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Health Protection as an Important Element of Sustainable Development: Example of European Union Countries

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Abstract:

Purpose: *The study attempted to compare the 27 countries of the European Union in terms of health protection. The output included 6 indicators describing the achievement of Sustainable Development Goal 3 (SDG3).*
Design/Methodology/Approach: *In order to create the ranking of the EU countries, a taxonomic measure of development based on standardized sums was used.*
Findings: *The best situation in terms of implementation of SDG3 was in the countries of Northern and Western Europe and also in Malta, with Sweden leading the ranking. The last in the ranking Latvia is characterized primarily by a low level of healthy life years at birth and a high level of indicators related to mortality.*
Practical Implications: *The results of the studies presented in this paper can be useful for the diagnosis of the results achieved so far and for the revision of the health policy of the whole European Union as well as of the individual countries in the future.*
Originality/Value: *The present article is a contribution to the most recent European and global scientific discussions on the combining of health protection and sustainable development.*

Keywords: *Sustainable development, health protection, standardized sum method.*

JEL classification: *C38, I15, Q56.*

Paper Type: *Research study.*

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1. Introduction

Human impact on the natural environment has many negative effects, some representing a real threat to health and even human life. It is therefore not surprising that strategic documents around the world pay special attention to the issue of population health. In September 2015, the UN National Assembly adopted the document: "Transforming our world: 2030 Agenda for Sustainable Development". It contains 17 Sustainable Development Goals (SDGs). One of them is Goal 3 (SDG3), defined as follows: Ensure a healthy life and promote prosperity for all people of all ages (Konarzewska, 2020).

For SDG3, which is of particular interest to us in this work, the United Nations has formulated thirteen goals to be achieved by 2030 (SDG Tracker, 2022):

3.1. Reduce maternal mortality.
3.2. End all preventable deaths under 5 years of age.
3.3. Fight communicable diseases.
3.4. Reduce mortality from non-communicable diseases and promote mental health.
3.5. Prevent and treat substance abuse.
3.6. Reduce road injuries and deaths.
3.7. Universal access to sexual and reproductive care, family planning and education.
3.8. Achieve universal health coverage.
3.9. Reduce illnesses and deaths from hazardous chemicals and pollution.
3.a. Implement the WHO framework convention on tobacco control.
3.b. Support research, development and universal access to affordable vaccines and medicines.
3.c. Increase health financing and support the health workforce in developing countries.
3.d. Improve early warning systems for global health risks.

The priority is to reduce the incidence and mortality of civilization diseases, as well as to reduce inequalities in access to health care, increase health awareness and detect diseases at early stages of development. It is also necessary to increase expenditure on health care and improve the quality of the health care system.

There is a close relationship between health and other elements of sustainable development (Acharya, Lin and Dhingra, 2018; Adshead, Thorpe and Ruter, 2006). Indeed, health depends on environmental (e.g., climate change and energy, sustainable transportation, sustainable production and consumption, natural resource management), economic (e.g., population wealth, unemployment) and social (e.g., demographic factors, social exclusion) issues.

Therefore, public health is not only a significant outcome but also a prerequisite for sustainable development. A similar view is taken by Fortune *et al.* (2018), who emphasise the direct or indirect links between health and all the Sustainable

Development Goals. They also highlight the importance of health promotion in achieving equality, strengthening communities and protecting human rights. Ayres and Agius (2004) also wrote on health protection in the light of sustainable development, pointing to the need for an interdisciplinary approach to develop an integrated and comprehensive strategy. According to Porritt (2005), sustainable development concerns improving the physical, social and personal quality of life of individuals in a way that does not hinder future generations.

Many researchers stress that achieving the health goals of SDG3 will require new investment and substantial financial resources. Stenberg et al. (2017) have produced forecasts for 67 low and middle-income countries between 2016 and 2030, representing 95% of the total population in low and middle-income countries. They believe that by 2030, an additional $274 billion of health expenditure will be needed annually to progress toward the objectives of SDG3. Approximately 75% of the costs are related to healthcare systems, with healthcare workers and infrastructure (including medical equipment) being the main cost drivers.

According to Akachi *et al.* (2016), global and national efforts to achieve sustainable health goals have extended primary health care to address infectious diseases and child mortality. However, focusing on health care alone is unlikely to be sufficient to achieve SDG3, as the issue of health care quality is important. High-income countries already invest considerable resources in measuring health care quality and its relationship with health outcomes (McGlynn *et al.*, 2003). Much less emphasis is placed on quality measurement in low and middle-income countries, although individual studies suggest that poor quality does not lead to better health outcomes (Souza *et al.*, 2013).

