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SELECTING THE OPTIMAL ROUTE FOR MUNICIPAL WASTE TRANSPORTATION USING THE EDAS METHOD

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Abstract

When solving problems related to capital investments in a company, it is necessary to elaborate on the issue in detail and consider as many influential parameters as possible in order to make the optimal decision. One such problem is the selection of a transfer station and the location of a regional landfill. Once these locations are selected, the next problem that arises is choosing the optimal route for transporting municipal waste from the transfer station to the regional landfill. To successfully solve such complex problems, multi-criteria decision-making methods can be applied.

In this paper, the EDAS method will be applied to select the optimal route for municipal waste transportation.

Key words: *optimization, transport route, multi-criteria decision-making methods.*

INTRODUCTION

Choosing the location of a capital facility is one of the most important decisions made by any company. Once a decision is made on the location of capital facilities, the next problem that arises is the choice of a transportation route from one location to another. The optimal route for transportation from one location, or facility, to another location, or facility, is of great importance for the smooth functioning of the company itself. In this particular case, we defined two locations, namely a transfer station and a regional landfill. We need to choose the optimal route for transporting municipal waste from the transfer station to the regional landfill. There are multiple roads, or routes, that connect these two locations, each characterized by their own specificities. Some of the transport routes pass through populated areas, on paved and well-maintained roads, then on a highway with a single toll, with a longer transport distance, etc. Another part of the transport routes passes by settlements or in the immediate vicinity of settlements, on paved and unmaintained roads, then on express or local roads without tolls, with shorter transport distances, etc. The great importance of optimally solving this problem is especially obvious, knowing that municipal waste will be transported daily along a defined transport route. When choosing a transport route, it is necessary to consider as many influential parameters as possible. In most cases, some parameters have greater and other parameters lesser influence on the choice of the transport route [1]. The optimal choice of a transport route has direct impact on transport costs, maintenance of transport vehicles, local population, etc.

The parameters, or criteria, by which potential transport routes are compared can be quantitative and qualitative. Basically, decision-making is the selection of one alternative from multiple possible alternatives for a given problem. For decision-making to be applied, there must be two or more possible alternatives for a given problem. The application of decision-making to solve a given problem can be single-criteria or multi-criteria. In single-criteria decision-making, only one criterion is applied, while in multi-criteria decision-making, multiple criteria are applied according to which the final decision is made. Single-criteria optimization uses only one criterion during optimization, which reduces the realistic solution to a given problem. Multi-criteria optimization uses multiple criteria, resulting in the most optimal solution for a given problem [2].

DEFINING A MULTI-CRITERIA MATHEMATICAL MODEL FOR DECISION-MAKING WHEN CHOOSING ALTERNATIVE TRANSPORT ROUTES

There are a number of multi-criteria decision-making methods that can be very successfully applied to solving problems related to transport route selection [1]. The most commonly used methods for multi-criteria decision-making are: ELECTRE method, PROMETHEE method, AHP method, ANP method, VIKOR method, TOPSIS method, EDAS method, WPM method, etc. A common characteristic of all multi-criteria decision-making methods is that the choice is made between more than two alternatives and, according to more than one influential criterion, i.e., the alternatives are compared with each other according to multiple criteria. All criteria have different weights, i.e., influence in choosing the optimal alternative. The sum of the weights for all criteria should be equal to one. The criteria have their own goal, that is, they can aim for a maximum (max) or a minimum (min). They can be quantitative or qualitative, but in order to perform calculations, the descriptive assessment needs to be converted into numbers so that further mathematical operations can be performed. There are three types of scales that can be used to measure different quantities: ordinal scale, interval scale, and ratio scale. In this paper, the interval scale will be applied to convert qualitative values into quantitative ones [2].

