Is It Worth Being a Parent in Europe? A Statistical Analysis of Conditions Across European Countries

A frequently discussed topic in Poland recently is the issue of low population growth. Changes in the attitudes and life priorities of young people have contributed to the postponement of starting a family. Moreover, government efforts aimed at increasing population growth have not solved this problem. Many people are questioning whether they want to become parents in the future. An additional dilemma is the decision about where to live, with young people often considering moving abroad.

The aim of the study is to analyse the situation of parents across Europe, identify similarities between countries, and pinpoint regions where parents are treated best, as well as those where parenthood appears noticeably more challenging, because of combination of various factors.

The research was based on data from 2019-2023 concerning a range of factors related to parenthood. Special attention was paid to data regarding equal rights for fathers and mothers, as well as equality between women and men. Additionally, healthcare, Standard of quality of life and environmental conditions in each country were also considered.

**Key words: Parenthood, linear ordering, cluster analysys**

# Introduction

The age at which people decide to start a family is influenced by various factors, particularly cultural and social ones, which vary across countries. In France, having a large family is highly valued by society, yet women there typically have their first child between the ages of 30 and 31. The government actively promotes family policies, with institutional childcare playing a crucial role. This country also stands out for its extensive social support system, contributing to France’s high birth rate [1]. However, some nations encourage starting a family at a much younger age. According to the World Population Review [2], women in Bangladesh, Azerbaijan, and Nepal typically have their first child between the ages of 25 and 26. Meanwhile, in countries with rapidly growing economies and more progressive societies, the average age at which women have their first child is rising. Data collected by the United Nations Economic Commission for Europe [3] shows that in Norway, the average age for having a first child increased from 28.4 to 30 years between 2012 and 2021, in Denmark from 29.3 to 30.3 years, and in Poland from 26.6 to 28.1 years.

Since 2013, Poland has faced a negative natural population growth rate, a trend that deepened during the COVID-19 pandemic [4]. This means that the number of births is lower than the number of deaths, resulting in an aging population. Such a demographic situation presents numerous challenges for politics. First, substantial financial resources are needed to care for the elderly. These funds largely come from the state budget, which depends on the economy’s health and taxes paid by working-age individuals. With the shrinking size of this age group, the current pension system struggles, as social security contributions from workers are allocated to current retirees. Additionally, there is a growing risk that elderly individuals may lack adequate care. To counter this trend, the government aims to encourage people not to resign having children in favour of career pursuits. Several government programs are in place to support parenthood in Poland. These include the "Family 800 Plus" program, which provides a tax-free 800 PLN monthly for each child up to the age of 18, and the "Family Assistant" program, which provides financial support to municipalities that employ specialists assisting families in difficult situations. However, efforts to boost the birth rate have yet to yield the desired results.

This study attempts to identify the key factors that make a country parent friendly. To achieve this, a ranking was created, cluster analysis was conducted, and results were examined to find similarities and to categorize Europe according to the degree of supportiveness toward parents.

# Methods

Measuring supportiveness toward parents is a highly complex concept. This means that making a reliable ranking and cluster analysis is not an effortless task and requires the use of multivariate data analysis techniques. Linear ordering enables the ranking of items based on specific criteria, helping to identify the best and the worst objects in a dataset.

## 2.1 Multidimensional Scaling

Multidimensional Scaling (MDS) is a method for representing a matrix of distances between objects in an m-dimensional space as a matrix of distances between objects in a q-dimensional space where q<m, to graphically visualize the relationships between the analysed objects and interpret the results. The dimensions q is not directly observable; instead, they act as latent variables that help explain similarities and differences between the objects under study. For the purposes of graphical presentation, the linear ordering dimension q is typically set to 2. In research the SMACOF technique was used [7].

The SMACOF (Scaling by MAjorizing a COmplicated Function) algorithm is a multidimensional scaling method that minimizes an objective function, known as *stress*, through a majorization technique. This approach, called stress majorization or the Guttman Transform, ensures monotonic convergence of stress and is more robust than traditional methods like gradient descent.

The distant matrix was filled by squared Euclidean distance, presented in formula 4

|  |  |
| --- | --- |
|  | (4) |

Where i, k = 1…n are objects numbers and j = 1…m is variable number.

The index STRESS which is minimized by SMACOF is calculated according to formula 5.

|  |  |
| --- | --- |
|  | (5) |

Where i is object index, k is another object index is distance between the i-th and k-th objects (determined based on the initial data) and is distance between the i-th and k-th objects (determined based on the multidimensional scaling)

## 2.2 Cluster analysis

Cluster analysis is a set of techniques that allow for dividing a set of objects into groups that, considering the data, demonstrate distinctiveness. The idea of cluster analysis is to identify homogeneous groups within a heterogeneous set of objects.[5]

In the study, the most commonly used clustering method, hierarchical clustering, was applied. The essence of hierarchical clustering is that each element is initially treated as a separate group. Then, objects are sequentially merged to ultimately form a single group comprising all objects. In this study, the process of grouping through hierarchical clustering was visualized with a dendrogram. It is very important that number of groups is not determined before clustering, it is picked based on the dendrogram and differences between length of branches. During the research minimum variance clustering was used.

