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TAXONOMIC ANALYSIS OF UNEMPLOYMENT IN EU COUNTRIES IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

Unemployment is one of the most important problems affecting people in all countries. It affects the functioning of entire economies, industries, and enterprises; it also reduces the level and quality of people's lives. The dynamic changes that are taking place in the labor market are forcing entrepreneurs to adopt a flexible approach to labor market resources – that is, employees – and also to choose appropriate forms of human capital management. This may lead to a reduction in unemployment in the market. Consequently, tackling unemployment is one of the important challenges facing the European Union, especially on its way to achieving sustainable development goals. High levels of unemployment could significantly hamper the achievement of the Agenda 2030 employment targets (SDG8), leading to poverty, social and economic inequality, and social instability. Therefore, the subject of this study is unemployment in EU countries; the main objective is to examine unemployment levels across EU member states. The deliberations and analysis are carried out in the context of the Agenda 2030 Goal 8 (SDG 8) for sustainable development. Taking into account the different degrees of implementation of SDG8 by individual Member States, and thus the different results in this respect, the study finds differences and similarities among the surveyed Member States in terms of types and levels of unemployment. The research is based on Eurostat data for 2022, and uses multidimensional comparative analysis methods

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such as cluster analysis and linear ordering. A review of selected sources on international and European law focuses on employment policy standards, including the problem of unemployment; this serves as a background for the analyses. The considerations are embedded in the concept of sustainable development, which influences the functioning of entire economies, but also in the processes of enterprise management. Based on the literature and the results of the analyses, it is concluded that levels of unemployment vary greatly in the analyzed countries. The best conditions for availability and accessibility of work are found in the Czech Republic and Malta; the worst are in Spain and Greece, where unemployment is very high.

Keywords: Sustainable development, unemployment, SDG8, labor market management, human capital management, taxonomic method.

1. INTRODUCTION

The level of unemployment around the world varies according to region, country as well as the time span of the study. Unemployment is determined by a number of different factors that can be considered in different dimensions and at multiple levels of research. Unemployment data are regularly collected by international organisations such as the International Labour Organisation (ILO) and Eurostat (for the European Union). In the European Union, the average unemployment rate reaches relatively high levels, particularly for long-term unemployment and unemployment of young people (Eurostat); (young people are defined as those between 15 and 29 years old; Eurostat, Which information). This gives rise to the need for adequate institutional intervention in the form of the use of economic policy instruments, including employment policy, for example, unemployment benefits, integration allowances or courses aimed at retraining unemployed people (Leogrande, 2023). It is becoming necessary to take measures designed to ensure a balance between the three dimensions of human life and work: the economic, environmental and social dimension, with particular emphasis on the latter.

In the context of the issues addressed in this paper, the greatest importance should be attached to any action aimed at stable, sustainable and inclusive economic growth, full and productive employment and decent work for all people (Background paper, 2012). The persistence of high levels of unemployment in many parts of the world is not conducive to such stabilising initiatives and, on the contrary, exacerbates socio-economic inequalities, making actions aimed at balancing development more difficult and less effective. An analysis of statistical data characterising global labour force participation does not inspire optimism. In the report "World Employment and Social Outlook: Trends 2023" (Trends, 2023), the International Labour Organisation (ILO) predicts that global employment growth in 2023 will be only 1.0%. The report also points to two vulnerable groups that have been the most disadvantaged in the labour market for years, namely women and young people, emphasising that these groups will continue to face difficulties in finding a satisfactory job. According to the aforementioned report, the global female labour force participation rate in 2022 was 47.4%, compared to 72.3% for men: this means that for every inactive male worker, there were two inactive women. Young people between the ages of 15 and 24 were also at a disadvantage when it came to finding and keeping a quality job: their unemployment rate was three times that of the rest of the unemployed. Overall, global unemployment is projected to reach 208 million people in 2023, with an unemployment rate of 5.8% (International Labour Office, 2023). High levels of unemployment make it very difficult to achieve the Sustainable Development Goals. This is due to the following

reasons (Levasseur, Lesage, Margni, Deschênes, Samson, Werf, 2010): lack of access to income, social inequalities, social conflicts and tensions, slowed economic growth. In view of the above, in the context of the implementation of Sustainable Development Goals 8 (SDG8), it is extremely important to focus attention on the upward/downward trends of the unemployment rate in individual EU countries, as well as to identify differences in this regard between countries. The subject of the research undertaken for the study is unemployment in the European Union countries, defined according to selected criteria (gender, age, length of unemployment). The main objective is to examine the variation of unemployment levels in EU countries due to various aspects and criteria. The analyses were carried out in the context of the eighth goal of Agenda 2030 (SDG 8) for the idea of sustainable development. A review of the international literature on these issues was carried out. Information and up-to-date statistical data collected from publicly available databases such as Eurostat and the OECD were used, the research period being 2022. Taxonomic methods were used in the course of the research task.

2. THE SEARCH FOR EMPLOYMENT POLICY STANDARDS AND THE PROBLEM OF UNEMPLOYMENT IN THE LIGHT OF SELECTED SOURCES OF INTERNATIONAL AND EUROPEAN LAW

The beginnings of the development of international employment policy standards can be traced back to the first half of the 20th century, when the ILO began its activity. Thus, already in 1919, the Preamble of the ILO clearly emphasized that the main assumptions of this organization included, among others: the development of uniform, universal international standards in the field of employment policy and combating unemployment. An update of the objectives stated was contained in the ILO Declaration on Social Justice for a Fair Globalization of 10 June 2008 (ILO Declaration, 2008). The document considered the promotion of employment by creating sustainable institutional and economic environment as a strategic objective within of social justice. Thus, both initially and several decades later, these goals were regarded as crucial, and their achievement was seen as the elimination of inhumane practices that invariably threaten universal prosperity, social justice and peace. According to the literal wording of the provisions, these rights are vested in everyone, and therefore their universal character should be considered. In the literature one emphasizes that the content of the indicated regulations shows that unemployment poses a threat to the implementation of one of the fundamental rights of the individual, i.e. the right to work. The concept of unemployment means the occurrence of a lack of paid work among people in a specific age range related to the working age, who are capable and ready to take up work, and who are looking for it. This means that unemployment remains in opposition to employment and is associated with shifting production resources to the sphere of professional inactivity (Frątczak, 1993). Similarly, the content of the International Covenant on Economic, Social and Cultural Rights of 16 December 1966 (International Covenant, 1966) confirms the indicated rights with their additional strengthening. Specifically, the document emphasizes the need for their full implementation, strengthening them by indicating specific organizational and legal instruments (Article 6(1)). The achievement of full and productive employment, which will allow all concerned to take up employment, will thus become an articulated and overriding objective of employment policy and one of the most important goals adopted by the ILO. Therefore, it is impossible to omit the basic principles regarding the subject matter, which were also the assumptions and objectives of the ILO. They were included in the

