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COMPARATIVE EVALUATION OF THE ECONOMIC AND SOCIAL PERFORMANCE OF EU MEMBER STATES USING THE AHP METHOD

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Abstract
This study analyses the economic and social performance of European Union (EU) member states using the Analytic Hierarchy Process (AHP) method as a multi-criteria optimisation tool. The aim of the research was to construct a composite performance index based on six relevant indicators: real GDP per capita, employment rate, public health expenditure, life expectancy, infant mortality and poverty rate. The data were normalised to ensure comparability between countries, and the criteria were weighted according to their relative importance in the analysis model. The results highlight significant differences between EU Member States. Countries in northern and western Europe stand out for their balance between economic performance and social sustainability, while Eastern European countries are at the bottom of the AHP ranking. The conclusions confirm the positive correlation between economic prosperity and social welfare, highlighting the importance of public investment and integrated policies for reducing development gaps and strengthening European convergence.

Keywords: *Multicriteria optimization; Analytic Hierarchy Process (AHP); Economic performance; Social development.*

JEL Classification: *C38, O47*

INTRODUCTION

In the current labour market context, characterised by high competitiveness and the need for organisational adaptability, the staff selection process is one of the most important components of human resource management. The selection of suitable candidates is based solely on objective criteria, such as level of education or professional experience, and subjective factors, such as motivation, compatibility with the organisation's values and development potential. This complexity turns the selection process into a multi-criteria decision-making problem, where a balance between efficiency, fairness, and decision-making sustainability is needed.

In this context, the Analytic Hierarchy Process (AHP) is a multi-criteria optimisation method used in the decision-making process regarding staff recruitment and selection. According to Saaty (1980), the AHP method provides a logical framework for analysing complex decisions, allowing the problem to be broken down into a clear hierarchy of objectives, criteria and alternatives. This method systematically analyses the factors that influence the decision, starting from the overall objective, identifying the optimal candidate, to the individual evaluation of alternatives (Aruldoss et al., 2013). The method involves pairing criteria (Yuen, 2024) and establishing the relative importance of each, a process that transforms qualitative judgements into quantifiable numerical values. Thus, AHP allows decision-makers to express their preferences in a coherent manner and to determine objective weights for each selection criterion (Erdogan et al., 2019). In the field of human resources, these criteria may include professional skills, experience, adaptability, interpersonal skills or compatibility with the organisation's values. The result is a transparent ranking of candidates based on a clear set of criteria and a comparative analysis of their performance. Through this structuring, the AHP method helps to reduce subjectivity and perception errors that influence recruitment decisions based on intuition or personal experience. The process allows for traceability and justification of decisions, providing a solid basis for the final selection (Paraskevas & Madas, 2024). We believe that the application of the AHP method in human resource management supports a balanced, rational decision-making process that is aligned with the organisation's strategic objectives.

Therefore, the study aims to explore the applicability of the AHP method in the personnel selection decision-making process, highlighting its advantages in creating a balanced and rational evaluation system. The

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study analyses how the multi-criteria approach transforms the recruitment process into a strategic human resource management tool based on objectivity, fairness and performance orientation.

I. LITERATURE REVIEW

Multi-criteria decision-making (MCDM) frameworks are designed to address evaluation contexts in which multiple, often conflicting objectives must be considered simultaneously (Turskis et al., 2009). In personnel selection, this translates into evaluating candidates based on heterogeneous attributes, which include measurable outcomes (seniority) and qualitative perceptions (adaptability and interpersonal skills).

Decision-makers frequently face cognitive strain when forced to evaluate these attributes without structured assistance. The conceptual basis of MCDM provides tools that reduce subjective biases by explicitly modelling the interrelationships between criteria and preference aggregation mechanisms (Paraskevas & Madas, 2024). One of the central principles of MCDM is the decomposition of complex decisions into a hierarchy or network, allowing evaluators to make focused comparisons at each level rather than attempting to process all information holistically (Malekmohammadia et al., 2011). While the analytic hierarchy process (AHP) emphasises a strictly hierarchical arrangement, extensions such as the analytic network process take into account the more complex dependencies that may exist between criteria (Bhambri & Kautish, 2024). These structures prevent hidden correlations from distorting the results, allowing explicit modelling of feedback loops between related attributes. The inclusion of dependency management is relevant where organisational competencies interact, collaborative capacity enhances creative outcomes, and influences project success rates.

An illustrative approach can be found in methodologies that apply multi-criteria decision-making strategies, including AHP for weighting, together with integrated value models for evaluating infrastructure projects in accordance with triple bottom line principles (Erdogan et al., 2019; Malakooti, 2012). Although developed for sustainable infrastructure evaluation, the logical sequence, the requirements leading to indicator criteria, is applicable in staff selection when institutional objectives include economic efficiency, social contribution and environmental awareness. In this framework, decision trees become orderly and consistent tools through which each criterion can be evaluated in relation to the overall objectives. Equally important is the operational distinction between single aggregate optimisation and Pareto-based exploration (Wang et al., 2017; Türkyılmaz et al., 2020). As Bonissone et al. observed, generating a single aggregate solution forces decision-makers to predefine trade-offs without understanding the space of possible trade-offs (Bonissone et al., 2009). This can lead to suboptimal hires if the initial weighting does not reflect nuanced strategic needs. In contrast, retaining and evaluating an efficient set before aggregation allows for the exploration of different candidate profiles. These have certain attributes, high technical expertise, moderate communication skills, which stimulate the final choice. In contexts of high uncertainty or indeterminacy, neutrosophic extensions of MCDM bring additional flexibility (Ahmad et al., 2020). Paraskevas and Madas (2024) describe the fusion of Delphi and AHP methods in a neutrosophic environment, so that linguistic terms from expert panels are directly introduced into structured evaluation, while preserving degrees of truth, falsity, and indeterminacy. This preserves the subtle differences between 'probably adequate' and 'certainly adequate' judgements without forcing premature numerical precision (Benítez et al., 2011; Munier & Hontoria, 2021). Adding a veto threshold improves selection by disqualifying candidates who do not meet essential requirements, regardless of their performance in other areas, which is particularly relevant in the hiring process, where some skills may be non-negotiable.

