STATISTICAL TOOLS IN THE FUNCTION OF SUSTAINABLE ECONOMIC DEVELOPMENT

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Abstract:

Sustainable economic development as a global tendency for the progress of economies towards climate-neutral, inclusive and more equitable societies, is based in the EU on several strategic documents. Among these documents, Agenda 2030 plays a key role, with 17 Sustainable Development Goals (SDG), 169 targets and 247 indicators based on which progress in achieving the Goals is monitored.
The objectives of the research in the paper are:
1) Analysis of the Sustainable Development Goals Reports from the aspect of statistical indicators of progress in achieving sustainable economic development,
2) Overview of available UNSD and Eurostat models of textual and visual presentation of the SDG and
3) Online statistical tools, further possibilities and contributions of statistical indicators to the achievement of the SDGs.

Keywords: *sustainable economic development, SDG, statistics, statistical tools*

JEL classification: *C40, O11, Q56*

Introduction

Achieving the Sustainable Development Goals (SDG) is an integral part of the 2030 Agenda as a development path toward sustainable economies starting from 2030 (UN, 2015). The Agenda includes goals, targets, and indicators based on which progress in achieving the goals is monitored. Since 2016, statistical reports have been published on the progress made in achieving the SDGs. However, statistical systems face numerous challenges. First of all, the global indicator framework was developed by the Inter-Agency and expert Group on SDG Indicators (IAG-SDGs) and adopted by the United Nations Statistical Commission in March 2017 and by the United Nations General Assembly in July 2017 (Report of the Inter-agency and Expert Group on Sustainable Development Goal Indicators, 2017). As decided by the Statistical Commission and in accordance with United Nations Economic and Social Council resolution 2006/6, estimates used for the compilation of global indicators are to be produced in full consultation with national statistical authorities (ECOSOC Resolution 2006/6). Reports show gaps in the data, which does not diminish the value of the goals or prioritize one goal over another, but rather indicates the insufficient development of the system and the capacity to track indicators.

The SDG goals have created an opportunity for other institutions and systems to incorporate them into their consideration and analysis. This is how the document 2030 Agenda is organized around four linked SDG clusters: People, Planet, Prosperity and Sustainable infrastructure. Each cluster covers specific goals - People SDG: 2,3,4,5 and 11; Planet SDG:

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12,13,14 and 15; Prosperity SDG: 1,8,10,16 and Sustainable infrastructure SDF: 6,7,9 (Asian Development Bank, 2024).

SDG statistical system Eurostat provides a lot of information about the SDGs for different groups of users. This information is categorized into different groups and presented through text, graphics, tables, and interactive maps. The system has been enhanced with Environmental Statistics, which provides a visual interactive data framework. This system is designed for beginners in statistics, aiming to provide useful information and develop an interest in environmental issues.

In addition, the SDG statistical system provides information on economic indicators; however, they must be related and contextualized with environmental indicators in order for the analysis to be more comprehensive and clearer.

Analysis of the Sustainable Development Goals Reports

SDG Progress Report is published by the UN Secretary-General and provides a global-level monitoring of the progress towards the achievement of the SDGs. They are published annually, starting from 2016, and are available online on the platform https://unstats.un.org/sdgs#. The reports are compiled based on the global indicator framework and data produced by national statistical systems and information collected at the regional level. **Seven** progress reports on the Sustainable Development Goals (SDGs) have been published, starting from 2016, 9 SDG Progress Report:

- SDG Progress Report (2016)
- SDG Progress Report (2017)
- SDG Progress Report (2018)
- SDG Progress Report (2019)
- SDG Progress Report (2020)
- SDG Progress Report (2021)
- SDG Progress Report (2022)
- SDG Progress Report (2023)
- SDG Progress Report (2024).

So far, **seven** SDG Progress Reports have been published, starting from 2016 and two the Global Sustainable Development Report which is produced once every four years to inform the quadrennial SDG review deliberations at the General Assembly:

- Global Sustainable Development Report (2019) and
- Global Sustainable Development Report (2023).

