

SOCIO-ECONOMIC DEVELOPMENT OF POLAND AGAINST THE BACKGROUND OF EUROPEAN UNION COUNTRIES

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Purpose: The main purpose of this article is to assess the level of socio-economic development in Poland, with particular emphasis on its position relative to other EU Member States between 2014 and 2023.

Methodology: The study was based on a review of the relevant literature and an analysis of socio-economic data from the following databases: Eurostat, the Happy Planet Index and the World Bank. Due to the complex nature of socio-economic development, tools from Multidimensional Statistical Analysis (MSA) were employed, specifically the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). A synthetic socio-economic development index (SEDI) was constructed on the basis of selected indicators. The analysis covered the years 2014–2023, which enabled an assessment of the dynamics of the phenomenon both in Poland and in other EU countries.

Findings: The analysis revealed an improvement in Poland's socio-economic development between 2014 and 2023; however, overall, Poland still ranks towards the bottom of the list of Member States. The constructed socio-economic development index enabled the presentation of Poland's position relative to other EU Member States. At the same time, it was found that significant disparities in socio-economic development persist between the countries of Northern and Western Europe and those of Central and Eastern Europe.

Practical implications: A practical application of the research could be to draw the attention of public authorities to the monitoring of development processes and the identification of areas requiring support. The proposed synthetic approach could also be used in comparative analyses of development levels at an international level.

Originality: This article presents the construction of a synthetic socio-economic development index (SEDI) and the application of multidimensional statistical analysis to assess Poland's position relative to other EU countries. The study also provides an empirical assessment of the extent of spatial diversity in socio-economic development within the EU.

Keywords: socio-economic development, Poland, European Union, Multidimensional Statistical Analysis, spatial diversity.

Category of the paper: research paper.

1. Introduction

Socio-economic development is the broadest concept relating to the development trends of a given territorial unit, and maximising it is the primary goal of all the world's economies. This concept is complex in nature; therefore, interpreting it correctly requires an analysis of its individual components. Economic development is a long-term process of internal social and economic transformation that fosters the emergence of a society striving to improve its material circumstances. It involves creating conditions favourable to investment in physical, human and intellectual capital, which ensures its continuous accumulation and the country's further development (Nasiłowski, 2004). Social development is a process of expanding human opportunities and choices, which leads to an improvement in the quality of life, increased prosperity and greater access to the resources necessary for a dignified existence (UNDP, 1990).

Overall, socio-economic development encompasses the totality of changes affecting society and the economy (Schumpeter, 1960). On a global scale, significant differences in the level of socio-economic development are evident, influenced by a range of factors. Factors of regional development include: human, social, material and financial capital, as well as innovation (Churski, Perdał, 2008). The causes of development are also classified according to their origin: political, economic, social, natural, legal and reputational (Parysek, 2021). Churski et al. (2018) also identify megatrends in the contemporary economic landscape that influence classic factors such as: transformation, economic integration, globalisation and post modernisation.

In recent years, the European Union has faced a number of challenges, such as the COVID-19 pandemic, crises resulting from the high cost of living, climate change and the digital transformation. In light of these difficulties, the European Union has stepped up its efforts to protect citizens and local communities. The organisation supports the creation of new and better jobs, skills development, equality, social protection and social inclusion (European Commission, 2024). The countries belonging to the European Union are mainly perceived as highly developed economies; however, there are differences in the level of socio-economic development within the community (World Bank, 2024). These disparities stem, among other things, from unequal access to resources and certain valued assets, i.e. social inequalities (Podemski, 2009). Wójcik-Żołądek (2013) identifies three areas of social inequality: economic, which includes income, wages and living conditions; social, covering social recognition, education, lifestyle and access to culture; and political, concerning influence and power. The relatively similar level of socio-economic development among European Union countries should lead to a similar level of inequality, or at least indicate a certain correlation between these phenomena.

The purpose of this article is to assess the level of socio-economic development in Poland, with particular emphasis on its position relative to other EU Member States. The article draws on socio-economic data from the years 2014-2023.

The article adopts a research hypothesis (H1) according to which selected methods of Multivariate Statistical Analysis constitute an appropriate tool for verifying and assessing the level of socio-economic development in Poland compared to other EU countries. A second hypothesis (H2) has also been formulated, which assumes that there is significant spatial diversity in the level of socio-economic development among EU Member States.

2. Literature Review

The concept of socio-economic development emerged after the Second World War, and research into measuring the development of global economies has been ongoing ever since. Issues relating to the level of socio-economic development in European Union countries have been addressed by many researchers and continue to attract considerable interest. Research into the impact of social inequalities on this level of development has also been ongoing for decades. Authors use a variety of methods to assess the level of development, some of which are considered useful, whilst others are deemed completely unacceptable. Stec (2008) compares the level of socio-economic development of EU countries between 2003 and 2006 using the following methods: Z. Hellwig's method, standardised sums and ranks, and Spearman's correlation coefficients.

