European Research Studies Journal
Volume XXIV, Issue 3, 2021

pp. 918-933

An Indicator Analysis for the Development of EU Countries in Relation to Sustainable Development

Submitted 22/06/21, 1st revision 29/06/21, 2nd revision 23/07/21, accepted 25/08/21

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Abstract:

Purpose: *The aim of this paper is to present the differentiation in the level of economic development among the EU Member States in the context of the progress in implementing the concept of sustainable development.*
Design/Methodology/Approach: *The time scope of the analysis involved the years 2014 and 2019, and the territorial one covered 27 EU countries. The research procedure used data from Eurostat and methods of descriptive statistics were applied, i.e. minimum value, maximum value, average, coefficient of variation.*
Findings: *The discussion led to the identification and application of indicators that enable describing economic development in the context of sustainable development of the EU-27 countries in 2014 and 2019. Based on the presented results, it can be concluded that positive changes are taking place in many countries that are getting closer to the implementation of the sustainable development paradigm, which is one of the main priorities of the Europe 2020 Strategy: the long-term socio-economic program of the EU.*
Practical Implications: *The results of the analysis conducted may contribute to the assessment of the effects of the development policy pursued in the EU-27 countries so far.*
Originality/value: *Indicator analysis of the economy development of EU countries in the context of the implementation of the concept of sustainable development is not often undertaken in scientific research.*

Keywords: *economic development, sustainable development, indicator analysis*

JEL codes: *Q01, O11, F63, B4.*

Paper Type: *Research study.*

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1. Introduction

The idea of sustainable development aims at achieving balance in three main dimensions: the economic one, expressing the pursuit of a sustainable economy, the social one, involving the protection of public health and social integration, and the environmental one, illustrating the emphasis on the protection of the environment and natural resources (Bluszcz, 2016). It should be noted that economic growth, social progress and environmental order are treated as interdependent phenomena, which implies the need for synergistic problem solving on the path of sustainable development (Barska and Jędrzejczak-Gas, 2019).

Sustainable development is such development that aims to improve the quality of life and ensure the well-being of the present generation, at the same time not threatening the ability to meet the needs of generations to come (Burny *et al.*, 2019). Sustainable economy is built on ethical principles, innovation, investments and sound financial foundations, using the resources available in a way ensuring maximum benefit.

Measurement and monitoring of the implementation of the concept of sustainable development in the European Union (EU) countries is a topic undertaken by many scientific works (Zhang and Zhu, 2020; Miola and Schiltz, 2019; Borys 2014; Lehtonen 2008; Ledoux *et al.*, 2005). There is, however, far less empirical research on economic governance issues. Therefore, the purpose of this study is to present the differentiation in the level of economic development among the EU Member States in the context of the progress in implementing the concept of sustainable development. The time scope of the analysis involved the years 2014 and 2019, and the territorial one covered 27 EU countries. The research procedure used data from Eurostat and methods of descriptive statistics were applied, i.e. minimum value, maximum value, average, coefficient of variation. The results of the analysis conducted may contribute to the assessment of the effects of the development policy pursued in the EU-27 countries so far.

2. Literature Review

2.1 The Economic Dimension of Sustainable Development

In the 1970s, attention was first drawn to the need for sustainable development. In 1972, a United Nations conference was held in Stockholm, during which the term "sustainable development" was coined for the first time (Stockholm Declaration, 1972). In 1987, the UN Environment Commission published the Brundtland report which introduced the concept of sustainable development, that is, a development aimed at improving the quality of life and ensure the well-being of the present generation without detriment to the ability of future generations to meet theirs (Brundtland, 1987; Burny *et al.*, 2019). The success of sustainable development policies implemented in countries or regions is determined by their ability to achieve

the highest attainable living standards measured in relation to the least possible environmental degradation (McKenzie, 2004). Sustainable development is therefore the concept denoting a relationship between economic growth and the environment.