AHP differs from other multi-criteria techniques in terms of decision traceability and methodological transparency: each aggregate score can be traced back to the sub-criteria that generated it, and the decision-making reasoning becomes reproducible (Aruldosset al., 2013). This systematic approach eliminates subjectivity and provides a solid basis for rational decisions, especially in organisational or economic contexts where criteria are interdependent. In modern contexts, such as economic and social performance analysis, AHP facilitates the integration of economic, social and institutional criteria into a unified model. Agarwal (2025) highlights that AHP is a methodology for determining strategic decisions, allowing for the correlation between organisational objectives, available resources and institutional priorities. Similarly, Paraskevas and Madas (2024) emphasise the relevance of AHP in evaluating complex decision-making alternatives, due to its ability to combine human reasoning with quantitative analysis.

The result of applying the AHP method is not just a ranking of alternatives, but a complete conceptual structure (Scott, 2002): careful definition of the criteria space, clear coding of importance relationships, consistency checking, and final aggregation of weighted scores. This structuring supports decision-making that is analytically rigorous and sensitive to human judgement. In addition, the iterative use of AHP, by recalibrating criteria after analysing preliminary results, offers the possibility of adaptive refinement of decisions (Erdogan et al., 2019). Thus, AHP is not just a prioritisation tool, but a robust decision-making framework capable of integrating multiple objectives, uncertainties, and subjective factors into a coherent evaluation process. This combination of computational rigour and cognitive flexibility makes AHP a relevant methodology for the analysis

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of complex strategic decisions (Ezeji et al., 2025), including in the fields of economics, management and public policy.

II. METHODOLOGY

The study aimed to conduct a comparative analysis of the economic and social performance of European countries by applying a multi-criteria decision-making method designed to integrate a diverse set of relevant economic indicators. The multi-criteria approach allows for the simultaneous assessment of several dimensions of economic, social and health development, and the establishment of a coherent hierarchy among the alternatives analysed.

The methodology is based on the Analytic Hierarchy Process (AHP), one of the most widely used multi-criteria optimisation techniques (Saaty, 1980; Saaty, 1990). This method allows a complex problem to be broken down into a hierarchical structure, from the general objective to criteria and alternatives, and the relative importance of each criterion to be determined through pairwise comparisons.

The main objective was to assess the economic and social performance of EU Member States using six representative indicators:

- Real GDP per capita, as a measure of economic development;
- employment rate, reflecting the utilisation of human resources;
- public expenditure on health (% of GDP), an indicator of state involvement in the welfare of the population;
- life expectancy at birth and infant mortality rate, expressions of quality of life and healthcare system efficiency;
- poverty rate, as a measure of social equity and inclusion.

To ensure comparability between countries, the data were standardised so that 'benefit' indicators (where higher values signify superior performance) and 'cost' indicators (where lower values indicate better results) could be integrated into a common framework. Subsequently, pairwise comparisons were made between criteria to determine relative weights, and by aggregating the normalised values, a synthetic score (AHP score) was obtained for each Member State.

The application of the AHP method provides a coherent and transparent decision-making framework, allowing for the comparative assessment of economic and social performance in an integrated manner. We believe that this approach combines quantitative analysis with multi-criteria decision-making, providing a balanced picture of the development differences between EU Member States and supporting the formulation of economic policy directions geared towards convergence and sustainability.

III. RESULTS AND DISCUSSIONS

The analysis covered all Member States of the European Union (EU-27), allowing for a comprehensive comparison between European economies in terms of economic and social performance. The inclusion of all EU countries in the multi-criteria model provides a solid basis for interpreting regional differences and highlighting the development gaps between Western, Central and Eastern Europe.

In order to assess the economic and social performance of EU Member States, a composite AHP index was constructed, integrating several criteria representative of the level of development and well-being. The AHP method made it possible to transform a heterogeneous set of economic, social and health indicators ( ) into a coherent hierarchy by assigning specific weights to each criterion according to its relative importance. The model included six main indicators: GDP per capita, employment rate, public health expenditure (% of GDP), life expectancy at birth, infant mortality rate and poverty rate. These indicators express the economic dimension, quality of life and social sustainability of each economy.

In the context of multi-criteria analysis, GDP per capita contributes significantly to determining a country's position in the global ranking, as it directly influences the resources available for public investment, infrastructure, health and social welfare.

