Chapter 5

LOGISTICS CENTRE LOCATION SELECTION BASED ON LOGISTICS COSTS: AN APPLICATION IN ISPARTA

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INTRODUCTION

The history of the concept of logistics, which we often encounter in the last century, is actually as old as the history of humanity. The fact that people living as hunters/gatherers in the prehistoric period hunted or gathered their needs from nature and brought these needs to their shelters can be characterized as a kind of logistics activity. In the recent past, logistics activities, which were characterized only as transportation and storage activities, have now reached their current and modern definition. According to this definition, logistics is the efficient and effective transportation, storage, control and planning of the movements along the supply chain from the point of origin of the raw material to the end user in order to meet customer needs (TZYK, 2022). The main purpose of modern logistics is to carry out logistics activities with the highest efficiency and lowest cost and to ensure customer satisfaction (Timur, 1998: 9). Within the scope of this purpose, logistics activities play a key role in meeting differentiated customer expectations in today's world in an increasingly competitive environment with globalization and technological developments (Demiroğlu & Eleren, 2014, p. 189).

Meeting customer expectations on time and at the desired level will bring customer satisfaction. Logistics activities carried out by businesses to meet their own needs and ensure customer satisfaction bring a significant financial cost burden to businesses. From this point of view, the survival of businesses in the competitive environment is possible with a well-planned and correctly implemented cost management. Businesses should first determine the costs originated from logistics activities. Lambert et al. (1998, p.17) classified the

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costs originated from logistics activities as transport costs, inventory costs, storage costs, order processing costs, customer service costs and procurement, distribution, handling and disposal costs. Effective control of these cost items will positively affect the performance of businesses as well as contribute to the survival and profitability of businesses, which is one of the main objectives of businesses.

The fact that total logistics costs have become the most important cost item of enterprises has caused the emergence of the concept of logistics centre (Bezirci and Dündar, 2011, p. 293). Logistics centres can be defined as special areas designed in accordance with national and international logistics activities where all logistics activities can be carried out in an integrated manner. Logistics centres provide significant cost advantages as they reduce the investment, transportation, storage and inventory costs of enterprises. It also contributes to increasing customer satisfaction by improving service quality (Jarzemskis, 2007, p. 51; Peker, 2012, p. 25). In addition to the cost advantages that logistics centres provide to businesses, their ability to operate as collection and distribution centres is of vital importance for cities. The World Health Organization's prediction that 70% of the world's population will live in cities by 2050 reveals the importance of logistics centres for cities in the future (Rao et al., 2015, p. 29).

Within the scope of the study, experts in the field of logistics were interviewed and basic logistics costs were determined. After the expert opinions, 5 main criteria related to basic logistics costs were determined. Then, the experts were asked to compare these criteria in pairs with integers between 1 and 5 according to their importance and the data obtained were entered into the table. In this comparison, the number 1 is used to express equal importance while 5 is used to express very important criteria. The data obtained after pairwise comparisons were analysed with the AHP method and the importance levels of logistics costs were determined. Then, the experts were asked to evaluate Eğirdir district, Bozanönü Village and Keçiborlu district in Isparta province of Turkey separately in terms of logistics costs and the data obtained were analysed by TOPSİS method and it was aimed to select the most suitable location for the construction of a logistics centre.

Although all of the locations determined within the scope of the study have a railway connection, the reason for choosing Eğirdir is that there is a large amount of fruit and marble production in the district and a significant portion of these products are exported. Bozanönü was chosen because it is very close to Isparta city centre, Keçiborlu district was chosen because it is located at the midpoint of Isparta and Burdur provinces, as well as at the intersection of the railway and highway connecting Antalya, Isparta and Burdur provinces to the interior regions and close to Süleyman Demirel Airport.

CONCEPTUAL FRAMEWORK

Analytic Hierarchy Process (AHP) method, which is one of the multi-criteria decision-making methods, is a qualitative research method for selecting the most appropriate one among multiple alternatives. First introduced by Thomas L. Saaty in the 1970s, the AHP method enables decision makers to model complex problems in a hierarchical manner by transforming the problem into a structure that reveals the relationship between the main objective, criteria, sub-criteria and different alternatives. The inclusion of both subjective and objective approaches of decision makers is the most important feature of AHP. More precisely, the AHP method is accepted as a logical combination of experience, knowledge, intuition and thoughts of people (Kuruüzüm & Atsan, 2001, p. 83).