Along with the term *sustainable development*, new concepts of measuring welfare emerged as well. Sustainable development pursues three types of goals: social, economic and environmental (Serageldin, 1994). Sustainability analysis differs from standard growth and development economics in that it takes into account natural resources as a form of natural capital, defined as the value of existing natural resources such as forests, fisheries, water, minerals and the environment in general (Asefa, 2005). Sustainability is about humans' relationship with the environment on which they depend for food, water, energy and raw materials. But there is much more to it than that. It is also about our relationship with the global economic system in which we source raw materials, manufacture products and conduct trade. And perhaps most importantly, it also has to do with our mutual relations, that is, the values of the society in which we live and our relations with other societies (Ashby, 2015).

Economic development is one of the pillars of sustainable development which, apart from quantitative changes in the economy expressed in terms of economic growth indicators, also includes qualitative changes in the socioeconomic structure at a national level (Woźniak, 2004, p. 20). Economic development means changes in the structure of the economic potential, the structure of production and consumption, socio-economic relations, and generally how the economy operates (Dach, 2011). According to Lange (1966, p. 144), economic development is a constant increase in the productive forces of a society, an increase in the quantity and quality of material goods and services used to satisfy human needs, and an increase in wealth and prosperity. A similar definition was put forward by Myrdal (1968, pp. 1859-1878), who argues that this development is about increasing changes in the entire social system, including factors such as productivity and income, production conditions, living standards, attitudes towards living and work. In contemporary terms, economic development is understood as a process of positive changes occurring in the production and redistribution of goods and services, their exchange and use for consumption purposes, as well as increasing the economic potential of a country (Marciniak, 2021, pp. 373-374).

3. Research Methodology

This study used descriptive statistical methods. Conducting empirical analyses in the field of economic development required consideration of the conceptual assumption from which it follows that such development is a product of changes in interrelated factors. The main problem is the selection of specific indicators allowing for the quantification of the research area. The analysis of the level of economic development in the context of sustainable development was based on a set of 26 variables relating to the following areas: (1) Economy, (2) Production patterns, (3)

Innovation, (4) Transport and (5) Employment, which characterize economic development to the fullest extent possible.

When selecting the diagnostic features, the following factors were taken into account: firstly - the relationship of a given feature with the factors determining sustainable development, and secondly - the possibility of drawing comparisons among EU countries. The in-depth investigation of the topic by means of literature review and the analysis of research conducted in the field were the starting point for the undertaken activities. Indicator analysis was carried out for the two time sections - years 2014 and 2019, using such descriptive statistics as minimum value, maximum value, average, coefficient of variation (V).

4. Research Results and Discussion

Indicator analysis of economic development in the context of the implementation of the concept of sustainable development in the EU-27 was carried out in five thematic areas through the time and space perspective. The selection of the explanatory indicators was made based on the following criteria: substantive, statistical and formal (mainly relevance, completeness and availability for the researched countries in 2014 and 2019).

The first examined area was: economy, characterized on the basis of 6 indicators (Table 1.). These are features that are of fundamental importance from the point of view of the determinants of sustainable development, as the improvement of these indicators leads to the development of other areas.

Table 1. *Descriptive statistics on indicators illustrating the area of economy in the EU-27 in 2014 and 2019*

Indicators	**Year**	**Descriptive statistics**			
		Min	**Max**	**Average (EU-27)**	**V (%)**
real GDP per capita growth	2014	-2,0 (Greece)	7,9 (Ireland)	1,4	105,5
	2019	0,2 (Luxembourg)	4,7 (Hungary, Romania)	1,3	68,2
real GDP growth	2014	-1,8 (Cyprus)	8,6 (Ireland)	1,6	97,1
	2019	0,3 (Italy)	5,6 (Ireland)	1,6	53,7
investment rate	2014	10,83 Greece)	25,58 (Estonia)	20,15	17,3
	2019	10,14 (Greece)	45,6 (Ireland)	22,45	26,6
general government debt	2014	10,6 (Estonia)	180,2 (Greece)	86,6	52,1
	2019	8,4 (Estonia)	180,5 (Greece)	77,6	59,7
resource productivity and domestic material consumption (DMC)	2014	0,67 (Bulgaria)	3,41 (Netherlands)	1,93	43,4
	2019	0,78 (Bulgaria)	4,55 (Netherlands)	2,20	47,5
environmental tax revenues	2014	1,73 (Lithuania)	4,0 (Denmark)	2,47	23,3
	2019	1,41 (Ireland)	3,86 (Greece)	2,37	24,3

