example, and mathematical calculations were made in the previously mentioned stages. Finally, while calculating the consistency rate, the randomness index was taken as 0.58 according to the randomness indicator table (Table 4) since 3 area alternatives were selected in the study.

5.1.1. Pairwise comparison for transportation criteria

Alternative comparisons according to transportation criteria and the hierarchical structure tables created for this are shown below. For each alternative, a value was given based on the average distance to the city center and the airport (Table 6, Table 7, Table 8 and Table 9) (Equation 2).

Table 6. Table of values for transportation criteria

	Side	Konyaltı	Göynük
Side	1	1/5	1/3
Konyaltı	5	1	3
Göynük	3	1/3	1

Table 7. Normalization phase

	Side	Konyaltı	Göynük
Side	1/9	3/23	1/13
Konyaltı	5/9	15/23	9/13
Göynük	3/9	5/23	3/13
Total	1	1	1

Table 8. Normalized matrix

	Side	Konyaltı	Göynük	Row Average
Side	0.112	0.131	0.077	0.107
Konyaltı	0.556	0.652	0.692	0.633
Göynük	0.332	0.217	0.231	0.260
Total	1	1	1	1

Table 9. Priority matrix and λ_{max} calculation for transportation criteria

	Side	Konyaltı	Göynük		Priority Vectör	Priority Matrix	Priority Matrix Priority Vectör	Average
Side	1	1/5	1/3		0.107	0.321	$\frac{0.321}{0.107}$	3
Konyaltı	5	1	3	X	0.633	1.948	$\frac{1.948}{0.633}$	3.077
Göynük	3	1/3	1		0.260	0.792	$\frac{0.792}{0.260}$	3.046
								=9.123 /3 = 3.041 (λ value)

$$\text{Consistency Indicator} = \frac{3.041-3}{3-1} = 0.020 \quad (2)$$

$$\text{Consistency rate} = \frac{0.020}{0.58} = 0.035 < 0.1 \text{ the matrix is consistent.}$$

5.1.2. Pairwise comparison for land size criterion

In recent years, the increase in the competitive environment and the expectation of physical facilities has led tourism structures to spatial diversity. A criterion that allows development plans to be made or to be made regarding the situation is the land size. Therefore, the land size criterion is important in the selection of the establishment location. The importance of values and mathematical results related to the land size criterion are given below (Table 10, Table 11, Table 12 and Table 13) (Equation 3).

Table 10. Value table for land size criteria

	Side	Konyaltı	Göynük
Side	1	3	1/5
Konyaltı	1/3	1	1/7
Göynük	5	7	1

Table 11. Normalization phase

	Side	Konyaltı	Göynük
Side	3/19	3/11	7/47
Konyaltı	1/19	1/11	5/47
Göynük	15/19	7/11	35/47
Total	1	1	1

Table 12. Normalized matrix

	Side	Konyaltı	Göynük	Row Average
Side	0.158	0.273	0.149	0.193
Konyaltı	0.053	0.091	0.106	0.083
Göynük	0.789	0.636	0.745	0.724
Total	1	1	1	1

Table 13. Priority matrix and λ_{max} calculation for land size criteria

	Side	Konyaltı	Göynük		Priority Vectör		Priority Matrix		Priority Matrix	Average
Side	1	3	1/5		0.193		0.587		$\frac{0.587}{0.193}$	3.041
Konyaltı	1/3	1	1/7	X	0.083	=	0.251	>	$\frac{0.251}{0.083}$	3.024
Göynük	5	7	1		0.724		2.270		$\frac{2.270}{0.724}$	3.135
										=9.20 /3
										= 3.067
										(λ value)

5.1.3. Pairwise comparison for distance to the sea criterion

According to the literature research, the distance to the sea criterion affects the hotel selection of the users in coastal tourism. Therefore, this criterion was taken into consideration in the selection of the establishment location. The comparison and results of the criterion are given in Table 14, Table 15, Table 16 and Table 17 (Equation 4).

Table 14. Table of values for the distance to the sea criterion

	Side	Konyaltı	Göynük
Side	1	1/7	1/5
Konyaltı	7	1	3
Göynük	5	1/3	1

Table 15. Normalization phase

	Side	Konyaltı	Göynük
Side	1/13	3/31	1/21
Konyaltı	7/13	21/31	15/21
Göynük	5/13	7/31	5/21
Toplam	1	1	1

Table 16. Normalization phase

	Side	Konyaltı	Göynük	Row Average
Side	0.077	0.097	0.048	0.074
Konyaltı	0.538	0.677	0.714	0.643
Göynük	0.385	0.226	0.238	0.283
Total	1	1	1	1