The article aims to assess the situation of the European Union countries regarding health protection. The study has adopted indicators related to Sustainable Development Goal 3 (SDG3) in 27 EU countries in 2020. This article is part of the debate on combining health protection and sustainable development. Health protection is expected to play an important (and transformative) role in achieving the sustainable development of Goal 3 (ensuring health for all and at all ages).

The layout of this article includes an introduction that outlines the paper's main purpose and explains the authors' key motivations for conducting research on health protection in EU countries. In addition, a review of the literature concerning the phenomenon under study is included. The following section discusses the statistical data used in the article and describes the research procedure. Finally, the results of the study, discussion, and conclusions of the study are presented.

2. Literature Review

Traditionally, sustainable development has largely been neglected in public health activities, as it has focused on meeting the short-term nutritional needs of the

population and identified these needs mainly in the context of biological health. Nevertheless, it is an immutable fact that we live in a world of physical limitations. Infinite resources of land, water, nutrients and fossil fuels cannot be created to drive food systems indefinitely, so the waste of food and the resources used to produce it must be emphasised.

There have always been threats to sustainability and consequently to public health, but the differences are that the current threats are more significant, complex and rapidly evolving. They require that sustainable development be treated as an integral part of nutrition research in public health, education and policy. Nutrition behaviour and how food systems are operated contribute to the disruption of environmental systems, which are crucial for sustainable development (Lawrence *et al.*, 2015).

In Fanzo and Davis' opinion (2019), the current dietary patterns are increasingly unhealthy, unsustainable and unfair to many populations. According to Springmann et al. (2018), sustainable diets aim to address the growing health and environmental problems associated with food production and consumption. They may result in a simultaneous reduction of environmental and health impacts worldwide, especially in high and middle-income countries, but may also increase the use of resources in low-income countries, especially when using mainly plant diets that are consistent with research on healthy eating.

According to Macassa (2022), a balanced and healthy diet is a dietary pattern that promotes all the dimensions of individual health and well-being, has low pressures and environmental impacts, is accessible, affordable, safe and equitable and is culturally acceptable. Furthermore, they are essential to achieve optimal growth and development for all and to promote the functioning and well-being of physical, mental and social well-being at all stages of life for present and future generations, contributing to the prevention of all forms of malnutrition, reducing the risk of non-communicable diseases related to diet and promoting the protection of biodiversity and the health of the planet.

Kjærgard, Land and Pedersen (2014) examined how sustainable development strategies could be combined with health protection strategies. They argue that health protection strategies are not sufficiently integrated into sustainable development strategies, and therefore policies aimed at addressing health problems or sustainable development problems may cause new, undesirable and unforeseen environmental or health problems. The authors use examples from agriculture and food production to illustrate that health and sustainable development are both mutually supportive and restrictive.

Many health and sustainability problems arise as a result of society's appropriation of natural resources and overexploitation of environmental services, such as carbon sequestration and biodiversity. In other words, many public health and environmental problems are caused by an increased intensification of agriculture and food

production. However, common causes or drivers do not ensure that health and sustainability dimensions are integrated into local, regional or global policy documents or initiatives.

The concept of sustainable development is now one of the key visions of the future, important both for the general public, enterprises, governments and the health care system. Healthcare structures serve to preserve and improve public health; however, they can also have a negative impact (through extensive use of water and energy and generation of vast amounts of waste) on the well-being and health of humans and other organisms (Buffoli *et al.*, 2013). Maintaining a sustainable healthcare system while ensuring high-quality, effective and safe medical services is a significant economic and social challenge (Molero *et al.*, 2021).

The 2030 Agenda for Sustainable Development promotes the improvement of health justice, which is why Hosseinpoor *et al.* (2018) emphasise the need to monitor health inequalities. It will make it possible to shape policies and programmes oriented toward the equality of society concerning health protection and promotion.

3. Materials and Methods

The baseline data for this study's attempt to compare European Union countries in terms of health protection came from the Eurostat (2022) database and was for the 2020 (in a few cases, due to lack of data, the previous year was chosen). This study uses the available indicators that have been assigned by Eurostat to SDG 3 group of sustainable development indicators.

Table 1 presents a list of diagnostic features used in the study. These relate to indicators describing the implementation of SDG3. The availability of data determined the choice of features. The influence of each characteristic on the analysed phenomenon was also shown by classifying it into a set of characteristics stimulating development in the area (symbol *S*) or destimulating this development (symbol *D*). It is worth noting that the destimulants are strongly predominant; only two indicators (Y_{1S} and Y_{2S}) are classified in the set of stimulants.