Source: *Own study based on Eurostat data.*

A commonly accepted measure of economic growth is the growth of real gross domestic product, often supplemented with GDP per capita figure. The dispersion of GDP per capita illustrates the diversification of the level of economic development between countries, reducing regional disparities in terms of economic development is the essence of sustainable development and a challenge for the EU. Its varied size attests to the differences in the standard of living among the countries and the differences in the purchasing power of the inhabitants of a given country as compared to others. Reducing such gaps in economic development and living standards is one of the main goals of sustainable development. The average value of this indicator decreased from 1.4 in 2014 to 1.3 in 2019. Still, the positive aspect is the reduction of differences between the individual countries, as evidenced by the decline in the coefficient of variation.

The investment rate is an important indicator illustrating economic development as it should be remembered that the higher its value, the more enterprises invest in the value of fixed assets. Gross fixed assets expenditures is a factor of economic growth. They have an impact on the growth of innovativeness and competitiveness of enterprises. The lowest value of this indicator in 2014 and 2019 was recorded in Greece, in 2014 it was the highest in Estonia, and in 2019 in Ireland. When analysing the investment rate indicator, it should be noted that the differences between the countries in 2019 deepened compared to 2014, as evidenced by the increase in the coefficient of variation.

When assessing the economic situation of a country, the general government debt should also be considered. The economic practice of EU countries is dominated by the approach based on the concept of the welfare state. With the help of various fiscal and legal stimuli, governments take actions that are not only meant to stabilize the current economic situation, but also, and perhaps more importantly, to secure at least a basic level of the living standards of their citizens, which, unfortunately, may have an impact on the growing public debt (Próchnicki, 2012).

When making international comparisons in the field of public debt, one needs to take into account many features that determine their specificity, such as the differences in the level of economic development and stability of individual countries' economies and the ability to cope with debt servicing costs. The amount of debt servicing costs depends both on the amount of the debt itself and on the amount of interest rates offered to investors by the government when purchasing securities (Mierzejewska, 2014; Grabia 2018; Bluszcz 2017). The lowest debt of public finances in relation to GDP was recorded both in 2014 and 2019 in Estonia and the maximum in Greece.

Another indicator is Domestic Material Consumption (DMC), i.e., the total amount of materials directly used by the domestic economy: the amount of raw materials, extracted from the country's territory, added to the imported raw materials, less exports to the country. The DMC index provides an assessment of the absolute level of resource use and enables consumption driven by domestic demand to be

distinguished from consumption driven by the export market. As a result, it is possible to define the directions of further sustainable economic growth of the country in relation to the use of natural resources, in order to achieve the reduction of environmental degradation resulting from primary production, material processing, production and waste disposal.

Measuring the use of natural resources and productivity is used to monitor progress in meeting the demands of sustainable consumption and production. It is particularly in line with Goal 12 on ensuring sustainable consumption and production patterns, reducing the amount of food and other waste in the world, the safe disposal of toxic waste and pollution, and Goal 8 on decent work and economic growth, levels of economic productivity for the creation of well-paid, high-quality jobs and achieving prosperity in the world. Resource productivity and domestic material consumption was the highest in 2014 and 2019 for the Netherlands and the lowest for Bulgaria, and it should also be noted that cross-country variation in this regard has increased.

The next indicator is environmental tax revenues, which shows the percentage of environmental tax revenues in gross domestic product (GDP) that allows environmental taxes to be compared between Member States, taking the size of different national economies into account. In the global context, where consumption patterns in one region can severely affect production patterns elsewhere in the world, it is particularly important that prices reflect the real costs of consumption and production. Therefore, they should also include payments for damage caused to human health and the environment. Hence, EU policies such as "Europe 2020" call for a shift from labour to energy and environmental taxes as part of the "greening" of tax systems, meaning environmental tax revenues should increase relative to labour taxes (file:///C:/Documents%20and%20Settings/user/Pulpit/ARTYKULY/X6.html)
The other area studied is: production patterns characterized on the basis of 5 indicators (Table 2).

