Araştırma Makalesi / Research Article

Integrated Analysis of the Cost of Living Index in Asian Countries

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Abstract

This study investigated the cost of living in 44 Asian countries in 2023. The data were collected from numbeo.com and analyzed using the Entropy method from the Multi-Criteria Decision Making (MCDM) methods. The five criteria determined for this analysis were ranked according to the MOOSRA, MOORA, VIKOR and WASPAS methods. The results showed that the countries at the top of the cost of living ranking have similar rankings in other methods. This study is expected to contribute to the literature on the current cost of living analysis with MCDM methods.

Key Words: *Cost of Living, Multi-Criteria Decision Making Methods, Entropy*

Jel Code: *I31, D81, C44*

Asya Ülkelerinin Yaşam Maliyeti Endeksinin Bütünleşik Analizi

Öz

Bu çalışma, 2023 yılında 44 Asya ülkesindeki yaşam maliyetini araştırmıştır. Veriler numbeo.com adresinden toplanmış ve Çok Kriterli Karar Ver-

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me (MCDM) yöntemlerinden Entropi yöntemi kullanılarak analiz edilmiştir. Bu analiz için belirlenen beş kriter MOOSRA, MOORA, VIKOR ve WASPAS yöntemlerine göre sıralanmıştır. Sonuçlar, hayat pahalılığı sıralamasında üst sıralarda yer alan ülkelerin diğer yöntemlerde de benzer sıralamalara sahip olduğunu göstermiştir. Bu çalışmanın ÇKKV yöntemleri ile hayat pahalılığı analizine ilişkin mevcut literatüre katkı sağlaması beklenmektedir.

Anahtar Kelimeler: *Yaşam Maliyeti, Çok Kriterli Karar Verme Yöntemi, Entropi*

Jel Kodu: *I31, D81, C44*

1. Introduction

The cost of living is the amount of money needed to cover basic expenses such as food, shelter, healthcare, and taxes in a given place and time period. It is often used to compare how much more expensive it is to live in one city than in another city. In short, it is a cost calculation used to determine how much it costs to live in a new city. Expenditures that affect the cost of living include housing affordability, transportation costs, food prices, and entertainment costs (Banton, 2018).

The cost of living index provides a direct comparison of the cost of living in one region to another and allows one to understand the purchasing power of the existing money in each region. The cost of living index for an individual is obtained by dividing the minimum cost required to achieve a certain standard of living during a specific period by the minimum cost needed to achieve that same standard (Diewert, 1990).

Countries' current cost of living can be measured by various criteria. Hence, this situation necessitates the existence of multiple alternatives and conflicting criteria. MCDM problems involve at least two alternatives and multiple criteria. MCDM can be categorized into multi-objective and multi-attribute decision-making problems. If the problem involves evaluating alternatives based on assigned scores to certain attributes to select the best one, it falls under the category of multi-attribute decision-making problems. On the other hand, if it involves selecting the best alternative based on conflicting objectives, it is considered a multi-objective decision-making problem. Both types of problems can have one or multiple decision-makers.

The purpose of this study is to conduct a current cost of living analysis for Asian countries using the Entropy, VIKOR, MOORA, WASPAS, and

MOOSRA analysis methods. The data has been obtained from Numbeo and includes 44 alternative countries and 5 criterias for evaluation.

2. Literature Review

MCDM methods refer to a set of approaches that involve selecting the best alternative among multiple alternatives and criteria. To qualify as an MCDM problem, there must be at least two alternative options. When we comprehensively examine the areas where the analysis method is used and the results it achieves: Ho et al. (2010), conducted a study on supplier evaluation and selection between the years 2000-2008 using MCDM methods. The study's outcome demonstrated that TOPSIS and VIKOR methods could be used to address different evaluation criteria and achieve more realistic results, leading to improved analysis. Cristobal (2011), applied the VIKOR method to select a renewable energy project. He combined the VIKOR method with the Analytic Hierarchy Process (AHP) to weight the importance of different criteria. The research findings revealed that the biomass plant alternative was identified as the most favorable option, followed by wind energy and thermal power alternatives, respectively.

Huang and Peng (2012), evaluated the competitiveness of tourism industries in Asian countries using the TOPSIS method and the Fuzzy Rasch model. Based on their analysis, they ranked the Asian countries in terms of their competitiveness as follows: 'China, Japan, Hong Kong, Malaysia, Thailand, Singapore, Taiwan, South Korea, and the Philippines'.