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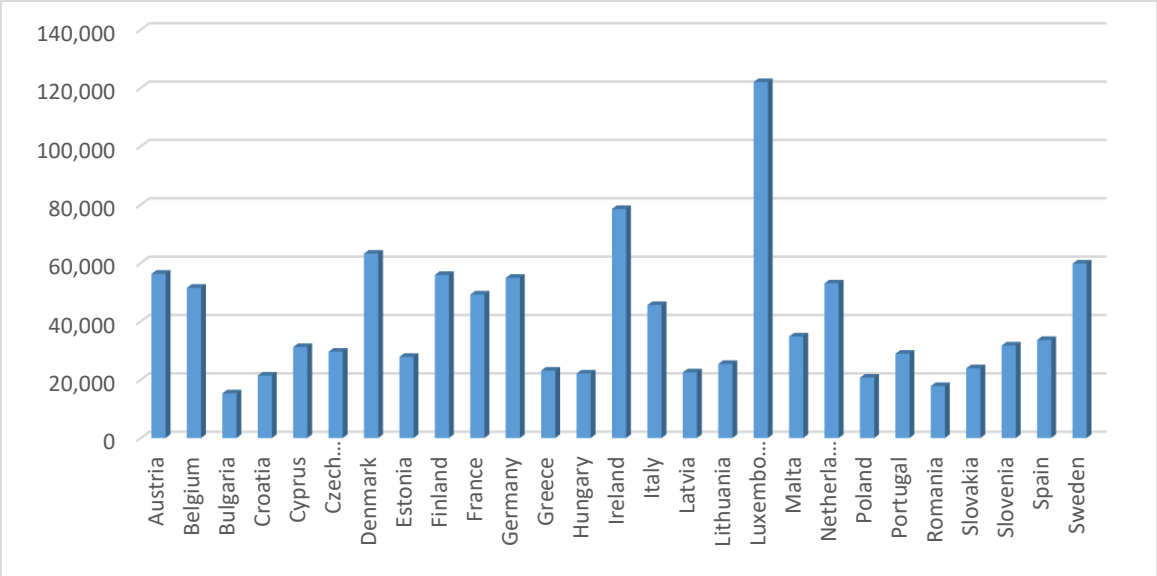

Figure 1. Real GDP per capita, https://ec.europa.eu/
Source: Author's own work

The graph on real GDP per capita highlights significant differences between the economies of EU Member States, underscoring the persistent development gaps between Western and Eastern Europe. The countries with the highest GDP per capita are Luxembourg, Ireland, Denmark and Sweden, which are well above the EU average. These economies are characterised by high productivity, consistent investment in high value-added sectors and a diversified economic structure based on financial services, technology and innovative industries. At the opposite end of the spectrum, Central and Eastern European countries such as Bulgaria, Romania, Croatia and Latvia have significantly lower GDP per capita values. These differences reflect development gaps and low levels of foreign direct investment (Macovei et al., 2024), economic infrastructure and human capital. We consider that these emerging economies are recording economic growth rates above the EU average, suggesting potential for convergence in the medium term. Southern European countries such as Spain, Italy, Greece and Portugal are at an intermediate level, with GDP per capita close to the European average, but affected by an ageing population, labour market rigidity and structural vulnerabilities inherited from the previous economic crisis.

The employment rate is a key indicator of economic performance and labour market stability. It has a direct impact on people's incomes, living standards and the sustainability of public systems. Within the AHP model, this indicator contributes significantly to the assessment of a country's economic performance, reflecting the economy's ability to capitalise on available human resources.