Table 2. *Descriptive statistics concerning illustrative indicators of production patterns in the EU-27 in 2014 and 2019*

Indicators	**Year**	**Descriptive statistics**			
		Min	**Max**	**Average (EU-27)**	**V (%)**
circular material use rate	2014	(1,4) Greece)	26,6 (Netherlands)	11,1	70,4
	2019	1,5 (Romania)	26,6 (Netherlands)	11,9	72,7
primary energy consumption	2014	1,51 (Romania)	7,53 (Luxembourg)	3,00	42,5
	2019	1,65 (Romania)	7,26 (Luxembourg)	3,03	38,4
energy productivity	2014	4,48 (Estonia)	12,52 (Ireland)	8,02	24,8
	2019	4,95 (Malta)	19,63 (Ireland)	9,31	31,7
area under organic farming	2014	0,29 (Malta)	19,35 (Austria)	6,08	73,3
share of renewable energy in gross final energy consumption	2019	0,47 (Malta)	25,33 (Austria)	8,49	69,1
	2014	4,47 (Luxembourg)	51,82 (Sweden)	17,46	60,9
	2019	7,05 (Luxembourg)	56,39 (Sweden)	19,73	54,5

Source: *Own study based on Eurostat data.*

The circular material use rate indicator comes first in this group and reflects the share of materials recovered and reintroduced into the economy. The cyclical use of materials is estimated on the basis of the amount of waste recycled in national recovery plants, less imported waste destined for recovery and waste exported for recovery abroad. A higher circulation rate means that more secondary materials replace primary raw materials, thus reducing the environmental impact of the extraction of primary raw material (https://ec.europa.eu/eurostat/web/products-datasets/-/cei_srm030).

The Netherlands stands out positively in this respect. It should also be noted that among the indicators illustrating the area of production patterns, it is this indicator that differentiates the EU countries the most. In 2019, the coefficient of variation for this variable for the EU-27 countries was 72.7%. Another indicator is primary energy consumption which measures the total energy demand of a country. In 2014 and 2019, Croatia reached the minimum value of this indicator, while Luxembourg reached the maximum. The analysis of the value of the share of renewable energy in gross final energy consumption indicator shows that the share of renewable energy in the total primary energy production increased in 2019, especially in Denmark.

Only three EU-27 countries, i.e., Hungary, Romania and Slovenia showed the opposite tendency. It is also positive that the coefficient of variation in 2019 decreased slightly compared to 2014. Renewable energy sources increase their share in the European and global energy balance, successfully competing with coal, oil, gas and nuclear energy (Bluszcz 2018). The current structure of the EU energy mix is influenced by the climate policy (Manowska *et al.*, 2017). In view of today's priorities, the most important issues are the ones concerned with the impact of human activity on changes in the Earth's climate. The assumption was to meet the target of 15% share of renewable energy sources in 2020, which had been set out in Directive 2009/28/EC, but the target turned out to be unattainable for many countries. Organic farming is also essential for sustainable development, as it reduces the burden on the natural environment, contributing to the improvement of the condition of ecosystems.

In 2019, the highest values of the share of the agricultural area of organic farms in the total agricultural area were recorded in Austria, and the lowest in Malta. In 2019, compared to 2014, there was an increase in the share of the agricultural area of organic farms in the total agricultural area in almost all EU-27 countries, except Poland. Another important area influencing economic development in the context of sustainable development is innovation. Five indicators were selected to describe it (Table 3).

EU-27 economies show significant diversity in terms of their innovation levels. This is evidenced by the degree of spatial differentiation of selected indicators determining innovation in the EU-27 in 2014 and 2019. In the analysed period, the coefficient of variation ranged from 19.0% for the variable human resources in

science and technology (HRST) to 136.8% for the variable patent applications to the European Patent Office.