Philadelphia Declaration of May 10, 1944, where it was noted that work was not a commodity, and that existing poverty was a threat to common prosperity. In view of the above, the indicated document obliges the Member States, together with international organizations, to undertake permanent and agreed actions, based on equal cooperation both from the representatives of employees, employers and the governments of the Member States. This means that none of the international organizations undertake employment policy directly, and their activities are limited only to defining certain standards, as well as goals voluntarily undertaken by the Member States in the field of autonomously conducted strategies. In case of voluntary actions on the part of the Member States, the activities of the ILO will be limited to the creation of specific legal standards in the field of global employment policy. Then, the international employment policy will consist in the establishment of legal standards defined by the ILO by the Member States that have decided to ratify the Convention in this matter. In addition to the Convention, the Member States must take into account the guidelines contained in circulars (ILO recommendations), as well as supervision in the field of compliance with applicable standards of conduct in the field of broadly understood employment. The achievements of the ILO contributed to the development of certain common solutions that are applicable both in the global and national labor markets of the Member States, i.e. uniform standards for labor markets in the form of job placement, vocational training and vocational guidance. On the other hand, in terms of protection against unemployment, it was recognized that the existing system should be coordinated with the national employment policy, and thus support full, productive, but also freely chosen employment. So far, the declarations contained in the Treaty of Rome have referred only to vague statements encouraging to promote employment, increase and maintain the level of employment and counteract unemployment (Baran, 2019). Thus, the activity of the Community institutions consisted only in encouraging the Member States to cooperate in matters relating to employment. This means that these issues were not considered priority goals at the time, but only complementary (Wise, Gibb, 1993) ones. The European Economic Community (EEC) was to be helpful in this respect by facilitating the coordination of activities in the field of social policy (Article 118 of the EC Treaty, modified by Article 156 of the TFEU – Treaty on the Functioning of the European Union (TFEU).

However, it is impossible to omit the activities of one of the first international organizations, i.e. the EEC, whose overriding goal was to build a common economy, but it was emphasized that the freedom of movement of employees in this case would become crucial both for prosperity and for the market economy (Baran, 2019). Nevertheless, in accordance with the then 48-66 Training and Enterprise Council, and now 45-62 TFEU, it was based on the assumption that both the supply and demand for labor would be self-clarified, thanks to the free movement of workers. In view of the above, until the 1980s, it was assumed that the activities related to employment policy remained within the competence of individual member states. Such a position was also reflected in the term used at that time to define the issues analyzed, so these issues were included in the category of socio-economic policy. The indicated tendency of non-interference of Community institutions in social matters was recognized as inappropriate already in 1973 during the summit in Paris (Świątkowski, 2016). At that time it was noticed the need not only to modify the resulting political union into an economic and monetary union, but also to actively participate social partners, trade union organizations and entrepreneurs in economic and social goals undertaken by community institutions. The result of these changes were the strategies of action announced in 1974 – the Social Action Program

(Council Resolution 1974) assuming the improvement of working and living conditions of employees, as well as allowing full, efficient employment (Świątkowski 1982). As a result of these changes, it was possible to see an improvement in the equal treatment of working women and men (Wandzel 2003), as well as the protection of employees' rights in the event of restructuring of the workplace, but the document did not contain proposals for changes in the employment policy. However, this was dictated by the previously adopted procedure, according to which actions in this area could be taken when they related to one of the objectives assumed in the treaties (Wandzel, 2003). This procedure was also aimed at ensuring the sovereignty of the Member States' authorities in the field of employment policy. Significant trends in the shaping of the European social model were initiated in Lisbon in 2000. One assumed to build competitive economy with better jobs, as well as to achieve full employment, which was a much better solution than the current concept of high employment (in accordance with Article 9 Treaty on the Functioning of the European Union (TFEU). The goal was to be achieved thanks to the open method of coordinating employment programs, and the strengthened role of the European Council as a supranational coordination center for a modern employment strategy. In the following decades, the Lisbon employment strategy, which was initiated, was given new, improved versions adapted to modern realities. At that time, the essence of the changes was based not so much on instructions and direct supervision, but on coordination by supranational EU institutions of modern undertakings that had proven themselves in national labor markets. In addition to the existing entities, non-governmental organizations were also involved in cooperation in this area. The activities strictly aimed at job seekers, and not only at those already employed have also become an important modification. The rights to full participation and development have also been equalized for all employees, including those outside the employment relationship. At this point, it should also be noted that the year 2010 was associated with the introduction of the concept of flexicurity, consisting in creating an attractive workplace for everyone interested in entering the common market, allowing the development of talents (Świątkowski, Wujczyk, 2011). An important stage was also the implementation of two new goals included in the Working Togeder for Growth and Jobs program – a New Start for the Lisbon Strategy. The first of them concerned initiating links between economic and social growth and employment policy, while the second was aimed at increasing the effectiveness of work management. The new program was implemented in 2005, and based its operation on three-year cycles. The essence of its operation was included in companions to economic and employment policy, which included guidelines in the field of macro and microeconomics and employment (Commission 2005/193). The next step was the development by the Commission of the Community Lisbon Programme, which contained a summary set of reform programmmess of the Member States. It was a comprehensive document whose implementation at the supranational level was to result in synergy between economic policy and employment policy.

For the analysis in question, it is important that out of the 24 guidelines, 8 concerned employment, i.e.: implementation of an employment policy aimed at achieving full employment, improving the quality and efficiency of work, strengthening social and territorial cohesion (no. 17); promoting a continuous training program (no. 18); modifying the nature of the labor market – by making it accessible to everyone, making work more attractive, paying financial benefits for job seekers (no. 19); balancing supply and demand in the labor market (no. 20); promoting flexibility and social protection, reducing the fragmentation of the labor market, respecting the powers of social partners (no. 21);

maintaining favorable employment costs, developing a wage increase mechanism (no. 22); enriching investment in human capital (no. 23), and updating the education and training system to real professional needs (no. 24). The indicated, revised strategy has been extended and condensed with goals and deadlines that should be achieved in 2010, i.e.

Unfortunately, not all of the intended objectives in the field of employment strategy were achieved, which is why they were replaced by the integrated EU 2020 strategy.

As the analysis shows, the proposed strategies were based mainly on the increasing use of active funds, modernization and flexibility. A further step in terms of the future of the EU, in accordance with the assumptions of the 2030 Agenda for Sustainable Development adopted by the UN General Assembly on September 25, 2015, was the pursuit of an economically sustainable Europe where people live well within the limits of our planet.

3. LITERATURE REVIEW

The conceptual category of 'sustainability' literally means 'the capacity to sustain some entity, outcome or process over time' (Jenkins, 2009) while taking care not to exhaust the resources on which this capacity depends (Klarin, 2018). In the above context, every action should be implemented in such a way that it does not lead to self-destruction, but allows for long-term repetition and renewal. The origins of the concept of sustainability can be traced back to the World Commission on Environment and Development's report 'Our Common Future', where the term was first defined (Report 1987). Sustainable development was considered to be 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (Report WCED 1987), which should not be at the expense of depleting non-renewable resources (Perło, 2014). Sustainable development implies the accomplishment of socially desirable goals (Pearce, Barbier, Markandya, 1990), and its most important message is to improve the quality of life of people around the world (by taking and implementing diverse actions in different regions of the world integrated in three key areas: economic, social and environmental) (Poskrobko, 2009). The concept aligns the essence of the three factors of development: economic growth, social progress and respect for the environment (Agenda 2030). The key document on sustainable development is the Agenda 2030, adopted in 2015 through the acceptance by all UN member states of the resolution:

> Transforming our world: the 2030 Agenda for Sustainable Development'. It sets out 17 Sustainable Development Goals (SDGs), which can be divided into five areas: people, planet, prosperity, peace and partnership. For each goal, specific tasks (a total of 169 tasks) to be achieved by 2030 are outlined (Transforming our world: the 2030). One of the extremely important areas included in the Agenda 2030, directly affecting everyone, is the labour market, to which Goal 8 (SDG8) refers: 'Promote inclusive and sustainable economic growth, full and productive employment and decent work for all (Transforming our world: the 2030).