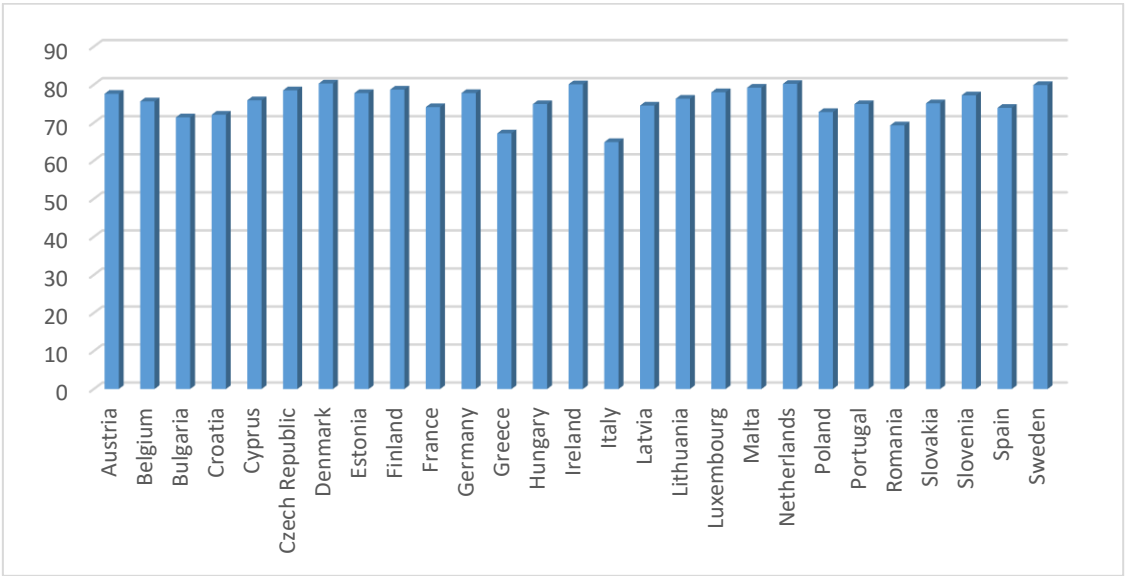

Figure 2. Employment rate (%), https://ec.europa.eu/
Source: Author's own work

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The graph highlights differences between EU Member States. Northern and Western European countries such as the Netherlands, Sweden, Denmark and Ireland have the highest employment rates, exceeding the 79-80% threshold. These economies are characterised by flexible labour markets, active employment policies, effective vocational training programmes and increased adaptability to the demands of the digital economy. In contrast, southern and eastern European countries such as Italy, Greece, Romania and Bulgaria are below the European average, with employment rates between 64% and 70%. These lower values are often associated with structural rigidities in the labour market, low skill levels in certain regions and a higher share of the informal economy. In the case of Romania and Bulgaria, external labour migration has had a significant impact on domestic labour market participation. Central European countries such as the Czech Republic, Poland and Hungary are close to the EU average, with values between 73% and 78%, indicating a positive development due to stable economic growth and the integration of regional labour markets.

Public health expenditure, expressed as a percentage of GDP, is an indicator for assessing the state's involvement in ensuring the well-being of the population and the quality of medical services. Within the AHP model, this criterion makes an important contribution, as it reflects an economy's ability to invest in human capital and support long-term social development.

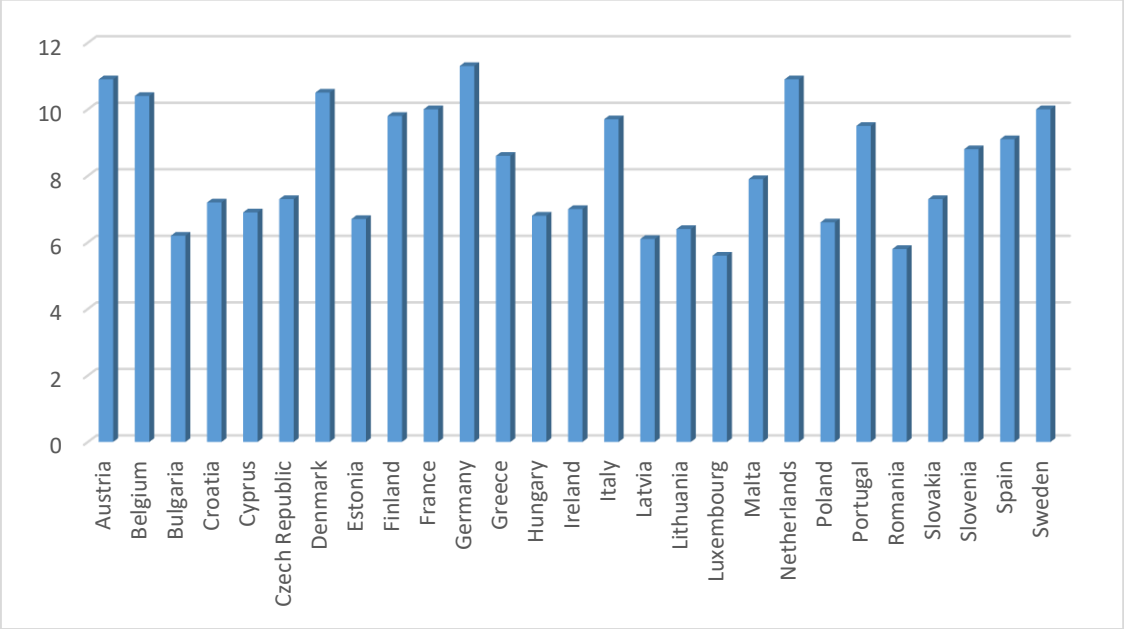

Figure 3. Public expenditure on health (% GDP), https://ec.europa.eu/
Source: Author's own work

The graph highlights a clear differentiation between the western and eastern EU countries. Western European countries (Germany, France, Belgium, Denmark and Sweden) allocate over 10% of their GDP to the health sector, which indicates a consolidated public financing system and a well-developed medical infrastructure. These investments are reflected in high life expectancy and low infant mortality rates, confirming the effectiveness of integrated social policies. At the opposite end of the spectrum, Central and Eastern European countries such as Romania, Bulgaria, Latvia and Lithuania are below the 7% of GDP threshold. This low level of funding limits the ability of healthcare systems to meet the needs of the population and contributes to maintaining disparities in access to healthcare services. In these countries, underfunding is often linked to poor infrastructure, insufficient human resources in the healthcare sector and the migration of medical staff to Western countries. Nordic and Central European countries, such as Finland, the Netherlands, Austria and the Czech Republic, adopt a balanced model, in which public spending is high but linked to administrative efficiency and social performance.

Life expectancy at birth is a key indicator of a country's quality of life and social performance, reflecting the efficiency of its health system, economic conditions, level of education and overall living standards. Within the AHP model, this indicator carries significant weight, as it directly expresses the outcome of public investment in health and welfare.