Table 3. *Descriptive statistics on indicators illustrating the area of innovation of EU countries in 2014 and 2019*

Indicators	Year	Descriptive statistics			
		Min	Max	Average (EU-27)	V (%)
human resources in science and technology (HRST)	2014	25,6 (Romania)	64,5 (Luxembourg)	43,0	20,5
	2019	28,2 (Romania)	63,7 (Luxembourg)	46,9	19,0
R&D personel	2014	0,30 (Cyprus)	2,10 (Denmark)	1,17	45,7
	2019	0,36 (Romania)	2,12 (Denmark)	1,41	39,1
gross domestic expenditure on R&D	2014	0,38 (Romania)	3,15 (Finland)	2,11	54,1
	2019	0,48 (Romania)	3,4 (Sweden)	2,20	53,5
government support to agricultural research and development	2014	0,5 (Luxembourg)	19,4 (Ireland)	5,7	90,0
	2019	0,3 (Luxembourg)	19,7 (Ireland)	6,5	75,4
patent applications to the European Patent Office	2014	1,4 (Romania)	816,1 (Luxembourg)	141,3	136,8
	2019	2,1 (Romania)	695,6 (Luxembourg)	148,7	124,8

Source: *Own study based on Eurostat data.*

The so-called human resources for science and technology are particularly important from the perspective of innovation. These are the resources with the greatest potential for creativity (Węgrzyn, 2016, p. 386). Human Resources for Science and Technology (HRST) are developed by people currently involved in or potentially capable of performing work related to the creation, development, dissemination and application of scientific and technical knowledge. There are many reasons to expect a positive impact of human capital on economic growth: more people with higher education mean faster technological progress and greater ability to absorb domestic and foreign innovation. In 2019, in the EU-27, human resources for science and technology amounted to 46.59% of the total working population.

Compared to the data from 2014, there was a slight increase in the share of human resources for science and technology in the total number of economically active people in the EU-27 (an increase by 3.9%). The situation in terms of the share of HRST varied across countries. Human resources in science and technology (HRST) ratio - in 2014 ranged from 25.6% in Romania to 64.5% in Luxembourg. Similarly in 2019 - this ratio ranged from 28.2% in Romania to 63.7% in Luxembourg. In 2019, compared to 2014, the largest increase in the share of HRST among the economically active took place in Malta (an increase by 18.9%), Portugal (an increase by 16.1%) and Slovakia (an increase by 15.8%). Only Luxembourg recorded a slight decrease (-1.3%).

The EU-27 countries also differ in terms of the share of R&D personnel in the total working population. In 2019, in the EU-27, the share of this group in the economically active was 1.4%, while in 2014 it was 1.2% (an increase of 0.2%). The R&D personnel ratio in 2014 ranged from 0.3% in Cyprus to 2.1% in Denmark. In 2019, however, this ratio ranged from 28.2% in Romania to 63.7% in Luxembourg. In 2014-2019, the largest increase in the share of R&D personnel among the economically active was recorded in Poland (an increase by 61.9%), Croatia (an increase by 52.7%) and Hungary (an increase by 46.5%). A decrease was observed only in three EU-27 countries, i.e., Malta (–16.6%), Luxembourg (–3.7%) and Finland (–3.1%).

Another indicator characterizing the innovative potential of the EU-27, the share of R&D expenditure in GDP was taken into account (gross domestic expenditure on R&D - percentage of gross domestic product (GDP)), i.e. a factor illustrating the importance of research and development in the economy of the country in question. In 2014, this indicator oscillated between 0.38% in Romania and 3.15% in Finland, and in 2019 - it ranged from 0.48% in Romania to 3.4% in Sweden. In 2014-2019, the largest increase in the share of R&D expenditure in GDP was recorded in Greece (increase by 51.2%), Croatia (an increase by 42.3%) and Poland (an increase by 40.4%). Still, the decline was recorded in as many as eleven EU-27 countries, the largest being in Ireland (-48.7%), Malta (-14.5%) and Slovenia (-13.9%). The indicator - government support to agricultural research and development - on the other hand, ranged from 0.5 in Luxembourg to 19.4 in Ireland. Similarly, in 2019 - this indicator ranged from 0.3 in Luxembourg to 19.7 Ireland.

When analysing selected descriptive statistics, it can be noticed that in the area of innovation in the EU-27 countries, the greatest differentiation in the analysed period is visible in terms of the indicator of patent applications to the European Patent Office per million inhabitants, which in 2014 ranged from 1.4 in Romania to 816.1 in Luxembourg and in 2019 - from 2.1 in Romania to 695.6 in Luxembourg. The number of reported inventions per 1 million inhabitants is an indicator characterising the level of inventiveness of a country and reflects its ability to use knowledge and translate it into potential economic benefits. Patent activity should be considered as one of the determinants of the effectiveness of human resources for science and technology in the EU countries.

