

How Happy Are Europeans? Implications for the Future Cohesion Policy

Adina-Iuliana JIGANI

Bucharest University of Economic Studies, Bucharest, Romania

adina.jigani@csie.ase.ro

Alexandra-Nicoleta CIUCU (DURNOI)

Institute for Economic Forecasting, Romanian Academy

*alexandra.ciucu@csie.ase.ro

Anca-Elena VLAD

Bucharest University of Economic Studies, Bucharest, Romania

vladanca18@stud.ase.ro

Extended abstract

Aim

Over the years, the concept of happiness has been defined in different ways, depending on the geographical region, and has acquired numerous meanings, outlined through the contributions of several research fields. In the specialized literature, this concept is considered to have a multidimensional character and has been analyzed based on aspects related to individuals' subjective perceptions of life, emotional state, as well as economic, social, and institutional factors (Helliwell et al., 2012). Another study describes happiness as a combination of several factors, such as life satisfaction and the balance between positive and negative affects (Diener, 2003). The idea presented in this study is also supported by one of the most influential researchers in psychology, who views happiness as a way of life achieved at the intersection of positive experiences and other psychological aspects, such as social relationships (Seligman, 2011). In comparative analyses between countries, the concept of happiness is measured by a set of indicators, which can be observed in the World Happiness Report (Helliwell et al., 2025). Thus, the European Union has laid the foundations for Cohesion Policies for the 2021–2027 period, aiming to reduce regional disparities and improve quality of life through economic, social, and institutional investments (“Inforegio - Report on the outcome of 2021-2027 cohesion policy programming,”). Cohesion policy includes economic growth and employment, social

inclusion, health and education, reduction of regional inequalities, quality of governance, and better public services. All these determinants are closely related to the determinants of happiness in research that proposes models for measuring happiness, as is the World Happiness Report. Thus, the cohesion policy contributes to achieving well-being by improving the socio-economic determinants of happiness.

In this report, it can be observed that life satisfaction and freedom to make life choices are the most important indicators, as they reflect each individual's perception of the quality of life and the freedom to make their own choices.

This study has as its main purpose the classification of European countries based on a set of indicators, used in the World Happiness Report, using the cluster method on panel data. The indicators used in the analysis include life ladder, log of GDP per capita, social support, healthy life expectancy at birth, freedom to make life choices, generosity, perceptions of corruption, positive affect, and negative affect. One of the significant indicators of this study is the life ladder, as it illustrates a subjective scale for the quality of life, the logarithm of GDP per capita representing the Gross Domestic Product per capita, logarithmized to reduce variation and normalize the distribution. Social support subjectively measures the degree to which a citizen can be helped by friends in case of need. Healthy life expectancy at birth is the indicator that refers to healthy life expectancy at birth, and freedom to make choices in life records binary responses for the freedom of each citizen to make choices regarding their own life. Generosity is the indicator that captures the social behavior of citizens of a state and shows the proportion of those who have made a recent charitable gesture. Corruption represents the general perception that citizens have regarding the degree of corruption within the Government and public institutions. Indicators related to positive affect and negative affect quantify the average of positive emotions, respectively, negative emotions, from the day before the questionnaire was completed (Helliwell et al., 2025).

Methodology

One of the partners supporting the publication of the World Happiness Report is the UN Sustainable Development Solutions Network. Table 1 presents the specific indicators examined in the report, detailing how each one relates to the corresponding Sustainable Development Goals (SDGs).

Table 1. Indicators

Label	Name	SDG
LL	Life ladder	SDG 3
lGDP	Log of GDP per capita	SDG 8
SS	Social support	SDG 3, SDG 10

HLEB	Healthy life expectancy at birth	SDG 3
FMLC	Freedom to make life choices	SDG 16
G	Generosity	SDG 10, SDG 17
PC	Perceptions of corruption	SDG 16
PA	Positive affect	SDG 3
NEA	Negative affect	SDG 3

Source: Authors' own research.

The research implemented the steps presented in the paper published by Wang and Lu (2021), which provides the code in the R programming language. Therefore, the first methodological step consists of determining the factorability of the data using the Kaiser-Meyer-Olkin (KMO) test, for which the Sampling Adequacy Measure (SAM) is calculated at the individual and global levels. A total value close to one indicates a higher factorability (Kaiser and Rice, 1974).

