Comparative Analysis of Selected European Cities's Potentials to Influence the Formulation and Implementation of Logistics Strategy

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Abstract:

Purpose: The purpose of the article is a comparative analysis of the potentials of European Union (EU) capitals in the formulation and implementation of logistics strategies using the analytic hierarchy process (AHP) multiple criteria decision making method.

Approach/Methodology/Design: To compare the results obtained by capital cities in EU countries the multiple criteria decision making (MCDM) method – AHP was used. The basis of empirical research are the indicators used by the European Commission in Eurostat, including survey data on Urban Audit.

Findings: As a result, cities were ranked based on their potential to formulate and implemente logistics strategies. Eight groups of cities with similar results emerged in the ranking. Helsinki had the highest potential while the weakest one is Athens. Research shows that cities that belong to countries that are so-called EU "old members" have higher potential in formulating and implementing logistics strategies than cities that belong to the so-called groups of "new members" of the EU. The exceptions are Athens and Lisbon.

Practical Implications: The AHP method presented can significantly help local governments to formulate a logistics strategy. This method makes it possible to carry out a comparative analysis of the potentials of cities that influence logistic strategic decisions. As a result, it is possible to determine the position of a given city in comparison to others and indicate in which areas or in relation to which criteria a given city is better and which is worse. In addition, this method can be used to set priorities for urban logistics projects planned to be implemented and what is important can be done in groups.

Originality/Value: The paper develops a group of criteria, which assist in analyzing the potential of the city in terms of logistics strategy formulation and implementation and in studying the results obtained with the use of multiple criteria decision making method AHP.

Keywords: City logistics strategy, city potential, MCDM, AHP.

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1. Introduction

The purpose of urban logistics, from the perspective of local governments is to improve the safety and quality of life of residents by reducing environmental pollution, as well as the flow of people and cargo in the city (Dablanc 2007; Lindholm 2012; Cherrett *et al.,* 2012; Iwan 2014; Lindholm and Behrends 2012; Kijewska and Ivan, 2015). The influence on strategic decisions in the field of urban logistics and the formulation of the city's logistics strategy affects society, economy, transport, innovation, and the environment (Kiba-Janiak, 2019).

The final form of the city's logistics strategy, and the possibilities related to its implementation, depends on the level of development of the city, which group of stakeholders dominates in it, what is the level of environmental pollution, as well as what are the problems in the area of moving people and cargo (Hickman *et al.,* 2013). Therefore, it is important to collect information and process it at the level of strategic analysis so that the city's logistics strategy is effective. The formulation of a logistics strategy also supports a comparative analysis concerning other cities, especially those with similar potential.

Therefore, the purpose of the article is a comparative analysis on the formulation and implementation of logistics strategies of European Union capitals, using the AHP multi-criteria decision support method. The following research questions were asked in the paper:

• What are the different capability levels of European cities that influence the formulation and implementation of a city logistics strategy.
• What factors determine the city's potential that affects the formulation and implementation of a logistics strategy?
• What are the differences between the analyzed cities in terms of social, economic and environmental factors, transport and innovation.
• Which of the cities surveyed have the highest and which the lowest level of potential that can affect the effective formulation and implementation of a logistics strategy?
• Which factors differentiate cities the most in terms of their potential to formulate and implement a logistics strategy?
• What are the advantages and disadvantages of using the AHP method to identify the city's potential in formulating and implementing a logistics strategy compared to other cities?

In the paper, a set of indicators were developed to analyze the city's potential in the formulation and implementation of the city's logistics strategy. The analysis of the city's potential using the AHP multiple criteria decision-making method can support local governments to formulate and update a logistics strategy.