Introduced in 1981 by Hwang and Yoon, the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) method is one of the multi-criteria decision-making methods that is based on the selection of the solution alternative according to the farthest distance from the negative ideal solution and the shortest distance from the positive ideal solution and enables to determine the most appropriate alternative among a limited group of alternatives (Cheng-Ru et al., 2008, p. 256, Perçin, 2009, p. 593).

LITERATURE REVIEW

Some of the studies in the literature on the subject addressed within the scope of the study are presented below.

Tsamboulas and Kapros (2003) evaluated the financial efficiency of a logistics centre financed by public and private sectors. For this purpose, they developed a model for financial evaluation of investments.

Rimienė and Grundey (2007) conducted a detailed literature review and explained the terminology of the logistics centre concept and commonly used logistics centre concepts in detail.

Afandizadeh and Moayedfar (2008) investigated the suitability of building a logistics centre in a port located in Hormuzgan province of Iran. As a consequence of the research, they concluded that the logistics centre will reduce the waiting time of ships at the port and increase the handling capacity of the port.

Hilmola and Lorentz (2010) investigated the storage orientations of Swedish and Finnish enterprises across Europe. As a result of the research, they found that Finnish enterprises are oriented towards the east and Swedish enterprises are oriented towards the west.

Li et al. (2011) presented comprehensive research on determining the most suitable logistics centre location in their study. In this context, they used Fuzzy Clustering and TOPSIS methods to select the most appropriate location.

Hong and Xiaohua (2011) created a logistics centre location selection model in their study. They evaluated this model with AHP method based on 5 different criteria under the headings of economic, environmental, technical factors, time and cost minimization and verified the results with MATLAB.

Demiroğlu and Eleren (2014) conducted their study to identify suitable regions for logistics centres that can operate globally in Turkey. In the study, AHP and PROMETHEE methods were used to rank the regions appropriate for logistics centre construction. As a result of the study, Mersin Port was found to be the most suitable location for the construction of a logistics centre.

Uysal and Gülmez (2014) conducted their study to determine the most suitable logistics centre location in the Mediterranean Region. For this purpose, they evaluated alternative locations with qualitative and quantitative criteria and analysed these data with fuzzy series theory and matrix approach method. As a consequence of the analysis, they concluded that Antalya province is the most suitable location for establishing a logistics centre in the Mediterranean Region.

Tomić et al. (2014) used AHP and greedy heuristic algorithm methods to determine the most suitable location for the establishment of a logistics centre in the Balkan Peninsula, taking into account environmental factors.

Rao et al. (2015) emphasized in their study that the city population will increase significantly in the future and therefore the necessity of building logistics centres in cities. In this context, they identified 3 main and 12 sub-criteria as social, environmental and economic for the establishment of a logistics centre and made an evaluation based on these criteria.

Elgün and Aşıkoğlu (2016) focused on selecting the most suitable locations for logistics centres in Turkey. In this context, they determined different criteria and analysed them with TOPSIS method. As a consequence of the study, they concluded that Mersin is the most suitable location for the construction of a logistics centre.

Atalay et al. (2017) aimed to analyse the location of the logistics centre to be built in Kars province, which is located on the historical Silk Road, with the AHP method in line with expert opinions and site selection criteria. As a result of the study, they determined that economic criteria are more important than social and environmental criteria in site selection and the least important criterion among these criteria is environmental criteria.

In his study, Baki (2018) comparatively examined the logistics centres in Turkey and European Union member countries and mentioned the factors considered in the location selection of logistics centres in Turkey. As a consequence of the study, he emphasised that the logistics centre studies in Turkey are limited to the TCDD (State Railways of the Republic of Turkey) and the location of the logistics centre should be determined by Multi-Criteria Decision Making methods.

Zaralı et al. (2018) aimed to select the most appropriate location for the logistics centre planned to be established in Kayseri province by using AHP and VIKOR methods. As a consequence of the research, Boğazköprü was determined as the most appropriate location, while Mimarsinan was the second most appropriate location.

Erdal and Aydoğmuş (2019) aimed to select the location of the logistics centre to be established in order for Istanbul Textile and Apparel Exporters' Association to carry out its export activities more effectively and increase its export potential by using the AHP method. As a consequence of the study, it was determined that Tuzla is the most suitable location for the logistics centre.