Kannan et al. (2013), aimed to rank the best green suppliers based on criteria using Fuzzy AHP and Fuzzy TOPSIS methods. They then intended to determine the optimal order quantities among these selected suppliers. The study emphasized that as environmental awareness increases, sustainability becomes a crucial requirement for supply chains. They concluded that Fuzzy AHP and Fuzzy VIKOR methods are supportive tools for managers in supplier selection and order quantity decisions in this field.

Zyoud et al. (2016), aimed to identify the primary options among the recommended strategies for reducing water losses in the water distribution systems of developing countries. They used the Fuzzy AHP to weigh the criteria and the Fuzzy TOPSIS method to rank the alternatives. The study's outcome revealed that the most common strategy for reducing water losses was pressure management and control.

Lapates et al. (2017) established a correlation between the cost of living index and health services index in Asian cities. Through their analysis, they found that cities with the highest cost of living also had high-level health services.

Orakçı and Özdemir (2017), utilized Grey Relational Analysis and MOORA methods to determine the human development levels of Turkey and European Union (EU) countries. They selected indicators from the European Quality of Life Survey for this purpose. The impact level of the indicators was evaluated using the Entropy and CRITIC weighting methods. According to the results, the top three countries with the highest human development levels were Luxembourg, Finland, and Austria based on the Grey Relational Analysis and MOORA Ratio method. On the other hand, using the MOORA Reference Point Approach, the top three countries were the United Kingdom, the Netherlands, and Denmark.

Ayyıldız and Demirci (2018) examined the dimensions of quality of life in cities using MCDM methods. They applied these methods to determine the quality of life in cities. The SWARA method was used to calculate index weights, and the TOPSIS method was employed to rank the cities based on their quality of life. The study's results demonstrated that cities with higher economic development had a higher quality of life.

Yıldız et al. (2019), aimed to assess the quality of life in European Union (EU) countries. They used nine criteria determined by the EU to evaluate the quality of life and combined them with expert opinions through the Modified Delphi Method. The TOPSIS method was employed to rank the countries based on their quality of life among thirty-one EU countries.

Taxa (2020) examined the most suitable cities to live in Europe by conducting a cluster analysis based on the cost of living data from 2019. The study's results demonstrated that some European countries, considering their geographical locations, were grouped together in a single cluster due to similarities in the cost of living.

Çınaroğlu (2021), conducted an analysis of the quality of life in European Union member countries using the MCDM techniques of CRITIC, CODAS, and ROV. The CRITIC method was used to determine the weights of the criteria, and it was found that the cost of living index was the most significant criteria in the assessment of quality of life. The CODAS and ROV methods were employed to evaluate countries in terms of their quality of life. The study's results revealed that Denmark had the highest quality of life, while Greece had the lowest quality of life.

Akyüz and Çetin (2022), ranked the Human Development Index (HDI) of the provinces in Turkey using the VIKOR method. In their study, the provinces were initially ranked based on the original HDI calculation. Then, the provinces were re-ranked using the VIKOR method, considering the dimensions and 14 sub-indicators of the Human Development Index.

Ersoy (2023) conducted an analysis of the current cost of living in European Union countries using the COPRAS-ARAS method. The study involved 27 alternatives and five criteria. The criteria were weighted using the Entropy method, and then the COPRAS-ARAS method was applied. The results showed that Romania was the least expensive country and Luxembourg was the most expensive country.

3. Methods

In MCDM approaches, the analyst aims to establish several criteria from various perspectives. These perspectives represent different aspects of the decision-making process, justifying, transforming, and discussing preferences. In short, MCDM analyses are methods used to select the best alternative, considering multiple conflicting criteria (Bouyssou, 1990). The analysis process can be summarized as follows (Triantaphyllou and Sánchez, 1997):

1. Identification of Alternatives and Criteria: The first step involves identifying the alternatives and evaluation criteria in the problem.
2. Determination of Criteria Weights: Weights are assigned to the criteria to determine their relative importance. These weights reflect the significance of each criterion.
3. Evaluation: Each alternative receives weighted values for each criterion based on its relationship to that criterion. This creates a set of values that represent the performance of each alternative for each criterion.
4. Integration: The evaluations are combined using the assigned weights to obtain an overall value for each alternative. This allows for a comprehensive comparison of the alternatives' performances.
5. Alternative Selection or Ranking: Based on the overall values, the best alternative is selected or ranked.