In the context of SDG8, sustainable economic growth should be inclusive, drive progress, create decent jobs for all and improve people's living standards. Accordingly, SDG8 sets the goal of achieving full and productive employment by 2030 (Goal 8). This term should be understood as a state where all people accepting a fixed wage in the labour market can find employment (Grzybek, 2021). In economics, the term is understood differently in a planned economy and differently in a market economy. The latter refers to

a situation in which there is only voluntary unemployment (Kośmicki, Malinowska, 2015) (the unemployed in this case are those who do not accept the offered working conditions and wages, look for a better job, etc.). High levels of unemployment can significantly impede the achievement of SDG8 (Lopez, Ahumada, 2022), leading to poverty, social and economic inequality and social instability. Without a stable income, it is difficult for people to meet basic needs such as food, housing and healthcare. The unemployed are often dependent on social assistance and institutional support programmes (social programmes), which is not conducive to achieving sustainable development goals that require investment in education, health and infrastructure. Those who are unemployed often have limited access to resources and development opportunities. They may also find it difficult to access education, health care and other social services, which consequently becomes an important barrier to achieving sustainable development goals aimed at eradicating poverty. On a psychological level, lack of employment prospects can lead to frustration, depression and anxiety. This, in turn, can lead to social conflict, political instability and a reduction in the state's ability to focus on sustainable development goals. Jobless people do not contribute to economic growth (Tjahjanto, Tuhana, Mafruhah, Istiqomah, Ismoyowati, 2023), often representing irretrievably lost human potential.

4. DATA AND RESEARCH METHODS

In the research on the differences in the level of unemployment in the EU countries, the methods of multidimensional comparative analysis, i.e. cluster analysis and linear ordering (Cattell 1944, Tryon 1939, Grabiński 1992, Gatnar, Walesiak 2004, Młodak, 2021) were used. The methods enabled the precise division of the examined units characterized by many features into clusters (groups, clusters) of objects similar to in terms of the indicators selected for the research. They are used in many scientific fields. In the study, thanks to the use of cluster analysis, it was possible to check to what extent EU countries were similar to each other in terms of the level of unemployment and to pay attention to what differentiated them. The Ward method was applied for the analysis (Ward, 1963). The method uses the analysis of variance approach in its procedures It aims at minimizing the sum of squared deviations of any two clusters that can be formed at any stage of the research (Grabiński, 1992). It was chosen as it is one of the most frequently used method (along with the k-means method). The order of operations in the Ward method is similar to that in other agglomeration methods. There are significant differences in the parameters used in the formula. The procedure is as follows: it starts with determining the n x n taxonomic distance matrix, which contains the distance of each pair of objects. The matrix is symmetrical about the main diagonal, which is all zeros. Then, pairs of objects (and then clusters) are searched for which the mutual distance is the smallest. The objects are denoted p p and q, with $p < q$ Subsequently, p and q are merged into one new cluster, which occupies the position with the number p At the same time, the object (cluster) with the number q is removed, and the numbers of clusters with a number higher than it are reduced by one. In this way, the dimension of the matrix is reduced by 1. Then, the distance of the new cluster from each other is determined according to the formula:

$$D_{pr} = a_1 \cdot d_{pr} + a_2 \cdot d_{qr} + b \cdot d_{pq} \quad (1)$$

where: D_{pr} – is the distance of the new cluster from the cluster with the number r, d_{pr} – is the distance of the original cluster p from the cluster r, d_{qr} – is the distance of the original

cluster q from the cluster r, d_{pq} – is the mutual the distance of the primary clusters p and q, a_1, a_2, b – these are the parameters that in the Ward method are calculated on the basis of the following formulas:

$$a_1 = \frac{n_p + n_r}{n_p + n_q + n_r}, \qquad a_2 = \frac{n_q + n_r}{n_p + n_q + n_r}, \quad b = \frac{-n_r}{n_p + n_q + n_r} \tag{2}$$

where: n_P, n_q, n_r mean the number of single objects in particular groups.

To assess the quality of division a lot of indicators have been developed (Młodak, 2011; Młodak, 2020; Migdał-Najman, 2011). Two indices were used in the analysis: silhouette coefficient – SI – (Rousseeuw, 1987; Kaufman, Rousseeuw, 2005) and Davies–Bouldin index – DB (Davies, Bouldin, 1979).

The silhouette index is a function of a_1 average distance of object Γ_i from all other objects in the same cluster and $b_i$the smallest the average dissimilarity between Γ_i and objects in any other clusters, which it does not belong to $i = 1, 2, \dots, n$:

$$SI = \frac{1}{n}\sum_{i=1}^{n} \frac{b_i - a_i}{max\{a_i, b_i\}} \tag{3}$$

The Davies–Bouldin measure was created using the distance between centroids of clusters and sum of their diameters, i.e.

$$DB = \frac{1}{s}\sum_{k=1}^{s} \max_{l=1,2,\dots,s, l\neq k} \left(\frac{diamc(\Theta_k) + diamc(\Theta_l)}{\|c_k - c_l\|} \right) \tag{4}$$

where $diamc(\Theta_r) = \sqrt{\frac{1}{n_r}\sum_{i:\Gamma_i \in \Theta_r} \|\gamma_i - c_r\|^2}$

and $n_r is\ the\ numbeer\ of\ objects\ in\ \Theta_r, r = 1,2, \dots s.$

For the obtained clusters, an analysis of group means was carried out. The analysis aims to show indicators (diagnostic features) dominant in a given group. For the matrix of numerical data, general arithmetic means (without division into groups) of the examined indicators, marked as $\overline{W}_i$ were calculated. Then, the group arithmetic means of the studied indices in the obtained clusters were calculated, which were marked as $\overline{w}_i$. The quotient $\overline{w}_i / \overline{W}_i$ is the indicator of the structure of each cluster. High values of the average structure indicator inform about the dominance of a given feature in the obtained cluster. If the average level of the phenomenon in the group is identical to the average level in the entire examined population of objects, then the average quotient takes the value of 1 (or 100%). The values above 1 (>100%) indicate an average level of the factor in the group significantly exceeding its general average, and the values below 1 (<100%) indicate a lower average level of this factor in the study group compared to the entire analyzed population (Chudy-Laskowska, Pisula, 2022). In order to check whether the levels of the examined features differ in the resulting clusters, the Kruskal-Wallis ANOVA test (Gopal,

2006) was applied. However, in order to determine the ranking of EU countries in terms of unemployment, the well – known and commonly used ranking methods of linear ordering of multi-feature objects were used – in particular the rank averaging method (López de Mántaras, Plaza, 2000).The ranking method should specify the nature of the variables selected for research (stimulants and destimulants). For each selected feature, ranking is performed by assigning a value of 1 to the best value (in the case of a stimulant to the highest and in the case of a destimulant to the lowest. In the next stage, the average rank for a given object is calculated and the average ranks are then ranked, treating the average as a destimulant. The lower value is the better because the analyzed object is in a higher position in the constructed ranking (Gatnar, Walesiak, 2004).