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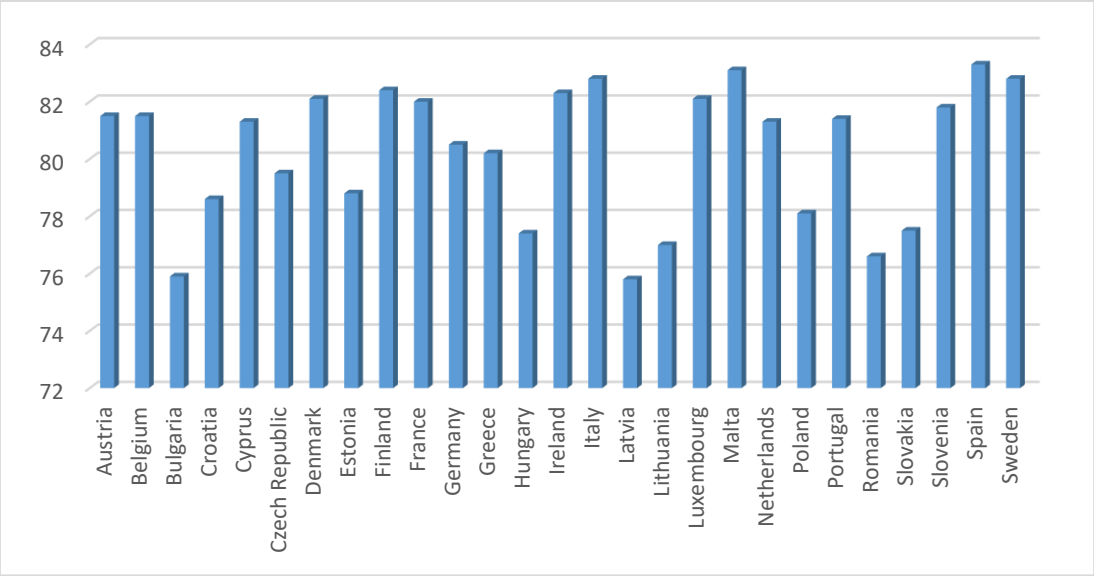

Figure 4. Life expectancy (years), https://ec.europa.eu/
Source: Author's own work

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The graph highlights the fact that EU Member States show differences in life expectancy, ranging from around 83 years in northern and western European countries to less than 77 years in some eastern European countries. The highest values are recorded in Spain, Italy, Malta, Sweden and France, where life expectancy exceeds 82 years. We believe that these results are due to an efficient healthcare system, a balanced diet and a high level of education and quality of life. Nordic countries such as Denmark and Finland maintain high values, reflecting the effectiveness of the Nordic social model, based on prevention, equal access to healthcare and constant investment in public health (Mogstad et al., 2025). At the opposite end of the spectrum, Romania, Bulgaria, Latvia and Lithuania are among the countries with the lowest life expectancy, ranging between 75 and 77 years. These values indicate structural deficiencies in health systems, but also the influence of socio-economic factors such as poverty, income inequalities, low levels of education and limited access to preventive healthcare services. Central European countries (the Czech Republic, Poland and Hungary) occupy an intermediate position, with gradual upward trends, thanks to recent investments in medical infrastructure and health reforms.

The infant mortality rate, expressed in per mille (‰), is one of the most sensitive indicators of the level of socio-economic development and the performance of the public health system. In the AHP model, this indicator is treated as a cost criterion, as lower values reflect better performance and a higher quality of life.