MCDM problems can be defined as problems where multiple criteria are optimized and the best alternative is selected from the feasible solution sets (Turan, 2018). To reach the best solution in a MCDM problem, different MCDM methods can be used. One of the challenges that decision-makers may face when defining the problem is determining the appropriate method to use. When identifying the most suitable method, decision-makers should consider the structure of the problem and the characteristics of the decision-making process (Ersöz and Kabak, 2010).

In the cost of living analysis for Asian countries, the criteria used include the ‘Rent Index, Cost of Living Plus Rent Index, Groceries Index, Restaurant Price Index, and Local Purchasing Power Index’. These criteria were weighted using the Entropy method, and the MOOSRA, MOORA, VIKOR, and WASPAS methods, which are MCDM techniques, were employed to rank the countries. The cost of living data for the year 2023 for these countries was collected from the website numbeo.com.

a. Entropy Method

In information theory, entropy is utilized to determine the degree of disorder and uncertainty. The smaller the entropy value, the lower the degree of disorder in the system (Li et al., 2011; 2087). Entropy weighting is a parameter that defines how different alternatives approach each other in terms of a specific criterion. The steps of the entropy method are as follows (Li et al., 2011: 2087; Karami and Johansson, 2014: 523-524).

Step 1: To eliminate the effects of different scale dimensions in the decision matrix, one must standardize the indices using the equations for relative optimal membership degrees. The criteria are normalized based on utility and cost indices with Equations (1) and (2):

$$r_{ij} = x_{ij}/max_{ij} \quad (i = 1, \dots, m; j = 1, \dots, n) \tag{1}$$

$$r_{ij} = min_{ij}/x_{ij} \quad (i = 1, \dots, m; j = 1, \dots, n) \tag{2}$$

Step 2: P_{ij} is calculated to remove anomaly due to different measurement units and scales.

$$P_{ij} = \frac{a_{ij}}{\sum_{i=1}^{m} a_{ij}} \ ; \ \forall_j \tag{3}$$

Where i stands for alternatives, j stands for criteria, P_{ij} stands for normalized values, α_{ij} stands for given utility values.

Step 3: The entropy of E_j is calculated.

$$E_j = -\frac{1}{\ln m}\sum_{i=1}^{m} P_{ij} \ln P_{ij} \ ; \ \forall_j \tag{4}$$

Step 4: The uncertainly d_j is calculated as the degree of variation.

$$d_j = 1 - E_j \; ; \; \forall_j \tag{5}$$

Step 5: Weights (w_j) are calculated as the degree of importance of criterion *j*.

$$w_j = \frac{d_j}{\sum_{i=1}^{n} d_j} \; ; \; \forall_j \tag{6}$$

b. VIKOR Method

Serafim Opricovic used this approach to solve a decision problem with unrelated criteria (Opricovic, 1998: 5-21). Alternatives are evaluated based on all established criteria, and the alternative closest to the ideal solution is considered the best. The goal of the method is to achieve a solution that maximizes group utility and minimizes regret (Yıldız and Deveci, 2013: 429). The compromise values are calculated using the measure.

$$L_{pi} = \left\{ \sum_{i=1}^{n} \left[w_i \frac{(f_i^* - f_{ij})}{(f_i^* - f_i^-)} \right]^p \right\}^{1/p} \; , 1 \le p \le \infty \; ; j = 1,2,\dots,j \tag{7}$$

The compromise solution is the optimal solution where F_c is closest to the ideal F^*. The steps of the VIKOR Method, a compromise ranking algorithm (Opricovic ve Tzeng, 2007:514-529):

Step 1: The best (f_i^*) and worst (f_i^-) criteria values are determined. It depends on whether the criteria are of the cost or benefit type.

$$f_j^* = max f_{ij} \qquad f_j^- = min f_{ij} \tag{8}$$

Step 2: S_j and R_j values are calculated. w_i indicates the criteria weights and their relative importance.

$$S_j = \sum_{i=1}^{n} w_i \frac{(f_i^* - f_{ij})}{(f_i^* - f_i^-)} \tag{9}$$

$$R_j = max \left[\frac{w_i}{(f_i^* - f_{ij}) - (f_i^* - f_i^-)} \right] \tag{10}$$

Step 3: O_j value is calculated.

$$O_j = v \frac{(S_j - S^*)}{(S^- - S^*)} + (1 - v) \frac{(R_j - R^*)}{(R^- - R^*)} \tag{11}$$

$S^* = \min S_j \, , S^- = \max S_j \, , R^* = \min R_j \, , R^- = \max R_j \; (v = 0{,}5).$

Step 4: S_j, R_j and O_j values are sorted. Values are sorted from smallest to largest.