There are a large number of authors who have conducted research related to optimal route selection, using some of the multi-criteria decision-making methods [1]. Below are some authors who have conducted research in this direction, such as: In 2022, Archetti et al. conducted a study on optimization in multimodal freight transportation problems: A Survey [3]. Song et al. conducted research in 2023 on optimizing routes for the transport of dangerous goods in the rail transport network, taking into account road traffic constraints [4]. Hamurcu et al. conducted a 2019 study on the application of multi-criteria decision-making to evaluate alternative monorail routes [5]. Milošević et al. conducted research in 2021 on a route selection model for the transport of hazardous materials using a fuzzy logic system [6]. In 2016, Correia et al. conducted a study on route optimization for the transport of hazardous materials, a case study of fuel delivery in Lisbon [7]. In 2014, Alkubaisi conducted a study on predefined evaluation criteria for selecting the best tram route [8]. In 2004, while preparing his master's thesis, Castillo conducted research on optimizing routes for the transportation of hazardous materials [9]. In 2022, Hajduk conducted research on multi-criteria analysis in a decision-making approach for linear urban transport planning based on the TOPSIS technique [10]. Hou et al. conducted a study on the application of multi-criteria decision-making (MCDM) to high-potential urban bus routes in Taiwan [11]. Kosijer et al. conducted a study in 2012 on multi-criteria decision-making in planning and designing railway routes [12]. There are many other studies related to this issue.

According to the aforementioned authors who conducted research aimed at choosing the optimal transport route, they compared alternatives according to various criteria. The choice of criteria depends on the problem being analyzed. The most commonly used criteria in research are: Expropriation, Access to shopping and residential areas, Access to employment and education, Aesthetic and visual impact, Public mobility, Ability to develop and to improve, Total travel time, Integration of transport, Traffic capacity, Demand level, Sensitive area, Land structure, Time of travel, Transportation route, Impact on the population, Environmental impact, Speed of response of rescue services (ambulance, firefighters, police), Probability of an accident, Route length, Exposure of the population, Probability of a traffic accident, Accessibility (Travel time, Land use), Safety (Black points no., Intersections no., Alignment), Environment (Noise-vibration, Aesthetic aspect), Economic (Path length, Construction cost), Population Trips (Population density, Acceptance, Trips no.), Security and others.

This paper will consider several criteria that, in the authors' opinion, are most appropriate for a specific problem.

MULTI-CRITERIA DECISION-MAKING METHOD EDAS

In this paper, the EDAS method will be applied to solve the problem of selecting the optimal route for municipal waste transportation [2, 13, 14].

The EDAS method was proposed by Mehdi Keshavarz Ghorabaee in 2016 and is an estimation based on the distance from the average solution or simply abbreviated as EDAS. The distance is calculated in the negative and positive directions relative to the average solution, individually and in an appropriate manner for the selected useful or useless criteria [15]. According to the EDAS method, it is necessary to create an inactive solution, where the highest values of the positive distance from the average solution and the lowest values of the negative solution give the best solution from the average solution [16]. This method stands out from other multi-criteria decision-making methods in that the result is obtained from an average solution, which eliminates the risk of expert bias towards alternatives. The result obtained from the average solution normalizes the data, which significantly limits the chances of deviating from the best solution. In this way, a better and more accurate solution is obtained, compared to the solution obtained by most multi-criteria decision-making methods.

The solution according to this method is implemented in several steps, namely [17]:

Step 1. Selecting the most important criteria describing the alternatives and forming a matrix for average decisions;

Step 2. Forming a matrix for criterion weights;

Step 3. Forming a matrix for the average solution according to all criteria:

$$AV_j = \frac{\sum_{i=1}^{n} X_{ij}}{n} \tag{1}$$

Where n is the number of alternatives.

Step 4. Calculating the positive distance from the average (PDA) and calculating the negative distance from the average (NDA):

If the j^{th} criterion is useful:

$$PDA_{ij} = \frac{max\left(0,(X_{ij}-AV_j)\right)}{AV_j} \tag{2}$$

$$NDA_{ij} = \frac{max\left(0,(AV_j-X_{ij})\right)}{AV_j} \tag{3}$$

If the j^{th} criterion is useless:

$$PDA_{ij} = \frac{max\left(0,(AV_j-X_{ij})\right)}{AV_j} \tag{4}$$

$$NDA_{ij} = \frac{max\left(0,(X_{ij}-AV_j)\right)}{AV_j} \tag{5}$$

Where i is alternative.