General common characteristics SDG Progress Reports:

- The use of aggregate weighted numbers in the international statistical system ensures international comparability. All goals, targets, and indicators are equally important, although the first reports do not contain data on all goals. These data are adjusted for comparability and, when unavailable, estimated.
- Aggregate weighted numbers: The use of weighted averages allows for better international comparability of data, taking into account differences in population size

and country specifics.

- Equal importance of goals and indicators: All goals, targets, and indicators are equally important in the context of sustainable development, with no prioritization, ensuring a balanced approach.
- Lack of data in early reports: While all goals and indicators are equally important, early progress reports may have data gaps, as not all goals and indicators were available in the initial stages.
- International comparability: Through standardized methodologies and international collaboration, data is adjusted for comparability, enabling global progress tracking.

- Collaboration among organizations: The reports are based on contributions from more than 50 international and regional organizations, ensuring a broad range of data and insights.

Individual characteristics SDG Progress Report:

1) SDG Progress Report 2016: The information presented in this report is based on selected indicators of the global SDG framework.
2) SDG Progress Report 2017: The information presented in this report is based on selected indicators of the global SDG framework. All goals and targets are equally important and will need to be addressed by the appropriate indicators.
3) SDG Progress Report 2018: Report is based on the latest available data as of May 2018 on selected indicators of the global SDG framework.
4) SDG Progress Report 2019: The indicators included in the report do not prioritize any specific SDG target and these indicators provide insight into global progress.
5) SDG Progress Report 2020: The choice of indicators for this report does not represent a prioritization of targets, since all goals and targets are equally important.
6) SDG Progress Report 2021: The information presented in this report is based on the latest available data on selected indicators in the global indicator framework for the SDGs.
7) SDG Progress Report 2022: The choice of indicators used in the report does not represent a prioritization of targets, since all goals and targets are equally important.
8) SDG Progress Report 2023: Owing to the emergence of new data and revised methodologies, data series presented in report may not be comparable with previous data series.
9) SDG Progress Report 2024: The Report provides a global overview of progress towards the Sustainable Development Goals using inputs from more than 50 international and regional organizations.

Key problems in statistical data coverage through the global framework for the Sustainable Development Goals include:

1) Lack of standardized methodologies: Different countries use various methodologies for data collection and processing, which complicates international comparability. Global monitoring should be based on comparable and standardized national data obtained through well-established reporting mechanisms from countries to the international statistical system. But, the lack, of adequate data to assess national trends and to inform and monitor the implementation of development policies.

2) Limited capacity of national statistical systems: Many countries lack sufficiently developed systems for data collection or do not have adequate resources, leading to data gaps or issues with accuracy. In resolution 70/1, Member States recognized the crucial role of strengthened data collection and capacity-building and committed to addressing the data gap (paragraph 57) (Resolution 70/1).

3) Lack of data in certain areas: While all goals and indicators are equally important, some goals and indicators may be underreported or omitted due to a lack of resources, technological infrastructure, or political challenges. The data disaggregation as one of the ways to address inequalities in the past 2015 agenda because setting targets to reduce gap between social and economic groups will ensure that the most deprived are not left until last (Cristian, 2015). By disaggregating data by factors like income, gender, age, disability, geography, and other social categories, it becomes possible to identify the most marginalized or disadvantaged groups. This allows policymakers and organizations to target interventions more effectively and ensures that resources and efforts reach those who need them the most. Setting targets based on disaggregated data is crucial for closing the gap between different social and economic groups.

   Also, It is observed a lack of research or studies focused on consumers goods, agricultural, fishery and forestry sectors (Abdullah & Khatib, 2024)

4) Coordination issues between organizations: Despite collaboration between international organizations, challenges in coordinating between different levels of statistical systems (national, regional, and global) can lead to delays in data collection or inconsistencies.

5) Geographical and demographic variations: Differences in the geographical and demographic characteristics of countries can make it difficult to accurately collect data that can be compared at the global level. Such that attention and action are directed on the most marginalized from the outset, making it harder to simply focus on the easy wins, leave the difficult work to later or revert to the status quo (Bantekas & Seatzu, 2023).