5. DIFFERENTIATION OF UNEMPLOYMENT IN THE EUROPEAN UNION COUNTRIES – RESEARCH RESULTS

For the needs of the analysis, a set of potential explanatory variables was created. There are many different variables describing the diversity of unemployment levels. For the purposes of the study, 9 potential explanatory variables that represent various aspects of unemployment were selected. The variables defining the level of unemployment in various divisions – by gender, age, and total unemployment in UE countries in 2022. Labor productivity and the level of employment were also taken into account. The availability of data was guided, but also the fact that the selected measures are reflected in the assumptions of the 2030 Agenda for sustainable development. The data were taken from the Eurostat Database.

Table 1. Indicators and dsignantion of tabel from Eurostat Database

Indicators selected for research	Designations
Unemployment, 15 to 24 years [% of population in the labour force]	[UNE_RT_A__custom_6811408]
Unemployment, 25 to 54 years [% of population in the labour force]	[UNE_RT_A__custom_6811408]
Unemployment, 55 to 74 years [% of population in the labour force]	[UNE_RT_A__custom_6811408]
Long term unemployment, 15 to 74 [% of population in the labour force]	[UNE_LTU_A__custom_6794888]
Females unemployment 25 to 74 [% of population in the labour force]	[UNE_RT_A__custom_6811408]
Males unemployment 25 to 74 [% of population in the labour force]	[UNE_RT_A__custom_6811408]
Nominal labour productivity per person employed**	[NAMA_10_LP_ULC__custom_3853725]
Total unemployment rate, 15 to 74 [% of population in the labour force]	Total unemployment rate [TPS00203]
Total employment, 20 to 64 [% of total population]	[LFSI_EMP_A$DEFAULTVIEW]

Source: own study.

Table 1 presents the basic descriptive statistics of individual variables proposed for the research. As a result of the analysis of the coefficient of variation, the employment rate (X_9) was excluded from further analysis. The coefficient of variation in its case was very

low (less than 10%), which means that it did not differentiate the surveyed countries in terms of total employment, 20 to 64 [% of total population] and is at a similar level in each of them.

Table 2. Basic descriptive statistics of indicators selected for research in EU countries in 2022

	Indicators selected for research	$\bar{x}$*	Me	Min	Max	σ	Vz	Sk	K
X_1	Unemployment, 15 to 24 years [% of population in the labour force]	15.5	15.3	6	31.4	6.7	43.3	0.7	0.1
X_2	Unemployment, 25 to 54 years [% of population in the labour force]	5.1	4.7	2	12	2.4	48.2	1.5	2.8
X_3	Unemployment, 55 to 74 years [% of population in the labour force]	4.4	3.9	1.7	11.4	2.1	48.5	1.7	4.2
X_4	Long term unemployment, 15 to 74 [%of population in the labour force]	2.0	1.5	0.5	7.7	1.6	81.3	2.0	4.7
X_5	Females unemployment 25 to 74 [%of population in the labour force]	5.2	4	2.3	15.2	3.1	58.9	2.2	5.1
X_6	Males unemployment 25 to 74 [%of population in the labour force]	4.7	4.8	1.6	9.9	1.9	40.2	0.8	1.0
X_7	Nominal labour productivity per person employed**	99.2	87.3	54.6	223.2	33.5	33.8	2.2	6.6
X_8	Total unemployment rate, 15 to 74 [%of population in the labour force]	5.7	5.6	2.2	12.9	2.6	45.2	1.4	2.5
X_9	Total employment, 20 to 64 [% of total population]	76.4	77.5	64.8	82.9	5.0	6.5	-0.9	0.0

*$\bar{x}$ – Mean, Min – minimum, Max – maximum, σ – standard deviation, V_z – coefficient of variation Sk – skewness, K – Kurtosis

** Nominal labour productivity per person employed (NLPR_EMP) is calculated by dividing GDP at current prices by total employment (employees and self-employed (EMP)). This ratio is expressed in euro per person. It indicates to some extent how much total economic activity in nominal prices in a given period can be attributed to each employed person. Source: https://ec.europa.eu/eurostat/cache/metadata /en/nama_10_prod_esms.htm

Source: own study.

The first indicator used for the purposes of the analysis – X_1 describe the level of unemployment in the youngest group aged 15 to 24. The lowest unemployment in the younger group (aged 15 to 24) was in Germany and amounted to 6%, and the highest in Greece – as much as 31.4%. The next two variables – X_2 and X_3 – mean the level of unemployment in two age groups - from 25 to 54 and from 55 to 74 years old. A higher percentage of the unemployed occurred in the group aged 25 to 54 years old – on average 5.1%. The lowest level of unemployment in this age group was in the Czech Republic – 2%, and the highest in Greece – 12%. On the other hand, in case of variable X_3 defining unemployment in the age group of 55 to 74 years old, the average unemployment rate was 4.4%, the lowest in Malta – 1.7%, and the highest in Spain – 11.4%. The next indicator (X_4), which was taken into account in the analysis of differences in the level of unemployment in the EU and in Poland, is the long-term unemployment rate, the average level of which for all EU countries was 2%. The lowest level of long-term unemployment was in Bulgaria and Finland (only 0.5%), and the highest in Estonia (7.7%). The next two variables used in the research are the unemployment rates in the group of women (X_5) and men (X_6). This rate was slightly higher in the group of women – 5.2%, while in the case of men it amounted to 4.7% on average. The lowest unemployment rate among women was in Malta (2.3%) and the highest in Greece – 15.2%. In the group of men, unemployment was lowest in the Czech Republic – 1.6%, and the highest in Spain – 9.9%. In addition,

nominal labour productivity per person (X_7) was included in the study. It is a measure for the economic activity. It is defined as the value of all goods and services produced less the value of any goods or services used in their creation. GDP per person employed is intended to give an overall impression of the productivity of national economies expressed in relation to the European Union average. If the index of a country is higher than 100, this country level of GDP per person employed is higher than the EU average and vice versa. Basic figures are expressed in PPS, i.e. a common currency that eliminates the differences in price levels between countries allowing meaningful volume comparisons of GDP between countries. *Person employed* does not distinguish between full-time and part-time employment (Eurostat). The year 2020=100 was adopted as the reference year in the analysis. The average labor productivity per person in 2022 in the EU countries amounted to 99.2, which was a slight decrease compared to 2020. The lowest labor productivity was characterized by employees from Bulgaria – it amounted to only 54.6%, i.e. compared to 2020 there was a decrease of almost 45%. On the other hand, the highest productivity was characteristic of people working in Ireland – (as much as 223.2%), i.e. compared to 2020, it increased by almost 124%.