In research the Ward’s method was used. Ward's method in hierarchical clustering minimizes the variance within clusters by merging groups that result in the smallest increase in total within-cluster variance. It is a valuable choice because it tends to create clusters of similar size and ensures high cohesion within clusters, making it ideal for data with well-defined group structures.[5]

## 2.3 Linear ordering

Linear ordering is a technique that allows for arranging a set of elements in a sequence where each element has a defined position relative to others. This approach has various applications, including ranking and prioritization. [5][6]

To create the ranking, standardized sums method was used. It’s a simple and quite popular method of arranging objects in the group of non-parametric methods.

The starting point for its application is the conversion of all variables into stimulants (by multiplying destimulatns by -1). Secondly, it is absolutely needed to standardize all of variables. In this study positional standardization was used to assure comparability between factors. Standardization was conducted according to equation (1),

|  |  |
| --- | --- |
|  | (1) |

where is a standardized variable data and is a variable data pre standardized. Positionalstandardization is particularly effective when the data does not have a normal distribution.

Additionally, in this study, wages were signed to variables in order to empathize some of the key factors. Higher the wage is higher the importance of variable. Because of that, the taxonomy measure, is constructed according to formula (2)

|  |  |
| --- | --- |
|  | (2) |

where (j = 1…p) are wages specified in an appropriate way.

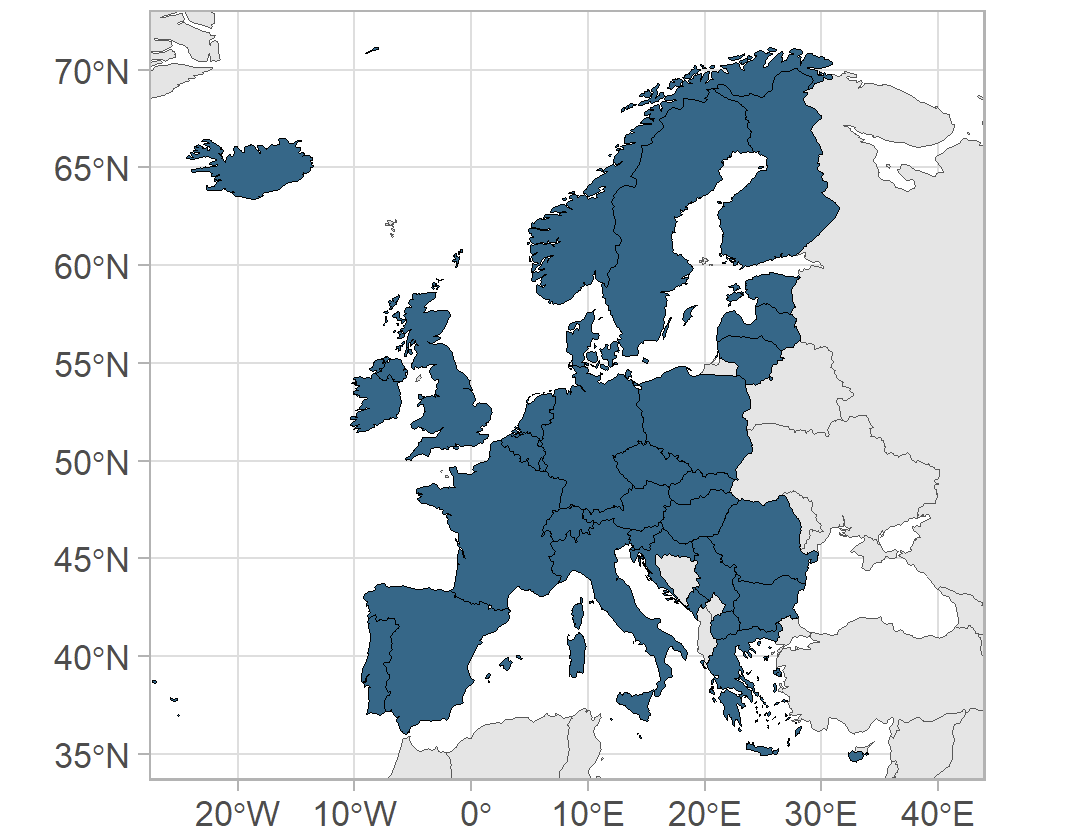
Lastly, final taxonomy measure is being created according to formula (3).

|  |  |
| --- | --- |
|  | (3) |

In that, the upper limit of the indicator is equal to one, and the lower limit is equal to zero, which gives the indicator a normalized range of values [0,1].

# Dataset analysis

Due to data availability, the study considered 33 European countries. Despite focusing on just one continent, significant difference is noticeable among countries in terms of family policy. For example, Northern European countries are known for their highly egalitarian policies and innovative education systems, which may be seen as interesting from a Polish perspective. Additionally, these countries have a high percentage of women in the workforce compared to the rest of Europe. On the other hand, countries in the Mediterranean or Eastern European regions tend to adopt more traditional approaches to family issues. All of the included countries were shown on a picture 1.



