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Evaluation of OECD Countries in Terms of Better Life Index According to Bulut Index

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ABSTRACT

Background: The "Better Life Index", first developed by the Organization for Economic Co-operation and Development (OECD) in 2011, includes many criteria from the functioning of public services to environmental wealth, from security services to individual and social well-being. Method: The performances of OECD countries according to the decision criteria that constitute the Better Life Index has been evaluated with Bulut Index (BI) method, which is a multi-criteria decision-making method. Normalized Maximum Values (NMV) method, one of the objective weighting methods, was used to determine weights of decision criteria. Findings: Among the indicators of the Better Life Index, the murder rate per 100 thousand population ranks first in terms of criterion weight. In the study, due to the analysis and evaluation made with Bulut Index, Switzerland ranked first among OECD countries with 82.28 points in the welfare and well-being index ranking. On the other hand, Türkiye ranked fourth from the bottom among OECD countries. Conclusion: Based on the findings of the study, it is recommended that urgent and

Keywords

Bulut Index,
Multi-Criteria Decision
Making Models,
OECD,
Normalized Maximum
Values Method,
Better Life Index

JEL Classification

C44, C02, I25, C52, I30

necessary measures be taken on homicide rates, long-term unemployment rates and air pollution criteria. The lack of criteria regarding civic participation, work-life balance and income status constitute limitations of the study. In future studies, it is especially recommended that other researchers include these variables.

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Bulut Endeksi'ne Göre OECD Ülkelerinin Daha İyi Yaşam Endeksi Açısından Değerlendirilmesi

ÖZ

Arka Plan: İlk olarak 2011 yılında Ekonomik İşbirliği ve Kalkınma Örgütü (OECD) tarafından geliştirilen “Daha İyi Yaşam Endeksi (Better Life Index)”, kamu hizmetlerinin işleyişinden çevresel zenginliğe, güvenlik hizmetlerinden bireysel ve toplumsal refaha kadar birçok kriteri içermektedir. Yöntem: OECD ülkelerinin daha iyi yaşam endeksi'ni oluşturan karar kriterlerine göre performansları, çok kriterli bir karar alma yöntemi olan Bulut Endeksi (BI) yöntemi ile değerlendirilmiştir. Karar kriterlerinin ağırlıklarının belirlenmesinde objektif ağırlıklandırma yöntemlerinden Normleştirilmiş Maksimum Değerler (NMV) yöntemi kullanılmıştır. Bulgular; ilk bölümde yapılan değerlendirmelere göre, Daha İyi Yaşam Endeksinin göstergeleri arasında kriter ağırlığı bakımından ilk sırada 100 bin nüfus başına düşen cinayet oranı yer almaktadır. Çalışmada Bulut Endeksi ile yapılan analiz ve değerlendirme sonucunda İsviçre, refah ve esenlik endeksi sıralamasında 82,28 puan ile OECD ülkeleri arasında ilk sırada yer aldı. Öte yandan Türkiye OECD ülkeleri arasında sondan dördüncü sırada yer aldı. Sonuç: Çalışmanın bulgularından hareketle cinayet oranları, uzun dönemli işsizlik oranları ve hava kirliliği kriterleri konusunda acil ve gerekli önlemlerin alınması önerilmektedir. Sivil katılım, iş-yaşam dengesi ve gelir durumu ile ilgili kriterlerin eksikliği çalışmanın kısıtlarını oluşturmaktadır. Gelecek çalışmalarda diğer araştırmacıların bu değişkenleri de dâhil etmesi özellikle önerilmektedir.

Anahtar Kelimeler

Bulut Endeksi,
Çok Kriterli Karar
Alma Modelleri,
OECD,
Normleştirilmiş
Maksimum Değerler
Yöntemi,
Daha İyi Yaşam
Endeksi

JEL Kodu

C44, C02, I25, C52,
I30

1. Background

In recent years, regional inequalities in wealth distribution have increased in the face of very rapid economic growth and developments at the global level. Today, income distribution and inequality of opportunity, access to health services, the existence of economically and socially disadvantaged groups, unregistered employment, unemployment, education problems, the existence of environmental risks and threats, climate change, global warming, and air pollution are the problems faced (OECD, 2021a). In this sense, policies are being produced at global, national, and local levels to ensure better living and health conditions in some parts of the world. For this reason, the "Better Life Index", which includes some criteria, was created to

compare and measure welfare among OECD countries. This index is designed to compare well-being between countries based on some criteria set by the OECD countries regarding material living conditions and quality of life. This study aims to weight the criteria that make up the OECD's "Better Life Index" with the Normalized Maximum Values (NMV) method (Bulut, 2017; 2022) and, based on these criteria, to evaluate the performances of the alternatives regarding the Better Life Index of OECD countries by Bulut Index (Bulut, 2017; 2022; 2022; Top & Bulut, 2022), one of the multi-criteria decision-making methods. Moreover, the study aims to rank these criteria according to their importance, to choose between the criteria, and to develop optimal solution policies regarding the performances of the countries that constitute the scope of the study.

As is known, with the Normalized Maximum Values (NMV) Method, the scores of the criteria are normalized by converting them into common units according to their cost or benefit characteristics. Therefore, the weighting process is done using the coefficients that make the criteria important (Turskis & Zavadka, 2010). In their study performed by Bağcı & Sarıay (2021) on businesses traded in Borsa Istanbul Public Offering Index, their use of NMV Method to compare performance indicators can be given as an example. Therefore, in the relevant study, NMV Method was used to determine the importance level of performance indicators of businesses (Bağcı & Sarıay, 2021). In his study, Kılıçarslan (2023) used NMV Method in criterion weighting in the study where the financial performances of renewable energy companies traded on Borsa Istanbul were evaluated based on the 2018-2021 data. Ergun et al. (2022) used NMV Method in their study in which the transaction performances of companies operating in the licensed warehousing sector were evaluated with Multi-Criteria Decision Making (MCDM) Methods. In his study on financial performance analysis of companies traded in the stock fund index of growing companies, Kılıçarslan (2023) used NMV Method in criterion weighting. Ergun et al. (2022) were used NMV Method in the criterion weighting process in the study where financial performance of six banks traded in Borsa Istanbul Corporate Governance Index were determined by MCDM Methods. The NMV Method, which was developed as an objective method within the scope of solving criteria weighting problems, is an easy-to-use method used in cases where the order of importance and weights of the selected criteria cannot be determined (Bağcı & Sarıay, 2021). NMV Method AHP, ANP and Entropy methods, which are used extensively in the literature, have shorter and easier application stages compared to weighting methods (Ergun et

al., 2022). Considering the large number of normalization techniques available, the NMV Method is a relatively new method and its application steps are shorter and more understandable than others, which was the determining factor in its use as a weighting method in this study.