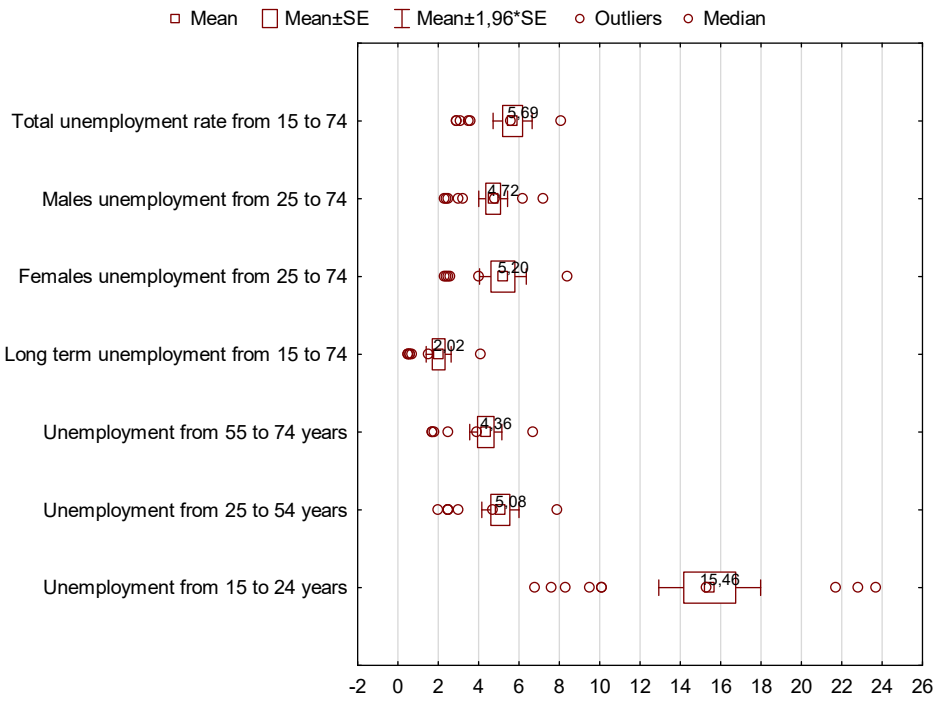

Figure 1. Boxplot. Average unemployment in individual age categories, by gender and in total, and long-term unemployment in the European Union crashes in 2022

Source: own study.

The last indicator included in the research on the differences in the level of unemployment in the EU countries and in Poland was the total unemployment rate (X_8), which in the EU countries was on average 5.7%. The lowest unemployment in the EU in

2022 was in the Czech Republic – 2%, and the highest in Spain – 12.9%, and in Greece – 12.5%. All indicators included in the research are characterized by right-sided asymmetry, which bodes well for unemployment and means that in most of the countries surveyed they reached lower than average values. The kurtosis of the distributions is positive, which in turn indicates a greater concentration of the values of individual indicators around the average level (Figure 1). For the 8 indicators selected for the study, describing the differentiation of the unemployment level, correlations were calculated, and showed that they were strongly related to each other. The correlation matrix of the studied variables is included in Table 2. It shows that the general level of unemployment is most closely related to the unemployment of people aged 25–54. The correlation coefficient is very high (87%) and positive, which means that with the increase in the level of unemployment in the group of people aged 25–54, the general level of unemployment increases. Another feature strongly correlated with the general level of unemployment is the percentage of unemployed women (95%). This relationship is also positive, which means that the more unemployed women, the higher the total unemployment rate. Based on the analysis of correlation coefficients, it can be concluded that the total unemployment rate is highly correlated with other features, but since the analysis concerns unemployment in EU countries, it is an extremely important indicator for describing the results, so it was not rejected and allowed for further analysis.

Table 3. Correlation matrix between the indicators selected for the study

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
Unemployment, 15 to 24 years [% of population in the labour force]	1							
Unemployment, 25 to 54 years [% of population in the labour force]	0,87	1						
Unemployment, 55 to 74 years [% of population in the labour force]	0,77	0,91	1					
Long term unemployment, 15 to 74 [% of population in the labour force]	0,24	0,12	0,02	1				
Females unemployment 25 to 74 [% of population in the labour force]	0,86	0,98	0,90	0,06	1			
Males unemployment 25 to 74 [% of population in the labour force]	0,82	0,95	0,93	0,15	0,88	1		
Nominal labour productivity per person	-0,18	-0,20	-0,11	0,22	-0,18	-0,19	1	
Total unemployment rate, 15 to 74 [% of population in the labour force]	0,86	0,97	0,92	0,14	0,95	0,93	-0,11	1

Source: own study.

The only one indicator which was negatively correlated with most features of unemployment was labor productivity. The relationship between them is small and negative, which means that labor productivity decreases with increasing the variables of unemployment. Correlation relationships between the selected indicators are presented in Figures 2 and 3. Figure 2 shows positive relationships between the total unemployment rate and long-term unemployment and the percentage share of the unemployed aged 25 to 54. On the other hand, the scatterplot (Figure 3) illustrates the relationship between labor productivity and the share of the unemployed aged 15 to 24. Noteworthy are the outliers

that appear in Figures 2 and 3. Greece and Spain definitely lag behind in the bagplot due to high unemployment values in the group of people aged 25–54. Similarly in the case of the scatterplot (Figure 3), which also shows very high values of the unemployment rate in these countries, this time among people aged 15 to 24. This graph also shows that Ireland is also an outlier, but in a positive sense – with a low level of unemployed people aged 15 to 24, labor productivity is very high there.

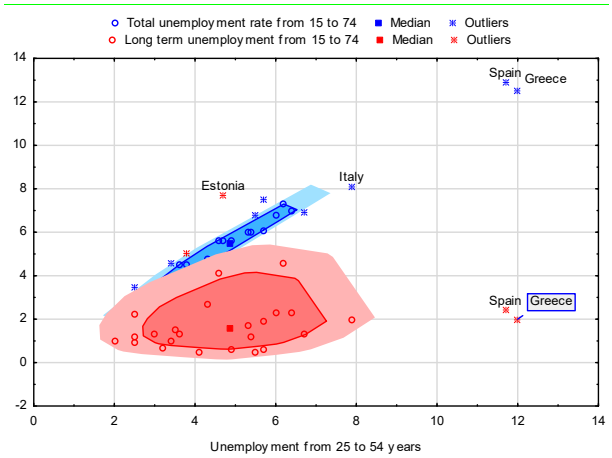

Figure 2. Bagplot. Unemployment in the group of people aged 25 to 54 and the total unemployment rate and long-term unemployment

Source: own study.

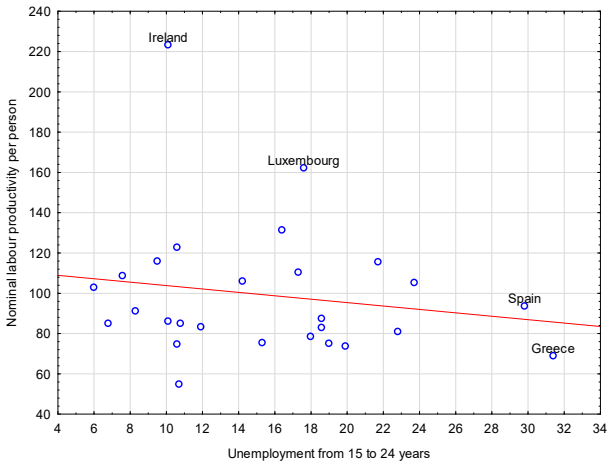

Figure 3. Scatterplot between labor productivity and the share of the unemployed aged 15 to 24

Source: own study.

Using the indicators adopted for the study, a clustering procedure was performed in order to isolate groups of countries similar to each other in terms of the level of unemployment. The results of the analysis are presented in a tree diagram (Figure 4). The Ward's method was selected for the study, assuming the Euclidean distance. A tree diagram can be divided into different heights (distances). By moving the dividing line to the left, more clusters are obtained, at a distance of 20 there are 2 of them, at a distance of 10 – 3, at a distance of 7 – 4 clusters are obtained and in the case of a cluster at the distance of 6 – 5 cluster are obtained.