Özdemir et al. (2020) aimed to determine the investment priorities of 6 logistics centers which are in the tender stage in Turkey by performing AHP and TOPSIS analyses based on different criteria. As a consequence of the study, the logistics centres that should be given priority in investment were determined as Yeşilbayır, Bözüyük and Boğazköprü logistics centres, respectively.

In their study, Paçacı et al. (2022) identified provinces suitable for multimodal transportation for the establishment of a logistics centre using GIS (Geographic Information System) and ranked them according to different criteria. Based on these criteria, the most suitable location for the establishment of a logistics centre was determined by AHP method. As a result of the research, the most suitable provinces for the establishment of a logistics centre were determined as Istanbul, Adana and Hatay, respectively.

As a consequence of the literature review, many studies on logistics, especially on logistics centres, were found. In these studies, it has been determined that AHP method is generally used in logistics centre location determination. However, it has been observed that there are also studies using other multi-criteria decision-making methods such as TOPSIS, VIKOR and PROMETHEE.

METHOD

Within the frameworkof the study, interviews were conducted with experts in order to determine the most suitable logistics centre location in Isparta province in terms of logistics costs, and experts were asked to determine logistics costs and rank these costs according to their importance. These data were analysed by Analytic Hierarchy Process (AHP) method and the importance levels of logistics costs were determined. Then, the same experts were asked to evaluate 3 different alternative logistics centre locations determined for Isparta province separately in terms of logistics cost advantages and the data obtained were analysed by TOPSIS method.

APPLICATION

In the application part of the study, logistics centre location selection was made based on logistics costs. The study was conducted in Isparta province. Within the scope of the study, firstly Analytic Hierarchy Process (AHP) method and then TOPSIS method were applied. The study was carried out with verbal expressions by eliminating the heavy mathematical operations used in the application of AHP and TOPSIS methods. The application steps of the AHP method applied in this study are shown in detail below (Öztürk & Erdoğan, 2017, pp. 626-629).

First of all, 5 logistics cost types that are thought to affect the selection of logistics centre location were determined by experts. The types of logistics costs, also referred to as criteria, are shown in Table 1.

Table 1. Main Types of Costs That May Affect Site Selection (Criteria)
Criteria
Transportation Costs
Marketing and Customer Service Costs
Storage Costs
Handling, Distribution and Supply Costs
Order Processing and Inventory Management Costs

5 logistics cost types were firstly compared by the experts in pairs according to their importance levels. The results of the pairwise comparison of the criteria are shown in Table 2.

Table 2. Pairwise Comparison of Criteria

Criteria										**Criteria**
Transportation	**5**	4	3	2	1	2	3	4	5	Marketing
Transportation	5	4	**3**	2	1	2	3	4	5	Storage
Transportation	5	**4**	3	2	1	2	3	4	5	Handling
Transportation	**5**	4	3	2	1	2	3	4	5	Order Processing
Marketing	5	4	3	2	1	2	3	**4**	5	Storage
Marketing	5	4	3	2	1	2	**3**	4	5	Handling
Marketing	5	4	**3**	2	1	2	3	4	5	Order Processing
Storage	5	**4**	3	2	1	2	3	4	5	Handling
Storage	5	**4**	3	2	1	2	3	4	5	Order Processing
Handling	5	4	**3**	2	1	2	3	4	5	Order Processing

The matrix showing the pairwise comparison of the criteria is shown in Table 3.

Table 3. Pairwise Comparison Matrix of Criteria

	Transportation	**Marketing**	**Storage**	**Handling**	**Order Processing**
Transportation	1	5	3	4	5
Marketing	1/5	1	1/4	1/3	3
Storage	1/3	4	1	4	4
Handling	1/4	3	1/4	1	3
Order Processing	1/5	1/3	1/4	1/3	1

In the pairwise comparison matrix, column totals should be calculated first. The column sums of the criteria are given in Table 4.