The set of socio-economic indicators used in the study comprises 23 quantitative characteristics relating to various aspects of development, ranging from the macroeconomic situation, demographics and the labour market to the development of industry, construction, agriculture, research and development, and socio-technical infrastructure. Sweden, Finland and Denmark occupy the top spots in the socio-economic development rankings, whilst Romania and Bulgaria are at the bottom, with Latvia or Greece also featuring near the bottom depending on the methodology. A study by Soava, Meheditu and Sterpu (2020) analyses the impact of income inequality on economic growth and the relationship between poverty and economic development in European Union countries between 2005 and 2016. The study utilised the Gini coefficient, the at-risk-of-poverty threshold and the median equivalent net income. The analysis supports Kuznets' hypothesis, according to which income inequality initially rises with economic development but begins to decline once a certain level of development is reached. Belas et al. (2020) assess the progress of economies across three levels of development, taking into account indicators of economic growth intensity, stability and rate. The study was conducted using the MDD (Minimum Detectable Difference) method and compared EU countries based on GDP per capita. The analyses carried out show that, between 2008 and 2017, only Luxembourg and Switzerland were classified at the first level of development, with a further 16 countries placed at the second level and a similar number at the third. Migąła-Warchoń (2021), in her research on the socio-economic development of EU countries

between 2008 and 2018, focuses on five areas that influence residents' standard of living: the economy and finance, science and technology, health, education, and living conditions. The author employs multidimensional ordinal analysis to create a composite socio-economic development index, which enabled the classification of EU countries and the analysis of the phenomenon of social convergence. A second-order non-linear model was used to model the changes. The research shows that the division between old and new EU countries, and between the wealthier North and the poorer South, persists. The low level of socio-economic efficiency of EU countries in 2018 stems from marked income inequalities, which vary from country to country, as confirmed by an analysis of the socio-economic efficiency of countries using the DEA (Data Envelopment Analysis) method. Myszczyszyn and Bąk (2025) use the TOPSIS method to assess the socio-economic development of European countries, creating an aggregate variable based on 11 indicators. The research findings confirm that this method allows countries to be ranked even when the values of the analysed characteristics are difficult to determine unambiguously. The inclusion of a large number of economic indicators allowed for a more comprehensive assessment of the development of the countries under study. The resulting ranking confirms significant differences between Western European and Nordic countries, and the countries of the former Eastern Bloc. Kasprzyk and Wojnar (2023) used the TOPSIS method to compare socio-economic development and quality of life in Poland against other EU countries. The authors constructed two composite variables based on 13 indicators. The first assessed the level of economic development, whilst the second assessed the quality of life in EU countries. Between 2005 and 2021, Poland significantly improved its position in the EU country rankings, rising by nine places in terms of economic development and by ten places in terms of quality of life. In other studies, EU countries were analysed on the basis of data relating to indicators (employment rates, average net income equivalent, GDP per capita in PPS (Purchasing Power Standard), and the percentage of people at risk of poverty and social exclusion). The research shows that only four EU countries achieve a satisfactory level of socio-economic efficiency (the Czech Republic, Luxembourg, Switzerland and Norway). Furthermore, countries in Northern and Western Europe achieve greater efficiency than those in Southern Europe (Stalković, Marjanović, Stalković, 2021). Kostov and Moraliyska (2022) confirm in their research that income inequality in the EU between 2010 and 2021 had a negative impact on GDP levels across the Union. And differences in the level of social inequality, particularly income inequality, undermine the economic performance of Member States. The Gini coefficient and the S80/S20 ratio (covering the richest 20% and the poorest 20%) were used as indicators of inequality. The greatest income disparities among EU Member States, with a Gini coefficient above 35, were recorded in Bulgaria, Lithuania and Latvia, whilst the most even distribution of income was found in the Czech Republic, Slovenia and Slovakia. Research by Popescu (2022) confirms that there is a significant and moderately strong positive linear relationship between the Gini coefficient and the S80/S20 ratio, allowing for their parallel use in assessing the level of inequality. Milek and Nowak (2024) analyse socio-

economic inequalities in Europe between 2010 and 2022, with particular emphasis on the level of social development and income distribution. The study employed a descriptive method, utilising the HDI, the Gini coefficient, the Lorenz curve and Ward's method. The study covered 32 European countries, including all EU member states as well as the United Kingdom, Switzerland, Norway, Liechtenstein and Iceland. The findings show that, despite general progress in social development across Europe, discrepancies between countries are deepening, with nearly 47% of the countries surveyed classified as having a low or very low level of social development. Furthermore, groups of countries with similar characteristics, such as Estonia, the Czech Republic, Poland, Hungary and other Central European countries, exhibit similar levels of GDP per capita.

3. Materials and Methods

The level of socio-economic development of EU countries was assessed using the Multidimensional Statistical Analysis tool, specifically the TOPSIS method (The Technique for Order of Preference by Similarity to Ideal Solution) (Hwang, Yoon, 1981). First, features describing the phenomena under study were selected and assigned a character (S – stimulant, D – destimulant) (Table 1).