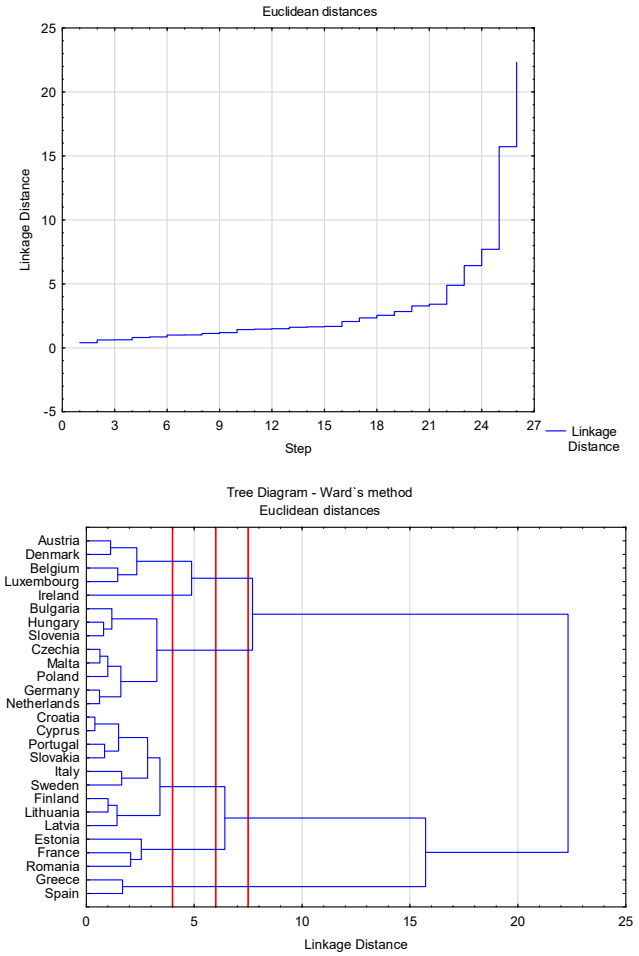

Figure 4. Clustering outcomes of EU countries in terms of unemployment in 2022

Source: own study.

First of all the correctness of obtained clusters should be verified. The optimum clusters should be internally homogenous and heterogenous in telations to the others (i.e. significantly differ one to other). To find out which of the divisions is the best and gives

good results, two indices were used in the analysis: silhouette coefficient – SI and Davies-Bouldin index –DB. The results were presented in table 3.

Table 4. Silhouette coefficient – SI and Davies-Bouldin index – DB

Number of clusters	Silhouette Score	Davies-Bouldin Index
4	0.366709	0.942432
5	0.367060	0.869809
6	0.349746	0.751170

Source: own study.

The Silhouette coefficient indicates that the best division is 5 groups and the Davies--Bouldin Index that the best division is into 6 clusters. Therofore the Kruskal Wallis's non-parametric ANOVA test was carried out, which showed for which of the divisions there are differences between groups in the set of all indicators adopted for research. The tests were carried out at the significance level α=0.05. Only one of the divisions ensures differentiation of all indicators between groups. This is a division into 5 clusters.The results are presented in table 5.

Table 5. Results of the Kruskal Wallis ANOVA test – indicators adopted for the study and group affiliation for 4, 5 and 6 clusters

Specification	**4 clusters p-value**	**5 clusters p-value**	**6 clusters p-value**
Unemployment, 15 to 24 years [% of population in the labour force]	0.0002	0.0000	0.0016
Unemployment, 25 to 54 years [% of population in the labour force]	0.0001	0.0000	0.0005
Unemployment, 55 to 74 years [% of population in the labour force]	0.0002	0.0000	0.0011
Long term unemployment, 15 to 74 [% of population in the labour force]	**0.2011**	0.0002	0.0248
Females unemployment 25 to 74 [% of population in the labour force]	0.0001	0.0000	0.0005
Males unemployment 25 to 74 [% of population in the labour force]	0.0001	0.0000	0.0005
Nominal labour productivity per person	0.0074	0.0007	0.0330
Total unemployment rate, 15 to 74 [% of population in the labour force]	0.0909	0.0000	**0.2255**

Source: own study.

The analysis of differences shows that all features differ significantly in the created clusters, which means that the division was carried out correctly.

Table 6 presents clusters of countries similar to each other in terms of various unemployment rates in 2022.

In order to characterize the clusters formed as a result of the analysis, the quotient $\bar{w}_i / \bar{W}_i$ as the indicator of the structure of each cluster was used. The method enables the separation of indicators that dominate in a given cluster, or are at a low level. If the value of the the quotient $\bar{w}_i / \bar{W}_i$ equal to 1 informs that a given feature is at the level of the global average. The results of the analysis of group means are presented in figure 5. When

analyzing the clusters in general, it can be stated that the best in terms of unemployment are clusters b and a. Group c and d represent the average level, and cluster e is definitely the worst in terms of the analyzed unemployment indicators. The best group *b* includes 8 countries: Bulgaria, Hungary, Slovenia, the Czech Republic, Malta, Poland, Germany and the Netherlands. In these countries, all analyzed unemployment indicators are at the lowest levels. The only thing that can be assessed negatively is the low labor productivity per capita. In cluster ”b” it is lower than the EU average.

Table 6. Division of EU countries into groups according to the level of unemployment in 2022

Group marking	Cluster composition
Group a	Belgium, Luxembourg, Denmark, Austria, Ireland
Group b	Bulgaria, Hungary, Slovenia, the Czech Republic, Malta, Poland, Germany, Holandia
Group c	Estonia, France, Romania
Group d	Croatia, Cyprus, Portugal, Slovakia, Italy, Sweden, Latvia, Lithuania, Finlandia
Group e	Greece, Spain

Source: own study.

Figure 5. Group averages of individual indicators

Source: own study.

Cluster *a* which was also rated very positively, includes: Belgium, Luxembourg, Denmark, Austria and Ireland. It ranks second in terms of the level of unemployment. All

the analyzed indicators are lower than the average values for the EU, but they are slightly higher than in group b. One exception is the long-term unemployment rate, which is above average. The labor productivity index was definitely above average and is the highest among all clusters, which is a very positive feature of this cluster. Group c consists of Estonia, France and Romania. Unemployment rates among young people are slightly above the global average, and the highest level is taken by the long-term unemployment rate (which is comparable to that in the worst cluster e). The unemployment rate among men and the general unemployment rate are also above the average level. Group d is the last cluster in terms of the analyzed unemployment characteristics. It consists of: Croatia, Cyprus, Portugal, Slovakia, Italy, Sweden, Latvia, Lithuania and Finland. All the indicators studied here exceed the average levels for the EU, only long-term unemployment there is quite low – below the global average. Definitely the worst in terms of unemployment is the last one, group e formed as a result of clustering, which includes Greece and Spain.