Table 4. Column Totals of Criteria

	Transportation	Marketing	Storage	Handling	Order Processing
Transportation	1	5	3	4	5
Marketing	0,2	1	0.25	0.333333	3
Storage	0.333333	4	1	4	4
Handling	0.25	3	0.25	1	3
Order Processing	0.2	0.333333	0.25	0.333333	1
Column Total	1.98	13.33	4.75	9.67	16

After this stage, the pairwise comparison matrix should be normalized and then the consistency of the matrix should be determined. To normalize the matrix, each number in the matrix is divided by the sum of the columns. Thus, the normalized matrix is obtained. The results of the normalized matrix are shown in Table 5.

Table 5. Construction of the Normalized Matrix

	Transportation	Marketing	Storage	Handling	Order Processing
Transportation	0.504202	0.375	0.631579	0.413793	0.3125
Marketing	0.10084	0.075	0.052632	0.034483	0.1875
Storage	0.168067	0.3	0.210526	0.413793	0.25
Handling	0.12605	0.225	0.052632	0.103448	0.1875
Order Processing	0.10084	0.025	0.052632	0.034483	0.0625

Then the sum of the rows in the normalized matrix should be calculated. The sum of the rows is calculated as follows and shown in Table 6.

Table 6. Determination of Importance Weights of Criteria						
	Transportation	**Marketing**	**Storage**	**Handling**	**Order Processing**	**Total of Rows**
Transportation	0.504202	0.375	0.631579	0.413793	0.3125	2.237074
Marketing	0.10084	0.075	0.052632	0.034483	0.1875	0.450455
Storage	0.168067	0.3	0.210526	0.413793	0.25	1.342387
Handling	0.12605	0.225	0.052632	0.103448	0.1875	0.69463
Order Processing	0.10084	0.025	0.052632	0.034483	0.0625	0.275455

The row sums obtained are averaged. The averages of the rows show the importance weights of the criteria, and the importance weights of the criteria are shown in Table 7.

Table 7. Importance Weights of Criteria		
	Average of Rows	**Importance Weights**
Transportation	2.237074/5	0.447415
Marketing	0.450455/5	0.090091
Storage	1.342387/5	0.268477
Handling	0.69463/5	0.138926
Order Processing	0.275455/5	0.055091

The ranking of the importance weights of the criteria is presented in Table 8.

Table 8. Ranking of Importance Weights of Criteria		
Order of Importance	**Cost Criteria**	**Importance Weights**
1	Transportation	0.447415
2	Storage	0.268477
3	Handling	0.138926
4	Marketing	0.090091
5	Order Processing	0.055091

According to Table 8, as a consequence of the AHP analysis, it is determined that the most important criterion among logistics costs is transport costs. Transportation costs are followed by storage, handling, marketing and ordering costs.

After determining the importance levels of the criteria, the consistency of the matrix should be calculated. First, the Consistency Indicator is created. Consistency Indicator (CI) should be calculated with the help of the equation in Formula (1).

$$\mathrm{CI} = \frac{\lambda_{Max} - \text{Number of Criteria}}{\text{Number of Criteria} - 1} \tag{1}$$

To calculate the consistency indicator, the λ_{Max} value should first be calculated according to Formula (2).

$$\lambda_{Max} = \frac{1}{\text{Number of Criteria}} \sum_{i=1}^{\text{Number of Criteria}} \frac{(\text{Pairwise Comparison of Criteria x Importance Weights of Criteria})_i}{\text{Importance Weights of Criteria}_i} \tag{2}$$

The results of the product of the pairwise comparison matrix and the importance weights of the criteria are shown in Table 9 below.

Table 9. Binary Comparison Matrix and Results of Multiplication of Importance Weights of Criteria

	Multiplication Results
Transportation	2.53446
Marketing	0.458275
Storage	1.554047
Handling	0.753445
Order Processing	0.288032

The results of the multiplication results in Table 9 divided by the importance weights of the criteria are presented in Table 10.

Table 10. Results of Multiplication Results divided by Importance Weights of Criteria

	Division Results
Transportation	5.664678
Marketing	5.086802
Storage	5.788374
Handling	5.42335
Order Processing	5.228305
Total	27.19151

The column total is calculated as 27.19151. To find the value of , the total result is divided by the number of criteria (n=5). The value result is as follows.