Table 1. *Base of indicators*

Symbol	Indicator	Name of the indicator	Indicator description
Y_{1S}	SDG_03_10	Healthy life years at birth	The indicator of healthy life years measures the number of remaining years that a person of specific age is expected to live without any severe or moderate health problems.
Y_{2S}	SDG_03_20	Share of people with good or very good perceived health	The indicator is a subjective measure on how people judge their health in general on a scale from "very good" to "very bad". It is expressed as the share of the population aged 16 or over

			perceiving itself to be in "good" or "very good" health.
Y_{3D}	SDG_03_30	Smoking prevalence (every day)	The indicator measures the share of the population aged 15 years and over who report that they currently smoke boxed cigarettes, cigars, cigarillos or a pipe.
Y_{4D}	SDG_03_40	Standardised death rate due to tuberculosis, HIV and hepatitis by type of disease	The rate is calculated by dividing the number of people dying due to selected communicable diseases by the total population.
Y_{5D}	SDG_03_42	Standardised preventable and treatable mortality	Preventable mortality refers to mortality that can mainly be avoided through effective public health and primary prevention interventions (i.e. before the onset of diseases/injuries, to reduce incidence).
Y_{6D}	SDG_03_60	Self-reported unmet need for medical examination and care	The indicator measures the share of the population aged 16 and over reporting unmet needs for medical care due to one of the following reasons: "Financial reasons","Waiting list" and "Too far to travel" (all three categories are cumulated).

Source: *Own elaboration.*

In the next step, the indicators adopted for the study were characterised by determining their selected descriptive characteristics (Table 2). The preliminary analysis of the diagnostic characteristics shows that there are large disparities between countries due to the indicators studied. The coefficients of variation in 2020 ranged from 7.19% (Y_{1S} – healthy life years at birth) to 117.65% (Y_{6D} – the self-reported unmet need for medical examination and care), with variation exceeding 30% for most features.

The consequence of the high dispersion of features is also their high asymmetry. It should be noted that right-sided asymmetry dominates, indicating the predominance of EU countries with index values below the average value, which is positive for features that are destimulants. It is evident in the case of the indicator with the highest level of variation (Y_{6D}), which is also characterised by a very high measure of asymmetry.

Noteworthy is the Y_{2S} (the share of people with good or very good perceived health) indicator, which is characterised by strong left-sided asymmetry, which means that in most EU countries, the population aged 16 or older rated their health above the EU average, which in 2020 was 68.1%. The lowest rating of this indicator was given by the residents of Lithuania (44.3%), and the highest by the residents of Ireland (83.7%).

Table 2. *Selected descriptive characteristics of the indicators adopted for the study in the 2020*

Symbol	$\overline{x}$	***Vs (%)***	***As***
Y_{1S}	62.38	7.19	0.21
Y_{2S}	68.12	13.55	-0.87
Y_{3D}	24.59	30.87	0.03
Y_{4D}	2.20	103.15	2.19
Y_{5D}	280.09	39.97	0.85
Y_{6D}	2.31	117.65	2.50

Source: *Own elaboration.*

In order to create the ranking of the EU countries, a taxonomic measure of development based on standardized sums was used. The application of a taxonomic measure allows comparisons of the development of multi-feature objects. The higher the value of the measure, the higher the level of the phenomenon characterize the object. The construction of synthetic variables uses various methods of normalization of the diagnostic features (Bąk, 2007).

In the article applied the standardization of features. Due to the standardization of the values of diagnostic features, they are considered equally important in constructed measure. Based on the standardized sum method, the construction of a synthetic measure uses the following formula:

$$g_i = \frac{1}{m}\left[\sum_{j \in S} \frac{y_{ij} - \overline{y}_j}{s_j} + \sum_{j \in D} \frac{\overline{y}_j - y_{ij}}{s_j}\right]$$

where: S – set of numbers of features which are stimulants, D – set of numbers of destimulant.

In the next step of construction of the measure, the following transformations are used:

$$g_i' = g_i - \min_i g_i \qquad g_i'' = \frac{g_i'}{\max_i g_i'}, \quad i = 1, \ldots, n.$$

Application of the formula for g_i' shifts the scale of the g_i measure to the zero point, and the next $g_i^{"}$ transformation sets the upper limit of the synthetic measure to 1. Ultimately, the synthetic quality measures are in the range <0, 1>. Based on the value of the synthetic measure it is also possible to distinguish four typological groups of objects, using the mean and standard deviation:

1. group 1: $g_i^{"} \geq \overline{g_i^{"}} + s_{g_i^{"}}$,
2. group 2: $\overline{g_i^{"}} + s_{g_i^{"}} > g_i^{"} > \overline{g_i^{"}}$

3. group 3: $\overline{g_i^{"}} > g_i^{"} \geq \overline{g_i^{"}} - s_{g_i^{"}}$
4. group 4: $g_i^{"} < \overline{g_i^{"}} - s_{g_i^{"}}$

4. Results of the Research

Table 3 shows the result of the ranking and typological groups of EU countries obtained using the taxonomic measure of development calculated for the implementation of SDG3 in 2020.