6) Lack of reliable administrative infrastructure: In many countries, statistical data is not adequately collected or archived due to the lack of administrative infrastructure that would enable long-term and accurate record-keeping.

7) Development science plays an important role for sustainable development. The 2030 Agenda provides an opportunity for developmental scientists in the policy framework to provide the necessary evidence-based innovative and creative inputs (Petersen & Verma, 2018). The UN Global Sustainable Development Report recognized the importance of science and technology in advancing sustainable development (SDG Progress Report, 2019).

8) Changes in methodology and data updates: Due to the development of new data collection methods and changes in definitions or categories, the use of newer data may not be compatible with older data series, making it difficult to analyze long-term progress.

UN Data: Integration of Artificial Intelligence and Statistical Framework

The UNSD framework provides support in achieving the SDGs in various ways. It publishes reports: The System of Environmental - Economic Accounting - Ecosystem Accounting (SEEA EA) as an integrated and comprehensive statistical framework for organizing data about habitats and landscapes, measuring the ecosystem services, tracking changes in ecosystem assets, and linking information to economic and other human activity. This

System is a statistical framework that helps organize and analyze data about natural ecosystems for:

1) Monitoring habitats and landscapes – how natural areas and environments change over time.
2) Measuring ecosystem services – the services nature provides to humans, such as water purification, food production, or flood protection.
3) Tracking changes in ecosystem assets – how natural resources (like forests, rivers, or land) change over time.
4) Linking this information to economic and other human activities – understanding how ecological changes impact the economy and society, and vice versa.

The importance of this system is reflected in the new UN Data platform launched jointly by UNDESA and Google.org in September 2023 at the SDG Summit (UNSDWebsite). This tool will optimize data access for policy action and data-driven decision-making, by allowing users to ask questions and simultaneously use data from multiple sources. Also, ensures that users can effortlessly explore and actively engage information from diverse UN datasets, all in one place (UNSTATS).

UN Data platform covers 12 thematic areas: Children and Youth, Climate and Environment, Disasters, Economic development, Education and Culture, Equality and Human Rights, Governance and peace, Health, Population and Demography, Poverty and Food Security, Urbanization and Water, Sanitation and Hygiene. Each of the mentioned areas offers opportunities for deeper analysis according to different criteria.

The second platform is directly linked to the SDGs and is called SDG Global Database. The global indicator framework includes 231 unique indicators. The metadata available in this repository reflects the latest reference metadata information provided by the UN System and other international organizations. Within this system, fiscal points are defined for each of the indicators concerning questions on definitions, methods of computation, data or other issues.

The platform contains a page: E-Handbook on Sustainable Development Goals Indicators that focuses on key aspects such as concepts, definition, sources, calculations (SDGE-Handbook).

Analysis of the Presentation of Statistical Data in the Eurostat System: the SDG context

The analysis of Eurostat's statistical system has been done on several levels:

1) Conceptual framework of the system that answers the question of what the database provides to the users of information about the SDGs,

2) The variety of statistical publications on the SDGs that can indicate the possibilities of using the data for different stakeholders and

3) Presentation of a special part of the SDG statistical system: Environmental statistics.

The analysis of the conceptual framework of the Eurostat system was conducted based on the SDG search filters. The results show that the total number of information provided by Eurostat is 538, all of which are related to the SDG. The mentioned information is divided into three categories: data, news and publications (Table 1 and Figure 1).