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2. Cities' Potentials in Terms of Formulation and Realization of Logistics Strategy – A Theoretical Approach

The term potential comes from late Latin 'potentialis, potentia' (capability, eventuality, possibility, potentiality, prospect) (Merriam-Webster Dictionary, 2020). According to the Cambridge Dictionary (2020) it means 'someone's or something's ability to develop, achieve, or succeed'. Potential has various interpretations in the literature of the subject (Cohen and Lewinthal, 1990). It can be observed in the literature on the subject that this issue is discussed in terms of various areas, such as freight transport (Ljungberg and Gebresenbet, 2004; Patterson *et al.,* 2008), tourism (Cetin, 2015), intelligent transportation systems and parking management (Vianna *et al.,* 2004), creative cities (Lewis and Donald, 2010). According to Hoblyk (2014) a potential of a city (as a locality) is usually referred to as the selected aspects of a city, such as an infrastructure, economy, creativity, education, etc.

In the subject literature, there are not many views regarding a city's potential, especially its capabilities for formulation and realization of logistics strategy. From this point of few, a city's potential involves the aspects which are significant from the perspective of city logistics' objectives (Ramokgopa, 2004). According to Crainic *et al.* (2008), city logistics's main aim is to improve mobility and reduce congestion, pollution, emission of CO_2 and noise. Taniguchi *et al.* (2003) classified these goals into three main categories: mobility, sustainability and liveability. Mobility is mainly related to the balance between road capacity and the level of congestion (Witkowski and Kiba-Janiak, 2012). Sustainability refers to three pillars, such as: social, economic, and environmental (European Commission, 2001; Rasoolimanesh *et al.,* 2012; Mozos-Blanco *et al.,* 2018; Bak and Cheba, 2019). Finally, liveability includes all issues related to safety, health, the attractiveness of the living place, etc., (Tseng *et al.,* 2005). All these three areas strive to improve the quality of residents' life. To realize these purposes and improve citizens' quality of life, it is necessary to formulate and implement a city logistics strategy.

The idea of formulating the city's logistics strategy comes from the business sphere, where this issue has been widely discussed for over 50 years (McGinnis and Kohn, 2002) by, among others, authors such as Bowersox (1974), Porter (1985) McGinnis and Kohn (1988). However, the company's logistics strategy is oriented towards slightly different goals than the city's logistics strategy. The former focuses more on efficiency and performance in the area of material resources and information accompanying them to meet stakeholdes' needs (residents, shippers, receivers, local authorities, etc.) (Kiba-Janiak, 2019).

In the subject literature, the strategic approach to urban logistics is diverse. In many publications, it refers to private enterprises and their strategic activities in urban areas (Taniguchi, 2014; Fossheim and Andersen, 2017; Digiesi *et al.,* 2017; Sanchez-Diaz, 2018). A much smaller number of publications take up the topic of urban logistics from a strategic perspective from city management. However, they

mainly focus on freight transport (Lindholm, 2012; Lindholm and Ballentyne, 2016; Bjorgen *et al.,* 2019).

According to the author, this approach is somewhat narrowed because freight and passenger transport are an integral part of the city. They operate in one area, use the same infrastructure, affect congestion and environmental pollution. Therefore, according to the author, the city's logistics strategy should represent a holistic approach taking into account passenger and freight transport and accompanying services. In this article, the city's logistics strategy is considered as the long-term objectives presented comprehensively, decisions and actions connected with the movement of persons, goods and related information, that can be implemented effectively; as a result compromise achieved among the stakeholders. The result of an effectively implemented city's logistic strategy should be the improved quality of life of its residents' (Kiba-Janiak, 2019). Regardless of which approach is represented by the city authorities, the formulation, and implementation of a city logistics strategy depends on its potential.

Considering literature sources (Ramokgopa, 2004; Hoblyk, 2014; Markowski (ed.), 2011; Little, 2014; Kiba-Janiak, 2019; Winkowska and Szpilko, 2020), the main goals of urban logistics and the scope of the city's logistics strategy, it can be assumed that the city's potential in terms of formulation and implementation of a logistics strategy covers such areas as legal regulations, society, economy, transport, innovativeness, environment and geographic location (Table 1).