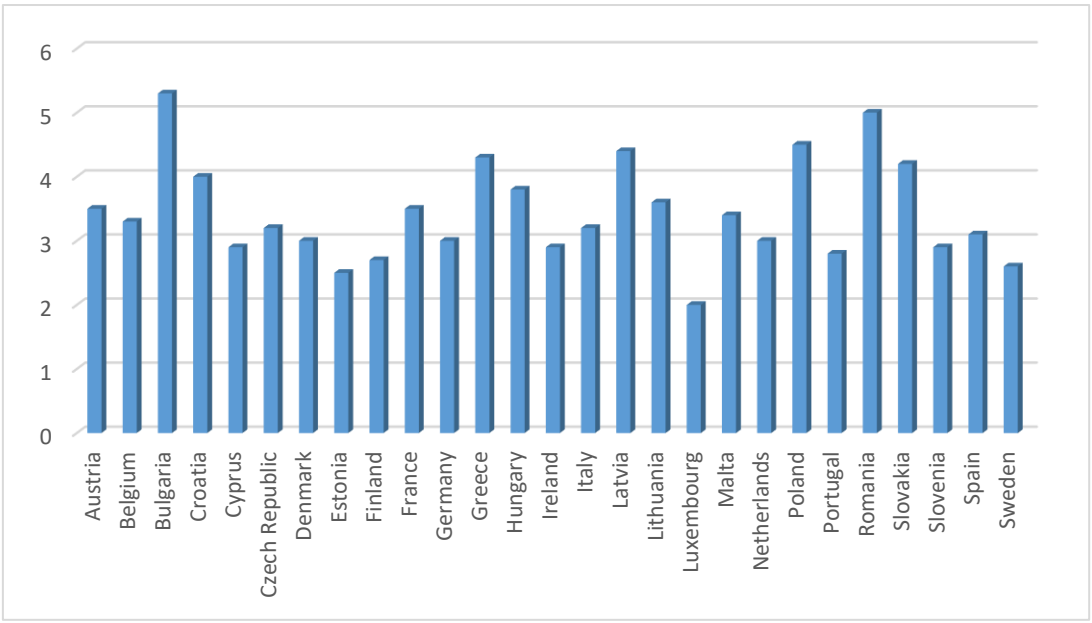

Figure 5. Infant mortality (‰), https://ec.europa.eu/
Source: Author's own work

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The graph highlights clear differences between EU Member States. The lowest infant mortality rates are recorded in Finland, Sweden, Denmark, the Netherlands and Luxembourg, where the figures are around 2-3‰, indicating highly efficient health systems, increased accessibility to maternal and child health services and a high level of health education. These countries demonstrate the direct effects of public investment and social policies focused on prevention and early care. At the opposite end of the spectrum, Romania, Bulgaria, Latvia and Lithuania have high rates, ranging from 4.5 to 8‰, above the European average. These results reflect inequalities in access to medical services, underfunding of the health system, and unfavourable socio-economic factors such as poverty, low levels of parental education and regional disparities. In the case of Romania and Bulgaria, the infant mortality rate remains one of the highest in the Union, highlighting the need to intensify maternal and child health programmes. Central European countries such as Poland, the Czech Republic and Hungary are in the middle of the ranking, with rates of 3-4‰, indicating a steady improvement in healthcare services in recent years, but also further potential for reducing regional inequalities.

The poverty rate is one of the most important social indicators included in the multi-criteria analysis. It reflects income distribution, economic equity and the level of social inclusion. Within the model, we consider AHP to be a "cost" criterion, as a higher value signals poorer social performance and increased vulnerability of the population.

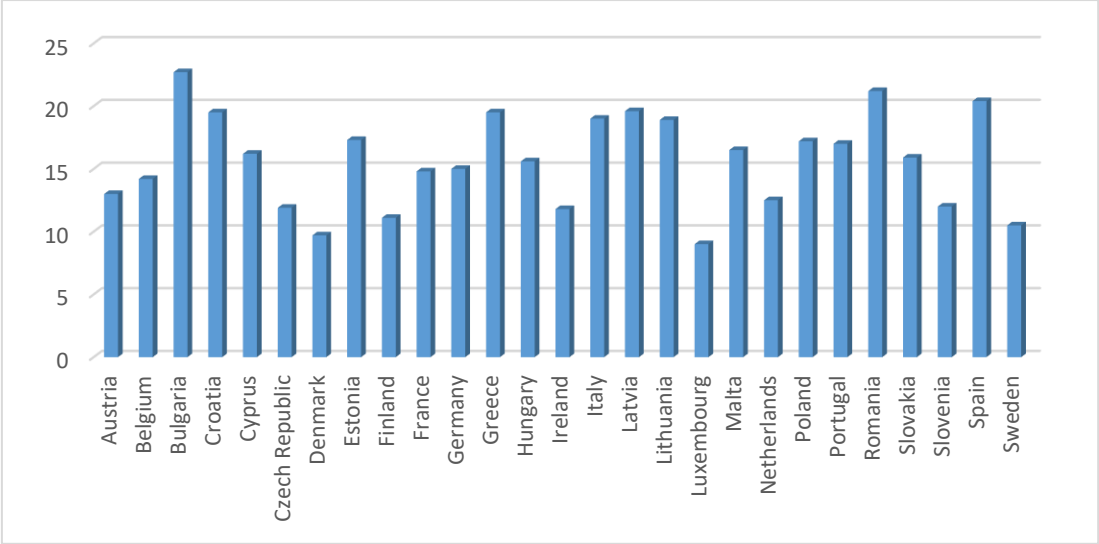

Figure 6. Poverty rate (%), https://ec.europa.eu/
Source: Author's own work

The graph highlights an uneven distribution of poverty among EU Member States. Northern and Western European countries (Denmark, Finland, Luxembourg and the Netherlands) have the lowest poverty rates, ranging from 8% to 12%, reflecting the effectiveness of social protection systems, redistributive policies and well-regulated labour markets. These countries manage to combine high economic performance with a high degree of social cohesion. In the middle of the ranking are countries such as France, Germany, Belgium and Slovenia, which, although they have strong economies, maintain moderate levels of poverty (between 13% and 16%) thanks to social compensation mechanisms and broad access to public services. At the opposite end of the spectrum, Romania, Bulgaria, Latvia and Croatia face the highest poverty rates, exceeding the 20% threshold. These figures highlight persistent inequalities in income distribution, low levels of social protection and pronounced regional disparities. In the case of Romania and Bulgaria, the high poverty rate is associated with an economic structure based on low value-added sectors and a lack of jobs.

By analysing the indicators included in the multi-criteria model, the economic and social performance of EU Member States is determined on the basis of a methodology that ensures comparability and balance between the dimensions analysed. In this regard, the data were normalised to eliminate differences in scale between indicators, and 'benefit' criteria, where higher values reflect superior performance, were treated separately from 'cost' criteria, for which lower values indicate more favourable results. The weights were distributed as follows: GDP per capita (0.25), employment rate (0.15), public health expenditure (0.15), life expectancy (0.20), infant mortality (0.10) and poverty rate (0.15). Based on these weights and normalised values, a composite AHP score was calculated for each country, reflecting its overall economic and social performance. The results obtained allowed the 27 EU Member States to be ranked in a synthetic performance ranking presented in Figure 7.