In addition to financial performance analysis, the Bulut Index Method can be used in solving other MCDM Method problems and performance analysis. With this index, it is also aimed to eliminate the deficiencies of other MCDM Methods based on the maximum and minimum principle. Therefore, also in this study, the performances of OECD countries regarding the Better Life Index were evaluated with the Bulut Index Method. Because the Bulut Index has been used in many studies in the literature. Aslan & Bolukçu (2022) evaluated the performance of OECD countries with the Bulut Index Method during the fight against Covid 19 disease. Kıran (2018) used the Bulut Index Method in comparing the financial performance of health institutions. In a study evaluating financial performance management in local governments, specifically in Istanbul and Kocaeli Metropolitan Municipalities, the Bulut Index Method was used (Kılıçarslan & Özmen, 2023). Apart from this, the Bulut Index Method was used in the evaluation of the financial performance of the companies registered in the Metal Goods Index (Güden, 2021). Apart from this, the Bulut Index Method was used in the study on investment barriers to organized industrial zones in Türkiye in 2018. In the thesis on the comparison of mail and web survey methods for companies in Organized Industrial Zones, the Bulut Index Method was used (Bulut, 2019).

As in the 2008 world economic crisis, the COVID-19 pandemic has dramatically affected all areas of people's lives, primarily on health but also on financial, social, and global levels. Even though patients with poor health conditions lost their lives during the epidemic and significant losses occurred in the world population, life expectancy at birth has increased in all OECD countries in the last ten years (OECD, 2019). The average life expectancy at birth in OECD countries is 80.5 years. However, the recovery possibilities of the population with chronic diseases among the elderly population, which increases in parallel with the increase in the value of life at birth, decrease day by day. In addition, deaths caused by infectious diseases, especially pneumonia and influenza, as well as deaths due to drugs and accidents, are increasing. Therefore, the increase in life expectancy at birth is slowing down compared to previous years (Raleigh, 2019). Economic problems are associated with people's mental health and increased suicide rates.

However, its relationship with the general mortality rate is lesser (Parmar et al., 2016). Due to economic and other problems, the average life satisfaction in OECD countries tends to decrease (OECD, 2017). So much so that a significant portion of the population in OECD countries reports a shallow level of life satisfaction (7%) (Van Zanden et al., 2020). When people are asked how satisfied they are with their lives, the score ranges from 0 to 10 in OECD countries, and the Arithmetic Mean Score is 7.4 points. Approximately 1 in 8 people report that they typically experience more negative emotions (anger, sadness, anxiety) than positive emotions in a day (Eurostat, 2018). Deaths due to attempted self-harm, acute alcohol intake disorder, and drug overdose have recently been described as the "death of despair" (Case & Deaton, 2017). Similarly, perceived social support from friends and family decreases proportionally (OECD, 2017). Across OECD countries, people spend almost half an hour less time with family and friends than they did nearly a decade ago. Moreover, 1 in 11 people say they do not have relatives or friends they can rely on for help in times of need. Especially in old age, the likelihood of being deprived of social support is almost three times higher than in young people (Van Zanden et al., 2020). On the other hand, ensuring trust in the executive institution, prosperity, and social harmony is also necessary. Civilian engagement measures how a country's executive agency interacts with stakeholders in developing basic laws and secondary regulations (OECD, 2022a). Work-life balance is other of the better life index criteria. It organizes paid and unpaid work, family responsibility, leisure and work. The average time full-time workers spend on leisure and personal care in OECD countries varies between 14 and 16.5 hours per day (OECD, 2020a). However, the long-term unemployment rate generally increases in half of OECD countries (OECD, 2018). Moreover, some Eastern European OECD countries' welfare levels, which are quite poor, are increasing significantly (OECD,2020b). On the other hand, there are many areas in OECD countries where full recovery has not yet been achieved. Almost 40% of households in OECD countries are financially insecure (Van Zanden et al., 2020). Despite this inadequacy in income distribution, there are some gains in human capital. The number and rate of those completing high school education have been increasing since 2010 (Durand & Exton, 2019). Low-income families in the bottom 40% of the income distribution in OECD countries use almost 40% of their income for housing and shelter (Van Zanden et al., 2020). Air pollution is currently the most significant environmental health risk and the leading cause of death and disability. By 2060, outdoor air pollution could cause the early death of approximately 6 million

to 9 million people annually worldwide (OECD, 2016). Ensuring water sanitation and access to safe water sources is important for human health. Therefore, access to safe water resources is essential for solving further development challenges, including food security, healthy living, energy, sustainable cities, sustainable consumption and production (United Nations, 2015). The benefits of investments and moves toward water security are invaluable, and the economic benefits exceed 100 billion dollars annually (Sadoff et al., 2015). Security is essential to people's well-being and includes the risk of being physically attacked or falling victim to other forms of crime. The average murder rate in the OECD is 2.6 murders per 100,000 people. This value for the murder rate is 4.4 per 100,000 for men and 0.9 per 100,000 for women (OECD, 2022b). Contrarily eight out of ten men and six out of ten women in the OECD say they feel safe walking alone in their neighborhoods at night (Eurostat, 2018).

The aim of the research is to determine the weights of the "Better Life Index" criteria in order of importance and to compare and rank the performances of OECD countries in the relevant field. Therefore, as it is known, welfare inequalities between countries and individuals are increasing day by day. Also, when it comes to well-being, it is a matter of curiosity which criteria are important for individuals. The Bulut Index, which was recently introduced to the literature (2017), is thought to make this study unique. In this respect, it is believed that the study will make a valuable contribution to the relevant literature. It is thought that weighting the criteria according to their importance levels and ranking the better life index performances of OECD countries with a dynamic model in the light of existing criteria will be of interest in terms of literature. Thus, it is thought that ranking the better life index performances of OECD countries with a dynamic model in the light of existing criteria and weighting the criteria according to their importance levels will be of interest in terms of literature. It is believed that it will also attract the attention of decision makers and people and institutions responsible for planning. The data set of this study was taken from OECD's Better Life Index database (<https://stats.oecd.org>). The limitations of this research are that criteria related to civilian participation, work-life balance, and income status are not included in the scope of the study.

2. Method

In this research, the Normalized Maximum Values (NMV) Method developed by Bulut (2017) was used to weight the criteria for the Better Life Index of OECD countries according to

their degree of importance (Bulut, 2017, 2022). Moreover, in the study, Bulut Index (BI), which is one of the multi-criteria decision-making methods produced by Bulut (2017) with the R programming language, which allows the evaluation of alternatives according to criteria and is used to determine optimal alternatives, was used (Bulut, 2017, 2022; Top & Bulut, 2022). The criteria that play a role in determining the welfare and well-being of individuals in the OECD are included in the scope of this study, and the direction of these criteria is given in Table 1.

Table 1

Criteria That Determine Well-Being and Health and the Direction of These Criteria

| Criterion | Direction of Criterion | Description |
|--|-------------------------------|---|
| K1 (Housing Expenditures) | Maximum | (Housing Expenditures) |
| K2 (Employment Rate) | Maximum | (Employment Rate) |
| K3 (Long Term Unemployment Rate) | Minimum | (Long Term Unemployment Rate*100) |
| K4 (Perceived Social Support) | Maximum | (% Perceived Social Support) |
| K5 (Average Training Time) | Maximum | (Average Training Time) |
| K6 (Life Expectancy at Birth) | Maximum | (Life Expectancy at Birth) |
| K7 (Satisfaction with Life) | Maximum | (Satisfaction with Life – Average Score) |
| K8 (The Ratio of People Perceiving Their Health as Good or Very Good) | Maximum | (The Ratio of Those Who Perceive Their Health Is Good or Very Good) |
| K9 (The Ratio of Those Satisfied with the Quality of Water) | Maximum | (Water Quality - Ratio of People Satisfied with Water Quality) |
| K10 (Micrograms Per Cubic Meters of Air Pollution) | Minimum | (Air Pollution – Micrograms Per Cubic Meters) |
| K11 (% of those who feel safe walking alone at night) | Maximum | (% of people who feel safe walking alone at night) |
| K12 (Murder Rates -Per 100 Thousand Population) | Minimum | (Murder Rates -per 100k population) |

Szücs et al. (2011) “have identified that satisfaction with work–life balance and overall life satisfaction were closely related in European countries. Especially, the higher the satisfaction with work-life balance, the higher the overall life satisfaction” (Szücs et al., 2011). The research

alternatives are coded from A1 to A33, and the OECD countries that constitute the alternatives are given in Table 2.

