WHERE IS THE BEST PLACE TO BECOME A PARENT? RANKING OF EUROPIAN COUNTRIES FAVORABLE TO PARENTHOOD

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: jescze nie wiem jakie**

# 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 policymakers. 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 forgo having children in favour of career pursuits. Several government programs are in place to support parenthood in Poland. These include the "Family 500 Plus" program, which provides a tax-free 500 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 [5] [6] [7]

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.

## 2.1 Linear ordering

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. 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. TUTAJ NAPISAĆ JAKA JEST RÓŻNICA MIĘDZY POZYCYJNĄ A ZWYKŁĄ ( narazie nie mam pojecia).

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].

## 2.2 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.

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.

In order to assess quality of multidimensional scaling STRESS index was used 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)

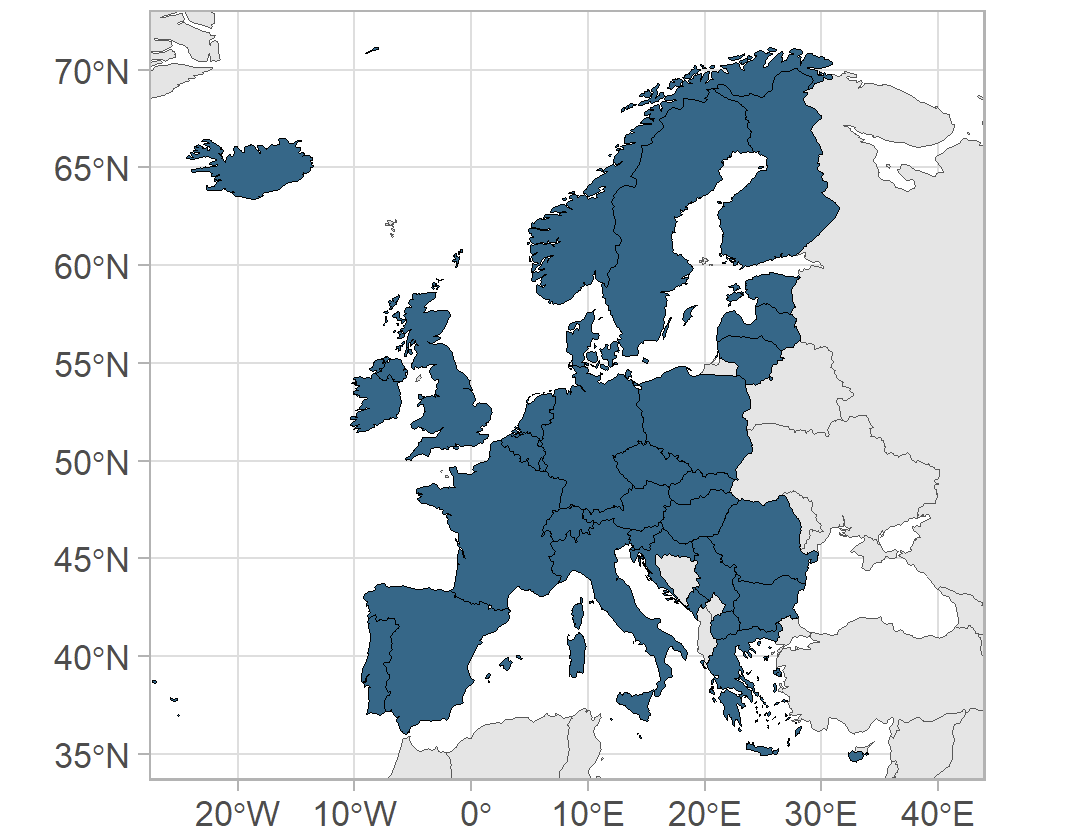
## 2.3 Cluster analysis

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.

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.

# 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), *Worlds of influence: Understanding what shapes child well-being in rich countries*, United Nations Children’s Fund.
* Ben-Arieh, A. (2020), *Measuring and monitoring the well-being of young children around the world*, Paper commissioned for the EFA Global Monitoring Report, 9-22.
* Ahrendt, D., Anderson, R., Dubois, H., Jungblut, J. M., Leončikas, T., Sándor, E., & Pöntinen, L. (2018), *European quality of life survey 2016*.