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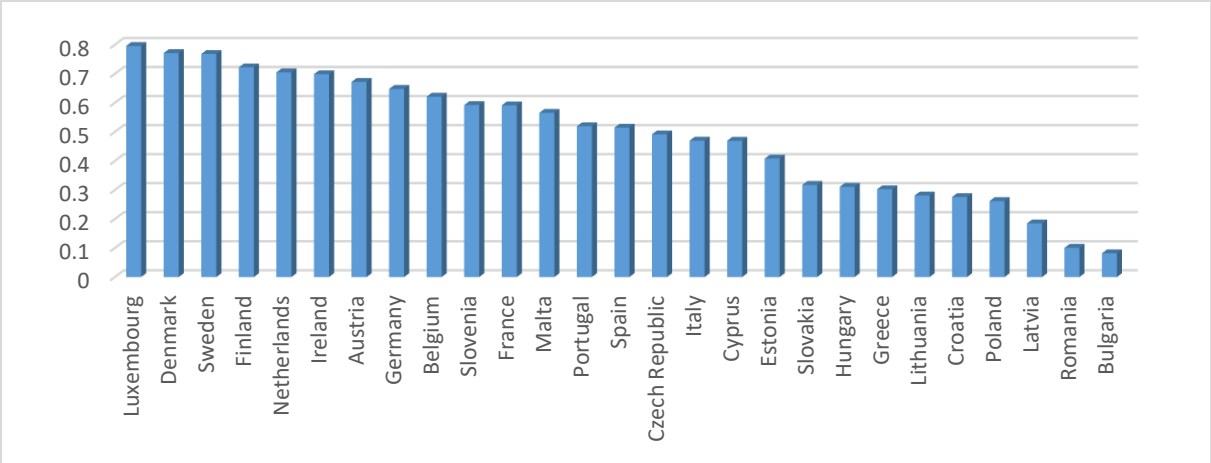

Figure 7. AHF Score Index
Source: Author's own work

Luxembourg, Denmark, Sweden, Finland, the Netherlands and Ireland are at the top of the list, distinguished by their economic prosperity, high public investment and high social quality. Luxembourg ranks first, thanks to the highest GDP per capita in the Union, combined with a low poverty rate and high life expectancy. Denmark and Sweden follow closely behind, benefiting from a well-established Nordic social model based on generous public spending, low levels of inequality and high-performing healthcare systems. The Nordic countries as a whole are characterised by a balance between economic performance and social sustainability, confirming the hypothesis that coherent and inclusive public policies can simultaneously support economic growth and overall well-being.

The upper-middle group of the ranking includes countries such as Austria, Germany, Belgium, France, the Netherlands and Slovenia. These countries have high GDP per capita and life expectancy, but the differences between them are due to the efficiency of public resource use and the level of social inequality. Germany has a strong economy and a solid healthcare system, but its poverty rate is slightly higher than in other northern European countries. France and Belgium have good social performance, but are affected by high public costs and demographic pressures. Slovenia is an interesting case, being the only country in Central Europe that is approaching the Western average, thanks to constant investment in health and a low poverty rate. The countries of southern Europe: Spain, Portugal, Italy and Greece, occupy intermediate positions, reflecting mixed performance. These countries enjoy high life expectancy and low infant mortality, a sign of a solid healthcare infrastructure, but are affected by lower employment rates and higher levels of poverty, particularly in the context of post-crisis economic imbalances. Italy and Greece, although they have a high quality of life, are penalised in the ranking by economic stagnation and low levels of public investment. Portugal and Spain are in the middle of the pack, benefiting from a visible economic recovery but still affected by regional inequalities. At the bottom of the ranking are Croatia, Poland, Latvia, Romania and Bulgaria, which have lower AHP scores. These countries are characterised by significantly lower GDP per capita, higher poverty rates and limited public spending on health, which affects the quality of healthcare services and life expectancy. Romania and Bulgaria are at the bottom of the ranking, confirming the persistence of economic and social gaps compared to the European average. In these countries, although there has been sustained economic growth in recent years, its effects on the well-being of the population are still moderate, and public investment in essential areas such as health and education remains below the EU average.

Therefore, the results presented in Figure 7 highlight the significant differences between the Nordic and Western European economies, characterised by a balance between economic prosperity and social welfare, and the economies of Central and Eastern Europe, where economic performance remains more modest and social differences more pronounced.

IV. CONCLUSION

The multi-criteria analysis carried out using the AHP method allowed for the coherent integration of economic and social indicators relevant to EU Member States, providing a comprehensive overview of performance and the balance between economic development and social welfare. The indicators used, real GDP per capita, the employment rate , public expenditure on health, life expectancy, infant mortality and the poverty rate, were selected to reflect the productive and social dimensions of development.

The results showed that the AHP score effectively summarises the interdependence between the indicators analysed**,** highlighting a correlation between economic prosperity and quality of life. Countries with high GDP per

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capita and employment rates, such as Luxembourg, Denmark, Sweden and Finland, are also those with high life expectancy, low poverty levels and low infant mortality. This positive convergence confirms that consistent investment in health, education and social policies directly contributes to strengthening economic performance and creating a model of sustainable development. On the other hand, Central and Eastern European countries such as Romania, Bulgaria and Latvia, which are at the bottom of the AHP ranking, continue to face significant gaps compared to the European average due to low levels of income, public investment and institutional capacity to implement social policies. We believe that the sustained pace of economic growth in recent years suggests real potential for convergence, if accompanied by coherent policies to reduce inequalities.