**Picture 1** Source: Own work

A key stage in the study is the identification of variables to be included in establishing the hierarchy of objects. It is recommended to support this choice with expert opinions. In the case of the conducted study, the variables were selected based on the following publications: Gromada, A., Rees, G., & Chzhen, Y. (2020), Ben-Arieh, A. (2020), and Ahrendt, D., Anderson, R., Dubois, H., Jungblut, J. M., Leončikas, T., Sándor, E., & Pöntinen, L. (2018).

Additionally, when qualifying features for the set of diagnostic features, substantive criteria (considering measurability, availability, reliability, and interpretability of features) and methodological criteria (choosing variables characterized by high variability among the subjects that are not strongly correlated with each other) were also taken into account.

To conduct this study, fourteen diagnostic variables were considered, covering four areas related to parenting: environment, support, health, and quality of life. The data was obtained from the Eurostat (data for 2023). There were little to no data gaps, so it was replaced with median of variable. Since a frequent practical problem in linear ordering is a strong positive asymmetry of selected diagnostic features, It was decided to apply winsorization [8] based on the boxplot analysis by formula 6.

|  |  |
| --- | --- |
|  | (6) |

As a result of the formal analysis (it is assumed that the level of correlation between variables cannot be greater than 70, and the coefficient of variation must be greater than 10 %) fourteen diagnostic features were obtained (Table 1).

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Description** | **Unit** | **Type** |
| SUPPORT | | | |
| Pension | Periodic cash benefits | Percentage of gross domestic product (GDP) | Stimulant |
| Dads too | Is paid leave structured to encourage working fathers to share infant caregiving responsibilities? | The coded variable takes values from 1 to 5, where 5 is the best situation | Stimulant |
| HEALTH | | | |
| Mother mortality | Number of dead women during pregnancy or giving birth | Per 1000 births | Destimulant |
| Neonatal mortality | Number of dead newborns | Per 1000 births | Destimulant |
| Suicide | Number of suicides of people 15-19 y.o. | Per 100 000 people | Destimulant |
| Unmet needs | Number of people reporting issues with access to essential medications | Per 100 000 people | Destimulant |
| QUALITY OF LIFE | | | |
| Nights | Employed persons working at nights as a percentage of the total employment | Percentage | Destimulant |
| Poverty risk | The share of persons who are at work and have an equivalised disposable income below the risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income (after social transfers). | Percentage | Destimulant |
| Global peace index | Synthetic index. Higher the index less safe country is | - | Nominant  (1) |
| Female income share | Share of female earnings in total earnings | - | Nominant  (50%) |
| Daily income | Average daily income per person | Euro | Stimulant |
| Housing costs | The median distribution of the share of total housing costs in the household's disposable income | - | Destimulant |
| ENVIROMENT | | | |
| Co2 | Co2 air contamination | Tons per capita | Destimulant |
| Forest coverage | Shere of forest areas in total country area | Percentage | Stimulant |

**Table 1** Source: Own Work

It was decided that not all of the variables are equally important for the research problem, and wages should be used. Wages were selected to mark the importance of every category that was consider in analysis. Categories are grouped from most to least influential, and in parentheses, the assigned weight is multiplied by the number of diagnostic variables in that category to reflect the contribution it will make when calculating the ranking or performing cluster analysis, Table (2) contains individual wage for every variable. For example, if weights were not assigned individually to the variable, each would have an equal weight of approximately 0.071.

* SUPPORT (
* HEALTH ()
* QUALITY OF LIFE ()
* ENVIRONMENT ()

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Wage** | **Variable** | **Wage** |
| Unmet needs | 0.08 | Suicide | 0.08 |
| Pension | 0.15 | Forest coverage | 0.07 |
| Housing cost | 0.04 | Dads too | 0.15 |
| Daily income | 0.04 | Nights | 0.04 |
| Co2 | 0.07 | Poverty risk | 0.04 |
| Mother mortality | 0.08 | Global peace index | 0.04 |
| Female income share | 0.04 | Neonatal mortality | 0.08 |

**Table 2** Source: Own calculation

Category SUPPORT was chosen as the most important one, because the ability of both parents to participate in the child-raising process was recognized as the most important factor in the analysis. This is measured by both variables included in this category. Second very important one is category HEALTH, which indicates if country cares for mother and infants’ well-being during hospitalization. In the light of previous two categories, the following two categories were considered less significant but still influential.