In 2019, the largest number of submitted applications per 1 million inhabitants was reported in Luxembourg (695.56), Sweden (428.24) and Denmark (414.05). The high value of the indicator, over 200 submissions per 1 million inhabitants, was also recorded in the Netherlands (402.38), Germany (322.88), Finland (308.63), Austria (264.26) and Belgium (211.51). The lowest rate in 2019, below 10 reports per 1 million inhabitants, was recorded in Romania (2.06), Croatia (4.66), Bulgaria (4.86) and Slovakia (7.71). The relatively highest increase in the number of patents per 1 million inhabitants in 2014-2019 was recorded in 20 EU-27 countries, including more than threefold in Latvia and more than twofold in Portugal.

Although the number of patents in these countries is still relatively small, compared to other EU-27 countries, the over 200% growth rate suggests a perspective of good upward trend in the future. Sweden deserves special attention, as being a leader in creating patents in Europe, it has a negligible annual increase in the number of patent applications to the European Patent Office, not exceeding 10%. This clearly points to a certain stagnation in this country. The existence of countries with negative growth rates must also be disturbing. This group includes as many as eight EU-27 countries.

The fourth group of indicators monitoring human development relates to transport, which has been described by 4 indicators (Table 4).

Table 4. *Descriptive statistics on indicators illustrating the area transport in the EU-27 in 2014 and 2019*

Indicators	Year	Descriptive statistics			
		Min	Max	Average (EU-27)	V (%)
average CO2 emissions per km from new passenger cars	2014	107,3 (Netherlands)	140,4 (Latvia)	123,1	8,0
	2018	105,5 (Netherlands)	132,5 (Estonia)	119,6	6,8
renewable energy sources in transport	2014	0,42 (Estonia)	18,8 (Sweden)	6,6	81,9
	2019	3,32 (Cyprus)	30,3 (Sweden)	8,9	60,6
share of rail and inland waterways in total freight transport	2014	1,1 (Ireland) 0,0 (Cypr, Malta)	81,2 (Latvia)	26,1	74,6
	2019	0,6 (Ireland) 0,0 (Cypr, Malta)	73,6 (Latvia)	23,7	75,3
share of collective transport modes in total passenger transport	2014	10,2 (Portugal)	32,5 (Hungary)	17,8	24,9
	2018	9,6 (Lithuania)	29,4 (Hungary)	17,1	24,7

Source: *Own study based on Eurostat data.*

The greatest diversification of the EU-27 countries in terms of transport potential can be observed for two indicators: renewable energy sources in transport (the coefficient of variation in 2014 was 81.9% and decreased by 21.3% compared to 2019) and share of rail and inland waterways in total freight transport (the coefficient of variation in 2014 was 74.6% and increased by 0.7% compared to 2019).

In 2019, the average share of energy from renewable sources used for transport in the EU-27 reached 8.9% and increased by 35.7% compared to 2014. Although this share was steadily increasing across the EU-27, in 2019, only 3 countries exceeded the target level of 10%, i.e., Sweden (30.3%), Finland (21.3%) and the Netherlands (12.5%). Relatively high values of this indicator, above the EU-27 average, were also true for France (9.2%), Portugal (9.1%) and Italy (9.0%). The lowest values of this indicator in 2019, in turn, were recorded in Cyprus (3.3%), Lithuania (4.0%), Greece (4.0%), Estonia (5.1%), and Croatia (5.8%). The largest, almost twelvefold

increase in the share of renewable energy sources in transport, as compared to 2014, was recorded in Estonia.

In 2019, the highest share of rail and inland waterways in total freight transport was recorded in Latvia (73.6%), Lithuania (67.4%), Romania (55.0%), Bulgaria (52.9%) and the Netherlands (49.1%), while the lowest in Ireland (0.6%), Greece (2.5%) and Spain (4.8%). An increase in this indicator, in relation to 2014, was recorded only in 7 EU-27 countries, including the highest in Greece (47%).