Table 1. *A city's potential's factors which affect formulating and realizing logistic strategy*

Areas	Descriptions
Legal regulations	Laws, acts decrees, other legal regulations and strategic documents prepared on national and international level (e.g. as part of the EU)
Society	Demographic changes at national level, safety levels in the country, etc.
Economy	Economic condition of the country (e.g. national GNP per capita, cost of living in the country, general costs of congestion, etc.)
Transport	Volume of transport of freight and waste material in the country, index of motorization, density of road network, access to different branches of transport
Innovativeness	Access to modern technologies, IT and ITC solutions, and other innovative solutions in the country
Environment	Commitment of the government to protection of the environment, environmental taxes, levels of expenditure on environmental protection in the country, etc.
Geographic location	Natural conditions of the land, landscape changes in the vicinity of the city and its localization (proximity to the sea, lake/s, mountains, etc.)

Source: *Own elaboration.*

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3. Research Procedure

An analysis of the city's potential in formulating and implementing a logistics strategy can be used to diagnose it and compare it with other cities' potentials. In this case multi-criteria decision support (MCDM / A) methods can be used that make it possible to rank cities, taking into account qualitative and quantitative criteria. This ranking allows to identify cities that have obtained the best results or identify those with similar potential. AHP analysis also allows to examine the distance between individual, holistic, individual criteria on a given area.

The selection of criteria for assessing cities' potential in the formulation and implementation of a logistics strategy was developed based on the literature on the subject (Markowski (ed.), 2011; Little, 2014) and the Eurostat indices. It was also imposed by limited access to data. Therefore, for the considerations presented in this paper, a family of criteria was developed in areas such as society, economy, transport and innovation, environment. In this group, the author omitted the three areas presented in Table 1, politics, legal regulations, and geographical localization due to their more descriptive character, yet this does not mean that they should not be included in the city's strategic analysis of logistics. They should be included in the PEST (ER) analysis, which is more descriptive.

At the initial stage of the analysis, a set of 27 criteria was developed in individual areas:

1. *Society:* population density, number of older people in the city, unemployment rate, public space, life satisfaction in the city, safety, job satisfaction, number of people killed in road accidents.
2. *Economics:* GDP, employment rate, cost of living, satisfaction with the financial situation, access to affordable housing.
3. *Transport and innovation:* the volume of loads transport, the volume of waste and recyclable materials transport, the most common way of moving - the car, the most common way of moving - the bike, the most common way of moving - public transport, the most common way of moving - on foot, the level of congestion, an indicator of innovation.
4. *Environment:* the city's involvement in the fight against climate change, NO2 concentration, pm10 concentration, air quality in the city, cleanliness in the city and noise in the city.

Among all the indicated criteria, the selection was made of those characterized by relatively high spatial variability, lack of excessive correlation of criteria representing the separated segment and asymmetric distribution. In the first stage of the analysis, the criteria that were characterized by very low spatial variability were eliminated. For this purpose, a coefficient of variation was used, which was determined for all considered criteria, in accordance with the following formula (Zeliaś, 2000):

$$v_j = \frac{s_j}{\acute{x}_{j}{}^{\vee}}, \qquad (j = 1,\ldots, k) \tag{1}$$

where:

$$s_j = \left[m^{-1} \sum_{i=1}^{m} \left(x_{ij} - \acute{x}_j \right)^2 \right]^{0,5}, (j = 1,\ldots, k) \tag{2}$$

$$\acute{x}_j = m^{-1} \sum_{i=1}^{m} x_{ij}, \qquad (j = 1, \ldots, k) \tag{3}$$

where:

v_j – coefficient of variation determined for the j-this criterion,

s_j - standard deviation of the j-this criterion,

$\acute{x}_j$ - arithmetic mean of j-this criterion,

x_{ij} – value of j-this criterion for i-this city.