Table 17. Priority matrix and λ_{max} calculation for distance to the sea criterion

	Side	Konyaltı	Göynük		Priority Vectör	Priority Matrix	Priority Matrix Priority Vector	Average
Side	1	1/7	1/5		0.074	0.223	$\frac{0.223}{0.074}$	3.014
Konyaltı	7	1	3	X	0.643	2.01	$\frac{2.01}{0.643}$	3.126
Göynük	5	1/3	1		0.283	0.867	$\frac{0.867}{0.283}$	3.064
								=9.204/3
								= 3.068
								(λ value)

$$\text{Consistency Indicator} = \frac{3.068-3}{3-1} = 0.034 \quad (4)$$

$$\text{Consistency Rate} = \frac{0.034}{0.58} = 0,035 < 0.1 \text{ the matrix is consistent.}$$

5.1.4. Pairwise comparison for architectural environment criteria

It has been observed that individuals prefer city hotels for business purposes and holiday resorts that are far from daily life activities and city chaos when choosing a hotel. Therefore, the architectural environment criterion is quite important in choosing the location of the establishment. The importance of values and consistency rates given according to the selected alternatives are given below (Table 18, Table 19, Table 20 and Table 21) (Equation 5).

Table 18. Table of values for architectural environment criteria

	Side	Konyaltı	Göynük
Side	1	5	3
Konyaltı	1/5	1	1/3
Göynük	1/3	3	1

Table 19. Normalization phase

	Side	Konyaltı	Göynük
Side	15/23	5/9	9/13
Konyaltı	3/23	1/9	1/13
Göynük	5/23	3/9	3/13
Toplam	1	1	1

Table 20. Normalized matrix

	Side	Konyaltı	Göynük	Row Average
Side	0.652	0.556	0.692	0.633
Konyaltı	0.131	0.111	0.077	0.106
Göynük	0.217	0.333	0.231	0.261
Total	1	1	1	1

Table 21. Priority matrix and λ_{max} calculation for architectural environment criteria

	Side	Konyaltı	Göynük		Priority Vectör		Priority Matrix		Priority Matrix Priority Vectör	Average
Side	1	5	3		0.633		1.946		$\frac{1.946}{0.633}$	3.074
Konyaltı	1/5	1	1/3	X	0.106	=	0.320	>	$\frac{0.320}{0.106}$	3.019
Göynük	1/3	3	1		0.261		0.790		$\frac{0.790}{0.261}$	3.027
										=9.120/3
										= 3.040
										(λ value)

$$\text{Consistency Indicator} = \frac{3.04-3}{3-1} = 0.02 \quad (5)$$

$$\text{Consistency Rate} = \frac{0.02}{0.58} = 0.034 < 0.1 \text{ the matrix is consistent}$$

5.2. Comparison of alternatives

In the second part of the solution, comparisons of 3 different alternatives were made in order to make the most appropriate location selection according to the selected criteria. Calculations related to this part were given, and in the last stage, the consistency rate was calculated (Table 22, Table 23, Table 24 and Table 25) (Equation 6).

Table 22. Table of values for criteria

	Transport	Land Size	Distance to the Sea	Architectural Environment
Transport	1	3	1/3	1/5
Land size	1/3	1	1/5	1/5
Distance to the sea	3	5	1	1/3
Architectural environment	5	5	3	1

Table 23. Normalization phase

	Transport	Land Size	Distance to the Sea	Architectural Environment
Transport	3/28	3/14	5/68	3/26
Land size	1/28	1/14	3/68	3/26
Distance to the sea	9/28	5/14	15/68	5/26
Architectural environment	15/28	5/14	45/68	15/26
Total	1	1	1	1

Table 24. Normalized matrix

	Transport	Land Size	Distance to the Sea	Architectural Environment	Row Average
Transport	0.107	0.214	0.074	0.115	0.127
Land size	0.036	0.072	0.044	0.115	0.067
Distance to the sea	0.321	0.357	0.220	0.193	0.273
Architectural environment	0.536	0.357	0.662	0.577	0.533
Total	1	1	1	1	1

Table 25. Priority matrix and λ_{max} calculation for criteria

	Transport	Land size	Distance to the Sea	Architectural Environment	Priority Vectör	Priority Matrix	Priority Matrix Priority Vectör	Average
Transport	1	3	1/3	1/5	0.127	0.526	$\frac{0.526}{0.127}$	4.142
Land Size	1/3	1	1/5	1/5	0.067	0.271	$\frac{0.271}{0.067}$	4.045
Distance to the Sea	3	5	1	1/3	0.273	1.166	$\frac{1.166}{0.273}$	4.271
Architectural Environment	5	5	3	1	0.533	2.322	$\frac{2.322}{0.533}$	4.357
								=16.815/4
								= 4.204
								(λ value)

$$\text{Consistency Indicator} = \frac{4.204 - 4}{4 - 1} = 0.068 \quad (6)$$

$$\text{Consistency Rate} = \frac{0.068}{0.9} = 0.08 < 0.1 \text{ the matrix is consistent}$$

6. Discussion

The results of this study demonstrate that the Analytical Hierarchy Process (AHP) provides a systematic and rational framework for selecting the most suitable hotel location among alternative sites in Antalya. results suggest that the AHP model can effectively handle multidimensional decision-making problems by quantifying subjective judgments and transforming them into measurable priorities.