Table 1.
Diagnostic variables for assessing socio-economic development.

Variable	Full name [character*]
W_1	Gross Domestic Product per capita (GDP per capita) (tys. euro) [S]
W_2	Gini index (0-100) [D]
W_3	At risk of poverty rate (60% of median income) (%) [D]
W_4	Income quintile share ratio (S80/S20**) [D]
W_5	Happy Planet Index (HPI) (0-100) [S]

*S: Stimulant, D: Destimulant.

**S80/S20: the ratio of the total income earned by the richest 20% to the income of the poorest 20%.

Source: Own study based on Eurostat. available online: <https://ec.europa.eu/eurostat>, 29 January 2026; World Bank. available online: <https://www.worldbank.org>, 29 January 2026; Happy Planet Index. available online: <https://happyplanetindex.org>, 29 January 2026.

Their selection was based on a review of the literature, data availability and statistical analysis. The statistical data used in this study were sourced from Eurostat, the Happy Planet Index and the World Bank databases. The study covers the period 2014-2023.

GDP per capita is an indicator based on the System of National Accounts. It represents the total value of goods and services produced by a given economy at a given time, per capita. It is calculated by dividing GDP—which includes consumption, government and investment expenditure, as well as net exports—by the population of the country in question (Urban, Urbanek, 2015). The GDP used to calculate GDP per capita is employed by economists as the

primary indicator of the health and prosperity of the national economy (Telberth, Cobb, Slettery, 2007). The most commonly used measure of income inequality in society is the Gini coefficient. It was introduced by Corrado Gini and first described in the journal "Metron" (Lisowski, 2023), and is based on the distribution of income within society. The higher its value, the greater the inequality in household income in a given country (Stawicka, 2012). The at-risk-of-poverty rate defines the percentage of people whose equalized disposable income, after taking social transfers into account, is below 60% of the national median. It measures a relatively low level of income in a given society, rather than poverty in absolute terms (Eurostat, 2026). Income disparities in society can also be compared using the S80/S20 ratio, also known as the quintile ratio. It is calculated by comparing the income of the richest 20% of the population with that of the poorest 20%. This indicator is expressed as the ratio of the sum of the incomes of the first and last quintile groups. In practice, it indicates how many times more income is held by the wealthiest 20% of the population compared to the poorest 20% (Eurostat, 2026). The Happy Planet Index (HPI) is a measure of sustainable well-being that assesses countries based on their ability to provide their inhabitants with a long and happy life whilst making the most of limited environmental resources. It was introduced in 2006 by the New Economics Foundation (NEF) and is scored on a scale of 0 to 100. The worst possible score indicates low life expectancy, low satisfaction and a high carbon footprint, whilst the ideal score represents a long and happy life with minimal environmental impact (Simms et al., 2006).

The values of the selected indicators (W_1 – W_5) formed the basis for the construction of a synthetic measure of socio-economic development.

The synthetic indicator of socio-economic development for each country was calculated using the formula (Hwang, Young, 1981).

$$SEDI_i = \frac{d_i^-}{d_i^- + d_i^+} \quad (1)$$

where:

$SEDI_i$ - a country's socio-economic development indicator i ($i=1,...,n$);

n – number of countries; d_i^- , d_i^+ these are the distances within the country i from the pattern and anti-pattern determined by the formula:

$$d_i^- = \sqrt{\sum_{j=1}^m (z_{ij} - z_j^-)^2} \quad \text{and} \quad d_i^+ = \sqrt{\sum_{j=1}^m (z_{ij} - z_j^+)^2} \quad (2)$$

when:

$$z_j^- := \begin{cases} \min_i \{z_{ij}\}, & W_j \in S \\ \max_i \{z_{ij}\}, & W_j \in D \end{cases}, \quad z_j^+ := \begin{cases} \max_i \{z_{ij}\}, & W_j \in S \\ \min_i \{z_{ij}\}, & W_j \in D \end{cases}, \quad z_{ij} = \frac{w_{ij}}{\sqrt{\sum_{i=1}^n w_{ij}^2}} \quad (3)$$

So that: w_{ij} , z_{ij} - actual and normalised value W_j for country i ($i=1,...,n, j=1,2,...,m$);

m – number of indicators.

4. Results

All variables in the sample group of objects meet the basic criteria for selecting variables to describe a complex phenomenon; they are not quasi-constant variables (Kukuła, Luty, 2015, 2017). Table 2 presents the basic characteristics of the socio-economic indicators analysed for EU countries in 2014 and 2023.

Table 2.

Key characteristics of selected indicators used to assess the socio-economic development of EU countries in 2014 and 2023.