As a result of the above calculations, the criteria that meet the following inequality have been eliminated:

$$vj \leq \varepsilon, \tag{4}$$

where ε>0 is a small positive number and its value is usually ε=0,1 (it is the threshold value of the coefficient of variation, also presented as a percentage - 10%) (Zeliaś, 2000).

In the present case, two criteria obtained coefficients of variation below 10% (percentage share of residents satisfied with urban life - 6.7% and employment rate aged 15 to 64 - 9.4%). As a result, the first of these criteria was eliminated from further analysis - the percentage of residents satisfied with life in the city. However, the second criterion, for which the coefficient of variation was only slightly lower than the adopted 10% threshold, was left in the set. Finally, a set of 26 criteria was obtained, among which 10 were obtained from primary research carried out by Eurostat entitled City audit, and a further 14 were established on the basis of secondary data obtained from the Eurostat database. Table 2 provides descriptions of the individual criteria.

Table 2. *Characteristics of the criteria for assessing the city's potential in the formulation and implementation of a logistics strategy*

Area	Criterion	Description
Society	C1. Population denesity	Population number per 1 km² of a (no. of persons) – 2015, [min*]
	C2. Percentage of the elderly in a city	Population above 65 to the number of persons aged 20 to 64 (%) – 2015, [min]
	C3. Unemployment rate	Unemployment rate shows how many persons over 15 does not work compared to all the persons of that age (%) – 2015, [min]
	C4. Residents' satisfaction with the quality of public	Percentage of residents declaring high or fairly degree of satisfaction with their city's public space (shopping and pedestrian zones) (%) – 2015, [max**]

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		space
	C5. Feeling of safety	Percentage of residents evaluating the level of safety as high or fairly high (%) – 2015, [max]
	C6. Job satisfaction	Percentage of residents evaluating their job satisfaction as high or fairly high (%) – 2015, [max]
	C7. Number of fatalities in road accidents	Number of fatalities in road accidents per million of residents (amount, 2013 r., [min])
Economy	C8. GDP *per capita*	Gross domestic product expressed in euro per capita (EUR) – 2014 r., max
	C9. Index employement rate	Number of employed people aged 15 to 64 in relation to the population of that age (%), 2015, [max]
	C10. Cost of living	The criterion showing cost of living including a correction coefficients for EU capitals., defined as the correction coefficient for Luxembourg as 100. These coefficients are calculated as the ratio of the 'economic parity' to the Euro's exchange rate. Economic parity shows how many units of currency pay for the certain amount of goods and services in different countries (%) – 2015 [Eurostat 2018], [min] [2]
	C11. Satisfaction with financial status	Percentage of residents declaring a high or fairly high level of satisfaction with the financial status of their hoeseholds (%) – 2015, [max]
	C12. Easy access to affordable housing	Percentage of residents who think that in their city it is easy to find a house/flat at an affordable price (%) – 2015 r., [max]
Transport and innovation	C13. Volume of road transport in terms of loading up and unloading	Total volume of goods delivered to the city by road transport in thousands of ton a year per 100 residents (t) – 2015, [min]
	C14. Volume of the transport of waste and recycled materials	Total volume of the transported recycled materials, municipal waste and other urban waste a year (amount) – 2015, [min]
	C15. The most common way of transportation - a car	Percentage of residents using a private car when going to work/gym (% of respondents using this type of transport, 2015, [min])
	C16 The most common way of transportation - a bicycle	Percentage of residents using bicycles when going to work/gym (% of respondents using this type of transport, 2015, [max])
	C17 The most common way of transportation - a public transport	Percentage of residents using public transport when going to work/gym (% of respondents using this type of transport, 2015, [max])
	C18. The most common way of transportation - walking	Percentage of residents going to work/gym on foot (% of respondents who walk to work/gym, 2015, [max]);
	C19. Congestion level	Level of traffic congestion according to the TomTom index in respect of the main hubs of the TEN_T network – the index shows an increase in the total time of travel resulting from congestion compared to the same journey during the off-peak times (%, 2015, [min]);
	C20. Index of	The index examines innovativeness of a city in 31 areas such as:

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[2] http://ec.europa.eu/eurostat/web/cities/data/database.

	innovativeness	architecture, business, logistics, mobility, technology, etc. using 162 indices*** (–) 2015, [max]
Environment	C21. City's commitment to fighting climate change	Percentage of residents who thing that their city (local government) is engaged in fighting climate change (e.g. by promoting alternatives to transport by car) (%) – 2015 r., [max]
	C22. NO_2 concentration	Average annual concentration of NO_2 ($\mu g/m^3$, 2013, [min]
	C23. PM_{10} concentration	Average annual concentration of PM ($\mu g/m^3$, 2013, [min])
	C24. Air quality in the city	Percentage of residents who think that the quality of air is good (% answers: good and rather good, 2015, [max]);
	C25. Cleanliness in the city	Percentage of residents who think their city is clean (% of answers: I agree or I rather agree, 2015, [max]);
	C26. The noise in the city	Percentage of residents who think that there is no heavy noise in the city (% of answers: very satisfied and fairly satisfied, 2015, [max]);

Source: *Own elaboration.*

AHP, the methodology used in this work was developed by Saaty (1987). This method makes it possible to rank variants by comparing them in pairs based on specific criteria. The main purpose of the AHP method is to find a solution for the so-called eigenvalue problem at every level of the hierarchy. Due to the very time-consuming calculation process, it is recommended to limit the number of variants to a dozen or so in this method. Therefore, for the purposes of this study, AHP ranking was made for 15 cities (variants) for which data in the Eurostad database was available.

The ranking of cities using the AHP method was based on the following stages (Kiba-Janiak and Żak, 2014):

Stage 1. Development of a criteria family in a hierarchical system.
Stage 2. Defining preferences (relative weights wr) in the form of a matrix of pair comparisons of all hierarchy elements (scale from 1 to 9 points)
Stage. 3. To examine the level of consistency of preferential information provided by the decision maker at each hierarchy level (matrices of relative weights wr).
Stage 4. Calculation of CI consistency indicators (CI <0,1).
Stage 5. Calculation of a set of vectors containing normalized values of absolute weights for criteria and variants, adding them to 1 (100%).
Stage 6. Aggregation of absolute weights by the additive utility function. Calculation of the usability of each variant i - Ui, which determines its position in the final ranking. The usability of the i - Ui variant (so-called preference index) is calculated by the sum of the product of the absolute weights wa for each variant in relation to individual criteria (Żak, 2005).
Stage 7. The final ranking, showing city preference indicators orders them from the best to the worst.

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The ranking of cities using the AHP method was conducted on the basis of Make it Rational computer program. The total number of pair-wise comparisons of variants and criteria was 2689. As a result of pairwise comparisons of the criteria, priority ratios were obtained as weights.

All four areas, such as society, economy, transport and innovation and the environment obtained the same weights (0.25 each), while the weights for the criteria were set at different levels. The highest weights were assigned to the following criteria:

- C5. Safety (0.262),
- C7. Number of people killed in road accidents (0.262),
- C8. PKB per capita (0.248),
- C9. Employment rate (0.248),
- C11. Satisfaction with the financial situation (0.248),
- C13. The volume of transporting loads (0.171),
- C15. The most common method of transportation - passenger car (0.171),
- C17. The most common method of transport - public transport (0.171) and
- C19. Level of congestion (0.171) and
- all from the environment (weight 0.182) except for one criterion C25. Cleanliness in the city, which obtained a slightly lower weight (0.091).

4. Study Results

Table 3 shows an example of a preference matrix for the C7 criterion—the number of people killed in road accidents. The weakest result in this matrix was obtained by the city of Bucharest, followed by Warsaw and Athens. These cities have the most road fatalities. Stockholm achieved the best result for this criterion.