An important indicator differentiating transport in the EU-27 is also share of collective transport modes in total passenger transport. In 2019, the EU average (EU-27) for this indicator was 17.1% and decreased by nearly 4% compared to 2014. Among the EU-27 countries, the highest value of the indicator was recorded in Hungary (29.4%), the Czech Republic (26.7%) and Slovakia (26.1%), while the lowest value of the indicator was recorded in Portugal (11.6%), in Slovenia (13.6%), Bulgaria (14.2%), the Netherlands (14.3%) and Germany (14.9%).

The EU indicator, which is part of the set describing the sustainable development goals in the area of transport, is also the average CO2 emissions per km from new passenger cars. The average CO2 emissions of passenger cars in the EU-27 in 2019 decreased by 2.8% compared to 2014. Among the EU-27 countries with the lowest average CO2 emissions per km from new passenger cars in 2019, the Netherlands (105.5), Malta (105.9) and Portugal (106.1) should be mentioned. The highest average CO2 emissions per km from new passenger cars were recorded in Estonia (132.5) and Luxembourg (131.4). In 2019, in relation to 2014, in all EU-27 countries, except Greece and Luxembourg, there was a decrease in the average CO2 emissions per kilometre from new passenger cars.

The last area determining economic development in the context of sustainable development is employment, described by 6 indicators (Table 5).

Table 5. *Descriptive statistics on indicators illustrating the area of employment in the EU-27 in 2014 and 2019*

Indicators	**Year**	**Descriptive statistics**			
		Min	**Max**	**Average (EU-27)**	**V (%)**
employment rate	2014	53,3 (Greece)	80,0 (Sweden)	68,2	8,8
	2019	61,2 (Greece)	82,1 (Sweden)	73,1	6,9
young people neither in employment nor in education and training	2014	6,5 (Luxembourg)	26,7 (Greece)	15,7	36,9
	2019	5,7 (Netherlands)	22,2 (Italy)	12,6	33,2
labour cost index	2014	-3,3 (Cyprus)	6,9 (Estonia)	1,5	109,4
	2019	1,5 (Italy)	13,1 (Romania)	2,7	72,3
nominal labour productivity per person	2014	44,1 (Bulgaria)	170,1 (Luxembourg)	100,0	29,1
	2019	48,8 (Bulgaria)	195 (Ireland)	100,0	31,2

overall employment growth	2014	-2,0 (Cyprus)	5,4 (Malta)	0,9	124,8
	2019	-0,2 (Poland)	6,6 (Malta)	1,0	94,8
unemployment rate	2014	5,0 (Germany)	26,5 (Greece)	10,8	49,4
	2019	2,0 (Czechia)	17,3 (Greece)	6,7	53,6

Source: *Own study based on Eurostat data.*

When analysing the data presented in Table 5, one may notice that in the EU-27 there is a large regional differentiation in terms of employment. Among the selected indicators in this area, labour costs were the most differentiating factor (the coefficient of variation in 2014 was 109.4% and decreased by 37.1% compared to 2019). Low labour costs are an important factor in the competitiveness of economies. In the analysed years, in 23 EU-27 countries, labour costs were characterized by positive dynamics. During this period, the highest, more than fivefold, increase in labour costs was recorded in Ireland, Croatia, Spain and Italy. On the other hand, the decrease in labour costs took place in Luxembourg, Portugal, Austria and Malta.

Significant differentiation of the EU-27 in terms of employment (coefficient of variation above 100%) can also be observed for the variable of overall employment growth. Over the years 2014-1019, the increase in employment and the decline in unemployment in the EU-27 continued. The employment rate increased by 7.2% and at the same time there was a decrease in unemployment by nearly 38%. A high level of employment is essential for economic and social cohesion. One of the main goals of the Europe 2020 strategy in the area of employment is to achieve the employment rate of people aged 20-64 at the level of 75%. Target values of indicators for monitoring the implementation of the objectives adopted in the strategy have been defined at the level of the entire EU, and individual Member States have been obliged to translate them into national targets.