# Results

## 4.1 Ranking

A final ranking for the specified diagnostic variables and 33 European countries was constructed using the standardized sums method. The results were displayed in Table 3. Creating such a ranking helps to provide a clear and comprehensive comparison of how individual countries perform in terms of their support for parenting. It simplifies complex, multidimensional data into an easily interpretable format, allowing researchers to identify leaders and laggards in promoting favourable conditions for families. Additionally, the ranking highlights disparities between countries, helping to pinpoint areas requiring improvement and fostering the exchange of best practices among nations.

|  |  |  |
| --- | --- | --- |
| **Place** | **Country** | **Value** |
| 1 | France | 1.00 |
| 2 | Germany | 0.99 |
| 3 | Netherlands | 0.97 |
| 4 | Austria | 0.91 |
| 5 | Poland | 0.91 |
| 6 | Finland | 0.85 |
| 7 | Spain | 0.84 |
| 8 | Italy | 0.83 |
| 9 | Sweden | 0.80 |
| 10 | Denmark | 0.73 |
| 11 | Belgium | 0.72 |
| 12 | Cyprus | 0.70 |
| 13 | Switzerland | 0.70 |
| 14 | Czechia | 0.68 |
| 15 | Croatia | 0.67 |
| 16 | Montenegro | 0.64 |
| 17 | Greece | 0.64 |
| 18 | Slovenia | 0.58 |
| 19 | Portugal | 0.57 |
| 20 | United Kingdom | 0.56 |
| 21 | Iceland | 0.53 |
| 22 | Ireland | 0.52 |
| 23 | Norway | 0.47 |
| 24 | North Macedonia | 0.47 |
| 25 | Slovakia | 0.43 |
| 26 | Luxembourg | 0.40 |
| 27 | Bulgaria | 0.35 |
| 28 | Serbia | 0.34 |
| 29 | Estonia | 0.32 |
| 30 | Lithuania | 0.25 |
| 31 | Romania | 0.23 |
| 32 | Hungary | 0.21 |
| 33 | Latvia | 0.00 |

**Table 3** Source: Own work

In the next stage, based on the results of linear ordering, European countries were divided into four groups in terms of being best to life for parents. To achieve this goal, the three-means method will be considered:

– group I contains the best countries, i.e.:

|  |  |
| --- | --- |
|  | (7) |

– group II contains countries with above average, i.e.:

|  |  |
| --- | --- |
|  | (8) |

– group III contains countries with average, i.e.:

|  |  |
| --- | --- |
|  | (9) |

– group IV contains the worst countries, i.e.:

|  |  |
| --- | --- |
|  | (10) |

where 𝑀𝑆 and sd(𝑀𝑆) are arithmetic mean and standard deviation of vector 𝑀𝑆𝑖, respectively.

The results of three-means method were visualized on picture 2-3. Picture 3 is a result of Multidimensional scaling. Multidimensional Scaling (MDS) provides a powerful tool for visualizing the similarities or dissimilarities between countries in the context of their favourability towards parenting. By transforming complex, high-dimensional data into a two- or three-dimensional map, MDS allows us to observe how closely related countries are based on the selected indicators, such as parental leave policies, child support benefits, access to healthcare, or general quality of life for families. Countries positioned close to one another on the MDS map (which was shown on Picture 3) share similar characteristics or policies, suggesting comparable conditions for parenting. Conversely, countries that appear farther apart exhibit significant differences in their support for parents. This visualization helps to identify clusters of nations with similar parenting environments and outliers that stand apart due to unique policies or challenges. By providing a clear spatial representation of relationships between countries, MDS enhances our understanding of the underlying patterns and can guide further analysis or policy discussions aimed at improving parenting conditions across Europe.