Table 3. *Ranking and typological groups of EU countries due to SDG3 implementation in 2020*

Rank	Country	g_i	Group
1	Sweden	1.0000	I
2	Malta	0.8932	
3	Ireland	0.8683	
4	Netherlands	0.8594	
5	Luxembourg	0.7916	II
6	Spain	0.7727	
7	Cyprus	0.7671	
8	Belgium	0.7646	
9	Italy	0.7482	
10	Germany	0.7202	
11	Denmark	0.7081	
12	Slovenia	0.6595	III
13	Austria	0.6548	
14	France	0.6511	
15	Finland	0.6224	
16	Czechia	0.5977	
17	Greece	0.5514	
18	Poland	0.5416	
19	Bulgaria	0.5008	
20	Portugal	0.4940	
21	Hungary	0.4908	
22	Slovakia	0.4899	
23	Croatia	0.4381	
24	Romania	0.3261	IV
25	Estonia	0.2447	
26	Lithuania	0.2346	
27	Latvia	0.0000	

Source: *Own elaboration.*

Based on a detailed analysis of the values of indicators in the year under study, it is possible to identify those that contribute to the formation of the value of the synthetic measure and thus rank the countries according to the level of the phenomenon under study i.e., the realisation of SDG3.

The best situation regarding the implementation of SDG3 is in the countries of Northern and Western Europe, as well as in Malta. Sweden and Ireland, which are at the top of the ranking, are characterised by high indicators for Healthy life years at birth (Y_{1S}) and the Share of people with good or very good perceived health (Y_{2S}). The first of these indicators is the highest for Sweden, while the second reaches the maximum value in the case of Ireland. In addition, these countries have low rates related to, for example, the Standardised death rate due to tuberculosis, HIV and hepatitis by type of disease (Y_{4D}). The high position of Malta is due to the lowest level of Self-reported unmet need for medical examination and care (Y_{6D}) and the good level of most of the examined indicators.

The high position of the Netherlands in the analysed year is a consequence of low values of destimulant indicators, such as the Standardised death rate due to tuberculosis, HIV and hepatitis by type of disease (Y_{4D}) and Self-reported unmet need for medical examination and care (Y_{6D}).

Latvia, at the bottom of the ranking has the lowest Healthy life years at birth (Y_{1S}) index and the highest level of the Standardised death rate due to tuberculosis, HIV and hepatitis by type of disease (Y_{4D}) among EU countries.

5. Discussion and Conclusions

In this article, based on the 6 indicators related to the implementation of SDG3 adopted for the study, a ranking of EU countries and typological groups with similar levels was constructed in terms of the phenomenon studied. The best situation in terms of implementation of SDG3 was in the countries of Northern and Western Europe and also in Malta, with Sweden leading the ranking. This country is characterized by a high level of stimulant indicators adopted for the study and a low level of indicators adversely affecting the studied phenomenon (destimulant). Over 76% of Sweden's residents rate their health as good or very good.

The last in the ranking Latvia is characterized primarily by a low level of healthy life years at birth and a high level of indicators related to mortality. The perception of health by the inhabitants of Latvia is associated with the un-favorable levels of most of the indicators adopted for the study, moreover, less than 50% of the country's population assesses their health as good or very good.

The dominance of Sweden and the weak position of Latvia are also confirmed by the research of Gavurova and Megyesiova (2022), who, using the TOPSIS method, analysed the EU countries due to the implementation of SDG3 in 2010-2014 and 2015-2019.

According to Rolova, Gavurova and Petruzelka (2020), researchers' interest in health awareness research in people from different populations has increased worldwide over the past two decades. The authors cite the European Health Literacy Survey (HLS-

EU), according to which almost half of Europeans have limited health awareness, and there are significant differences in this knowledge between countries. The countries with the highest prevalence of limited health awareness were Czechia and Bulgaria, ranked 16th and 19nd 2020 in our study.

Europe is a continent of great diversity. Despite the powerful forces of globalisation and European integration, the people of Europe are still very different in their attitudes, beliefs and lifestyles. Their governments are also differentiated regarding health policy implementation (Mackenbach and McKee, 2013).

Following its values, the EU should strive to promote the prosperity, security and interests of all citizens, and sustainable development will have to constantly inspire the po-litical decision-making process of the European Commission and guide the development of the post-EU2020 growth strategy (Molero *et al.*, 2021).

The research presented in this study can help diagnose the results obtained so far and review the European Union's health policy in the future. In view of the finding of significant variation among the surveyed countries concerning progress in the implementation of SDG3, it is important in the process of determining the direction and implementation of health policy to take into account the specific characteristics and level of development of individual EU countries. Therefore, it appears necessary to review social policy, including health policy, and intensify efforts to achieve sustainable development in the area of public health in the European Union.

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