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 there were 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 limit high values to the value of the upper whisker 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-rasing 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 4.

|  |  |  |
| --- | --- | --- |
| **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 will be 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 most attractive districts, i.e.:

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

– group II contains districts with above average tourist attractiveness, i.e.:

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

– group III contains districts with average tourist attractiveness, i.e.:

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

– group IV contains districts with low tourist attractiveness, i.e.:

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

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

## Cluster analysis

Based on the analysis of the dendrogram illustrating hierarchical clustering using minimum variance method, a division into four groups was selected.

A diagram of a family tree

Description automatically generated

**Picture 2** Source: Own work

A map of europe with different colored countries/regions

Description automatically generated

**Picture 3** Source: Own work

**Picture 4** 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** | **Country** |
| CLUSTER 1 | |
| 1 | France |
| 2 | Germany |
| 3 | Netherlands |
| 4 | Austria |
| 13 | Switzerland |
| CLUSTER 2 | |
| 6 | Finland |
| 7 | Spain |
| 8 | Italy |
| 9 | Sweden |
| 10 | Denmark |
| 11 | Belgium |
| 12 | Cyprus |
| 18 | Slovenia |
| 20 | United Kingdom |
| 21 | Iceland |
| 22 | Ireland |
| 23 | Norway |
| 26 | Luxembourg |
| CLUSTER 3 | |
| 5 | Poland |
| 14 | Czechia |
| 15 | Croatia |
| 16 | Montenegro |
| 17 | Greece |
| 24 | North Macedonia |
| 25 | Slovakia |
| 27 | Bulgaria |
| 28 | Serbia |
| 31 | Romania |
| CLUSTER 4 | |
| 19 | Portugal |
| 29 | Estonia |
| 30 | Lithuania |
| 32 | Hungary |
| 33 | 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 groups. The first cluster seems to be a group of the best countries to become a parent, 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. 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 group, 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 and Table 6.

Mean

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **Cluster 1** | **Cluster 2** | **Cluster3** | **Cluster4** |
| Unmet needs | 0.51 | 0.50 | 0.53 | 0.65 |
| Pension | 13.20 | 11.29 | 9.73 | 8.86 |
| Housing cost | 16.30 | 14.42 | 16.37 | 11.22 |
| Daily income | 69.54 | 65.00 | 29.19 | 40.88 |
| Co2 | 9.00 | 8.40 | 5.84 | 7.24 |
| Mother mortality | 4.62 | 3.5 | 6.60 | 7.48 |
| Female income share | 0.36 | 0.40 | 0.40 | 0.43 |
| Suicide | 5.52 | 5.30 | 3.90 | 6.91 |
| Forest coverage | 59.41 | 27.89 | 38.19 | 10.28 |
| Dads too | 3.80 | 3.76 | 3.40 | 3.60 |
| Nights | 4.38 | 4.73 | 5.01 | 4.20 |
| Poverty risk | 7.24 | 7.39 | 8.71 | 8.86 |
| Global peace index | 1.12 | 1.28 | 1.50 | 1.38 |
| Neonatal mortality | 2.46 | 1.75 | 2.56 | 1.72 |

**Table 5** Source: Own work

Variability

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **Cluster 1** | **Cluster 2** | **Cluster3** | **Cluster4** |
| Unmet needs | 125.25 | 89.19 | 83.36 | 85.31 |
| Pension | 12.16 | 29.34 | 25.65 | 34.12 |
| Housing cost | 23.54 | 29.19 | 30.49 | 21.51 |
| Daily income | 8.90 | 18.39 | 31.10 | 12.75 |
| Co2 | 21.92 | 28.82 | 35.49 | 29.10 |
| Mother mortality | 22.43 | 47.76 | 46.61 | 43.50 |
| Female income share | 6.76 | 5.52 | 4.60 | 2.34 |
| Suicide | 44.27 | 58.84 | 35.19 | 52.10 |
| Forest coverage | 13.75 | 35.60 | 25.85 | 56.34 |
| Dads too | 43.24 | 28.96 | 24.80 | 24.84 |
| Nights | 23.80 | 29.50 | 37.80 | 37.60 |
| Poverty risk | 19.67 | 22.24 | 36.93 | 16.21 |
| Global peace index | 14.40 | 16.42 | 15.34 | 9.94 |
| Neonatal mortality | 8.04 | 30.78 | 31.95 | 28.35 |

**Table 6** 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 [8]. 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 share (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

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