Step 5: A compromise solution is found. If the two conditions in Equation 12 are satisfied, the ordering of the options from smallest to largest allows us to obtain an alternative solution.

C1: (Acceptable advantage):

$$Q(a'') - Q(a') \geq DQ. \tag{12}$$

$$DQ = {}^{1}/_{(J-1)} \tag{13}$$

Where stands fort he number of alternatives. İt is accepted as *'DQ*=0,25*'*.

$$Q(a_j) - Q(a') < DQ \tag{14}$$

If condition C2 is not met, other options should be considered (Özbek, 2017:217-221).

c. MOORA-Ratio Approach

The process steps of the MOORA Method begin with the MOORA-Ratio Approach. Steps of the MOORA-Oran Method (Brauers and Zavadskas, 2009:1-25):

Step 1: The process starts by calculating the performance of the objectives and alternatives. The performances of the calculated values are summarized in a matrix.

Step 2: The matrix is normalized. It is computed using Equation 15, regardless of whether the criteria are oriented towards maximization or minimization (Önay and Çetin, 2012).

$$x_{ij}^{*} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^{2}}} \tag{15}$$

$$y_i^{*} = \sum_{j=1}^{g} x_{ij} - \sum_{j=g+1}^{n} x_{ij}^{*} \tag{16}$$

In Equation 16, *i* is the alternative; *j* is the attribute or criterion; *g* maximum; *(n-g)* minimum number of criteria; *n* is the total number of attributes or criteria; x_{ij}, is the performance measurement value of alternative *i* in terms of criterion *j*. x_{ij} is between the values [0,1].

Step 3: A decision matrix is created, and criteria and alternatives are determined, then the process continues.

Step 4: The normalized maximization is the difference between the sum of the performance values and the minimization values.

$$r_{ij} = max_j(x_j - x_{ij}) \tag{17}$$

In Equation 17, *i* is the alternative; *j* is the attribute or criterion; *m* is the total number of alternatives; *n* is the total number of attributes or criteria; x_{ij} is the performance measurement value of alternative *i* in terms of criterion *j*.

Step 5: The normalized decision matrix is weighted.

$$r_{ij} = f_{ij} \times w_j \tag{18}$$

Step 6: Reference points are determined. The reference point is found from the values in the decision matrix of the problem.

Step 7: Values are calculated relative to the reference point. This is done by calculating the differences to the reference point.

$$d_i = max\ _j(r_j - r_{ij}) \tag{19}$$

Step 8: Alternatives are ranked and evaluated. In the final rankings for each alternative, the alternative with the lowest maximum difference value is the most ideal alternative (Çelikbilek, 2018: 197).

d. MOORA Reference Point Approach

A reference point is determined based on the data calculated with the MOORA-Ratio Approach. The distance of each criterion to the reference point is calculated.

$$d_{ij} = |r_i - x_{ij}^*| \tag{20}$$

The ranking of the options is calculated with Equation 21. The highest value of each option is calculated (Stanujkic et al., 2012: 141-154).

$$P_i = min_i(max_j d_{ij}) \tag{21}$$

The performance values of the options are calculated by Equations 22 and 23, where denotes the priorities of the objectives (Brauers and Zavadskas, 2012: 10).

$$y_i^* = \sum_{J=1}^{g} w_j x_{ij}^* - \sum_{j=g+1}^{n} w_j x_{ij}^* \tag{22}$$

$$d_{ij} = w_j|r_i - x_{ij}^*| \tag{23}$$

The values of y_i^* are ordered from largest to smallest. The first option in the order of y_i^* is the most appropriate.

e. WASPAS Method

It is a combination of the 'Weighted Sum Model' (WSM) and 'Weighted Product Models' (WPM). Steps of the WASPAS Method (Chakraborty et.al., 2015: 6-8):

Step 1: A decision matrix is created.