Step 5. Calculating the weighed sum of positive (SP) and negative (SN) distances for all alternatives:

$$SP_i = \sum_{j=1}^{m} w_j PDA_{ij} \tag{6}$$

$$SN_i = \sum_{j=1}^{m} w_j NDA_{ij} \tag{7}$$

Where w_j is the weight of the j^{th} criterion.

Step 6. Normalizing the values for the sum of positive (NSP) and negative (NSN) distances for all alternatives:

$$NSP_i = \frac{SP_i}{max_i(SP_i)} \tag{8}$$

$$NSN_i = 1 - \frac{SN_i}{max_i(SN_i)} \tag{9}$$

Step 7. Calculating the Assessment Score (AS) of all alternatives:

$$AS_i = \frac{1}{2}(NSP_i + NSN_i) \tag{10}$$

Where $0 \le AS_i \le 1$.

Step 8. Ranking the alternatives by descending assessment score (AS) values. The alternative that has the highest value for AS is the best ranked alternative.

CASE STUDY

This paper will examine a municipal company engaged in the collection, transport, and storage of municipal waste. The company collects municipal waste from the entire municipality and stores it at a designated location, which is a transfer station. The area where the transshipment station is located is called "Skala". With the help of special trucks, it is necessary to transport municipal waste from the transfer station to the regional landfill, where municipal waste from several municipalities will be permanently stored. The area where the regional landfill is located is called "Mecka". Of all the existing roads connecting the transfer station (location 1) and the regional landfill (location 2), 6 roads (routes) can be distinguished as of greatest importance (Fig. 1).

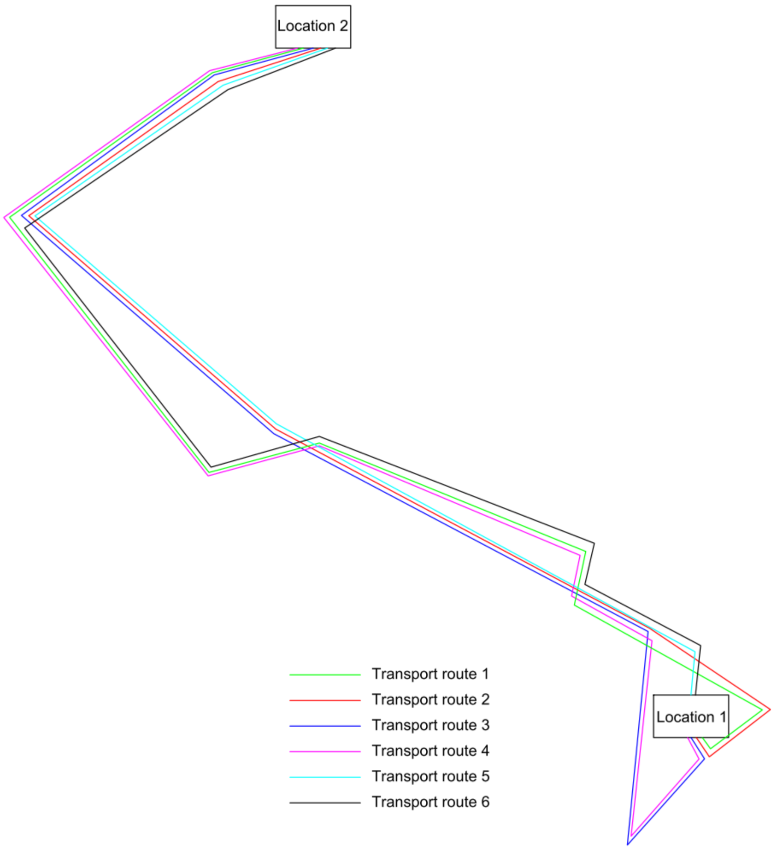

Figure 1. Schematic representation of transport routes

The most important roads (routes) connecting the two locations will represent alternatives for choosing the optimal route for transporting municipal waste from the transfer station to the regional landfill. The alternatives for the given example are shown in Table 1:

Table 1. Alternatives

Alternatives	**Symbol**	**Description**
Transport route 1	A_1	This transport route is of medium length, passes through and near populated areas; part of the road is not in very good condition.
Transport route 2	A_2	This transport route is of medium length, passes through and near populated areas; part of the road is in excellent condition (highway).
Transport route 3	A_3	This transport route is long, passes through populated areas, and part of the road is in excellent condition (highway).
Transport route 4	A_4	This transport route is the longest, passes through populated areas, and part of the road is not in very good condition.
Transport route 5	A_5	This transport route is short in length, passes through and near populated areas, and part of the road is in excellent condition (highway).
Transport route 6	A_6	This transport route is the shortest, passes through and near populated areas, and part of the road is not in very good condition.

The comparison of alternatives will be conducted according to several influential parameters, which will represent criteria. Each criterion has its own impact (weight) on the alternatives, and to define the weights of the criteria, the following was done:

- Consultations and surveys of experts in the relevant field;
- Techno-economic analyses and other expert information;
- Calculation of average weight values obtained from the above procedures.

All multi-criteria methods use the so-called normalized weights, where the sum of all criterion weights should equal 1 (one). After normalization is performed by weighing the weights, the normalized criteria are obtained and the nature of the criteria is displayed. All criteria have their own goal, i.e., they strive for a maximum or minimum and can be qualitative or quantitative. Table 2 shows the normalized criteria.

Table 2. Normalized criteria and the nature of criteria

Criteria	**Symbol**	**Normalized weights**	**Definition**
Transport route status	C_1	0.10	This criterion is qualitative and strives for the max. It represents the current state of each transport route, i.e., what conditions for movement exist. The value for this criterion is adopted descriptively for each alternative separately.
The need for the construction of new sections of the transport route or the rehabilitation of parts of the existing transport route [kilometers]	C_2	0.12	This criterion is quantitative and tends towards a min. The value for this criterion was measured on site for each transport route.
Length of transport route [kilometers]	C_3	0.13	This criterion is quantitative and tends towards a min. The value for this criterion was measured on site for each transport route.
Average speed along the transport route [kilometers per hour]	C_4	0.11	This criterion is quantitative and strives for a max. The value for this criterion was measured on site for each transport route.
Settlements along the transport route [number of settlements]	C_5	0.14	This criterion is quantitative and tends towards a min. The value for this criterion is adopted on site for each transport route.
Toll ramps (tolls) on the transport route [number of tolls]	C_6	0.10	This criterion is quantitative and tends towards a min. The value for this criterion is adopted on site for each transport route.
Average utilization of transportation means [%]	C_7	0.09	This criterion is quantitative and strives for a max. The value for this criterion was obtained by calculation for each transport route.
Average maintenance costs of transport vehicles [$/km]	C_8	0.10	This criterion is quantitative and tends towards a min. The value for this criterion is adopted as an orientation based on empirical data and calculations for each transport route.
Average travel time along the transport route [minutes]	C_9	0.11	This criterion is quantitative and tends towards a min. The value for this criterion was measured on site for each transport route.

After the analysis conducted to evaluate the individual criteria for each alternative, the following multi-criteria model was obtained (Tab. 3).

Table 3. Multi-criteria model

Alternatives	Criteria								
	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9
Goal	**max**	**min**	**min**	**max**	**min**	**min**	**max**	**min**	**min**
A_1	Good	5	44.0	43.3	6	0	70	2	61
A_2	Very good	5	44.1	57.5	5	1	90	1	46
A_3	Very good	5	48.9	65.2	4	1	90	1	45
A_4	Good	5	49.6	45.8	5	0	70	2	65
A_5	Very good	6	40.6	59.4	4	1	90	1	41
A_6	Good	6	40.5	43.4	5	0	70	2	56
Weights	0.10	0.12	0.13	0.11	0.14	0.10	0.09	0.10	0.11

After converting qualitative values into quantitative ones, an input multi-criteria model is obtained (Tab. 4). To translate qualitative values into quantitative ones, we used an interval scale. In further calculations to solve a specific problem, the appropriate equations for the EDAS method will be used [2, 13, 14].