Table 2

Decision Alternatives

| Alternative | Code | Alternative | Code | Alternative | Code |
|--------------------|-------------|--------------------|-------------|--------------------|-------------|
| Australia | A1 | Hungary | A12 | Norway | A23 |
| Austria | A2 | Ireland | A13 | Poland | A24 |
| Belgium | A3 | Italy | A14 | Portegual | A25 |
| Canada | A4 | Japanese | A15 | Slovakia | A26 |
| Czech Republic | A5 | Korea | A16 | Slovenia | A27 |
| Denmark | A6 | Latvia | A17 | Spanish | A28 |
| Estonia | A7 | Lithuania | A18 | Sweden | A29 |
| Finland | A8 | Luxemburg | A19 | Switzerland | A30 |
| France | A9 | Mexico | A20 | Turkey | A31 |
| Germany | A10 | Holland | A21 | United Kingdom | A32 |
| Greece | A11 | New Zeland | A22 | U.S.A. | A33 |

2.1. Normalized Maximum Values (NMV) Method

The process of weighting the criteria with the Normalized Maximum Values (NMV) method is completed in four stages (Bulut, 2022).

2.1.1. Decision Matrix

First, the decision matrix is created. The columns of this created matrix include criteria, and the rows include factors or alternatives. The function of this matrix is shown below in the

matrix. In the x_{ij} matrix, r indicates the number of rows and c the number of columns of the matrix (Bulut, 2022).

$$X_{ij} = \begin{bmatrix} x_{11} & x_{11} & \dots & x_{11} \\ x_{11} & x_{11} & \dots & x_{11} \\ \cdot & \cdot & \dots & \cdot \\ \cdot & \cdot & \dots & \cdot \\ \cdot & \cdot & \dots & \cdot \\ x_{c1} & x_{c2} & \dots & x_{cr} \end{bmatrix} \tag{1}$$

2.1.2. Creating Ratio Matrix

At this stage, each criterion in the decision matrix is compared to the sum of the criteria. This process prevents over-dispersion, and the data set is made as comparable as possible. In this process, the sum of each matrix column is calculated one by one, and the subtotals of the values of the decision criteria in the matrix columns are calculated. The formula for this calculation is shown below (Bulut, 2022).

$$T = \sum_{j=1}^c X_{ij} \tag{2}$$

The set of subtotals of the criteria is expressed as follows (Bulut, 2022).

$$t = \{c_1, c_2, c_3, \dots, c_c\} \tag{3}$$

$$R_{ij} = \begin{pmatrix} x_{1,1} / c_1 & x_{1,2} / c_2 & \dots & x_{1,c} / c_c \\ x_{2,1} / c_1 & x_{2,2} / c_2 & \dots & x_{2,c} / c_c \\ \vdots & \vdots & \ddots & \vdots \\ x_{r,1} / c_1 & x_{r,2} / c_2 & \dots & x_{r,c} / c_c \end{pmatrix} \rightarrow R_{ij} = \begin{pmatrix} r_{1,1} & r_{1,2} & \dots & r_{1,c} \\ r_{2,1} & r_{2,2} & \dots & r_{2,c} \\ \vdots & \vdots & \ddots & \vdots \\ r_{r,1} & r_{r,2} & \dots & r_{r,c} \end{pmatrix} \tag{4}$$

2.1.3. Calculation of Normalized Values Based on Maximum Criterion Values

At this stage, the maximum value is first determined among the value series of each criterion. Afterwards, normalized values are obtained by calculating the mean and standard deviation of the value series for each criterion. In these processes, first, the maximum values are calculated. The maximum values set for each criterion are shown below (Bulut, 2017, 2022).

$$max = \{max_1, max_2, max_3, \dots, max_c\} \tag{5}$$

The average of each value is formulated as follows (Bulut, 2022).

$$A = \frac{\sum_{j=1}^c R_{ij}}{r} \quad (6)$$

The formula of the set containing the averages of the values of each criterion is shown below (Bulut, 2022).

$$a = \{a_1, a_2, a_3, \dots, a_c\} \quad (7)$$

The standard deviation of the values of each criterion is calculated (Bulut, 2022).

$$S = \frac{R_{ij} - a_i}{\sqrt{\sum (R_{ij} - a_i)^2}} \quad (8)$$

The standard deviation set with the standard deviation value of each criterion is shown below (Bulut, 2022).

$$s = \{s_1, s_2, s_3, \dots, s_c\} \quad (9)$$

The standardized value of each criterion is calculated based on the maximum values of the criteria with the following formula (Bulut, 202).

$$N = \frac{\max_i - a_i}{s_i} \quad (10)$$

2.1.4. Determination of Criterion Weights

At this stage, weight coefficients are calculated by proportioning the normalized criterion values calculated for each criterion to the total of these criterion values. Weight coefficients are obtained with the following formula (Bulut, 202).

$$w = \frac{n_i}{\sum_{i=1}^c n_i} \quad (11)$$

The weight coefficient set is expressed as follows (Bulut, 2022).

$$w = w_1, w_2, w_c \quad (12)$$

Here, the sum of the values must BI equal to 1 (Bulut,2022);

$$w_i \in R \text{ ve } \sum_{i=1}^c w_i = 1 \text{ dir.} \quad (13)$$

2.2. Bulut Index (BI)

Bulut Index can be easily used in solving Multi-Criteria Decision Making (MCDM) problems within the field of operations research, regardless of sector (Kıran, 2018; Bulut, 2017).

In addition, the index, which includes open-ended and one-way inequalities and has a dynamic feature is used in ranking, selection, effectiveness and efficiency measurements, performance evaluation, risk estimation and solving "optimal solution problems". In cases where the decision criteria are open-ended and contain one-way inequality, it providing an application area with its sub-levels (general, intermediate and core), allowing many outputs to be obtained. With these aspects mentioned, it is believed that the Bulut Index will make a significant contribution to the literature (Bulut, 2017; Güden, 2021). According to the criteria taken as basis in the study, the performances of the alternatives are completed in seven stages with the Bulut Index (Bulut, 2017, 2022).

2.2.1. Decision Matrix Creation

First, a CXR-dimensional decision matrix is created and there are alternatives in the columns of this matrix and criteria in the rows (Bulut, 2017, 2022; Top & Bulut, 2022).

$$X_{ij} = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1r} \\ x_{21} & x_{22} & \dots & x_{2r} \\ \vdots & & & \\ \vdots & & & \\ x_{c1} & x_{c2} & \dots & x_{cr} \end{bmatrix} \quad (14)$$

2.2.2. Stage of Determining the Difference According to Ideal Values

At this stage, the difference matrix must BI found by determining the difference between each X_{ij} value in the rows and the previously allocated or calculated reference values for each criterion. While performing this process, it is necessary to take into consideration the upper and lower case symbols in the ideal value. If any criterion is desired to BI maximum (Bulut, 2017, 2022; Top & Bulut, 2022).