After the factorability of the indicators is established, Principal Component Analysis (PCA) can be applied in order to determine the number of common factors. By applying this analysis, information redundancy is reduced, each component taking over the maximum variance of the original variables, provided that the components are independent, that is, the correlation between them is non-existent (Jolliffe, 2002). The next methodological step is to determine the common factors by performing an orthogonal rotation, based on the Varimax method, in order to maximize the variance of the factors. The new eigenvalues obtained, together with the scores, are used to calculate the comprehensive factor score matrix, with which cluster analysis is implemented (Wang and Lu, 2021).

Cluster analysis begins by calculating the Euclidean distances between objects, using hierarchical algorithms, which are one of the most popular methods for unsupervised clustering of shapes (Arutyunova and Röglin, 2025). For a higher degree of precision in determining the number of clusters, the NbClust package was used, which consists of 30 indicators designed to recommend the optimal number of clusters (Charrad et al., 2014). The next step, after determining the number of clusters, is based on calculating the average width of the silhouette to guarantee the robustness of the results. It is considered that the clustering method was efficient when the value of this indicator is more than 0.5.

Another important step in this analysis is the illustration of the dendrogram for the best clustering method identified and creating a map to help visualize the clusters. Then, the results of the cluster analysis were compared with those of LL. The last step of the analysis was based on the presentation of the dynamics for each indicator, from the analyzed period for the determined clusters.

Results

As mentioned in the methodological section, the pre-analysis phase includes data standardization. Determining factorability is the first step in implementing factor analysis. The overall MSA value of 0.81 highlights very good factorability, which supports the use of this technique on the selected variables.

In order to determine the number of common factors, PCA was applied. Its results were illustrated in Table 2. As can be seen, only two of the components had eigenvalues greater than one, and the percentage taken up by them is quite close to 80%, which means that they can be taken into account in the analysis.

Table 2. Principal Component Analysis

	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8
SS	4.21	1.52	0.69	0.51	0.41	0.30	0.22	0.14
Proportion	0.53	0.19	0.09	0.06	0.05	0.04	0.03	0.02
Cumulative	0.53	0.72	0.80	0.87	0.92	0.95	0.98	1.00

Source: Authors' own research.

Regarding the common factors, an orthogonal rotation is performed using the Varimax method to maximize variance. Table 3 highlights the new results related to FA, the two eigenvalues being taken into account in the construction of the comprehensive factorial score.

Table 3. Factor analysis

	RC1	RC2
SS	3.72	2.00
Proportion	0.47	0.25
Cumulative	0.47	0.72

Source: Authors' own research.

In the R function, the type of distance, the linking method, and the range in which to find the number of clusters were specified. Thus, the Euclidean distance was chosen, based on linking methods, the complete distance, and Ward's distance, with the number of clusters being a minimum of two and a maximum of five. In this sense, by implementing the complete method, most indicators recommend two clusters, while Ward's method recommends four classes (Table 4).

Table 4. Identifying the number of clusters using the NbClust package

Number of recommended clusters	Complete	Ward
2	10	8
3	2	2
4	7	10
5	4	3

Source: Authors' own research.

Since different numbers of classes were recommended, average silhouette widths were calculated for the two methods of grouping countries into classes. Thus, it was observed that the value for the complete method was 0.6, a value of 0.5 indicating a good way of grouping. Therefore, the countries were grouped into two classes using the complete method.

Figure 1 illustrates the dendrogram according to which Denmark, Sweden, Ireland, Luxembourg, Finland, the Netherlands, Estonia, Austria, Germany, Belgium, France and Malta were placed in one class, while the other EU member states were included in the second cluster.

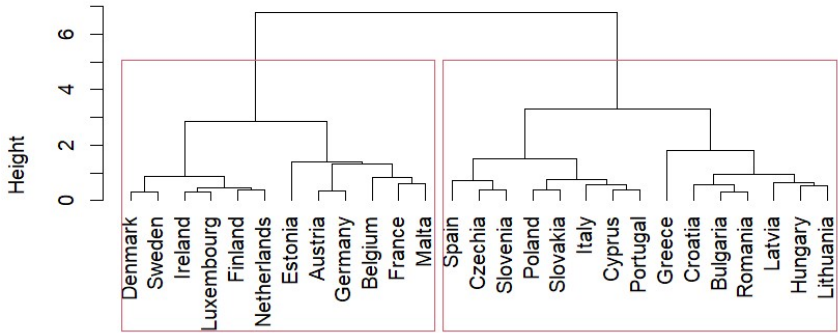


Figure 1. Dendrogram

Source: Authors' own research

The eight indicators taken in the cluster analysis are used to explain the happiness of citizens, this being expressed by the variable LL. As can be seen by comparing Figure 2 (a) and Figure 2 (b), countries with high values assigned to happiness were grouped in cluster 1.