Previous studies applying AHP in the context of tourism and architecture have primarily focused on different decision-making domains rather than spatial location selection. For example, [Yılmaz & Surat \(2015\)](#) applied the AHP method to determine the most suitable ecotourism activities; [Davras & Karaatlı \(2014\)](#) used it in supplier selection within hotel management; [Altunkasa & Alim \(2018\)](#) analyzed urban squares; [Harputlugil \(2012\)](#) applied AHP to architectural design quality; and [Serdar \(2015\)](#) employed it in supermarket location selection. Although these studies confirmed the methodological flexibility of AHP, none of them directly addressed the physical site selection of tourism structures in Antalya or similar urban–coastal contexts.

This study differs from previous research conducted in Antalya and other tourism regions in several key aspects. First, it integrates architectural site selection with quantitative multi-criteria analysis, bridging a gap between tourism planning and architectural decision-making. Second, it examines spatially diverse urban and coastal zones (Konyaaltı, Göynük, Side) under a unified decision framework, allowing for comparative interpretation of accessibility, plot size, and environmental attributes. Third, unlike studies relying on institutional data, this study utilizes subjective assessments from technically informed and expert participants, demonstrating that the AHP method can still yield consistent and valid results in participatory decision-making contexts.

Moreover, the findings contribute to the growing literature emphasizing the importance of context-specific applications of decision-making models in urban tourism development. Antalya, as a rapidly expanding tourism hub with complex spatial dynamics, provides an exemplary testbed for assessing the adaptability of AHP to real-world site selection problems. By revealing the dominance of Side in the overall evaluation, the study highlights how environmental tranquility and spatial isolation can outweigh pure accessibility in determining hotel suitability — a point often overlooked in previous tourism development studies.

In summary, this research extends the application of the AHP method beyond its conventional uses in tourism planning and design evaluation. It provides an operational model for architectural site selection in tourism-oriented projects and offers a replicable decision-making framework for planners, architects, and investors seeking data-driven, transparent, and sustainable investment decisions in Antalya and similar coastal cities.

7. Results

According to the analysis results obtained through AHP, the selected tourism areas were evaluated based on four main criteria, and the ranking of alternatives was determined accordingly.

The selection of location is very important in the hotel design process. The numerical results obtained are shown in Figure 4. Accordingly, when the evaluation is made according to the transportation criterion based on the distance to the airport and the city center, Konyaaltı received the highest score, Göynük ranked second, and Side obtained the lowest score. Thus, Konyaaltı is identified as the most accessible alternative.

Plot size is important in terms of design flexibility and sustainability concepts. According to this criterion, Göynük achieved the highest score due to having the largest available area. Konyaaltı received the lowest score because it has the smallest plot size. In hotel location selection, especially when coastal hotel design is planned, the distance to the sea criterion becomes significant. For this criterion, Konyaaltı received the highest score, followed by Göynük, while Side received the lowest score.