Specification	2014						2023					
	Q_1	Q_2	Q_3	M	SD	CV	Q_1	Q_2	Q_3	M	SD	CV
W_1	12.40	20.17	38.30	26.59	18.54	0.70	16.90	25.74	40.78	31.62	20.49	0.65
W_2	28.40	31.90	35.60	31.78	3.67	0.12	28.50	30.10	33.40	30.59	3.57	0.12
W_3	14.40	15.90	19.40	16.44	3.62	0.22	13.00	15.40	19.30	16.25	3.56	0.22
W_4	4.05	4.90	6.23	5.02	1.15	0.23	3.87	4.63	5.37	4.71	0.92	0.19
W_5	35.80	40.20	44.70	39.66	6.56	0.17	39.30	46.80	49.80	44.95	6.73	0.15

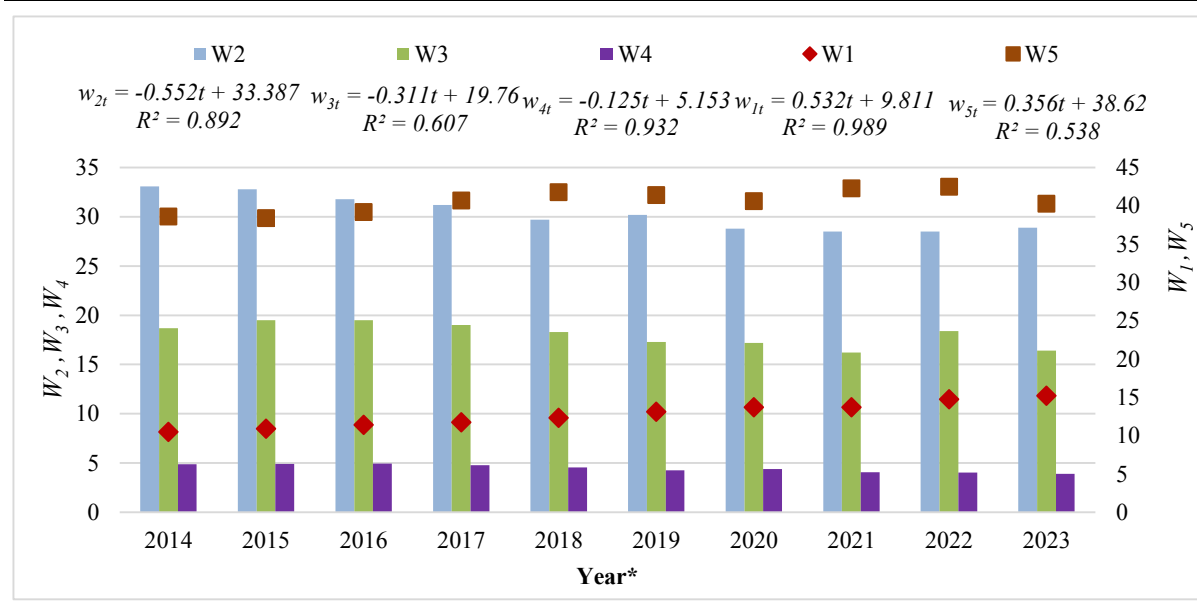
* 2012 and 2021 respectively.

Q_1 , Q_2 , Q_3 : the first, second and third quartiles, respectively; M : arithmetic mean; SD : standard deviation; CV : coefficient of variation.

Source: Own study based on Eurostat. available online: <https://ec.europa.eu/eurostat>, 29 January 2026; World Bank. available online: <https://www.worldbank.org>, 29 January 2026; Happy Planet Index. available online: <https://happyplanetindex.org>, 29 January 2026.

For the indicators: Gross Domestic Product per capita (W_1) and Happy Planet Index (W_5), an increase in all position measures (Q_1 , Q_2 , Q_3 , M) was recorded in 2023 compared to 2014. The simultaneous increase in the standard deviation of the indicators indicates greater absolute variation between countries, whilst the decrease in the coefficient of variation points to a reduction in relative variation. For the Gini coefficient (W_2), Q_2 , Q_3 and M decreased, whilst Q_1 increased slightly. The standard deviation also decreased, and the coefficient of variation remained at the same level, indicating a stable degree of variation in this indicator. The measures of central tendency for two indicators also decreased: Gross Domestic Product per capita (W_3) and Income quintile share ratio (W_4), whilst the reduction in the standard deviation and coefficient of variation indicates a reduction in both absolute and relative variation between Member States.

During the period under review, an increase in the GDP per capita indicator in Poland was recorded, from €10,900 to €15,290, which confirms the positive incline of the linear trend equation (Figure 1).



*years 2012 – 2021 for indicator W₅

Figure 1. Values of diagnostic variables used to assess the level of socio-economic development in Poland for the period 2014-2023, with linear trends ($t = 1, 2, \dots, 10$).

Source: Own study based on Eurostat. available online: <https://ec.europa.eu/eurostat>, 29 January 2026; World Bank. available online: <https://www.worldbank.org>, 29 January 2026; Happy Planet Index. available online: <https://happyplanetindex.org>, 29 January 2026.