Table 4. Input model for the EDAS method

Alternatives	Criteria								
	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9
Goal	**max**	**min**	**min**	**max**	**min**	**min**	**max**	**min**	**min**
A_1	7	5	44.0	43.3	6	0	70	2	61
A_2	9	5	44.1	57.5	5	1	90	1	46
A_3	9	5	48.9	65.2	4	1	90	1	45
A_4	7	5	49.6	45.8	5	0	70	2	65
A_5	9	6	40.6	59.4	4	1	90	1	41
A_6	7	6	40.5	43.4	5	0	70	2	56
Weights	0.10	0.12	0.13	0.11	0.14	0.10	0.09	0.10	0.11

Table 5. Determination of the average solution (AV_j)

Average solution	Criteria								
	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9
AV_j	8.00	5.33	44.62	52.43	4.83	0.50	80.00	1.50	52.33

Table 6. Calculation of the positive distance from average (PDA)

Alternatives	Criteria								
	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9
Goal	**max**	**min**	**min**	**max**	**min**	**min**	**max**	**min**	**min**
A_1	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.33	0.17
A_2	0.13	0.00	0.00	0.10	0.03	1.00	0.13	0.00	0.00
A_3	0.13	0.00	0.10	0.24	0.00	1.00	0.13	0.00	0.00
A_4	0.00	0.00	0.11	0.00	0.03	0.00	0.00	0.33	0.24
A_5	0.13	0.13	0.00	0.13	0.00	1.00	0.13	0.00	0.00
A_6	0.00	0.13	0.00	0.00	0.03	0.00	0.00	0.33	0.07
Weights	0.10	0.12	0.13	0.11	0.14	0.10	0.09	0.10	0.11

Table 7. Calculation of the negative distance from average (NDA)

Alternatives	Criteria								
	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9
Goal	**max**	**min**	**min**	**max**	**min**	**min**	**max**	**min**	**min**
A_1	0.13	0.06	0.01	0.17	0.00	1.00	0.13	0.00	0.00
A_2	0.00	0.06	0.01	0.00	0.00	0.00	0.00	0.33	0.12
A_3	0.00	0.06	0.00	0.00	0.17	0.00	0.00	0.33	0.14
A_4	0.13	0.06	0.00	0.13	0.00	1.00	0.13	0.00	0.00
A_5	0.00	0.00	0.09	0.00	0.17	0.00	0.00	0.33	0.22
A_6	0.13	0.00	0.09	0.17	0.00	1.00	0.13	0.00	0.00
Weights	0.10	0.12	0.13	0.11	0.14	0.10	0.09	0.10	0.11

Table 8. Calculation of the normalized values of SP, SN, NSP, NSN and AS

Alternatives	SP_i	SN_i	NSP_i	NSN_i	AS_i
A_1	0.09	0.15	0.52	0.02	0.27
A_2	0.14	0.06	0.85	0.64	0.75
A_3	0.16	0.08	1.00	0.48	0.74
A_4	0.08	0.15	0.49	0.06	0.27
A_5	0.15	0.09	0.94	0.40	0.67
A_6	0.06	0.15	0.37	0.00	0.19

Table 9. Ranking of alternatives

Alternatives	AS_i	Rank
A_1	0.27	4
A_2	0.75	1
A_3	0.74	2
A_4	0.27	4
A_5	0.67	3
A_6	0.19	5