A map of europe with different colors

Description automatically generated

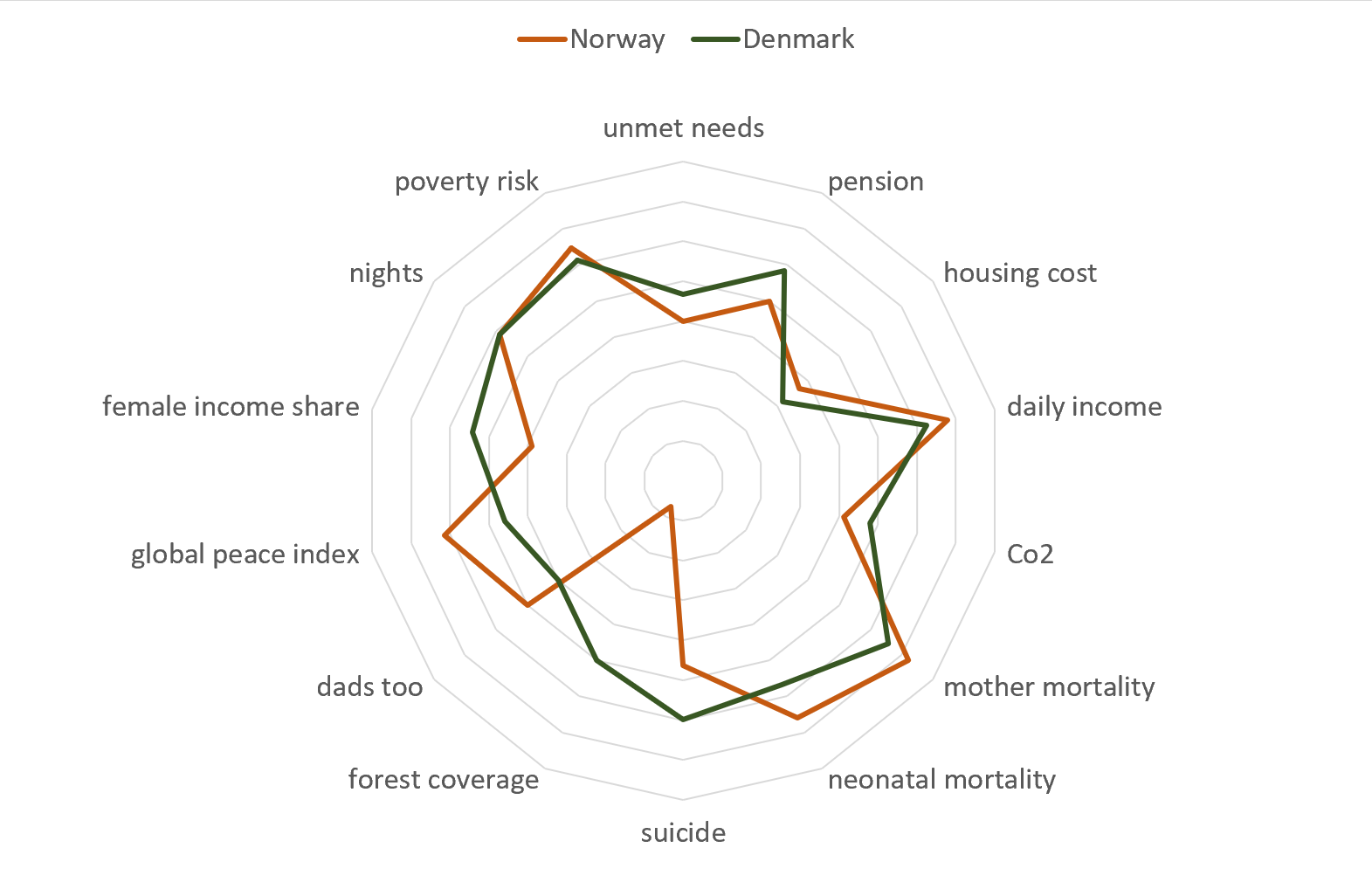
**Picture 2** Source: Own work

A grid with different colored dots

Description automatically generated with medium confidence

**Picture 3** Source: Own work

Surprisingly, Northern and Scandinavian part of Europe is not in the “green” group, furthermore, as picture 3 reveals, those countries are not so similar with one definitely unique country: Norway. For the purpose of identification factors that’s vary Norway from other countries, radar chart was made, with Norway and with typical country to this region (Denmark). The data was transformed to make the radar chart easier to interpret. The farther the line extends from the center, the better the factor performs. Countries with a larger area enclosed by the line on the radar chart indicate stronger performance compared to those with smaller areas.



**Picture 4** Source: Own work

The most striking category where Denmark stands out is Environment. Norway, in comparison, shows notably poorer performance in this area, with lower forest coverage and higher CO₂ emissions. Additionally, healthcare in Norway appears to fall short due to a higher suicide rate and a greater percentage of unmet medical needs, which highlights disparities in access and support within the healthcare sector. These differences suggest that while Denmark maintains a more sustainable and supportive environment for well-being, Norway faces challenges in both environmental sustainability and healthcare accessibility in comparison to Northern European countries.