Table 1

The structure of the statistical system from the perspective of SDGs

Categories	Number	%
Data	181	33,64
News	94	17,47
Publications	263	48,89

Source: Author, Based on Eurostat

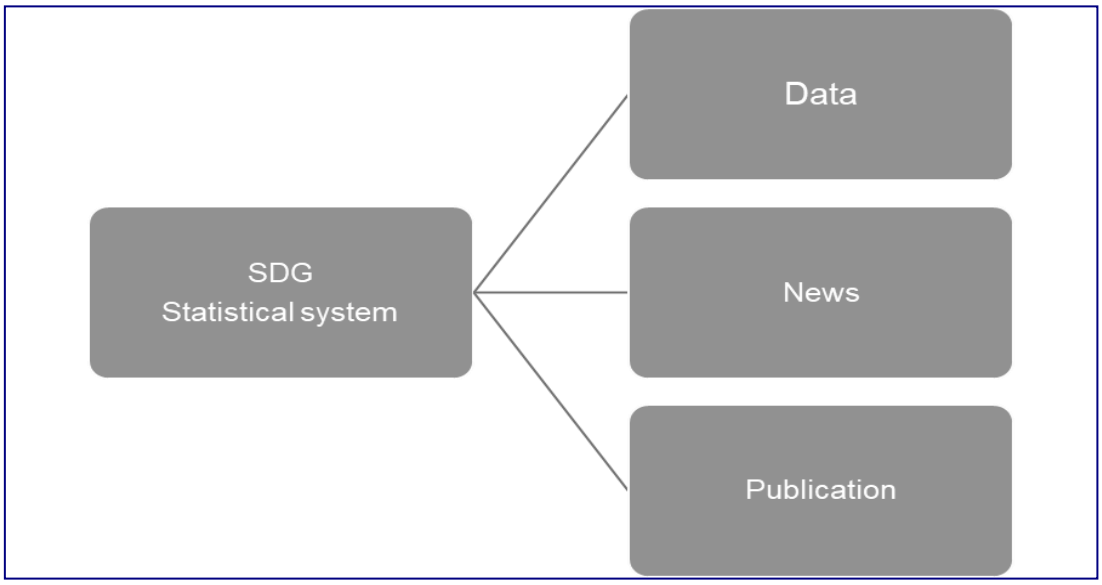

Figure 1 – The structure of the statistical system from the perspective of SDGs

The data in the statistical system is classified into two subcategories: Datasets (119) and Thematic sections (62). A total of 119 datasets have been published so far, covering individual SDGs. The analysis shows that there are no significant fluctuations in the representation of individual goals in terms of reporting. The largest number of datasets is 8, related to SDG1, SDG8, SDG12 i SDG13 (Table 2 and Figure 2).