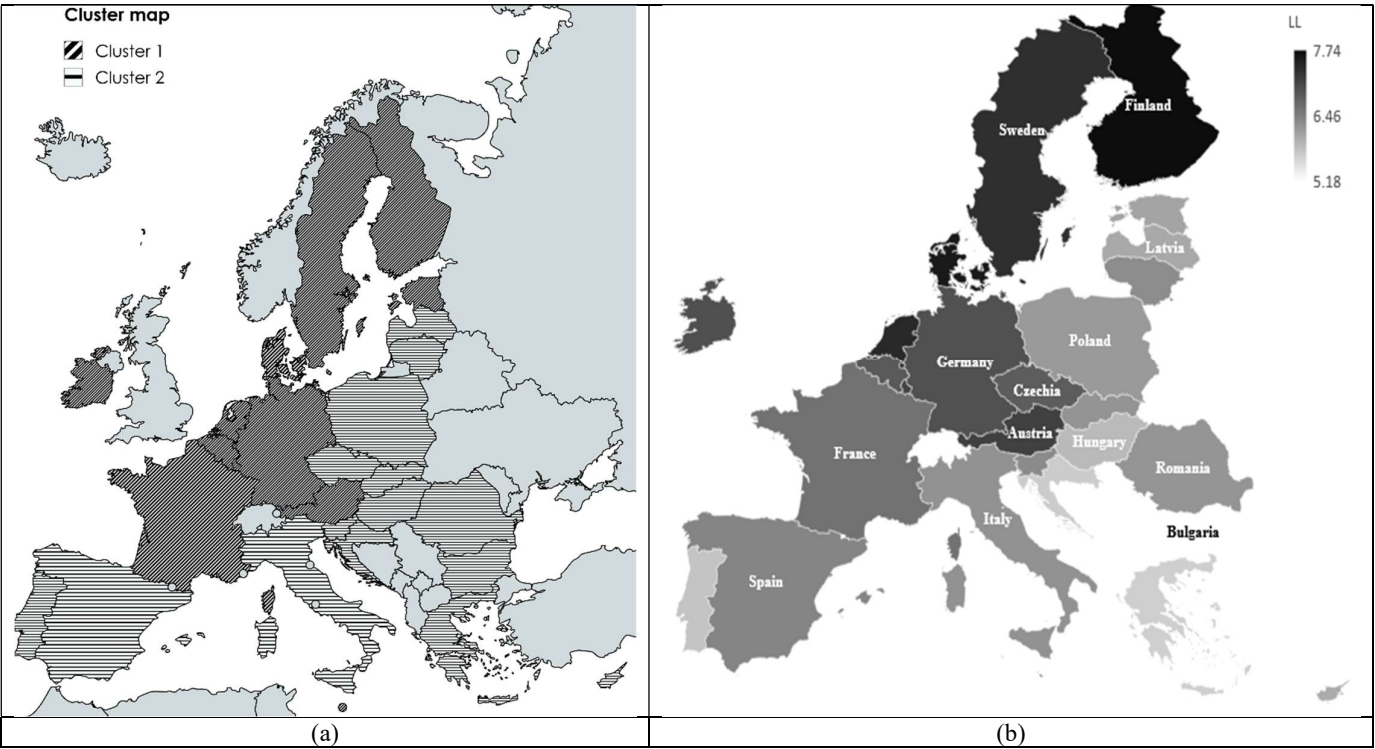


Figure 2. Cluster map

Figure 3 illustrates the dynamics of each indicator from the perspective of the two clusters in the period 2015-2022.