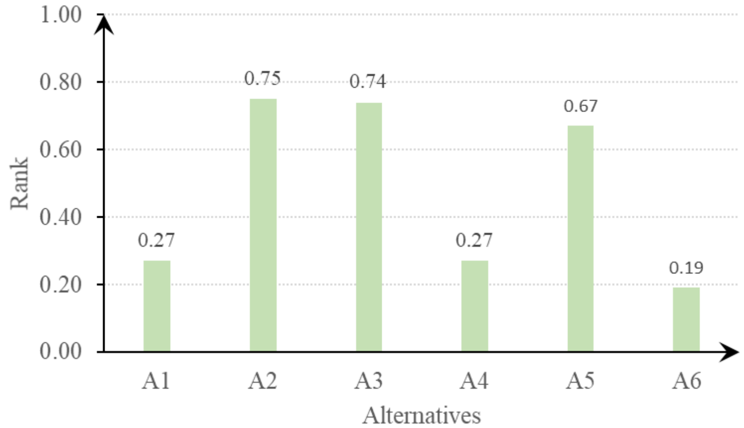

Figure 2. Presentation of the ranking of the alternatives

When the calculation is complete, a ranking of the alternatives is obtained shown in Table 9. According to the resulting ranking shown in Table 9, it can be observed that the best ranked alternative is "A_2", i.e., Transport route 2 (Fig. 2), with this transport route being selected as the most acceptable route for transporting municipal waste from the transfer station (location 1) to the regional landfill (location 2). Alternative "A_3" is ranked second, followed by alternative "A_5", then alternatives "A_1" and "A_4", and the last ranked alternative is "A_6" ($A_2 \rightarrow A_3 \rightarrow A_5 \rightarrow A_{1,4} \rightarrow A_6$). According to the resulting ranking of alternatives, we can observe that there is a relatively small difference between the first-ranked and second-ranked alternatives. The "A_2" alternative is by far the best compared to the others, and we can choose the optimal route for transporting municipal waste without hesitation.

In order to confirm the optimal transport route, a calculation was performed according to the VIKOR method, and then the resulting ranks of the alternatives were compared. These rankings of alternatives are shown in Table 10.

Table 10. Comparison of rankings according to EDAS and VIKOR methods

Alternatives	EDAS	VIKOR	Average	Rank
A_1	4	3	3.5	3
A_2	1	1	1	1
A_3	2	4	3	2
A_4	4	2	3	2
A_5	3	5	4	4
A_6	5	6	5.5	5

By comparing the ranking of alternatives according to the EDAS and VIKOR methods (Table 10), we can conclude that according to both methods, the best ranked alternative is "A_2", i.e., transport route 2.

CONCLUSION

When any company solves a strategic problem, such as choosing the optimal transportation route, several influential parameters need to be considered. The goal of including as many influential parameters as possible is to take into account the influence of all parameters and thus make the most optimal decision, i.e., to choose the most acceptable alternative. All parameters that influence the final decision have different weights, i.e., some parameters have a smaller impact and others have a greater impact. Sometimes these parameters cannot be measured and are therefore presented descriptively.

Multi-criteria decision-making methods can be very successfully applied in the process of selecting the optimal transport route, where a large number of influential parameters can be taken into account. In the process of selecting the optimal transport route, some of the following multi-criteria decision-making methods can be applied: AHP, ELECTRE, PROMETHEE, TOPSIS, VIKOR, EDAS, WPM and others. In this paper, the EDAS method was used to select the optimal route for municipal waste transportation; six alternatives were considered and compared based on nine criteria, concluding that the most acceptable route for municipal waste transportation was route number 2. The VIKOR method was also applied to compare the ranking of alternatives, concluding that, according to both methods, the best ranked alternative is "A_2", i.e., the most optimal route for transporting municipal waste is transport route 2.

To solve such complex problems, it is desirable to apply several multi-criteria decision-making methods and then compare the results obtained. When solving a given problem using different multi-criteria decision-making methods, there is a possibility of obtaining different rankings of alternatives. Therefore, it is desirable to apply at least three methods from the group of multi-criteria decision-making methods. The rankings obtained by each method should be compared and an average ranking of the alternatives should be performed. In this way, the most optimal decision will be obtained, i.e., the most suitable route for transporting municipal waste from the transfer station to the regional landfill. The selection of the optimal transport route using various multi-criteria decision-making methods will be the subject of research in a future study.