$X_{ij} - \bar{X}_j$ minimum, $\bar{X}_j - X_{ij}$ equality must BI taken into account,

$X_{ij} - \bar{X}_j =$ value of criterion $\bar{X}_j - X_{ij} =$ reference value.

$$F_{ij} = \begin{bmatrix} f_{11} & f_{12} & \dots & f_{1r} \\ f_{21} & f_{22} & \dots & f_{2r} \\ \vdots & & & \\ \vdots & & & \\ f_{c1} & f_{c2} & \dots & f_{cr} \end{bmatrix} \quad (15)$$

2.2.3. Normalizing the Matrix

At this stage, the difference of each F_{ij} value ($f_{11}, f_{12}, f_{13}, \dots, f_{1r}$) in the row from the average ($\overline{F_j}$) of the row to which it belongs is calculated. Then, each difference value is squared and all values are summed. Then, each difference value is divided by the square root of these sums. The normalization process is achieved with the final calculation (Bulut, 2017, 2022; Top & Bulut, 2022).

$$S_{ij} = \frac{F_{ij} - \overline{F_j}}{\sqrt{\sum_{i=1}^k (F_{ij} - \overline{F_j})^2}} \tag{16}$$

$$i = 1 \dots k \text{ (and) } j = 1 \dots n \tag{17}$$

$$S_{ij} = \begin{bmatrix} S_{11} & S_{12} & \dots & S_{1r} \\ S_{21} & S_{22} & \dots & S_{2r} \\ \vdots & & & \\ \vdots & & & \\ S_{c1} & S_{c2} & \dots & S_{cr} \end{bmatrix} \tag{18}$$

2.2.4. Process of Obtaining Absolute Value of Minimum Negative Values

In this process, the absolute value of the minimum value in each row is taken. Then, each S_{ij} value in the row containing the relevant positive value is added. Thus, the smallest negative value is zero. All other negative values are converted to positive. Thus, the P_{ij} matrix is provided (Bulut, 2017).

$$X_j^- = \{ \min_1 S_{ij} \} \tag{19}$$

$$X_j^- = \{ S_{11}^-, S_{12}^-, S_{13}^- \dots, S_{1n}^- \} \text{ minimum value specific to each row} \tag{20}$$

$$X_i^+ = \{ S_{11}^-, S_{12}^-, S_{13}^- \dots, S_{1n}^- \} \tag{21}$$

$$P_{ij} = \begin{bmatrix} S_{11} + x^+ & S_{12} + x^+ & \dots & S_{1r} + x^+ \\ S_{21} + x^+ & S_{22} + x^+ & \dots & S_{2r} + x^+ \\ \vdots & & & \vdots \\ \vdots & & & \vdots \\ S_{c1} + x^+ & S_{c2} + x^+ & \dots & S_{cr} + x^+ \end{bmatrix} \rightarrow P_{ij} = \begin{bmatrix} P_{11} & P_{12} & \dots & P_{1r} \\ P_{21} & P_{22} & \dots & P_{2r} \\ \vdots & & & \vdots \\ \vdots & & & \vdots \\ P_{c1} & P_{c2} & \dots & P_{cr} \end{bmatrix} \tag{22}$$

2.2.5. Taking the Reverse of the Minimum Required Values

It is considered a positive situation that some rates, such as unemployment and inflation rates, are low. This can be done by reversing the situation. In these cases, as seen in Table 3 the ratios that are desired to BI low must BI reversed (Bulut, 2017).

Table 3

Reversing the Minimum Values

| Current Status | | | | | New Status | | | | |
|----------------|--------------|----|----|----|------------|--------------|----|----|----|
| Criterion | Alternatives | | | | Criterion | Alternatives | | | |
| | A1 | A2 | A3 | A4 | | A1 | A2 | A3 | A4 |
| K | 2 | 4 | 6 | 8 | K | 8 | 6 | 4 | 2 |

Source. (Bulut, 2017: p.13) Access: <https://dergipark.org.tr/en/pub/verimlilik/issue/30386/328150>

This situation can BI explained as follows:

$$\min_i p_{ij} \leftrightarrow \max_i p_{ij} \tag{23}$$

If the criteria are to BI weighted, it should BIdone after absolute matching (inverse transformation). Thus, the weighted matrix in equation Aij is achieved by multiplying the p_{ij} values with the weight coefficients. k_{ij} Here k_{ij} their sum must BI equal to 1.Namely (Bulut, 2017);

$$\sum_{i=1}^n k_{ij} = 1 \tag{24}$$

$$P_{ij} = \begin{bmatrix} k_1 xp_{11} & k_1 xp_{12} & \dots & k_1 xp_{1r} \\ k_2 xp_{21} & k_2 xp_{22} & \dots & k_2 xp_{2r} \\ \vdots & \vdots & \ddots & \vdots \\ k_n xp_{c1} & k_n xp_{c2} & \dots & k_n xp_{cr} \end{bmatrix} \rightarrow A_{ij} = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1r} \\ a_{21} & a_{22} & \dots & a_{2r} \\ \vdots & \vdots & \ddots & \vdots \\ a_{c1} & a_{c2} & \dots & a_{cr} \end{bmatrix} \tag{25}$$

2.2.6. Determination of Index

The maximum value in each line explains the index reference value in that line. The reference value is shown with the equation (Bulut, 2017, 2022; Top & Bulut, 2022). These are the maximum values specific to each line.

2.2.7. Calculation of Index Points

The overall index score is obtained by summing the index reference values of each row (Bulut, 2017). The total score of that decision-making unit is calculated by summing the ratio values of each decision-making unit (located in its row) . The Bulut Index score of each decision-making unit is calculated by dividing the total score of each decision-making unit by the general index score and multiplying it by 100 (Bulut.2017).

3. Results

3.1. NMV Method Results

In this section, the weights of the decision criteria are determined impartially by NMV method, and the findings obtained in NMV method are given according to the implementation stages.

3.1.1. Creating Decision Matrix

Creating the decision matrix constitutes the first stage of the weighting model NMV. Here, the columns indicate the decision-making criteria, and the rows indicate the 38 OECD countries (alternatives) whose performance will be evaluated by BI. The values obtained in the decision matrix as a result of the application are presented in Table 4.