Step 2: Normalization is performed. To compare performance measures and render them dimensionless, normalization is applied to all elements in the decision matrix using the equations in Equations 24 and 25:

$$x_{ij}^{*} = \frac{x_{ij}}{\max(x_{ij})} \quad (i = 1,2,\ldots,m \; ve \; j = 1,2,\ldots,n) \tag{24}$$

$$x_{ij}^{*} = \frac{\min(x_{ij})}{x_{ij}} \quad (i = 1,2,\ldots,m \; ve \; j = 1,2,\ldots,n) \tag{25}$$

Equation 24 is calculated fort he benefit criterion and Equation 25 for the cost criterion. x^{*}_{ij} is the normalization value x_{ij}.

Step 3: The total relative importance of the alternative is calculated by Equation 26 (Zavadskas et al., 2014: 3-6).

$$Q_j^{(1)} = \sum_{j=1}^{n} \bar{x}_{ij} \times w_j \tag{26}$$

Where w_j is the relative importance weight of the j'th criterion.

Step 4: Using the WPM, the total relative importance of the alternative is found. Based on the WPM Method, the total relative importance of the alternative is calculated according to Equation 27.

$$Q_i^{(2)} = \prod_{j=1}^{n} (\bar{x}_{ij})^{w_j} \tag{27}$$

Step 5: The common generalized criterion value is calculated by Equation 28.

$$Q_i = 0.5Q_i^1 + 0.5Q_i^2 = 0.5\sum_{j=1}^{n} x_{ij} \times w_j + 0.5\prod_{j=1}^{n} (\bar{x}_{ij})^{w_j} \tag{28}$$

Step 6: The total relative importance of the alternatives is improved as in Equation 29.

$$Q_i = \lambda Q_i^1 + (1-\lambda)Q_i^2 = \lambda \sum_{j=1}^{n} \bar{x}_{ij} \times w_j + (1-\lambda)\prod_{j=1}^{n} (\bar{x}_{ij})^{w_j} \quad \lambda = 0, 0.1, \ldots, 1 \tag{29}$$

The alternatives are ranked according to their Q values, the most ideal alternative is the one with the highest Q_i value (Zavadskas et al., 2014: 3-6).

f. MOOSRA Method

Step 1: A decision matrix is created.

Step 2: The decision matrix is normalized by Equation 30.

$$x_{ij}^* = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \quad (i = 1,2,\ldots,n) \tag{30}$$

Step 3: The performance scores of the alternatives are determined.

$$y_{ij} = \frac{\sum_{j=1}^{g} w_j x_{ij}^*}{\sum_{j=g+1}^{n} w_j x_{ij}^*} \tag{31}$$

Where, j=1,2,…,g is the benefit criteria, j=g+1,g+2,…,n is the cost criteria, w_j is the criteria weight. The alternatives are ranked according to the magnitudes of the y_j values determined as a result of this step.

4. Findings

The study utilized the cost of living index values calculated for 44 Asian countries in the year 2023. The criteria used to calculate the cost of living index include: 'Cost of living and rent index (C1), Rent index (C2), Grocery index (C3), Restaurant price index (C4), and Local purchasing power index (C5)'. The weights for these criteria, determined using the Entropy method, are presented in Table 1.

Table 1: Criteria Weights Determined by Entropy Method

Weights	C1	C2	C3	C4	C5
w_j	0,220	0,161	0,208	0,192	0,219

In Table 1, C1 is calculated as the 'Cost of Living + Rent Index' with the highest weight. C5, C3, C4 and C2 criteria follow the C1 index. The cost of living ranking of Asian countries is presented in Table 2.