$\lambda_{Max} = 5.438302$

The Consistency Indicator (CI) is then calculated as shown in Formula (1).

$$\mathrm{CI} = \frac{\lambda - 5}{5 - 1} = \frac{5.438302 - 5}{5 - 1} = \mathbf{0.109575}$$

To find the consistency of the matrix, the Consistency Ratio (CR) should be calculated. Consistency Ratio (CR) is calculated with the help of Formula (3).

$$\mathrm{CR} = \frac{\mathrm{CI}}{\mathrm{RE}} \tag{3}$$

To calculate the CR value, the Random Consistency Index (RE) value should be determined. The values in Table 11 should be used to determine the RE value.

Table 11. Random Consistency Index Table

Number of Criteria	1	2	3	4	**5**	6	7	8	9	10	11
RE	0	0	0.58	0.90	**1.12**	1.24	1.32	1.41	1.45	1.49	1.51

Since n=5 in this study, the RE value will be used as 1.12 as shown in Table 11.

$$\mathrm{CR} = \frac{0.109575}{1.12} = 0.097835$$

As a consequence of the calculation, the Consistency Ratio was calculated as 0.097835. Since the CI value is less than 0.10, it is concluded that the matrix is consistent.

After determining the importance levels of the criteria with the AHP method, the most appropriate logistics centre location will be selected using the TOPSIS method. The application stages of the TOPSIS method used in this study are given below (Öztürk and Erdoğan, 2017, pp. 629-632).

The logistics centre location options to be used in the study and located in Isparta province and some characteristics of these centres are presented in Table 12.

Table 12. Logistics Centre Location Options in Isparta Province

Location Options	Distance to City Centre	Distance to Airport	Railway Connection
Eğirdir	36.6 Km	61.8 Km	Yes
Bozanönü	12.6 Km	27.5 Km	Yes
Keçiborlu	37.2 Km	15.8 Km	Yes

The alternative logistics centre locations considered within the scope of the study was evaluated separately by experts. In the evaluation, alternative logistics centre locations were evaluated with numbers between 1 and 5 in terms of logistics costs in terms of their locations. In this evaluation, the number 5 was used for the most advantageous logistics centre location, while the number 1 was used for the most disadvantageous location. The standardized decision matrix created as a consequence of the evaluations is shown in Table 13.

Table 13. Standardized Decision Matrix

Logistics Centre	Transportation	Marketing	Storage	Handling	Order Processing
Eğirdir	2	3	5	2	3
Bozanönü	4	5	2	3	3
Keçiborlu	5	4	3	4	3

The sum of the squares of the values in each column of the standardized decision matrix in Table 13 is calculated and the square roots of these sums are calculated. The resulting values are shown in Table 14.

Table 14. Obtaining Square Roots of Column Sums

Logistics Centre	Transportation	Marketing	Storage	Handling	Order Processing
Eğirdir	4	9	25	4	9
Bozanönü	16	25	4	9	9
Keçiborlu	25	16	9	16	9
Total	45	50	38	29	27
Square Root of Column Sums	6.71	7.07	6.16	5.39	5.20

Each value in the standard decision matrix in Table 13 is divided by the square root of the column totals in Table 14. This results in the normalized decision matrix shown in Table 15.

Table 15. Normalization Results of the Decision Matrix

Logistics Centre	Transportation	Marketing	Storage	Handling	Order Processing
Eğirdir	0.2981424	0.4242641	0.8111071	0.3713907	0.5773503
Bozanönü	0.5962848	0.7071068	0.3244428	0.557086	0.5773503
Keçiborlu	0.745356	0.5656854	0.4866643	0.7427814	0.5773503

Then, the weighted decision matrix is obtained by multiplying the importance levels shown in Table 7 in the AHP method and the normalized decision matrix shown in Table 15. The weighted normalized decision matrix is shown in Table 16.

Table 16. Weighted Normalized Decision Matrix

Logistics Centre	Transportation	Marketing	Storage	Handling	Order Processing
Eğirdir	0.133393305	0.0382223	0.2177639	0.051595842	0.0318068
Bozanönü	0.26678661	0.0637039	0.0871055	0.077393762	0.0318068
Keçiborlu	0.333483262	0.0509631	0.1306583	0.103191683	0.0318068

After the calculation of the weighted normalised decision matrix, positive and negative ideal solution sets are created. The largest value in the columns of the weighted decision matrix is selected to obtain the positive ideal solution set and the smallest value in the columns of the weighted decision matrix is selected to obtain the negative ideal solution set. The solution set is shown in Table 17.