We can therefore conclude that the AHP index provides an integrated and balanced picture of economic and social performance, demonstrating that sustainable development cannot be assessed using a single indicator, but rather through a coherent set of interdependent factors. The proposed model confirms that economic prosperity and social equity are complementary components of European progress, and maintaining the balance between them is one of the main challenges for the EU's economic and social policy.

REFERENCES

1. Agarwal, A. (2025). Optimising employee roles in the era of generative AI: A multi-criteria decision-making analysis of co-creation dynamics. *Cogent Social Sciences*. https://doi.org/10.1080/23311886.2025.2476737.
2. Ahmad, MR, Saeed, M., Afzal, U. & Yang, MS (2020). A new MCDM method based on hyper-soft plithogenic sets in a fuzzy neutrosophic environment. *Symmetry*, *12* (11), 1855.
3. Aruldoss, M., Lakshmi, T. M., & Venkatesan, V. P. (2013). A survey on multi criteria decision making methods and its applications. *American Journal of Information Systems*, *1*(1), 31–43. https://doi.org/10.12691/ajis-1-1-5.
4. Benítez, J., Delgado-Galván, X., Gutiérrez, JA, & Izquierdo, J. (2011) . Balancing consistency and expert reasoning in AHP. *Mathematical and Computational Modelling*, *54* (7-8), 1785-1790.
5. Bhambri, P. & Kautish, S.K. (2024) . The hierarchical analytical process and value creation in business. In *Using strategic analysis for value creation in business and competitive advantage* (pp. 54-77). IGI Global.
6. Bonissone, P.P., Subbu, R., & Lizzi, J. (2009). IEEE COMPUTATIONAL INTELLIGENCE MAGAZINE. *IEEE COMPUTATIONAL INTELLIGENCE MAGAZINE*, 1556–603X/09/$25.002009IEEE .
7. Erdogan, S. A., Šaparauskas, J., & Turskis, Z. (2019). A multi-criteria decision-making model to choose the best option for sustainable construction management. *Sustainability*. https://doi.org/10.3390/su11082239.
8. Ezeji, I. N., Adigun, M. O., & Oki, O. (2025). Strategic Selection of Application Area for Optimising Computational Complexity in Explainable Decision Support System Using Multi-Criteria Decision Analysis (MCDA). *J. Syst. Cybern. Inf*, *23*, 36-47.
9. Macovei, A. G., Cara, E., & Pârțachi, I. (2024). Econometric analysis of the impact of financial indicators on the attractiveness of foreign direct investment in Romania. *The USV Annals of Economics and Public Administration*, *24*(2 (40)), 210-219.
10. Malakooti, B. (2012) . Decision making process: Typology, intelligence, and optimisation. *J Intell Manuf*, 733–746. https://doi.org/10.1007/s10845-010-0424-1
11. Malekmohammadia, B., Zahraieb, B., & Kerachianb, R. (2011) . Ranking solutions of multi-objective reservoir operation optimisation models using multi-criteria decision analysis. *Expert Systems with Applications*, 7851–7863. https://doi.org/10.1016/j.eswa.2010.12.119.
12. Mogstad, M., Salvanes, K. G., & Torsvik, G. (2025). *Income Equality in The Nordic Countries: Myths, Facts, and Lessons* (No. w33444). National Bureau of Economic Research. DOI 10.3386/w33444.
13. Munier, N. & Hontoria, E. (2021) . *Uses and limitations of the AHP method*.
14. Paraskevas, A., & Madas, M. (2024). Selection of academic staff based on a hybrid multi-criteria decision method under neutrosophic environment. In Operations Research Forum (Vol. 5, No. 1, p. 23). Cham: Springer International Publishing.
15. Saaty, T.L. (1980). The analytic hierarchy process. New York: McGraw-Hill, New York, pp 20–25.
16. Saaty, T.L. (1990). How to make a decision: The analytic hierarchy process. European Journal of Operational Research, 48(1):9–26.
17. Scott, M.J. (2002). Quantifying certainty in design decisions: an examination of AHP. In *International Technical Conferences on Design Engineering and Computers and Information in Engineering* (vol. 3624, pp. 219-229).
18. Turskis, Z., Zavadskas, E. K., & Peldschus, F. (2009) . Multi-criteria optimization system for decision making in construction design and management. *ENGINEERING ECONOMICS*, *1 (61)*.
19. Türkyılmaz, A., Şenvar, Ö., Ünal, I., & Bulkan, S. (2020). A research: heuristic approaches for solving flexible workshop problems with multiple objectives. *Journal of Intelligent Manufacturing*, *31*(8), 1949–1983.
20. Yuen, K.K.F. (2024). Gram inverse matrix methods for prioritisation in the analytical hierarchy process: Explainability of the weighted least squares optimisation method. *arXiv preprint arXiv:2401.01190*.
21. Wang, H., Olhofer, M. & Jin, Y. (2017) . A mini-review on preference modelling and articulation in multi-objective optimisation: current status and challenges. *Complex & Intelligent Systems*, *3*(4), 233–245.
22. EUROSTAT: https://ec.europa.eu/

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