Table 3. *Preference matrix for C7 criterion. Number of people killed in accidents*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	2.00	2.00	2.00	2.00	2.00	3.00	3.00	4.00	4.00	4.00	5.00	5.00	6.00	9.00
2	0.50	1	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	3.00	4.00	4.00	5.00	8.00
3	0.50	1.00	1	1.00	1.00	1.00	2.00	2.00	3.00	3.00	3.00	4.00	4.00	5.00	8.00
4	0.50	1.00	1.00	1	1.00	1.00	2.00	2.00	3.00	3.00	3.00	4.00	4.00	5.00	8.00
5	0.50	1.00	1.00	1.00	1	1.00	2.00	2.00	3.00	3.00	3.00	4.00	4.00	5.00	8.00
6	0.50	1.00	1.00	1.00	1.00	1	2.00	2.00	3.00	3.00	3.00	4.00	4.00	5.00	8.00
7	0.33	0.50	0.50	0.50	0.50	0.50	1	1.00	2.00	2.00	2.00	3.00	3.00	4.00	7.00
8	0.33	0.50	0.50	0.50	0.50	0.50	1.00	1	2.00	2.00	2.00	3.00	3.00	4.00	7.00
9	0.25	0.33	0.33	0.33	0.33	0.33	0.50	0.50	1	1.00	1.00	2.00	2.00	3.00	6.00
10	0.25	0.33	0.33	0.33	0.33	0.33	0.50	0.50	1.00	1	1.00	2.00	2.00	3.00	6.00

11	0.25	0.33	0.33	0.33	0.33	0.33	0.50	0.50	1.00	1.00	1	2.00	2.00	3.00	6.00
12	0.20	0.25	0.25	0.25	0.25	0.25	0.33	0.33	0.50	0.50	0.50	1	2.00	3.00	6.00
13	0.20	0.25	0.25	0.25	0.25	0.25	0.33	0.33	0.50	0.50	0.50	0.50	1	2.00	5.00
14	0.17	0.20	0.20	0.20	0.20	0.20	0.25	0.25	0.33	0.33	0.33	0.33	0.50	1	4.00
15	0.11	0.12	0.12	0.12	0.12	0.12	0.14	0.14	0.17	0.17	0.17	0.17	0.20	0.25	1

Source: *Own calculation using computer software Make it Rational.*

As a result of a computer simulation, preference indicators were obtained for individual cities, including cities concerning four areas (A1. Society, A2. Economy, A3. Transport and Innovation, A4. Environment). As a result, Helsinki topped the ranking, followed by Stockholm and Vienna, then Athens the lowest. Stockholm gained the highest position for the A1. Society area. Stockholm followed immediately by Helsinki (Table 4). Besides, Helsinki achieved the highest value concerning the A4 Environment area. In the case of the A2. Economy area Stockholm took the best position and Paris in the A3. Transport and innovation area.
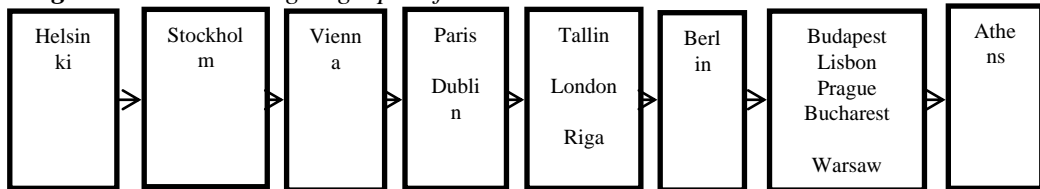
The AHP method enables the ranking to be presented in the form of a diagram (Figure 1). The preference indicators obtained as a result of the simulation illustrate not only the order of individual cities in the ranking but also the distances between them. The most considerable distance is observed between Helsinki and Stockholm. Three groups of cities that have the same or very similar results also emerge in the ranking. For example, Paris and Dublin scored 0.08 in the ranking. The next group is Tallinn, London, and Riga, with a score of 0.07. The largest group in which cities are located with the same or very similar results are Budapest, Lisbon, Prague, Bucharest, and Warsaw. Unfortunately, these cities were at the bottom of the ranking with a score of 0.05.