Furthermore, the very high value of the coefficient of determination (0.989) indicates that the trend line fits the data almost perfectly, which points to stable growth. At the same time, income inequality indicators show a downward trend: the Gini coefficient fell from 32.8 in 2014 to 28.5 in 2023, and the S80/S20 ratio decreased by 0.85. High R^2 values indicate that the model provides a good fit and explains 89.2% and 93.2% of the variance in the dependent variable, respectively. The at-risk-of-poverty rate also showed a downward trend (a decrease of 3 percentage points), though its R^2 value (0.607) suggests an unstable direction of change. The HPI index showed a slight upward trend from 38.6 in 2012 to 40.3 in 2021; however, the relatively low value of the coefficient of determination (0.538) indicates irregular changes. The overall trend in the HPI index values between 2012 and 2021 highlights a clear instability in the level of well-being in relation to environmental impact.

An assessment of Poland's position in terms of GDP per capita shows that it lies well below the EU average, which stood at €26,590 in 2014 and €31,620 in 2023 (Figure 2). At the same time, the very wide gap between the minimum and maximum values indicates significant disparities in the economic development of Member States.

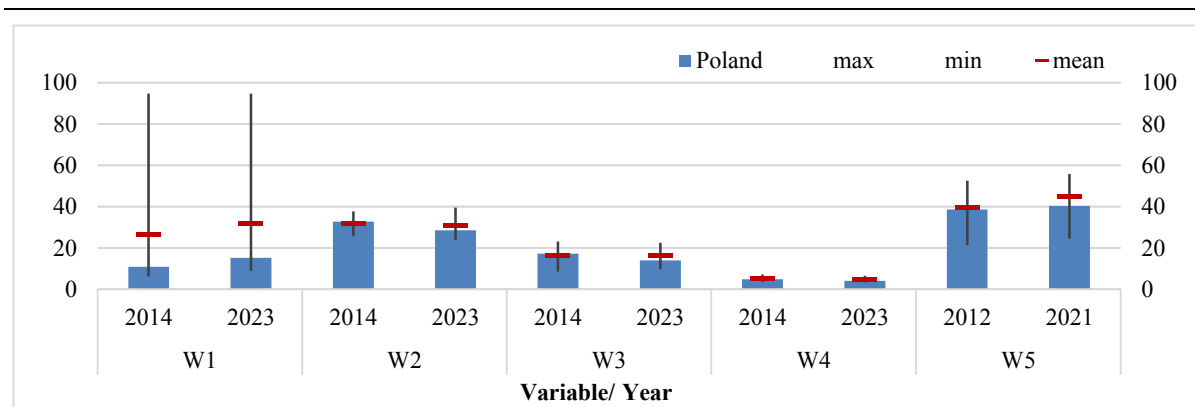


Figure 2. Values of selected numerical characteristics of diagnostic variables for assessing the level of socio-economic development of EU countries.

Source: Own study based on Eurostat. available online: <https://ec.europa.eu/eurostat>, 29 January 2026; World Bank. available online: <https://www.worldbank.org>, 29 January 2026; Happy Planet Index. available online: <https://happyplanetindex.org>, 29 January 2026.

In 2014, Poland's Gini coefficient was slightly higher than the EU average, which stood at 31.78, whereas in 2023 it fell below the EU average of 30.59. Differences in the level of income inequality across the EU are not significant. This is confirmed by the limited range between the minimum and maximum values of the S80/S20 income inequality ratio in the EU. The values of this ratio for Poland in selected years were very close to the EU average, which stood at 5.02 in 2014 and 4.71 in 2023. In terms of the risk of poverty, Poland in 2014 was slightly above the EU average of 16.44%, and after a decade the value of the indicator fell below this average, which stood at 16.25%. The HPI value for Poland in both years under review was lower than the EU average, which stood at 39.66 in 2014 and 44.95 in 2023, indicating a relatively lower level of effectiveness in terms of sustainable development.

In 2023, GDP per capita in Poland rose by 40% compared to 2014. Although this growth rate indicates significant economic progress, income levels in Poland lag considerably behind those of the EU leaders (Table 3). Poland's per capita income is similar to that of Hungary and Croatia, for which the W_1 indicator stood at €14,760 and €15,370 respectively in 2023, representing an increase of €3,690 and €4,770 compared to 2014. However, this level is significantly higher than in the countries at the bottom of the ranking: Romania, where it stood at €7800 in 2014 and €11,120 in 2023, and Bulgaria, where it was €6260 in 2014 and €8830 in 2023. In both the first and last years of the survey, the leading positions in terms of GDP per capita were held by Luxembourg, Denmark and Ireland, for which GDP per capita in 2023 stood at €94,830, €53,230 and €84,560, and in 2014: €94,820, €47,240 and €47,010 respectively. Lithuania and Bulgaria had the highest levels of inequality, with W_2 standing at 36.0 and 39.5 respectively in 2023. In the case of Lithuania, it fell by 1.7 compared to the base year, whilst in the case of Bulgaria it rose by 2.1, indicating an increase in inequality over the decade. In 2023, Poland had higher income inequality (W_2) than Finland (27.4), Belgium (26.8), the Netherlands (25.9), the Czech Republic (25.7), Slovenia (24.7) and Slovakia (23.8).