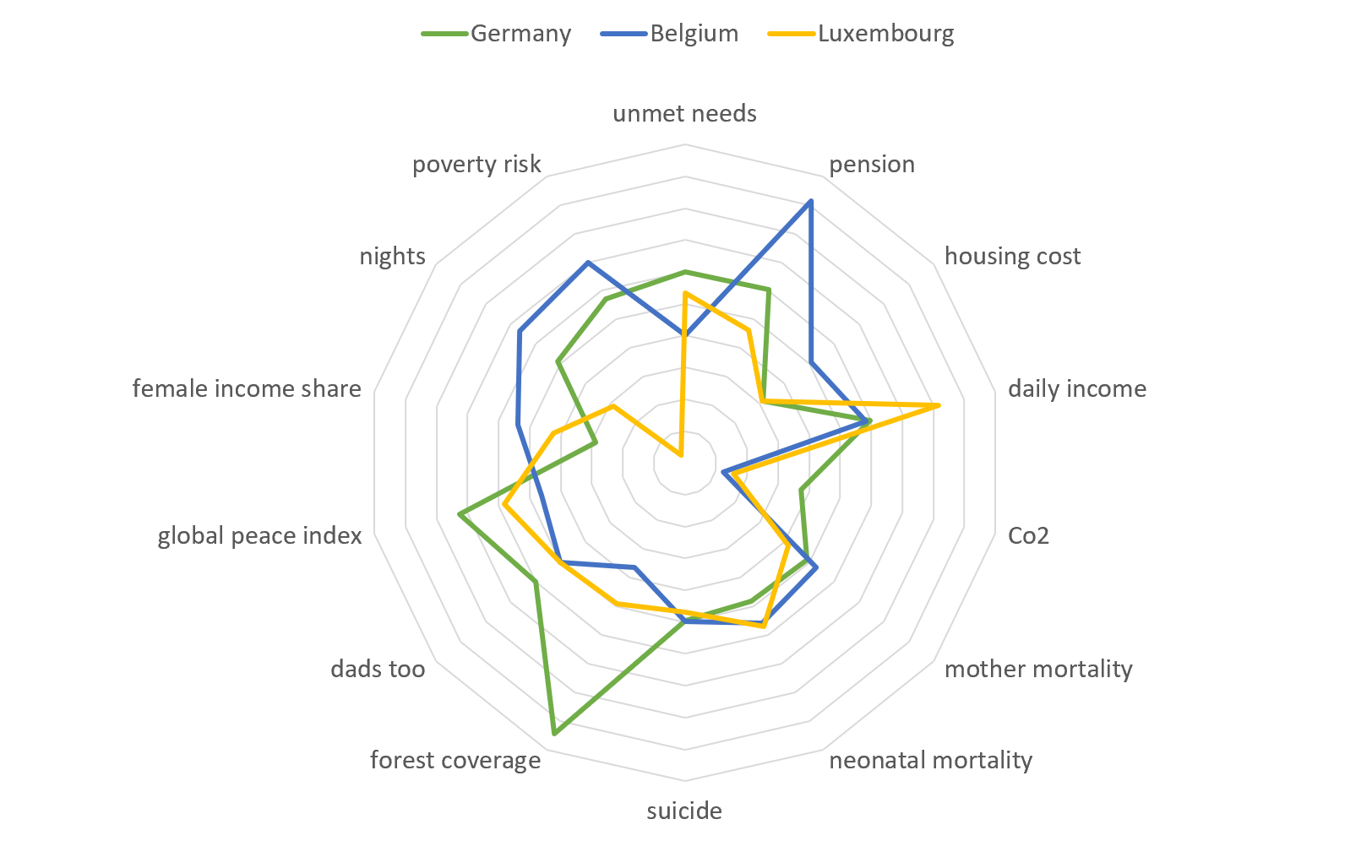
Eastern Europe seems like the worst region of Europe to bear children, with one exception being Poland. The whole region appears highly diverse. Although these countries belong to the same, lowest-rated group, they are significantly more spread out on picture 3 compared to, for example, the previously discussed Northen European countries. To identify the factors that make Poland stand out so distinctly, radar chart was created, for Poland and for Latvia.

A diagram of a star with blue lines and white text

Description automatically generated

The area enclosed by the yellow line representing Poland is noticeably larger than that of Latvia, indicating stronger overall performance across key factors. In particular, Poland excels in healthcare, with only one factor—neonatal mortality—ranking slightly worse than in Latvia. Furthermore, Poland shows a more supportive and positive work environment, suggesting a healthier work culture and better support for employees. These advantages proves that Poland provides a more favourable setting for families, combining improved healthcare outcomes with a work culture that prioritizes stability and support.

In the study, Western Europe emerged as a highly parent-friendly region, as demonstrated by the ranking and clustering results. On picture 3, the countries are close enough to each other to be considered genuinely similar, with the exception of Belgium and Luxembourg. These two countries stand out significantly, displaying a much lower level of parent-friendliness. To identify the factors contributing to this disparity, radar charts were created for Belgium, Luxembourg, and Germany (considered a representative Western European country).



Firstly, it’s clear that Luxembourg performs significantly worse than the other two countries, excelling in only one category—daily income. Luxembourg ranks as the least favourable country for parents in Western Europe, mainly due to high poverty risk, elevated housing costs, and poor environmental conditions. Although Belgium and Germany are not entirely similar, both offer a supportive environment for parents. Germany stands out for its peaceful atmosphere, stronger environmental quality, and favourable family policies. Meanwhile, Belgium excels in promoting work-life balance and providing robust financial support for families.

Mediterranean Europe countries are spread across picture 3. Although it indicates significant differences between them, most of me mediterranean Europe countries were classified in group II (above average).

## Cluster analysis

Based on the analysis of the dendrogram illustrating hierarchical clustering using the minimum variance method, a division into four groups was selected. This method, which minimizes the variance within each cluster, allowed for a clear differentiation between countries based on their parental support conditions. The dendrogram visually represents the relationships between countries, showing how closely or distantly they cluster based on the selected diagnostic variables. By cutting the dendrogram at a specific point, we were able to identify four distinct groups of countries, each sharing similar characteristics in terms of policies and support structures for parents. These groups provide valuable insights into the varying levels of parental support across Europe, highlighting regions or countries where policies might need adjustment to better support families. The division into four clusters also enables more targeted comparisons and policy recommendations, as countries within the same group are likely to face similar challenges and opportunities in fostering a family-friendly environment.