Table 4

Decision Matrix

| | K1 | K2 | K3 | K4 | K5 | K6 | K7 | K8 | K9 | K10 | K11 | K12 |
|-----------|------|----|-----|----|----|------|-----|----|----|------|-----|-----|
| A1 | 19,4 | 73 | 1 | 93 | 20 | 83 | 7,1 | 85 | 92 | 6,7 | 67 | 0,9 |
| A2 | 20,8 | 72 | 1,3 | 92 | 17 | 82 | 7,2 | 71 | 92 | 12,2 | 86 | 0,5 |
| A3 | 20 | 65 | 2,3 | 90 | 19 | 82,1 | 6,8 | 74 | 79 | 12,8 | 56 | 1,1 |
| A4 | 22,9 | 70 | 0,5 | 93 | 17 | 82,1 | 7 | 89 | 90 | 7,1 | 78 | 1,2 |
| A5 | 23,4 | 74 | 0,6 | 96 | 18 | 79,3 | 6,9 | 62 | 89 | 17 | 77 | 0,7 |
| A6 | 23,3 | 74 | 0,9 | 95 | 19 | 81,5 | 7,5 | 70 | 93 | 10 | 85 | 0,5 |

| | | | | | | | | | | | | |
|-----|------|----|------|----|----|------|-----|----|----|------|----|------|
| A7 | 17 | 74 | 1,2 | 95 | 18 | 78,8 | 6,5 | 57 | 86 | 5,9 | 79 | 1,9 |
| A8 | 23,1 | 72 | 1,2 | 96 | 20 | 82,1 | 7,9 | 68 | 97 | 5,5 | 88 | 1,2 |
| A9 | 20,7 | 65 | 2,9 | 94 | 17 | 82,9 | 6,7 | 67 | 78 | 11,4 | 74 | 0,4 |
| A10 | 20 | 77 | 1,2 | 90 | 18 | 81,4 | 7,3 | 66 | 91 | 12 | 76 | 0,4 |
| A11 | 21,8 | 56 | 10,8 | 78 | 19 | 81,7 | 5,8 | 79 | 67 | 14,5 | 69 | 1 |
| A12 | 19,9 | 70 | 1,2 | 94 | 16 | 76,4 | 6 | 58 | 81 | 16,7 | 74 | 0,9 |
| A13 | 20,6 | 68 | 1,2 | 96 | 18 | 82,8 | 7 | 84 | 80 | 7,8 | 76 | 0,5 |
| A14 | 22,5 | 58 | 4,8 | 89 | 17 | 83,6 | 6,5 | 73 | 77 | 15,9 | 73 | 0,5 |
| A15 | 21,8 | 77 | 0,8 | 89 | 16 | 84,4 | 6,1 | 37 | 87 | 13,7 | 77 | 0,2 |
| A16 | 14,7 | 66 | 0 | 80 | 17 | 83,3 | 5,8 | 34 | 82 | 27,3 | 82 | 0,8 |
| A17 | 20,8 | 72 | 2,2 | 92 | 18 | 75,5 | 6,2 | 47 | 83 | 12,7 | 72 | 3,7 |
| A18 | 18,4 | 72 | 2,5 | 89 | 18 | 76,4 | 6,4 | 46 | 83 | 10,5 | 62 | 2,5 |
| A19 | 20,7 | 67 | 1,7 | 91 | 15 | 82,7 | 7,4 | 72 | 85 | 10 | 87 | 0,2 |
| A20 | 17,8 | 59 | 0,1 | 77 | 15 | 75,1 | 6 | 66 | 75 | 20,3 | 42 | 26,8 |
| A21 | 19,6 | 78 | 0,9 | 94 | 19 | 82,2 | 7,5 | 75 | 91 | 12,2 | 83 | 0,6 |
| A22 | 19,7 | 77 | 0,4 | 95 | 18 | 82,1 | 7,3 | 86 | 85 | 6 | 66 | 1,3 |
| A23 | 17,7 | 75 | 0,9 | 96 | 18 | 83 | 7,3 | 75 | 98 | 6,7 | 93 | 0,6 |
| A24 | 21,2 | 69 | 0,6 | 94 | 18 | 78 | 6,1 | 60 | 82 | 22,8 | 71 | 0,5 |
| A25 | 19,6 | 69 | 2,3 | 87 | 17 | 81,8 | 5,8 | 50 | 89 | 8,3 | 83 | 0,7 |
| A26 | 27,4 | 68 | 3 | 95 | 16 | 77,8 | 6,5 | 65 | 81 | 18,5 | 76 | 0,8 |
| A27 | 18,2 | 71 | 1,9 | 95 | 18 | 81,6 | 6,5 | 67 | 93 | 17 | 91 | 0,4 |
| A28 | 21,7 | 62 | 5 | 93 | 18 | 83,9 | 6,5 | 75 | 76 | 10 | 80 | 0,7 |
| A29 | 20,1 | 75 | 1 | 94 | 20 | 83,2 | 7,3 | 76 | 97 | 5,8 | 79 | 1,1 |
| A30 | 21,4 | 80 | 1,7 | 94 | 17 | 84 | 7,5 | 81 | 96 | 10,1 | 86 | 0,3 |
| A31 | 18,9 | 48 | 3,3 | 85 | 19 | 78,6 | 4,9 | 67 | 62 | 27,1 | 59 | 1 |
| A32 | 23,2 | 75 | 0,9 | 93 | 17 | 81,3 | 6,8 | 73 | 82 | 10,1 | 78 | 0,2 |
| A33 | 18,3 | 67 | 0,5 | 94 | 17 | 78,9 | 7 | 88 | 88 | 7,7 | 78 | 6 |

3.1.2. Determination of Criterion Weights

In the third stage, weight coefficients are determined by dividing the normalized criterion values calculated for each criterion by the sum of these criterion values. The ranking of criterion weight levels is presented in Figure 1 from largest to smallest.

Accordingly, when the Normalized Maximum Values Method (NMV) results are examined, the murder rate criterion ranks first among the criteria that determine the Better Life Index of individuals. Other criteria are long-term unemployment rate, housing expenditures, air pollution, life satisfaction/dissatisfaction, duration of education, feeling safe while walking alone

at night, satisfaction with water quality, level of health status perception, employment rate, life expectancy at birth criterion and perceived social support criteria, respectively.