The improvement in the situation of Polish society is also reflected in the decline in W_3 from 17.0% in 2014 to 14.0% in 2023.

Table 3.

Rankings of EU countries based on selected indicators used to assess socio-economic development in 2023 and 2014, with Poland's position highlighted

Variable/ year		Ranking*
W_1	2014	LU, DK, IE, SE, NL, AT, FI, DE, BE, FR, IT, ES, MT, CY, SL, PT, GR, EE, CZ, SK, LT, LV, HU, PL , HR, RO, BG
	2023	LU, IE, DK, SE, NL, AT, FI, BE, DE, FR, IT, MT, CY, ES, SL, PT, GR, CZ, EE, SK, LT, HR, PL , HU, LV, RO, BG
W_2	2014	LT, BG, ES, RO, GR, CY, PT, LV, IT, EE, PL , FR, HR, IE, LU, HU, DE, AT, MT, NL, DK, SE, BE, FI, SK, CZ, SL
	2023	BG, LT, IT, LV, PT, LU, ES, GR, MT, CY, FR, AT, EE, HR, DK, RO, DE, SE, IE, HU, PL , FI, BE, NL, CZ, SL, SK
W_3	2014	RO, ES, GR, BG, EE, LV, PT, HR, IT, LT, PL , IE, DE, LU, MT, SE, BE, HU, SL, CY, AT, FR, FI, SK, DK, NL, CZ
	2023	EE, LV, RO, BG, LT, ES, HR, GR, IT, LU, PT, MT, SE, FR, AT, CY, DE, SK, PL , HU, NL, SL, BE, FI, IE, DK, CZ
W_4	2014	RO, BG, ES, EE, LV, GR, PT, LT, IT, CY, DE, HR, PL , IE, LU, HU, FR, SE, AT, DK, MT, SK, NL, BE, SL, FI, CZ
	2023	BG, LT, LV, RO, PT, ES, EE, MT, GR, IT, HR, LU, SE, FR, DE, HU, AT, CY, DK, PL , NL, IE, FI, SK, CZ, BE, SL
W_5	2012	SE, FR, ES, NL, DK, HR, AT, IE, IT, FI, DE, CZ, PT, SL, RO, PL , SK, LT, GR, CY, MT, BE, LV, HU, BG, EE, LU
	2021	SE, DK, ES, FR, PT, NL, FI, IT, RO, GR, SL, HR, IE, CZ, DE, AT, HU, LT, SK, PL , MT, LV, BE, EE, BG, CY, LU

*: in descending order.

AT: Austria, BE: Belgium, BG: Bulgaria, CY: Cyprus, CZ: Czechia, DE: Germany, DK: Denmark, EE: Estonia, ES: Spain, FI: Finland, FR: France, GR: Greece, HR: Croatia, HU: Hungary, IE: Ireland, IT: Italy, LT: Lithuania, LU: Luxembourg, LV: Latvia, MT: Malta, NL: Netherlands, PL: Poland, PT: Portugal, RO: Romania, SE: Sweden, SL: Slovenia, SK: Slovakia.

Source: Own study based on Eurostat. available online: <https://ec.europa.eu/eurostat>, 29 January 2026; World Bank. available online: <https://www.worldbank.org>, 29 January 2026; Happy Planet Index. available online: <https://happyplanetindex.org>, 29 January 2026.

In 2023, Poland had a lower at-risk-of-poverty rate than Malta (16.6%), Sweden (16.1%), France (15.4%), Austria (14.9%), Cyprus (14.9%), Germany (14.4%) and Slovakia (14.3%), which in 2014 were ranked higher than Poland. In terms of the W_4 index, Poland also improved its position in the ranking; the index stood at 4.91 in 2014 and fell to a level in 2023 closer to that of Germany (4.44) and the Netherlands (3.87). However, it still remains significantly below the level of countries with the most equal income distribution: the Czech Republic (3.50), Belgium (3.39) and Slovenia (3.34). With regard to the HPI (W_5), Poland recorded an increase from 38.6 in 2012 to 40.3 in 2021. However, this result still differs significantly from those of the leaders: Sweden (55.9), Denmark (53.0) and Spain (53.0). In 2023, Poland's HPI reached a level similar to that of the economies of Lithuania (41.0), Slovakia (41.0) and Malta (39.3).

In accordance with the described TOPSIS method, EU countries were ranked according to the *SEDI* index (Figure 3).