A diagram of a family tree

Description automatically generated

**Picture 5** Source: Own work

A map of europe with different colored countries/regions

Description automatically generated

**Picture 6** Source: Own work

Additionally, table was created to combine the ranking results with the cluster analysis, allowing for a more comprehensive interpretation and improved assessment of the situation of parents in European countries.

|  |  |  |
| --- | --- | --- |
| **Position in ranking** | **Groups (three-means method)** | **Country** |
| CLUSTER 1 | | |
| 1 | Group I (the best) | France |
| 2 | Group I (the best) | Germany |
| 3 | Group I (the best) | Netherlands |
| 4 | Group I (the best) | Austria |
| 13 | Group II (above average) | Switzerland |
| CLUSTER 2 | | |
| 6 | Group II (above average) | Finland |
| 7 | Group II (above average) | Spain |
| 8 | Group II (above average) | Italy |
| 9 | Group II (above average) | Sweden |
| 10 | Group II (above average) | Denmark |
| 11 | Group II (above average) | Belgium |
| 12 | Group II (above average) | Cyprus |
| 18 | Group III (belove average) | Slovenia |
| 20 | Group III (belove average) | United Kingdom |
| 21 | Group III (belove average) | Iceland |
| 22 | Group III (belove average) | Ireland |
| 23 | Group III (belove average) | Norway |
| 26 | Group III (belove average) | Luxembourg |
| CLUSTER 3 | | |
| 5 | Group I (the best) | Poland |
| 14 | Group II (above average) | Czechia |
| 15 | Group II (above average) | Croatia |
| 16 | Group II (above average) | Montenegro |
| 17 | Group II (above average) | Greece |
| 24 | Group III (belove average) | North Macedonia |
| 25 | Group III (belove average) | Slovakia |
| 27 | Group III (belove average) | Bulgaria |
| 28 | Group IV (the worst) | Serbia |
| 31 | Group IV (the worst) | Romania |
| CLUSTER 4 | | |
| 19 | Group III (belove average) | Portugal |
| 29 | Group IV (the worst) | Estonia |
| 30 | Group IV (the worst) | Lithuania |
| 32 | Group IV (the worst) | Hungary |
| 33 | Group IV (the worst) | Latvia |

**Table 4** Source: Own work

As can be seen from Table 4, linear ordering results corresponds with clustering analysis very well. Typically, countries with similar positions in ranking, were put into the same clusters. The first cluster seems to be a group of the best countries to become a parent with only one country from a group II. Cluster 2 and cluster 3 seems to be average groups with slightly better cluster 2, (in further analysis it is establish what makes groups unique) and the cluster 4 is a group of lest favourable countries for parents with only one country (Portugal) from group III. Questionable appearances in groups are for sure Switzerland in cluster 1 with 13th position in ranking and Poland among countries from worsen half of ranking in cluster 3 with 5th position in ranking.

To identify the strengths and weaknesses of each cluster, the mean and variability of each diagnostic variable within a single cluster were calculated. This approach aims to highlight the characteristics that distinguish each cluster. The obtained results were presented in Table 5.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Cluster 1** | | **Cluster 2** | | **Cluster 3** | | **Cluster 4** | |
| **Variable** | **Mean** | **Coefficient of variation** | **Mean** | **Coefficient of variation** | **Mean** | **Coefficient of variation** | **Mean** | **Coefficient of variation** |
| Unmet needs | 0.51 | 125.25 | 0.50 | 89.19 | 0.53 | 83.36 | 0.65 | 85.31 |
| Pension | 13.20 | 12.16 | 11.29 | 29.34 | 9.73 | 25.65 | 8.86 | 34.12 |
| Housing cost | 16.30 | 23.54 | 14.42 | 29.19 | 16.37 | 30.49 | 11.22 | 21.51 |
| Daily income | 69.54 | 8.90 | 65.00 | 18.39 | 29.19 | 31.10 | 40.88 | 12.75 |
| Co2 | 9.00 | 21.92 | 8.40 | 28.82 | 5.84 | 35.49 | 7.24 | 29.10 |
| Mother mortality | 4.62 | 22.43 | 3.5 | 47.76 | 6.60 | 46.61 | 7.48 | 43.50 |
| Female income share | 0.36 | 6.76 | 0.40 | 5.52 | 0.40 | 4.60 | 0.43 | 2.34 |
| Suicide | 5.52 | 44.27 | 5.30 | 58.84 | 3.90 | 35.19 | 6.91 | 52.10 |
| Forest coverage | 59.41 | 13.75 | 27.89 | 35.60 | 38.19 | 25.85 | 10.28 | 56.34 |
| Dads too | 3.80 | 43.24 | 3.76 | 28.96 | 3.40 | 24.80 | 3.60 | 24.84 |
| Nights | 4.38 | 23.80 | 4.73 | 29.50 | 5.01 | 37.80 | 4.20 | 37.60 |
| Poverty risk | 7.24 | 19.67 | 7.39 | 22.24 | 8.71 | 36.93 | 8.86 | 16.21 |
| Global peace index | 1.12 | 14.40 | 1.28 | 16.42 | 1.50 | 15.34 | 1.38 | 9.94 |
| Neonatal mortality | 2.46 | 8.04 | 1.75 | 30.78 | 2.56 | 31.95 | 1.72 | 28.35 |

**Table 5** Source: Own work

Starting with the identification of the first cluster, this group consists of nations from Western Europe. Those are countries with high financial support for families, the highest income levels, and the lowest risk of being unable to sustain themselves from their earnings. In summary, the most characteristic feature of the countries in the first cluster is a strong overall socioeconomic stability for families. That would explain why Switzerland was assigned to this particular group.