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REFERENCES

1. Mijalkovski S., Belik D. (2025) Application of multi-criteria decision-making for selecting the optimal route for municipal waste transportation. In: 16th International Conference in the field of Underground and Surface Exploitation of Mineral Resources, PODEKS - POVEKS 2025, Ohrid, 138–142.

2. Mijalkovski S., Stefanov V., Mirakovski D. (2024) Selection of the location of the main warehouse using the EDAS method. Natural Resources and Technology, 18(1), 32-38.
3. Archetti C., Peirano L., Speranza M. G. (2022) Optimization in multimodal freight transportation problems: A Survey. European Journal of Operational Research, 299, 1-20.
4. Song L., Yu L., Li S. (2023) Route optimization of hazardous freight transportation in a rail-truck transportation network considering road traffic restriction. Journal of Cleaner Production, 423, 138640.
5. Hamurcu M., Eren T. (2019) An Application of Multicriteria Decision-making for the Evaluation of Alternative Monorail Routes. Mathematics (MDPI), 7(16), 1-17.
6. Milošević T.D., Pamučar D.S., Chatterjee P. (2021) Model for selecting a route for the transport of hazardous materials using a fuzzy logic system. Military technical courier, 69(2), 355-390.
7. Correia, D., Gomes, M.C., Gonçalves, A. B, Shrubsall, S. (2016) Optimization of Routes for Hazardous Materials Transportation - A Case Study of Fuel Deliveries in Lisbon. In Proceedings of 5th the International Conference on Operations Research and Enterprise Systems (ICORES 2016), 357-361.
8. Alkubaisi, M.I.T. (2014) Predefined Evaluating Criteria to Select the Best Tramway Routes. Journal of Traffic and Logistics Engineering, 2(3), 211-217.
9. Castillo, J.E.A., 2004. Route Optimization for Hazardous Materials Transport. Master's thesis (unpublished), Pages: 123.
10. Hajduk S. (2022) Multi-Criteria Analysis in the Decision-Making Approach for the Linear Ordering of Urban Transport Based on TOPSIS Technique. Energies (MDPI), 15(274), 1-30.
11. Hou H., Chen Y., Hou P., Tzeng G. Application of multiple criteria decision making (MCDM) on high potential city bus routes in Taiwan. Journal of Society for Transportation and Traffic Studies (JSTS), 1, 26-35.
12. Kosijer M., Ivić M., Marković M., Belošević I. (2012) Multicriteria decision-making in railway route planning and design. GRAĐEVINAR 64(3), 195-205.
13. Mijalkovski S., Efe F.O., Zeqiri K. (2023) Chapter 3: Application of Multi-Criteria Decision-Making Methods for the Underground Mining Method Selection. In: Handbook of Research on Sustainable Consumption and Production for Greener Economies, IGI GLOBAL, Pennsylvania, pp 42-57.
14. Ghorabaee M.K., Zavadskas E.K., Olfat L., Turskis Z. (2015) Multi-criteria inventory classification using a new method of evaluation based on distance from average solution (EDAS). Informatica, 26(3), 435-451.
15. Ghorabaee M.K., Zavadskas E.K., Amiri M., Turskis Z. (2016) Extended EDAS method for multi-criteria decision-making: An application to supplier selection. International journal of computers communications & control, 11(3), 358-371.
16. Aggarwal A., Choudhary C., Mehrotra D. (2018) Evaluation of smartphones in Indian market using EDAS. International Conference on Computational Intelligence and Data Science (ICCIDS 2018), ScienceDirect, 132, 236-243.
17. Stevic Z., Vasiljevic M., Zavadskas E. K., Sremac S., Turskis Z. (2018) Selection of Carpenter Manufacturer using Fuzzy EDAS Method. Inzinerine Ekonomika-Engineering Economics, 29(3), 281–290.