Table 2: Cost of Living Index Ranking of Asian Countries

Country	Moosra	VIKOR	MOORA Ratio	MOORA Reference Point	Waspas	Country	Moosra	VIKOR	MOORA Ratio	MOORA Reference Point	Waspas
Singapore	20	2	1	18	1	**Thailand**	17	25	23	23	24
Israel	22	4	3	16	4	**China**	37	20	25	11	18
Hong Kong	12	3	2	13	2	**Georgia**	7	24	15	30	21
South Korea	30	7	9	15	8	**Vietnam**	24	28	27	25	30
Macao	26	5	4	10	5	**Iran**	9	32	24	38	31
Lebanon	2	12	5	35	17	**Malaysia**	41	23	39	9	23
Japan	38	8	16	7	7	**Philippines**	11	31	26	36	32
United Arab Emirates	39	6	11	5	6	**Myanmar**	14	27	22	27	26
Qatar	5	1	6	6	3	**Iraq**	34	29	37	17	29
Yemen	3	18	10	39	25	**Mongolia**	13	33	28	34	33
Cyprus	19	11	7	14	10	**Indonesia**	23	36	34	28	37
Brunei	27	13	13	12	13	**Azerbaijan**	28	35	35	24	34
Maldives	8	17	8	22	15	**Kazakhstan**	32	30	31	20	28
Taiwan	33	15	19	8	14	**Turkey**	31	39	40	26	39
Bahrain	35	10	14	4	9	**Uzbekistan**	18	37	30	32	35
Palestine	16	19	18	19	20	**Bangladesh**	29	40	42	29	39
Saudi Arabia	42	14	32	1	16	**Syria**	1	44	36	42	43
Oman	43	9	29	2	12	**Kyrgyzstan**	21	38	33	31	36
Kuwait	40	16	21	3	11	**Sri Lanka**	10	41	38	40	40
Jordan	15	21	20	21	22	**Nepal**	25	42	41	37	41
Cambodia	4	26	17	41	27	**India**	**44**	**34**	**44**	**10**	**38**
Armenia	6	22	12	31	19	**Pakistan**	36	45	43	33	43

Based on the analysis presented in Table 2, it can be observed that the rankings obtained are quite close to each other. The countries that ranked high in the life cost analysis are also found to be ranked similarly in the overall analysis. Singapore ranks first, followed by Hong Kong in the life cost rankings. Following them are Kuwait, Israel, China, United Arab Emirates, and Japan. On the other hand, India ranks last in the rankings.

In this study, the criteria were weighted using the entropy method. Since the entropy method is subjective, the study's results can vary based on the chosen method. It was observed that the rankings of countries based on living costs are similar to each other, aligning with the findings from other studies as identified in the literature review. Had a different weighting method been employed in place of the entropy method, the outcomes would likely differ. Every MCDM method can produce varying results. Similarly, if expert opinions had been utilized for criterion weighting, the results would have varied. These factors can be viewed as limitations of the method.

5. Conclusion

The cost of living is a crucial factor in various aspects, such as a country's attractiveness and companies' location decisions. Furthermore, achieving sustainable development in terms of the cost of living in countries can offer significant benefits. According to the findings of this study, knowing the rankings of countries in terms of the cost of living and the factors influencing these rankings can provide valuable insights for countries to focus on areas that need improvement. The study's comparative analysis of different MCDM methods is expected to contribute to the literature in terms of understanding and utilizing these methods effectively.

In this study, the cost of living index of Asian countries for the year 2023 was analyzed using MCDM methods. Data for the research were sourced from the website Numbeo. The study evaluated 44 alternatives based on five criteria: 'rent index, cost of living + rent index, grocery index, restaurant price index, and local purchasing power index'. The Entropy method was employed to weight the criteria, and the MOOSRA, MOORA, VIKOR, and WASPAS methods were utilized to assess the alternatives. As displayed in Table 2, the rankings are notably consistent with each other. According to the findings, Singapore ranked 1st, followed by Hong Kong in 2nd place, while India was at the bottom of the list.

This study is expected to contribute to the literature, given the limited number of studies that have analyzed the current cost of living using MCDM methods. In future research, different MCDM methods can be applied to analyze the cost of living in various countries. It's important to note that rankings obtained through different MCDM algorithms may vary.

The results obtained in this study align with the findings of other related studies in the literature (Özkaya et al., 2021; Orakçı and Özdemir, 2017; Yıldız et al., 2019; Huang and Peng, 2012; Valipour et al., 2018; Lapates et al., 2017; Aldalou and Perçin, 2020). This study holds unique value, as this approach has not been previously undertaken. Given its novel approach to analyzing the cost of living using MCDM methods, it can serve as a benchmark for future research in this field. Diversifying the methods and analyzing different countries can offer valuable insights into the cost of living and its implications across various regions and nations.

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