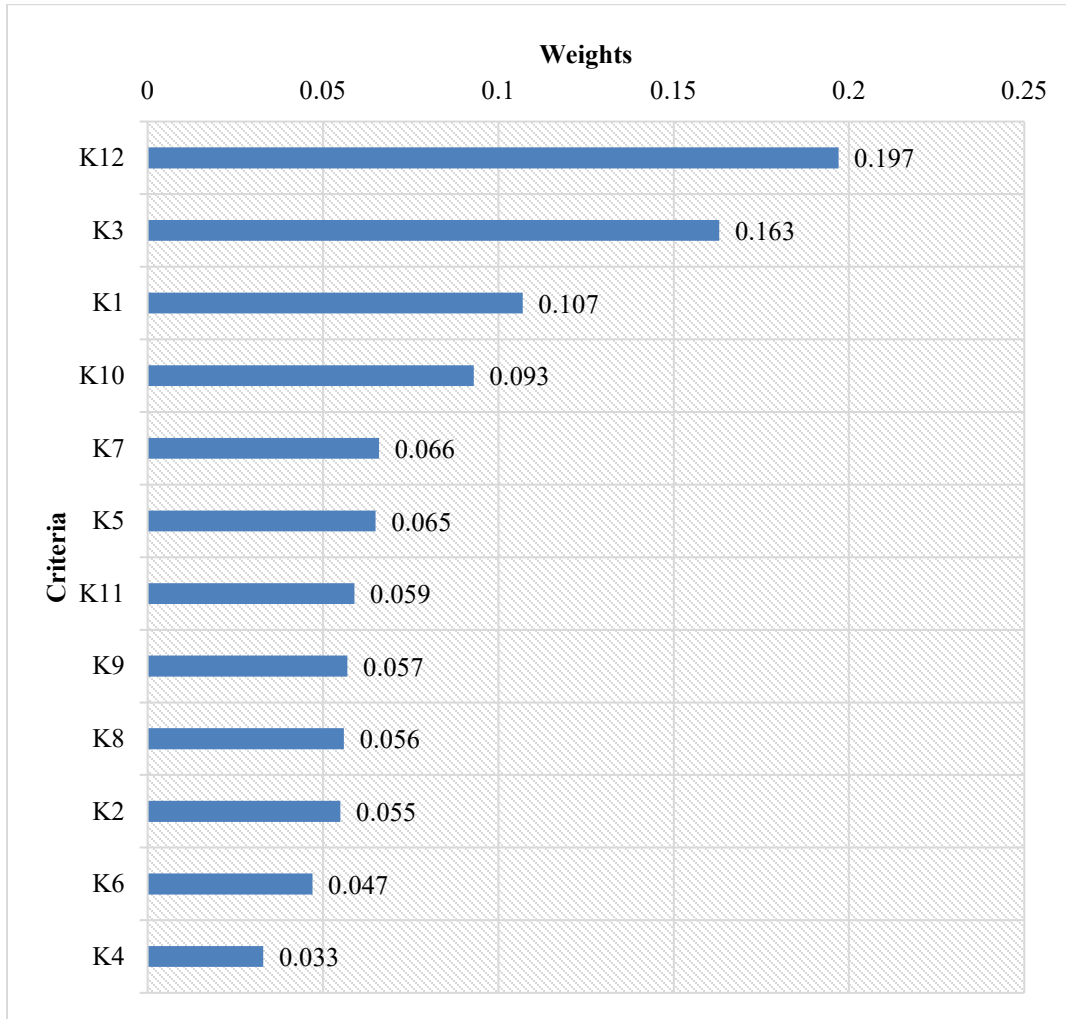


Figure 1. Weights of Criteria by NMV Method

3.2. BI Results

Since the application findings were mentioned in the theoretical framework of the study, they were not included again in this section. In this context, only the Bulut Index results were included.

3.2.1. Creating Decision Matrix

Creating the decision matrix is the first stage of the Bulut Index method. The values obtained in the decision matrix were previously created in the Normalized Maximum Values Method section and are presented in Table 4.

3.2.2. Calculation of BI Scores

At this stage, the total index score is calculated with the sum of the index reference values of each criterion. Then, the total score specific to the decision unit is proportioned to the total index reference values. By multiplying the obtained value by 100, the "Bulut Index (BI)" score of the alternatives is calculated (Bulut, 2017; Kıran, 2018). The "Bulut Index" scores of OECD countries (alternatives) are shown in Table 5. In this context, based on the criteria that make up the Better Life Index, Switzerland ranks first among the top 10 countries as a result of the evaluation made with the Bulut Index. The other 9 countries are Finland, Denmark, Slovakia, Netherlands, Austria, Slovenia, Sweden, Czech Republic and Germany, respectively. On the other hand, Japan is at last of the evaluation. Second to last is Korea, third is Mexico, fourth is Turkey, fifth is Estonia, sixth is Lithuania and seventh is New Zealand. According to the results of the evaluation, the Bulut Index scores of Latvia, Poland, Luxembourg, Portugal, United States, Hungary, Lithuania, Estonia, Türkiye, Mexico, Korea and Japan are below the OECD average.

Table 5

Bulut Index Scores

| Alternatives | BI scores | Rank |
|----------------------|------------------|-------------|
| Switzerland(A30) | 82,287245 | 1 |
| Finland (A8) | 81,73725591 | 2 |
| Denmark (A6) | 81,29461968 | 3 |
| Slovakia (A26) | 80,12144471 | 4 |
| Holland (A21) | 80,01753653 | 5 |
| Austria (A2) | 79,0109528 | 6 |
| Slovenia (A27) | 77,91844048 | 7 |
| Sweden (A29) | 77,70741347 | 8 |
| Czech Republic (A5) | 77,65490948 | 9 |
| Germany (A10) | 77,54044518 | 10 |
| Norway (A23) | 77,19741567 | 11 |
| Spain (A28) | 77,13089386 | 12 |
| Australia (A1) (A1) | 76,834066 | 13 |
| Ireland (A13) | 75,69339502 | 14 |
| Italy (A14) | 75,52989917 | 15 |
| Canada (A4) | 75,16287896 | 16 |
| United Kingdom (A32) | 74,52302718 | 17 |
| Belgium (A3) | 73,8642293 | 18 |

| | | |
|-------------------|-------------|----|
| France (A9) | 73,22044929 | 19 |
| Greece (A11) | 72,53391295 | 20 |
| Latvia (A17) | 71,66583291 | 21 |
| Poland (A24) | 71,34173781 | 22 |
| Luxembourg (A19) | 70,56402979 | 23 |
| Portugal (A25) | 70,35846656 | 24 |
| U.S.A. (A33) | 69,73695478 | 25 |
| Hungary (A12) | 69,35355296 | 26 |
| New Zealand (A22) | 69,30099996 | 27 |
| Lithuania (A18) | 68,23342102 | 28 |
| Estonia (A7) | 67,80541117 | 29 |
| Turkey (A31) | 63,46026703 | 30 |
| Meksika (A20) | 52,23065044 | 31 |
| Korea (A16) | 48,4285479 | 32 |
| Japan (A15) | 48,33746409 | 33 |

4. Discussion

In the research part of this study, some fundamental indicators of the “Better Life Index” of OECD countries were weighted by the order of importance NMV method, and each country's better life success level was evaluated with the Bulut Index. The NMV method, developed to provide solutions to criteria weighting problems, is an easy-to-use method used in cases where the order of importance and weights of the selected criteria cannot be determined (Bağcı & Sariay, 2021). The NMV method has shorter and easier application stages compared to weighting methods such as AHP, ANP and Entropy, which are widely used in the literature. At this stage, the evaluation of the findings was discussed in two parts. The criteria that make up the Better Life Index are weighted according to their importance using the NMV method. 100 thousand people ranks first among the criteria. In nearly two-thirds of OECD countries, the murder rate is below 1 per 100,000 person. However, this rate is more than three times higher in the United States and more than 20 times higher in Mexico and Colombia (OECD, 2020c). The second criterion among the criteria is the long-term unemployment rate criterion. In a meta-analysis study conducted in the literature on this subject, it is stated that as long-term unemployment increases, the level of welfare decreases, and there is a negative relationship between them (Gedikli et al., 2022). In another study, job loss leads to short-term income losses, permanent wage reductions, and worse mental and physical health outcomes, and it has been pointed out that parental job loss negatively affects children's education (Nichols, 2013). According to another