Table 4. *Preference matrix for K 7 criterion. Number of people killed in accidents*

Miasta	Areas				Results
	A1. Society	A2. Economy	A3. Transport and innovation	A4. Environment	
Helsinki	0,11	0,09	0,08	0,32	0,15
Stockholm	0,12	0,11	0,09	0,11	0,11
Vienna	0,08	0,06	0,09	0,12	0,09
Paris	0,08	0,08	0,12	0,02	0,08
Dublin	0,06	0,09	0,04	0,12	0,08
Tallinn	0,08	0,06	0,04	0,11	0,07
London	0,08	0,07	0,05	0,07	0,07
Riga	0,06	0,05	0,06	0,10	0,07
Berlin	0,06	0,06	0,07	0,05	0,06
Budapest	0,04	0,05	0,08	0,04	0,05
Lisbon	0,05	0,07	0,05	0,05	0,05
Prague	0,07	0,05	0,05	0,04	0,05
Bucharest	0,04	0,06	0,07	0,02	0,05
Warsaw	0,06	0,06	0,04	0,03	0,05
Athens	0,02	0,05	0,07	0,02	0,04

Source: *Own calculation with usage of software Make it Rational.*

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Figure 1. *AHP ranking in graphic form*

| Helsin ki | | Stockhol m | | Vienn a | | Paris Dubli n | | Tallin London Riga | | Berl in | | Budapest Lisbon Prague Bucharest Warsaw | | Athe ns |

Source: *Own study.*

5. Discussion and Conclusions

The paper's purpose was to conduct a comparative analysis of the potentials of European Union capitals in the formulation and implementation of logistics strategies using the AHP multiple criteria decision-making method. The study examined the differences in levels of potentials influencing formulation and realization of a city logistics strategy among European cities. The greatest differences are between the "old EU members" and the "new ones". Only exceptions are Athens and Lisbon, which obtained the lowest positions. Stockholm got the highest position for society and economy areas, while Helsinki achieved the highest value for the environment area. It can be observed that Helsinki obtained much higher results than other cities in this field. The AHP method also allowed to explore more thoroughly analysis, for example, to assess the distance among cities.

The most significant range was obtained between Helsinki and Stockholm (0.04). There were also identified groups of cities, which were classified into the same groups, such as e.g., Paris and Dublin, Tallinn, London, and Riga. However, it should be emphasized that the conducted analysis takes into account a limited group of criteria. So, both results and conclusions relate only to those criteria.

The presented AHP method can significantly help local governments formulate a logistics strategy, especially in terms of sustainable development (Bąk et al., 2020). Both methods make it possible to carry out a comparative analysis of cities' potentials that influence logistics strategy. As a result, you can determine the level of potential of a given city compared to others and indicate in which areas or for which criteria a given city is better and which is worse. Besides, this method can be used to set priorities for urban logistics projects planned to be implemented, and what is important can be done in groups. Thanks to this, the local government can involve various stakeholder groups in the decision-making process and take into account their opinions, suggestions, and expectations. In this way, you can find optimal solutions in the field of urban logistics.

This method can be a practical tool for local governments when analyzing, formulating, and implementing a logistics strategy. In addition various stakeholders can be invited to the analysis, what can improve the quality of the study. However, it

should be noted that the AHP method is time-consuming, which may cause difficulties in involving some stakeholders.

In future research, the author would like to use other methods to help local governments formulate and implement the city's logistics strategy. In particular, there is an obvious need to develop indicators that will allow for effective monitoring of the implemented strategy and a response to any deviations from the adopted goals.

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