Taking into account the employment rate in the EU-27, it should be noted that in 2019 the highest values of the employment rate, above 75%, were recorded in 18 EU-27 countries, mainly in Sweden (82.1%), Germany (80.6%), the Czech Republic (80.3%), Estonia (80.2%) and the Netherlands (80.1%). The lowest employment rate in 2019 was recorded in Italy (63.5%), Croatia (66.7%) and Spain (68%).

When analysing the changes in employment in 2014 and 2019, it is worth emphasizing that the employment rate increased in all EU-27 countries. The phenomenon should therefore be treated very positively, especially in the context of sustainable development. Additionally, it is worth adding that a marked increase in this indicator in the EU-27 in the analysed period took place in Bulgaria (15.2%), Greece (14.8%), Spain (13.5%) and Malta (13.1%).

On the other hand, when considering the unemployment rate among the EU-27, defined as the share of the unemployed in the total number of economically active people aged 15 to 74, it should be noted that in 2019 it exceeded 10% in two

countries, i.e., Greece (17.3%) and Spain (14.1%). On the contrary, the clearly lowest unemployment rate, below 5%, was recorded in 2019 in 11 EU-27 countries, including the Czech Republic (2%), Germany (3.1%), Portugal (3.3%), Austria (3.4%) and Malta (3.4%).

When assessing the changes in the unemployment rate in 2014 and 2019, it can be concluded that the unemployment rate decreased in all EU-27 countries. Clearly the largest decrease in the unemployment rate, over 50%, took place in 11 EU-27 countries, including the Czech Republic (-67.2%), Portugal (-63.4%), Bulgaria (-63.2%) and Italy (-61.8%).

The pace of changes in labour productivity is one of the key factors determining economic growth. The analysis of statistical data shows that the average value of nominal labour productivity per person in the EU-27 in 2019 did not change compared to 2014. The largest decline in labour productivity in 2014-2019 took place in 14 EU-27 countries, including Slovakia (-13.6%), and the highest growth took place in Ireland (32.6%) and Romania (28.1%). In 2019, the highest labour productivity was recorded in countries with developed and innovative economies. This year, the highest value of the indicator was recorded in Ireland (195.0), Luxembourg (162.2), Belgium (129.1), Denmark (117.5), France (117.2), Austria (115.4), Sweden (111.0), the Netherlands (108.3), Finland (107.1) and Germany (103.2).

Young people neither in employment nor in education and training is also an important indicator describing the area of employment in the EU-27. The indicator young people neither in employment nor in education and training, abbreviated as NEET, corresponds to the percentage of the population of a given age group and gender that is not employed and not involved in further education or training. The problem of non-working youth is very important as it leads to a number of consequences, both financial and social. On the one hand, young people who do not work do not generate any income and do not pay taxes. On the other hand, they have their own needs. Hence the state's outlays for their social welfare, benefits and medical care. Such people are at a greater risk of social exclusion since, by remaining long-term unemployed, they lose their self-esteem, which results in problems with finding their place on the labour market.

The EU-27 countries with the highest rate of economic and social inactivity of young people in 2019 were: Italy (22.2%), Greece (17.7%), Romania (16.8%), Bulgaria (16.7%) and Spain (14.9%). On the other hand, among the EU-27 countries, the lowest percentage of economically and socially inactive people that year was recorded in Sweden (6.3%), Luxembourg (6.5%) and Germany (7.6%). In annual terms, most EU-27 countries recorded a decrease in the youth economic and social inactivity index, including the highest in Portugal (-36.9%), Ireland (-35.9%) and Croatia (-34.8%). The index increased only in Germany (by 20%).

5. Conclusions

Due to the multidimensionality of the economic development of states in the context of sustainable development, the issue can be approached from various angles. When conducting such research, it should be borne in mind that due to its complex nature, the obtained results largely depend on the adopted assumptions. Therefore, the substantive discussion led to the identification and application of indicators that enable describing economic development in the context of sustainable development of the EU-27 countries in 2014 and 2019.

Indicators describing each area provide an overview of the EU's progress on its path to sustainable development in terms of economic goals. Based on the presented results, it can be concluded that positive changes are taking place in many countries that are getting closer to the implementation of the sustainable development paradigm, which is one of the main priorities of the Europe 2020 Strategy: the long-term socio-economic program of the EU.

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