study conducted by Helliwell and Huang (2014), a 1% increase in local unemployment in the USA creates a 4% decrease in welfare (household income) (Helliwell & Huang, 2014). In third place is the housing expenditure criterion. Individuals are forced to purchase healthy food and reduce expenses related to medical care and health services because they must buy housing and pay high rent (Rowley, 2012). High housing costs are a significant concern, particularly in developing countries. In fourth place is the air pollution criterion. “A study in this field concluded that ambient particulate matter pollution ranks ninth among the foremost risk factors for the global disease burden and causes 3.1 million deaths worldwide due to respiratory, cardiovascular, and cerebrovascular diseases” (Lim et al., 2012). The life satisfaction criterion ranks fifth. Thus, “higher income is associated with higher life satisfaction” (Boarini et al., 2012). According to the results of a study, “it was determined that if the income doubled, there was a 0.3 point increase in the life satisfaction scale (on a scale with the lowest being 0 and the highest being 10)” (Sacks, 2010). Therefore, as the level of welfare increases, life satisfaction also increases. In sixth place is the average education period criterion. In OECD countries, individuals spend an average of 18 years on education. A good education provides an advantage in finding a job and increases the financial possibilities required for a good quality of life. “Unemployment affects highly educated individuals less” (OECD, 2023a). In seventh place is the rate of people who feel safe walking alone at night. This situation causes assault, loss of life and property, as well as physical pain, post-traumatic stress, and anxiety. Moreover, “one of its most significant impacts on people's well-being comes from the sense of vulnerability it creates” (OECD, 2022b). In eighth place is the rate of those satisfied with water quality. Because “many people suffer from water shortages in insufficient quantity and quality” (OECD, 2020d). Furthermore, access to clean and drinkable water is the basis of human well-being. In ninth place is the rate of those who perceive their health as good or very good. Good health provides easier access to education and the job market. This issue reduces healthcare costs and increases productivity and well-being (OECD, 2023b). In tenth place is the employment rate. “Societies with higher employment levels are also wealthier, more politically stable, and healthier” (OECD, 2021b). In eleventh place is the criterion of life expectancy at birth. The last 50 years have seen significant increases in life expectancy in OECD countries. In this regard, “further improvements in the population's health status and life expectancy can be achieved through improving the quality and performance of healthcare systems” (OECD, 2023b). In the criterion weighting process, the perceived social

support criterion ranked twelfth. The inadequacy of the social support network in society leads to limited economic opportunities, lack of communication, and, ultimately, feelings of isolation. “Social isolation also causes the disintegration of the family structure, illness, and some material and moral difficulties” (Fleche et al., 2012).

In the second part of the research, findings regarding the rankings among OECD countries were evaluated. As a result of the evaluation, ten countries came to the fore. However, the better life index rankings of the first and last four countries were found to be remarkable, and their results were discussed. Switzerland is first with 82.28 points, Finland is perfect second with 81.73 points, and Denmark is third with 81.29 points; with 80.12 points, Slovakia is in fourth place, and it is understood that they are at a reasonable level. Among the reasons why Switzerland ranks first, BI said that the employment rate, life expectancy at birth, average life satisfaction score, water quality, and murder rates are low and advantageous compared to other OECD countries. Switzerland ranks first; Employment rate, life expectancy at birth, average life satisfaction score, water quality, and low murder rates are among the reasons. It is also advantageous compared to other OECD countries. According to the results of many studies conducted in the literature on this subject, “it is suggested that employment, income generation, and meeting various psychological needs are essential for the well-being of individuals” (Jahoda, 1982). Finland ranks second because its life satisfaction average score is very high compared to other countries, its water quality is high, and its air pollution is the lowest.

Additionally, BI stated that similar results were obtained for Denmark and Slovakia, which are at a level close to Switzerland and Finland. In this context, Turkey is 30th with 63.46 points, Mexico 31st with 52.23 points, Korea ranks 32nd with 48.42 points, and Japan ranks last with 48.33 points. Even though their scores are not the same, Turkey and Mexico were seen to be in the same category because the evaluation results were thought to be similar to BI. However, one of the essential reasons why Japan and Korea ranked last in the study is that the criterion regarding the proportion of people who perceive their health as good or very good is at the lowest level in these two countries. On the other hand, while life expectancy at birth is higher in Korea than in other countries, it is understood that it is primarily at the highest level in Japan.

5. Conclusion

In this study and research section, it is once again underlined how vital and necessary the subject is by evaluating the "Better Life Index criteria" developed for OECD countries through the "Bulut Index" developed by Bulut (2017). In this context, according to the results of the research conducted on OECD countries, in order to increase the "Better Life Level", first of all, It comes to the fore to take urgent and necessary measures to reduce murder rates, long-term unemployment rates and air pollution criteria to minimum levels. Moreover, It is pointed out that criteria such as employment rate, average education period, water quality, life satisfaction, perceived social support, health status, life expectancy at birth, and feeling safe walking alone at night are necessary to reach maximum levels for the welfare and well-being of the society. In light of these evaluations, the results obtained in this research conducted in terms of the 11 criteria that constitute the "Bulut Index" better life index for OECD countries developed by Bulut (2017) will contribute to the field. In conclusion, regarding the deficiencies in the study, it may be recommended that other scientists and researchers deepen the issue with future studies and research on similar subjects and develop new and different perspectives. In addition, in the future, it is recommended that statesmen, managers, leaders, entrepreneurs, and community leaders in OECD countries take more measures to develop and improve the results of the study.

References

- Aslan, Ş., & Bolukçu, F. (2022). COVID-19 hastalığıyla mücadele sürecinde OECD ülkelerinin performanslarını bulut performans endeksiyle değerlendirme. *Sağlık ve Sosyal Refah Araştırmaları Dergisi*, 4(1), 75-96.
- Bağcı, H., & Sariay, İ. (2021). Halka açık piyasa değeri ve piyasa değerinin işletme performansındaki rolü: BİST halka arz endeksi'nde bir uygulama. *Finansal Araştırmalar ve Çalışmalar Dergisi*, 13(24), 36-54.
- Boarini, R., Comola, M., Smith, C., Manchin, R., & De Keulenaer, F. (2012). What makes for a better life? The determinants of subjective well-being in OECD countries – evidence from the Gallup World Poll. *OECD Statistics Working Papers*, 2012/03. OECD Publishing. <https://doi.org/10.1787/5k9b9ltjm937-en>
- Bulut, T. (2017). Index proposal for financial performance analysis of organized industrial zones (OIZs) legal entities: Bulut performance index. *Journal of Productivity*, 3, 29-57. <https://dergipark.org.tr/en/pub/verimlikte/issue/30386/328150>
- Bulut, T. (2022). Normalized maximum values [NMV] method. URL: <https://tevfikbulut.net/normalize-edilmis-maksimum-degerler-NMV-metodu/>
- Case, A., & Deaton, A. (2017). Mortality and morbidity in the 21st century. *Brookings Papers on Economic Activity*. <http://brookings.edu/wp-content/uploads/2017/08/casetextsp17bpea.pdf> (Accessed on 26 September 2022)
- Durand, M., & Exton, C. (2019). Adopting a well-being approach in central government: Policy mechanisms and practical tools. *Global Happiness and Well Being Policy Report*. https://s3.amazonaws.com/ghwbpr-2019/UAE/GH19_Ch8.pdf
- Ergun, H., Gülal, M., & Kılıçarslan, A. (2022). Lisanslı depoculuk sektöründe faaliyet gösteren şirketlerin işlem performanslarının çok kriterli karar verme yöntemleriyle ölçülmesi. *Muhasebe ve Finansman Dergisi*, (94), 105-132.
- Ergun, H., Sucu, M. Ç., Yaralı, C., Gülal, M., & Kılıçarslan, A. (2022). Finansal performans, kurumsal yönetim ve marka değeri arasındaki ilişki: Borsa İstanbul kurumsal yönetim endeksi kapsamındaki bankalar üzerine bir uygulama. *Nevşehir Hacı Bektaş Veli Üniversitesi SBE Dergisi*, 12(2), 852-869.
- Eurostat. (2018). European Union Statistics on Income and Living Conditions, OECD calculations, based on the sources listed in Annex 1.A. <https://ec.europa.eu/eurostat/data/database>
- Fleche, S., Smith, C., & Sorsa, P. (2012). Exploring determinants of subjective well-being in OECD countries: Evidence from the World Value Survey. *OECD Statistics Working Papers*, 2012/01. <https://www.oecd-ilibrary.org/docserver/5k9ffc6p1rvb->