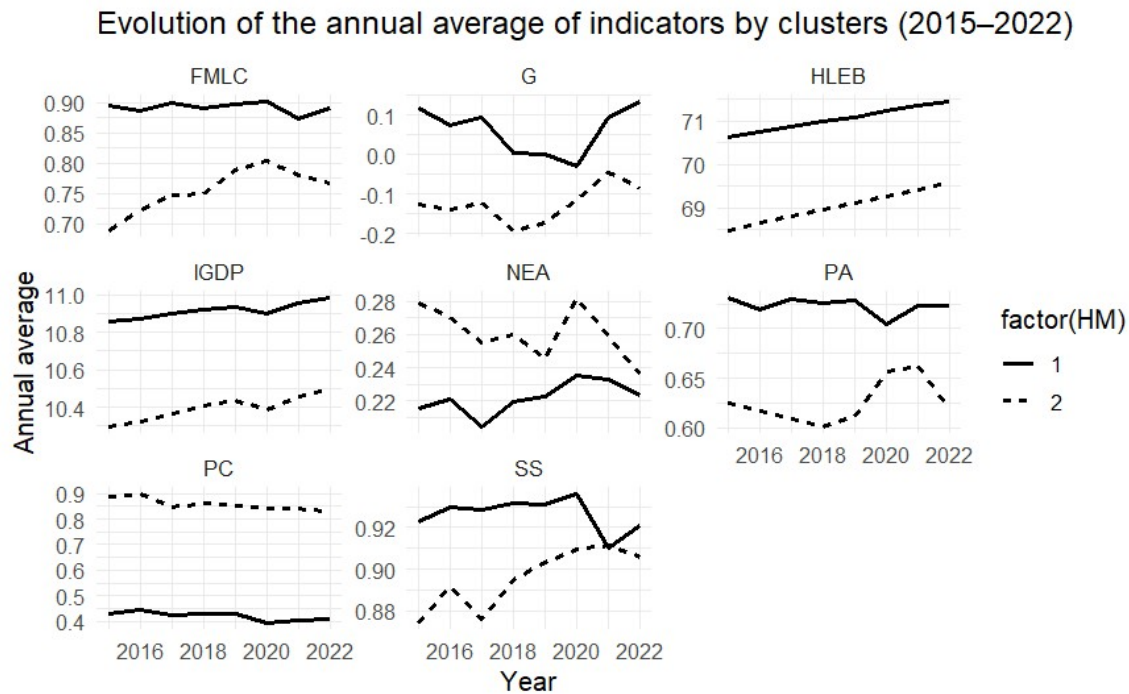


Figure 3. Trend of annual average indicators across clusters (2015–2022)

Source: Authors' own research

Thus, for the FMLC indicator, throughout the analyzed period, a much better opinion was observed among those in cluster 1, however, a decrease was noted in 2021, most likely as a result of the pandemic. In the case of cluster 2, the trend was upward until 2020, since then continuing to decrease until the end of the analyzed period. In case G, until 2020, the trend was downward in cluster 1, with a spectacular increase in 2021, the value continuing to increase in 2022.

For the second cluster, a decrease is noted in 2018 and another in 2022, otherwise, the trend is upward. For HLEB, a constant growth trend is highlighted from one year to the next, although the value assigned to cluster 1 was always higher compared to that in cluster 2. For IGDP, the trends for both clusters are similar, being characterized by an upward trend with a slight decrease in 2020. Again, cluster 2 fell below cluster 1, although, until 2019, the growth trend was higher in the case of cluster 2. PC had a slight decreasing trend in the case of the second cluster; values remained relatively constant during the period 2015-2019 for cluster 1, followed by a decrease in 2020, with values increasing slightly in the last two years investigated. Although SS was much higher in cluster 1 during the period 2015-2020, 2021 was characterized by a much lower value; even after the increase in the value in 2022, the level of the variable did

not return to that of 2020. 2021 was the year for which the average in cluster 1 was lower than that of cluster 2, which was characterized by an upward trend of this indicator during the period 2017-2021, followed by a slight decrease in SS in 2022. Finally, the affects were left, in the case of the positive ones (PA), noting that in 2020 a decrease was noted in the case of the first cluster, otherwise, the values being quite similar for this class. In the case of cluster 2, the trend was one of decrease in the period 2015-2028, followed by an increase until 2021, and a significant decrease in 2022. In the case of NEA, despite the decrease in 2017 and 2022, the trend was one of increase for this indicator, a sign that people in cluster 1 are experiencing more negative emotions. Except for the slight increase in 2018, until 2019, the trend associated with cluster 2 was a downward one, followed by a sudden increase in 2020 and an equally sudden decrease in the following period, managing to reach a minimum value in 2022. Although in cluster 2 the trend was one of decrease, it still did not reach the level of cluster 1, although in 2022 the values were quite close.

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