Table 7. Ranking of EU countries by unemployment rate in 2022

Countries	Group	Ranking
Czechia	b	1
Malta	b	2
Netherlands	b	3
Germany	b	4
Poland	b	5
Denmark	a	6
Hungary	b	7
Luxembourg	a	8
Ireland	a	9
Slovenia	b	10
Bulgaria	b	11
Austria	a	12,5
Belgium	a	12,5
Finland	d	14
Lithuania	d	15
Romania	c	16
Estonia	c	17
Sweden	d	18
Portugal	d	19
Cyprus	d	20
Slovakia	d	21
Latvia	d	22
France	c	23
Croatia	d	24
Italy	d	25
Spain	e	26
Greece	e	27

Source: own study.

All indicators here are definitely higher than the EU average. Unemployment among women reaches the highest level (out of all clusters), and labor productivity is also the lowest. In the created ranking, these two countries occupy the last positions. A ranking was created for EU countries taking into account the analyzed features regarding unemployment $(X_1 - X_8)$. The countries are ordered from 1 – which means the best situation in terms of unemployment and 27 – which means the worst situation in terms of unemployment. Table 7 and Figure 6 present the ranking and grouping of EU countries in terms of unemployment in 2022.

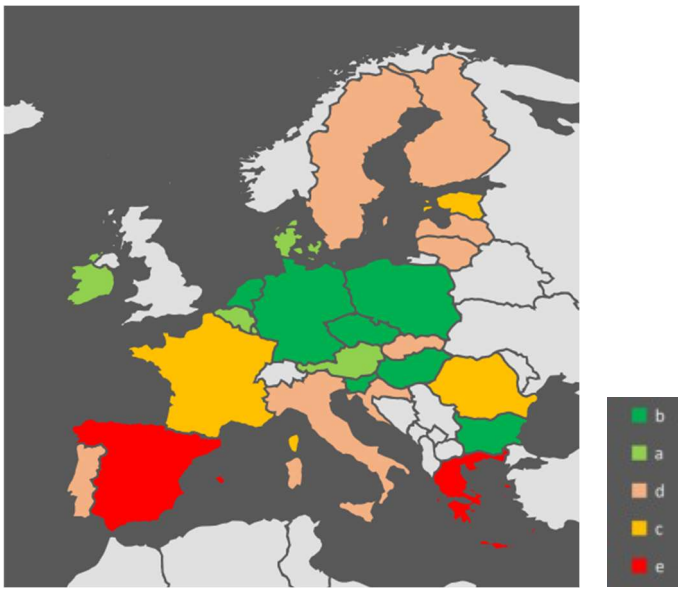

Figure 6. Ranking of EU countries by unemployment rate in 2022

Source: own study.

When comparing the results of the ranking and grouping, it can be seen that the countries from cluster ”b” occupy the highest positions in the ranking. The Czech Republic came first, Malta came second, and the Netherlands came third (all three from cluster ”b”, which dominates the ranking). On the other hand, the last two positions were taken by Spain and Greece, which form the last cluster ”e”, in which the level of unemployment is very high and the situation on the labor market is the worst among the analyzed Member States.

6. CONCLUSIONS

Unemployment is a state that, under certain conditions, can apply to everyone. It is determined by various factors, sometimes independent of those concerned, these are cultural, geographical, random factors, but in some cases they may be intentional. It is well known that everyone tries to earn at a level that ensures a decent existence. That is why, the concept of unemployment appears so often in many studies and analyses. States strive to secure the basic living conditions for their inhabitants. For some, it works very well and

unemployment rates are low, while other countries, perhaps for geographical, cultural or simply historical reasons, do not have such a chance and unemployment reaches a very unfavorable level. Therefore, the undertaken research is aimed at showing the diversity of unemployment and its types in the countries of the community. The reduction of unemployment and the implementation of mechanisms encouraging professional activity significantly contribute to the acceleration of the economic development process in the long term. Therefore, EU institutions are working out common concepts of actions in the field of counteracting unemployment and employment policy.The adopted concept of actions initiated and only coordinated by EU institutions should be assessed as not threatening the sovereignty of individual members. Coordination, based on the open method with a clear division of tasks between the EU institutions and its members, remains in line with the principles of the functioning of the EU, i.e. the principle of subsidiarity. Ongoing and voluntary exchange of experiences between individual members undoubtedly brings us closer to developing a unified employment policy in the common labor market. The employment policy of the governments of individual countries, aimed, in accordance with SDG8 of the 2030 Agenda, at ensuring full and productive employment and decent work for all women and men by 2030, also includes the fight against unemployment (mainly long-term and structural), and consequently contributes to balancing (Csillag, Scharle, 2017). Together with social dialogue, it plays an important role in promoting a just transition towards sustainable development (International Labor Office 2012). Based on the taxonomic analysis of the unemployment level in EU countries, it can be concluded that:

- unemployment in the analyzed EU countries is very diverse, as evidenced by as many as 5 separate clusters;
- the countries with the most favorable situation in terms of the analyzed features characterizing unemployment are the Czech Republic, Malta, the Netherlands, Germany, Poland, Hungary, Slovenia and Bulgaria, they clearly differ from other EU countries;
- Denmark, Ireland, Luxemburg, Austria and Belgium are characterized by the highest labor productivity, although it is not the best group in terms of other analyzed indicators characterizing the level and diversity of unemployment; however, as its level is influenced, among others, by physical capital, human capital, innovation or organization of work - it is justified that it characterizes countries from group ”a”, not ”b”;
- the cluster rated as the worst included Greece and Spain, where all the analyzed indicators reached the highest level, significantly different from the EU average; the situation of these countries is very unfavorable.

The situation of the countries with the most favorable situation in terms of the analyzed features characterizing unemployment – the Czech Republic, Malta, the Netherlands, Germany, Poland, Hungary, Slovenia and Bulgaria – should be carefully analyzed and some employment policy solutions used there should be implemented to the countries where the unemployment situation is much worse (Spain and Greece). This requires further in-depth qualitative research as some determinants are probably cultural in nature, which are difficult to capture in quantitative analyses.

Limitations:

The study covers only one year 2022, i.e., when countries are recovering from problems related to the COVID-19 pandemic. The research didn't refer to the connection between the situation in the

labour market and the effects od the COVID-19 counteracting policy. Only 8 features were accepted for the study, if more indicators are introduced into the study, the results may change. There are many questions about the research conducted, therefore more extensive research should be conducted, covering a longer time range and a larger set of adopted indicators, which will be taken into account in subsequent analyses.

REFERENCES

Agenda 2030 na rzecz zrównoważonego rozwoju – implementacja w Polsce, http://www.un.org.pl/files/170/Agenda2030PL_pl-5.pdf.

Baran, K.W. (2019). *System Prawa Pracy, Międzynarodowe publiczne prawo pracy. Standardy globalne*, t. IX. Warszawa.

Cattell, R.A. (1944). *Note on correlation clusters and cluster search methods. „Psychonometrica"*, Vol 9.

Chudy-Laskowska, K., Pisula, T. (2022). *An Analysis of the Use of Energy from Conventional Fossil Fuels and Green Renewable Energy in the Context of the European Union's Planned Energy Transformation. "Energies"*, Vol. 15. DOI: 10.3390/en15197369.

Commission (2005/193), Delivering on Growth and Jobs. A New Integrated Economic and Employment Co-ordination Cycle in the EU, SEC 2005/193. Access on the internet: https://www.cedefop.europa.eu/en/news/new-and-integrated-economic-and-employment-co-ordination-cycle-eu.

Council Resolution (1974) of 27 January 1974 concerning a social action programme, OJ C 013, 12.02. 1974.