- [en.pdf?expires=1708171225&id=id&acname=guest&checksum=3645770931E1F1DA5BA34440DF0CAE04](https://doi.org/10.1080/1359432X.2022.2106855) (Accessed on 26 September 2022)
- Gedikli, C., Miraglia, M., Connolly, S., Bryan, M., & Watson, D. (2022). The relationship between unemployment and well-being: An updated meta-analysis of longitudinal evidence. *European Journal of Work and Organizational Psychology*, 1-17. <https://doi.org/10.1080/1359432X.2022.2106855>
- Güden, M. (2021). Metal eşya endeksine kayıtlı şirketlerin finansal performanslarının bulut endeks performans yöntemiyle değerlendirilmesi (Master's thesis, Aydın Adnan Menderes Üniversitesi Sosyal Bilimler Enstitüsü).
- Helliwell, J. F., & Huang, H. (2014). New measures of the costs of unemployment: Evidence from the subjective well-being of 3.3 million Americans. *Economic Inquiry*, 52(4), 1485-1502.
- Jahoda, M. (1982). *Employment and unemployment*. Cambridge Books.
- Kılıçarslan, A. (2023). Yenilenebilir enerji sektörü şirketlerinin finansal performans analizi: Borsa İstanbul'da bir uygulama. *Kastamonu Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 25(1), 232-253.
- Kılıçarslan, A., & Özmen, A. Yerel yönetimlerde finansal performans yönetimi: İstanbul ve Kocaeli büyükşehir belediyeleri örneği. *Eskişehir Osmangazi Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 18(1), 289-313.
- Kiran, Ş. (2018). Sağlık kurumları finansal tablo analizlerinde kullanılacak anahtar finansal oranların belirlenmesi: Bir performans endeksi önerisi (Master's thesis, Sosyal Bilimler Enstitüsü).
- Lim, Y. H., Kim, H., Kim, J. H., Bae, S., Park, H. Y., & Hong, Y. C. (2012). Air pollution and symptoms of depression in elderly adults. *Environmental Health Perspectives*, 120(7), 1023-1028.
- Nichols, A., Mitchell, J., & Lindner, S. (2013). Consequences of long-term unemployment. *The Urban Institute*.
- OECD. (2017). *How's life? 2017: Measuring well-being*. OECD Publishing. https://doi.org/10.1787/how_life-2017-en
- OECD. (2018). *Good jobs for all in a changing world of work: The OECD jobs strategy*. OECD Publishing. <https://doi.org/10.1787/9789264308817-en>
- OECD. (2019). *Health at a glance 2019: OECD indicators*. OECD Publishing. <https://doi.org/10.1787/4dd50c09-en>
- OECD. (2020d). *Environment at a glance 2020*. OECD Publishing. <https://doi.org/10.1787/4ea7d35f-en>

- OECD. (2020a). *Work-life balance*. In *How's life? measuring well-being*. OECD Publishing. <https://doi.org/10.1787/e6597da1-en>
- OECD. (2022a). *Trust in government (indicator)*. <https://doi.org/10.1787/1de9675e-en>
- OECD. (2023a). *Education at a glance 2023: OECD indicators*. OECD Publishing. <https://doi.org/10.1787/e13b1f63-en>
- OECD. (2023b). *Health at a glance 2023: OECD indicators*. OECD Publishing. <https://doi.org/10.1787/7a7afb35-en>
- OECD. (2021b). *Better life index*. Retrieved September 25, 2023, from <https://www.oecdbetterlifeindex.org/topics/jobs/>
- OECD. (2022b). *Better life index: OECD calculations based on OECD national accounts database*. OECD Publishing. Retrieved February 05, 2023, from <https://stats.oecd.org/index.aspx?DataSetCode=BLI>
- OECD. (2020c). *Health status*. In *How's life 2020 (database)*. StatLink. <https://doi.org/10.1787/888934081321>
- OECD. (2021a). *Environment at a glance indicators*. Retrieved September 25, 2023, from <https://www.oecd.org/environment/environment-at-a-glance/>
- OECD. (2016). *The economic consequences of outdoor air pollution*. <https://doi.org/10.1787/9789264257474-en>
- OECD. (2020b). *How's life? Highlights*. Retrieved February 05, 2023, from <https://www.oecd.org/sdd/How-is-Life-2020-Highlights.pdf>
- Parmar, D. C., Stavropoulou, C., & Ioannidis, J. (2016). Health outcomes during the 2008 financial crisis in Europe: Systematic literature review. *British Medical Journal*, 354, i4588. <https://doi.org/10.1136/bmj.i4588>
- Raleigh, V. (2019). Trends in life expectancy in EU and other OECD countries: Why are improvements slowing? *OECD Health Working Papers, No. 108*. OECD Publishing. <https://doi.org/10.1787/223159ab-en>
- Rowley, S. (2012). *Housing affordability, housing stress and household well-being in Australia*. Retrieved from https://habitat.org.au/housing-and-health/?gad_source=1&gclid=Cj0KCQiAz8GuBhCxAARIsAOpzk8xTdheWeWZEpm_hxUcIrm6NmPJXjVtw4ymuZ0FIY4rUJ1vbG2D-tsaAIVcEALw_wcB (Accessed September 26, 2022)
- Sacks, W. D., Stevenson, B., & Wolfers, J. (2010). Subjective well-being, income, economic development, and growth. *National Bureau of Economic Research Working Paper No. 16441*.

- Sadoff, C., et al. (2015). *Securing water, sustaining growth: Report of the GWP/OECD task force on water security and sustainable growth*. <https://www.gwp.org/globalassets/global/about-gwp/publications/the-global-dialogue/securing-water-sustaining-growth.pdf>
- Szücs, S., Drobnič, S., den Dulk, L., & Verwiebe, R. (2011). Quality of life and satisfaction with work-life balance. In *Quality of life and work in Europe: Theory, practice and policy* (pp. 95-117). London: Palgrave Macmillan.
- Top, M., & Bulut, T. (2022). A new multi-criteria decision-making method: Bulut index-Beta (Be-β). *Journal of Productivity*, 3, 393-414. <https://doi.org/10.51551/efficiency.1031366>
- Turskis, Z., & Zavadskas, E. K. (2010). A novel method for multiple criteria analysis: Grey additive ratio assessment (ARAS-G) method. *Informatica*, 21(4), 597-610.
- United Nations. (2015). *The critical role of water in achieving the sustainable development goals: Synthesis of knowledge and recommendations for effective framing, monitoring, and capacity development*. Retrieved from <https://sustainabledevelopment.un.org/content/documents/6185Role%20of%20Water%20in%20SD%20Draft%20Version%20February%202015.pdf>
- Van Zanden, J. L., Rijpma, A., Malinowski, M., & Mira d'Ercole, M. (2020). *How's life? Measuring well-being*. OECD Publishing.