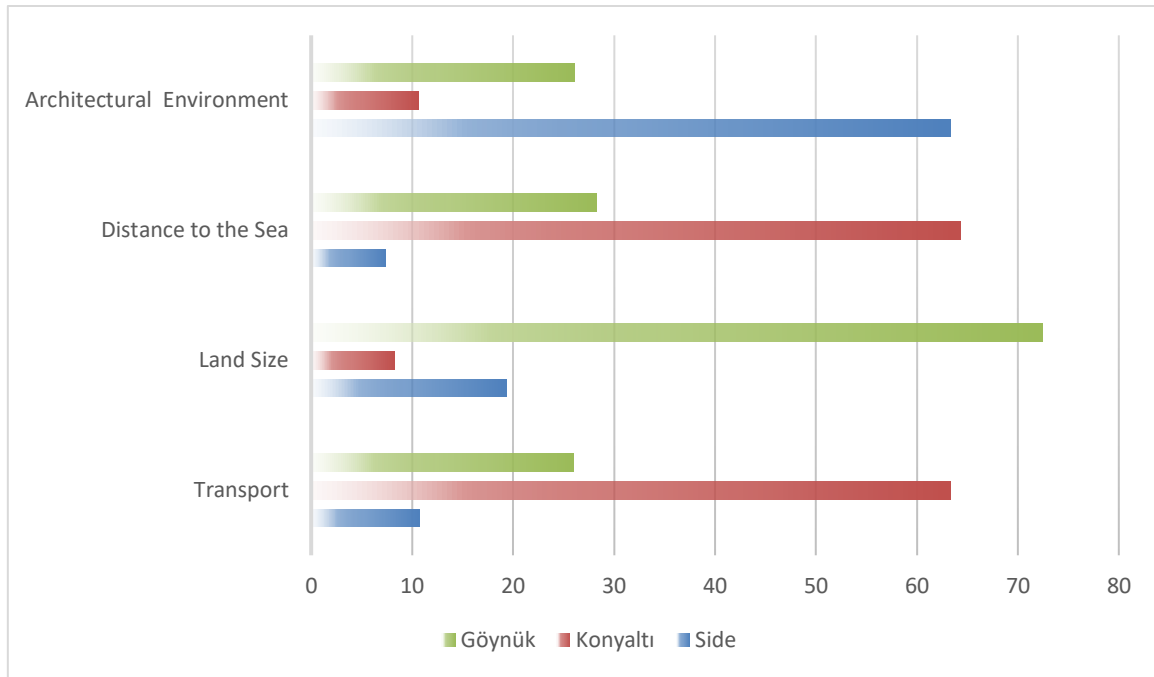


Figure 4. Ranking of alternatives according to criteria.

People tend to seek a calmer environmental setting during vacations; therefore, the environmental quality of the hotel location is important. When evaluated according to this criterion, Side received the highest score, as it is situated entirely within a hotel zone. Konyaaltı ranked second due to its location both within the city center and a residential area. Göynük received the lowest score, as it is partially within a residential and partially within a hotel environment.

According to all evaluation results, Side emerged as the most suitable hotel location, with a total score of 38%, followed by Konyaaltı (32%) and Göynük (30%), as presented in Table 26.

Table 26. Score table for alternatives

Region	Point	Percentage Rate
Side	0.384	%38
Konyaaltı	0.318	%32
Göynük	0.298	%30
Total	1	%100

8. Conclusions

As a result, this study developed a model for hotel location selection in Antalya by applying the Analytical Hierarchy Process (AHP), a multi-criteria decision-making method. The model demonstrates how AHP can integrate both quantitative factors, such as transportation accessibility, plot size, and environmental quality, and qualitative considerations, such as proximity to the sea and user preferences, to support rational and evidence-based decision-making. results confirm that AHP provides a systematic framework for evaluating complex site selection problems and balancing diverse criteria.

Furthermore, the study highlights that multi-criterion decision-making methods, such as AHP, can be effectively applied to other architectural and urban planning problems, including facility or building location selection, building material choice, space quality assessment, and evaluation of public spaces. This approach is expected to guide decision-makers and contribute to the development of original studies in the field of architecture that have not yet been widely explored in the literature.

9. Limitations

This study has certain limitations that should be acknowledged. First, the analysis was limited to only three alternative locations within the Antalya region, which may not fully represent the wider range of possibilities for hotel development. Second, the study primarily utilizes secondary data, and did not incorporate stakeholder or user-based preferences, which could offer valuable perspectives in real-world applications. Lastly, the AHP method, though widely used, is sensitive to consistency issues in pairwise comparisons and may not capture dynamic urban variables over time.

10. Suggestions for future studies

Future research could expand the scope by including a larger number of alternative sites and incorporating geographic information systems (GIS) to enhance spatial accuracy. Moreover, integrating stakeholder participation—such as inputs from investors, local authorities, and community members—could improve the relevance and applicability of findings. Comparative studies using alternative multi-criteria decision-making methods (e.g., TOPSIS) may also provide deeper insight into the robustness of results. Finally, longitudinal studies that monitor actual hotel performance post-location selection could validate the predictive.

Author Contribution Statement

Ashhan Çetin Coşkun: Theory Generation, Methodology, Software, Validation, Formal Analysis, Research, Data Analysis, Drafting, Reviewing and Editing, Visualization

Conflict of Interest Statement

The authors declare that they have no conflict of interest.

Research and Publication Ethics Statement (Required)

The authors of this article declare that they have adhered to research and publication ethics in their work.

Ethics Committee Declaration

The author of this article declares that the materials and methods used in this study do not require ethics committee approval and/or legal or special permission.

Use of Artificial Intelligence

The author declares that they did not use any form of generative artificial intelligence in the writing of this article or in the creation of images, graphs, tables, or corresponding titles.

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