Table 17. Minimum and Maximum Values of Columns in the Weighted Normalized Decision Matrix

	Transportation	Marketing	Storage	Handling	Order Processing
Smallest Value	0.133393305	0.0382223	0.0871055	0.051595842	0.0318068
Biggest Value	0.333483262	0.0637039	0.2177639	0.103191683	0.0318068

After determining the lowest and highest values in the columns, all values in the columns shown in Table 16 are subtracted from the maximum value determined in Table 17. Then the squares of the results obtained are calculated for each value. Thus, the distance values to the positive ideal solution are determined respectively. Then, to calculate the positive ideal solution results, the distances in each row are summed and then the square roots of these sums are calculated to form Table 18.

Table 18. Positive Ideal Solution Results

Logistics Centre	Transportation	Marketing	Storage	Handling	Order Processing	Total of Rows	Square Root of the Sum of Rows
Eğirdir	0.040036	0.000649	0	0.002662	0	0.043347	0.208201
Bozanönü	0.004448	0	0.017072	0.000666	0	0.022186	0.148948
Keçiborlu	0	0.000162	0.007587	0	0	0.007750	0.088032

The minimum values determined in Table 17 are subtracted from all values in the columns shown in Table 16. The squares of these results are then calculated for each value. Thus, the distances to the negative ideal solution are determined respectively. Then, to calculate the negative ideal solution results, the distances in each row are summed and then the square roots of these sums are calculated to form Table 19.

Table 19. Negative Ideal Solution Results

Logistics Centre	Transportation	Marketing	Storage	Handling	Order Processing	Total of Rows	Square Root of the Sum of Rows
Eğirdir	0	0	0.017072	0	0	0.017072	0.130658
Bozanönü	0.017794	0.000649	0	0.000666	0	0.019109	0.138234
Keçiborlu	0.040036	0.000162	0.001897	0.002662	0	0.044757	0.211559

Formula (4) shown below should be used to calculate the ideal solution. According to this formula, the negative ideal solution value for each row of the locations should be divided by the sum of the positive ideal solution value and the negative ideal solution value.

$$Ideal\ Solution_i = \frac{Negative\ Ideal\ Solution_i}{Negative\ Ideal\ Solution_i + Positive\ Ideal\ Solution_i} \quad (4)$$

When the data in the formula are substituted, the optimal solution results are obtained. The optimal solution results according to the determined locations are shown in Table 20.

Table 20. Results of the Best Logistics Centre Location Selection According to the Ideal Solution	
Logistics Centre Location Options	Results
Eğirdir	0.3855834
Bozanönü	0.481345805
Keçiborlu	0.70615864

When the values shown in Table 20 are ranked, the most appropriate locations for the logistics centre are ranked as shown in Table 21.

Table 21. Results of Logistics Centre Location Selection in Sequential Order		
Sıra	Logistics Centre Location Options	Results
1	Keçiborlu	0.70615864
2	Bozanönü	0.481345805
3	Eğirdir	0.3855834

As a result of the calculations made, as seen in Table 21, it has been determined that Keçiborlu district is the most suitable location for the logistics centre in Isparta within the framework of costs.

CONCLUSION

The purpose of the study is to select the logistics centre location in Isparta province by targeting logistics costs. In the application part of the study, firstly Analytical Hierarchy Process (AHP) method was used and then TOPSIS method was applied. First of all, 5 logistics costs that are thought to affect the logistics centre location selection were determined. The 5 types of logistics costs are transportation costs, marketing costs, storage costs, handling costs and order costs. After determining the types of costs that may affect the logistics centre location selection, the importance levels of logistics costs were calculated with the Analytical Hierarchy Process method. As consequence of the calculation, it was determined that the most important logistics cost type is transportation costs. Transportation costs are followed by storage, handling, marketing and ordering costs, respectively.

After the application of the analytical hierarchy process method, 3 possible logistics centre locations in Isparta province were determined. The possible logistics centre locations used in the study and located in Isparta province were determined as Eğirdir, Bozanönü and Keçiborlu. As a result of the application of the TOPSIS method, the most suitable logistics centre location was calculated with the effect of logistics costs. According to the results of the study, it was determined that the most suitable logistics centre location in Isparta is Keçiborlu district based on logistics costs.

As a result of the detailed literature review, no such study specific to Isparta province was found in the literature. For this reason, it is thought that the study is an original study and will contribute to the literature.

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