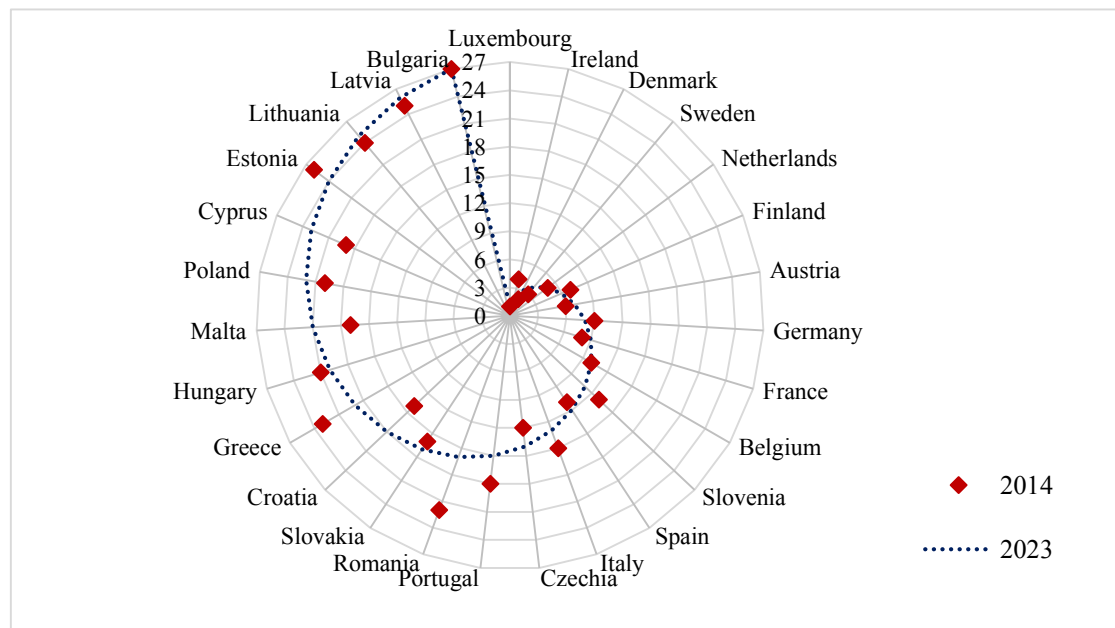


Figure 3. Rankings of EU countries by Socio-Economic Development Index (*SEDI*) score in 2023, with their 2014 rankings based on this index.

Source: Own study based on Eurostat. Available online: <https://ec.europa.eu/eurostat> (accessed on 29.01.2026); World Bank. Available online: <https://www.worldbank.org> (accessed on 29.01.2026); Happy Planet Index. Available online: <https://happyplanetindex.org> (accessed on 29.01.2026).

In 2023, Luxembourg and Ireland achieved the highest level of socio-economic development, establishing a clear lead over the other countries (Table 4). Denmark, Sweden and the Netherlands also achieved high positions in the ranking. Among the leaders, particular attention should be paid to Ireland, which has significantly improved its position compared to 2014. This improvement was primarily driven by an increase in GDP per capita of nearly 80%, which represents the highest growth rate in the EU, alongside a moderate decline in W_2 and W_4 , and minor changes in W_3 . In 2023, the middle of the ranking was occupied by: Slovenia, Spain, Italy, the Czech Republic, Portugal, Romania and Slovakia. Compared to 2014, the level of socio-economic development in these countries increased, driven by rises in the values of indicators W_1 and W_5 , and decreases in the values of W_2 , W_3 and W_4 . In 2023, despite a marked improvement in the socio-economic situation compared to the base year, Poland was placed in the lower part of the ranking. Positive changes in the Polish economy are confirmed by the indices of the analysed indicators.

During the period under study, GDP per capita increased by 40.3% and the HPI by 4.4%. At the same time, income inequality decreased (with the Gini coefficient falling by 13.1% and the S80/S20 ratio by 17.3%), and the risk of poverty was reduced by 19.1%. In 2023, only Cyprus, Estonia, Lithuania, Latvia and Bulgaria ranked lower than Poland. These economies also recorded positive changes in the analysed indicators compared to 2014, but the scale of these changes was insufficient to strengthen their position in the ranking.

Table 4.

Index values for 2023 and 2014, and indices of the output diagnostic variables used to assess the level of socio-economic development for EU countries