Switzerland generally provides socioeconomic stability for families. It is characterized by high income levels and low unemployment rates. Additionally, while the level of family benefits, such as child allowances, may be lower than in countries with more developed family policies like the Nordic countries, the economic stability and high standard of living enable families in Switzerland to enjoy favourable conditions for living and development [9]. The reason behind such a low placement in a ranking is very high value of unmet needs for medication (0.9 while the average is approximately 0.55), one of the lowest female income shares (0.35) and very high Co2 air contamination.

The second cluster mainly consists of Scandinavian and Northern European countries, though Spain, Italy or Cyprus appears less typical in terms of geographic location. The defining characteristic of this cluster is the effectiveness of the healthcare sector, evidenced by the lowest maternal and infant mortality rates and a very low rate of unmet medical needs. This suggests that countries in this cluster prioritize accessible, high-quality healthcare, making them particularly supportive environments for parents and young families, although the suicide rate is not significantly lower than in other clusters. This cluster is made of developed countries with also high pensions and daily income like the first cluster.

The third cluster comprises countries from Eastern and Mediterranean Europe, which is not surprising given that these regions tend to take a more traditional approach to family matters compared to the rest of Europe. Countries in this cluster are characterized by very high housing costs relative to the lowest average wages. Additionally, they exhibit the highest poverty risk, a high percentage of night work, and minimal financial support for families from the state.

This cluster clearly reflects countries with a poor work culture, where employees often face a lack of respect in the workplace, characterized by an intense “grind culture.” This environment suggests an underlying weak economic state, with high demands placed on workers yet little structural support or financial aid for families. This challenging work environment seems embedded in the national mentality, perpetuating a cycle of economic strain and low quality of life that impacts family well-being. That’s why Poland was assigned to this cluster, despite such high place in ranking.

Cluster 4 includes countries such as Portugal, Estonia, Lithuania, Latvia, and Hungary, all of which share significant social and economic challenges. These nations are marked by limited healthcare access, evident in high rates of unmet medical needs and maternal mortality, as well as a troublingly high youth suicide rate. Financial support for families is minimal, and the population faces a substantial poverty risk. Together, these factors reflect an overall low quality of life and economic strain, with limited social infrastructure to support families, contributing to a challenging environment for parenthood and family well-being.

# 5. Conclusions

The aim of the work was to use multivariate data analysis techniques to build a ranking of countries in Europe in terms of the level of attractiveness for parents, as well as identify similarities between them. As part of the empirical research, appropriate techniques are used, and the obtained results indicate their influence on the obtained form of ranking or clustering.

Various factors were considered in the study, to reflect complexity of the problem. Clustering reflected ranking result quite well, underlining that geographical location is relevant in terms of culture and traditions, but also economic or environmental state of countries. Surprisingly, is was not always the case, with several outliers.

In conclusion, while some countries in Europe have developed strong systems to support parents, others still face significant challenges. The results of this study provide a foundation for future research, enabling policymakers to focus on evidence-based solutions that could help bridge the gaps in parental support. Additionally, this analysis highlights the importance of international collaboration and knowledge-sharing, as countries with similar challenges can benefit from exchanging best practices and experiences.

BIBLIOGRAPHY

[1] Nauka w Polsce, Francja nadal współliderką pod względem dzietności w Europie, https://naukawpolsce.pl/aktualnosci/news,401778,francja-nadal-wspolliderka-pod-wzgledem-dzietnosci-w-europie.html [accessed: 16.02.2024]

[2] World Population Review, Average Age of Having First Child by Country 2024, https://worldpopulationreview.com/country-rankings/average-age-of-having-first-child-by-country [accessed: 14.02.2024]

[3] United Nations Economic Commission for Europe, Mean age of women at birth of first child, https://w3.unece.org/PXWeb/en/Table?IndicatorCode=34 [accessed: 16.02.2024]

[4] Główny Urząd Statystyczny, Sytuacja demograficzna Polski do roku 2022, https://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc/sytuacja-demograficzna-polski-do-roku-2022,40,3.html [accessed: 16.02.2024]

[5] Balicki A. (2009), *Statystyczna analiza wielowymiarowa i jej zastosowania społeczno-ekonomiczne*, Wydawnictwo UG, Gdańsk

[6] Wolak J., *The use of the spatial taxonomic measure of development to assess the tourist attractiveness of districts of the Lesser Poland Province*

[7]Wizualizacja wyników porządkowania liniowego dla Walesiak Marek: danych porządkowych z wykorzystaniem skalowania wielowymiarowego, Przegląd Statystyczny, vol. 64, nr 1, 2017, s. 5-19

[8] Lien, D., & Balakrishnan, N. (2005). On regression analysis with data cleaning via trimming, winsorization, and dichotomization. *Communications in Statistics—Simulation and Computation®*, *34*(4), 839-849.

[9] Bernard, M., Braunschweig, G., Fegg, M. J., & Borasio, G. D. (2015). Meaning in life and perceived quality of life in Switzerland: results of a representative survey in the German, French and Italian regions. *Health and quality of life outcomes*, *13*, 1-10.