Csillag, M., Scharle, Á. (2017). *Analytical paper, Sustainable integration into the labour market, Employment*, Social Affairs and Inclusion, Budapest Institute.

Davies, D.L., Bouldin, D.W., (1979). *A cluster separation measure. „IEEE Transactions on Pattern Analysis and Machine Intelligence"*, PAMI-1, No. 2. DOI: 10.1109/TPAMI. 1979.4766909.

ILO Declaration (2008) On social justice for fair globalization of June 10, 2008.

Eurostat, https://ec.europa.eu/eurostat/web/main/data/database.

Eurostat, https://ec.europa.eu/eurostat/databrowser/view/TESEM160/default/table?lang=en&category=es.tesem.

Eurostat, Which information can I find here?, https://ec.europa.eu/eurostat/web/youth.

Frątczak, E. (1993). *Bezrobocie – wyzwanie dla polskiej gospodarki*. Warszawa.

Gatnar, E., Walesiak, M. (2004). *Metody statystycznej analizy wielowymiarowej w badaniach marketingowych.* Wrocław: Wydawnictwo Akademii Ekonomicznej we Wrocławiu.

Goal 8: Promote inclusive and sustainable economic growth, employment and decent work for all. Access on the internet: https://unric.org/en/sdg-8/.

Gopal, K.K. (2006). *100 Statistical Test*. SAGE Publications. London: Thousand Oaks, New Delhi.

Grabiński, T. (1992). *Metody taksonometrii*. Kraków: Wydawnictwo AE w Krakowie.

Grzybek, D. (2021). *Pełne zatrudnienie – porzucona idea i jej odrodzenie. „Social Inequalities and Economic Growth"*, No. 68(4/2021). DOI: 10.15584/nsawg.2021.4.1. Access on the internet: https://repozytorium.ur.edu.pl/items/7931ef26-3808-42ae-ac48-fdd85dc97829.

International Labour Office (2012), Geneva Organisation For Economic Co-Operation And Development, Paris, May. Access on the internet: https://www.oecd.org/els/emp/50318559.pdf.

International Labour Office (2023), World Employment and Social Outlook: Trends 2023, Geneva.

Jenkins, W. (2009). *Berkshire encyclopaedia of sustainability: the spirit of sustainability*, Vol. 1 (1sted.), Berkshire: Berkshire Publishing Group.

Kaufman, L., Rousseeuw, P. (2005). *Finding groups in data. An introduction to cluster analysis*, Series: Series in Probability and Statistics. Wiley, Hoboken.

Klarin, T. (2018), *The Concept of Sustainable Development: From its Beginning to the Contemporary Issues*. "Zagreb International Review of Economics and Business" 21(1).

Kośmicki, E., Malinowska, S. (2015). *Bezrobocie we współczesnym świecie. Czy istnieją możliwości pełnego zatrudnienia?* Uniwersytet w Białymstoku, Optimum. *„Studia Ekonomiczne"*, nr 4(76). DOI: 10.15290/ose.2015.04.76.01.

Leogrande, A., (2023). *The Employment Rate in Europe.* DOI: 10.5281/zenodo.8008148.

Levasseur, A., Lesage, J., Margni, M., Deschênes, R., Samson, I., van der Werf, G.M.L.S. (2010). *Considering time in LCA: dynamic LCA and its application to global warming impact assessments. "Environmental Science & Technology",* 44, No. 8(2010).

Lopez Ahumada, J.E. (2022), *The promotion of decent work under Sustainable Development Goal* N. 8. DOI: 10.19135/revista.consinter.00014.20.

López de Mántaras, R., Plaza, E. [eds.] (2000). *Machine Learning: ECML 2000. ECML 2000, Lecture Notes in Computer Science*, Vol. 1810, Springer, Berlin, Heidelberg 2000. DOI: 10.1007/3-540-45164-1_8.

International Covenant (1966) on Economic, Social and Cultural Rights, Dz.U. 1977, nr 38, poz. 169.

Migdał-Najman, K. (2011), *Ocena jakości wyników grupowania – przegląd bibliografii. „Przegląd Statystyczny"*, t. 58, z. 3–4. Warszawa: PAN.

Młodak, A., (2011). *Classification of multivariative objects using interval quantile classes. "Journal of Classification"*, 28.

—— (2021). *k-Means, Ward and Probabilistic Distance-Based Clustering Methods with Contiguity Constraint. "J Classif"*, 38. DOI: 10.1007/s00357-020-09370-5

Pearce, W., Barbier, E., Markandya, A. (1990). *Sustainable Development. Economics and the Environment in the Third World*, Aldershot/Brookfield, p. 2.

Perło, D. (2014). *Modelowanie zrównoważonego rozwoju regionów*. Białystok: Wydawnictwo Uniwersyteckie Trans Humana.

Poskrobko, B. (2009). *Zrównoważony rozwój gospodarki opartej na wiedzy*. Białystok: Wydawnictwo WSE w Białymstoku.

Rousseeuw, P.J., (1987). *Silhouettes: a graphical aid to the interpretation and validation of cluster analysis. "Journal of Computational and Applied Mathematics"*, Vol. 20, No. 1.

Report 1987, of the World Commission on Environment and Development: note/by the Secretary-General. United Nations, Secretary-General; World Commission on Environment and Development, New York, 4 Aug. 1987. Access on the internet: https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf.

Report WCED 1987 Our Common Future, World Commission on Environment and Development, U.N. General Assembly, the Prime Minister of Norway, Oxford: Oxford University Press.

Background paper (2012). Sustainable development, green growth and quality employment. Realizing the potential for mutually reinforcing policies, Background paper for the Meeting of G20 Labour and Employment Ministers, Guadalajara, 17–18 May 2012.

Świątkowski A.M. (1982). *Polityka pełnego i racjonalnego zatrudnienia. „Praca i Zabezpieczenie Społeczne"*, No. 11–12.

—— (2016). *Istota polityki społecznej – Urzędowa, planowa dystrybucja. „Horyzonty Polityki"*, 2016/7/19.

Świątkowski, A.M., Wujczyk, M. (2011). *Między elastycznością zatrudnienia a stabilnością socjalną. Idea flexsecurity na początku XXI wieku. „Praca i Zabezpieczenie Społeczne"*, nr 5.

Tjahjanto, H., Tuhana, T., Mafruhah, I., Istiqomah, N., Ismoyowati, D. (2023). *High unemployment, disrupted economic growth and sustainable development goals: Analyzing unemployment reduction*. *"Economics and Sociology"*, 16(1). DOI: 10.14254/2071-789X.2023/16-1/7.

Transforming our world: the 2030 Agenda for Sustainable Development, Department of Economic and Social Affairs, Sustainable Development, United Nations, https://sdgs.un.org/2030agenda.

Trends (2023). World Employment and Social Outlook: Trends 2023. Access on the internet: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_865332.pdf.

Tryon, R.C. (1939). *Cluster analysis*. New York: McGraw-Hill.

Ward, J.H. (1963). *Hierarchical Grouping to Optimize an Objective Function*. "Journal of the American Statistical Association", 58. DOI: 10.1080/01621459.1963.10500845.

Wandzel, M. (2003), *Równe traktowanie kobiet i mężczyzn*. Kraków.

Wise, M., Gibb, R., (1993), *Single market to social Europe*. Harlow.