Country (i)	<i>SEDI_i</i>		Indices				
	2023	2014	$\frac{w_{1,2023}}{w_{1,2014}}$	$\frac{w_{2,2023}}{w_{2,2014}}$	$\frac{w_{3,2023}}{w_{3,2014}}$	$\frac{w_{4,2023}}{w_{4,2014}}$	$\frac{w_{5,2023}}{w_{5,2012}}$
Luxembourg	0.797	0.824	1.000	1.077	1.182	1.084	1.144
Ireland	0.785	0.271	1.799	0.909	0.764	0.788	1.109
Denmark	0.362	0.290	1.127	1.053	0.992	1.007	1.142
Sweden	0.327	0.288	1.082	1.032	1.006	1.140	1.063
Netherlands	0.298	0.247	1.131	0.906	1.250	1.010	1.065
Finland	0.259	0.213	1.065	1.022	1.034	1.044	1.200
Austria	0.238	0.222	1.060	1.023	1.035	1.036	1.013
Germany	0.231	0.196	1.064	0.955	0.894	0.867	1.101
France	0.228	0.202	1.074	0.985	1.124	1.084	1.077
Belgium	0.226	0.180	1.107	0.954	0.821	0.890	1.093
Slovenia	0.195	0.139	1.274	0.961	0.876	0.903	1.197
Spain	0.193	0.158	1.144	0.925	0.990	0.808	1.097
Italy	0.187	0.138	1.129	0.988	0.979	0.912	1.178
Czechia	0.186	0.152	1.180	0.992	1.140	0.977	1.133
Portugal	0.175	0.109	1.192	0.952	0.909	0.899	1.250
Romania	0.163	0.088	1.426	0.828	0.922	0.805	1.260
Slovakia	0.161	0.130	1.232	0.912	1.117	0.924	1.088
Croatia	0.159	0.139	1.450	0.938	0.990	1.000	1.043
Greece	0.155	0.079	1.160	0.933	0.818	0.817	1.316
Hungary	0.149	0.097	1.333	0.939	0.920	1.023	1.265
Malta	0.144	0.117	1.400	1.138	1.051	1.309	1.098
Poland	0.141	0.103	1.403	0.869	0.809	0.827	1.044
Cyprus	0.140	0.103	1.425	0.893	0.974	0.788	0.997
Estonia	0.109	0.061	1.161	0.887	1.210	0.829	1.307
Lithuania	0.100	0.079	1.363	0.955	1.000	1.036	1.111
Latvia	0.093	0.070	1.276	0.969	1.160	0.957	1.147
Bulgaria	0.070	0.045	1.411	1.056	0.981	0.971	1.218

Source: Own study based on Eurostat. Available online: <https://ec.europa.eu/eurostat> (accessed on 29.01.2026); World Bank. Available online: <https://www.worldbank.org> (accessed on 29.01.2026); Happy Planet Index. Available online: <https://happyplanetindex.org> (accessed on 29.01.2026).

5. Summary

The socio-economic development studies conducted assess the diagnostic reliability of the research models used. The complex nature of the phenomenon under analysis required the use of tools capable of taking multiple variables into account simultaneously, which justified the choice of Multi-Dimensional Statistical Analysis and the TOPSIS method.

The research confirmed hypothesis H1, according to which the selected models of multidimensional statistical analysis constitute an appropriate tool for assessing the level of Poland's socio-economic development in comparison with other EU countries. The application of this method enabled a synthetic approach to complex socio-economic processes and the

construction of the synthetic SEDI index, which allowed the ranking position of individual countries to be determined. Furthermore, the hypothesis is supported by research by other authors (Muszczyszyn, Bąk, 2025), who in their conclusions also highlight the usefulness of the TOPSIS method in assessing the level of socio-economic development of countries. It should be emphasised, however, that the mere fact of applying specific research methods does not imply their universality in every comparative analysis, and synthesis involves a certain simplification of the data. Further research could incorporate additional diagnostic variables or alternative methods of data normalisation. Migdał-Warchoń (2021) proposes assessing the socio-economic efficiency of EU countries using the DEA method. In contrast, Belas et al. (2020) use the MDD method in their development analyses, which aims to verify statistically significant differences in the level of GDP per capita across EU countries. These methods were also found to be useful in the analyses conducted and could form the basis for further research aimed at assessing the situation of the Polish economy in comparison with EU countries.

An analysis of selected indicators revealed a marked improvement in Poland's situation during the period under review. There was a significant increase in GDP per capita, a decrease in income inequality and a reduction in the risk of poverty. At the same time, the HPI index showed greater variation, indicating that developments in the area of sustainable development were less straightforward. Despite improving its position in the rankings for individual indicators, Poland still remains below the EU average in terms of socio-economic development. In summary, Poland ranks in the lower part of the table, which indicates a persistent development gap compared to the leaders of European integration. Poland's position in 2023 differs significantly from that of Luxembourg or Ireland, which are at the top of the ranking. Kasprzyk and Wojnar (2023) present different conclusions; the authors point to a significant improvement in Poland's position relative to EU countries between 2005 and 2021. The synthetic variables constructed by the authors place Poland in a relatively higher position than the results obtained in this study. Differences in the results may be a consequence of the use of different diagnostic indicators or a different methodology.

The results also confirmed Hypothesis H2, which assumes the existence of significant spatial diversity in the socio-economic development of EU Member States. There are clear and persistent differences between the economies of Northern and Western Europe and those of Central and Eastern Europe, a finding which is confirmed by the research of other authors (Migdał-Warchoń, 2021; Stalković, J., Marjanović, Stalković, N., 2021). The range between the minimum and maximum values of the analysed indicators, as well as the distribution of their values, point to the persistent nature of these inequalities. This implication is consistent with the findings of Miłek and Nowak (2024), who highlight the fact that differences in Europe's social development are widening. The results obtained therefore confirm that the process of economic convergence within the EU is gradual and non-uniform.

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