Table 2

The structure of the statistical system from the perspective of concrete SDGs

SDG	Number datasets
SDG 1	8
SDG 2	6
SDG 3	7
SDG 4	7
SDG 5	6
SDG 6	6
SDG 7	7

SDG 8	8
SDG 9	6
SDG 10	6
SDG 11	7
SDG 12	8
SDG 13	8
SDG 14	6
SDG 15	7
SDG 16	7
SDG 17	6

Source: Author, Based on Eurostat

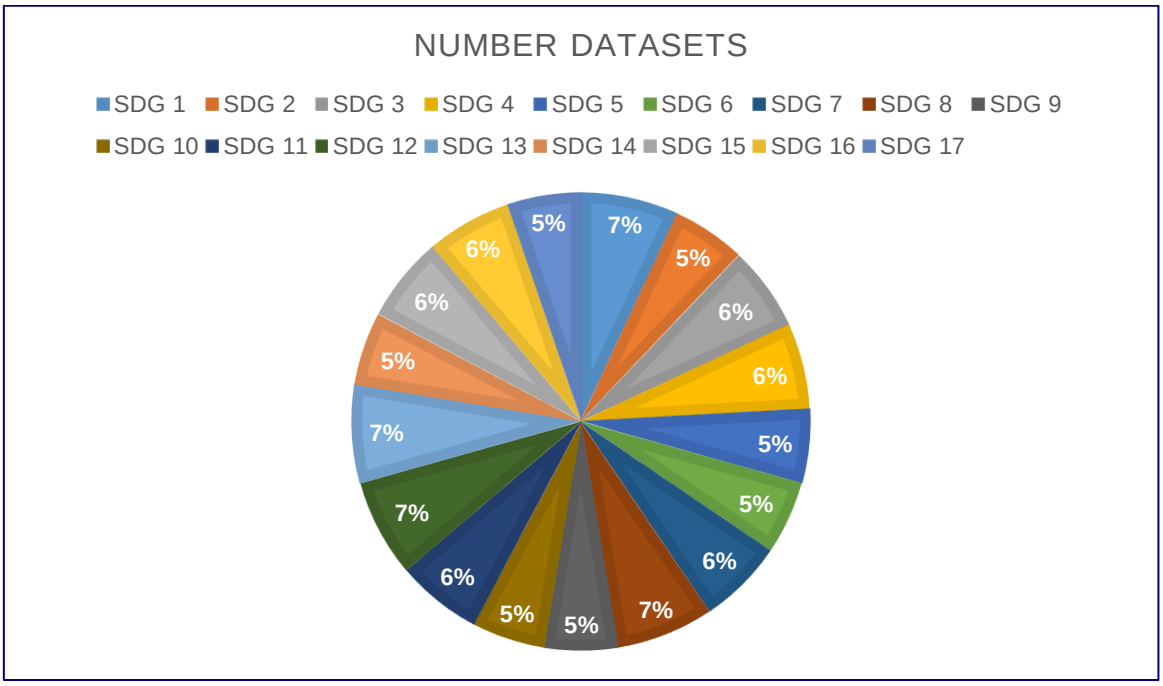

Figure 2 – Number datasets in the SDG Statistical system

The second subcategory within the Data category of the SDG Statistical System is Thematic sections. As previously mentioned, this subcategory contains 62 pages, which are classified into the following categories: SDG, Eurostat, Population and social conditions, Environment and energy, Agriculture, poverty and fisheries, General and regional statistics (Table 3).

Table 3

Thematic sections from perspective of SDGs

Thematic sections	Number	%
Sustainable development goals	10	45.45
Eurostat	3	13.64
Population and social conditions	4	18.18
Environment and energy	2	9.09
Agriculture, poverty and fisheries	1	4.55
General and regional statistics	2	9.09

Source: Author, Based on Eurostat

Visual representations in the SDG Statistical System

In the SDG statistical system, publications have the largest share (49%). The system has developed various types of publications, which are grouped into 11 categories: Statistics Explained articles, Manuals and guidelines, Glossary, Flagship publications, Statistical books/Pocketbooks, Leaflets and other brochures, Statistical working papers, Statistical reports, Interactive publications, Key figures and Statistics 4 beginners.

Table 4

Structure of publications o SDGs

Types of publications	Number	%
Statistics Explained articles	117	44.5
Manuals and guidelines	35	13.31
Glossary	26	9.89
Flagship publications	19	7.22
Statistical books/Pocketbooks	19	7.22
Leaflets and other brochures	18	6.84
Statistical working papers	13	4.94
Statistical reports	8	3.04
Interactive publications	5	1.9
Key figures	2	0.76
Statistics 4 beginners	1	0.38

Source: Author, Based on Eurostat

Key figures includes two publications "Key figures on the European food chain" which provides intuitive visualizations accompanied by concise texts, offering a comprehensive overview of the European food chain. Publications provides a selection of recent data from the domains of agriculture and fisheries statistics, as well as, a chapter on environmental issues related to some of the stages of the food chain.
Statistics 4 beginners contains a developed system Environmental statistic which provide information on the mutual relationship between natural resources and human activities and give information about a wide range of phenomena, ranging from the emission of greenhouse gases to data on biodiversity. The environment statistics data generally come from national statistical offices, national environment agencies or other administrative bodies in the EU Member States and the EFTA countries.

Key characteristics of the system Environmental statistic (EC, 2025):

- Eurostat's environmental accounts, including the air emissions accounts, energy accounts and environmental taxes, as well as the forest statistics,
- Environmental accounts support the ambition of making the European Union carbon neutral by 2050,
- The material flow accounts describe how materials move through the economy, from the extraction and trade of raw materials to the transformation processes, until their disposal as waste,
- Air emissions accounts provide information on the substances released in the atmosphere by human activities,
- Water statistics describe how much groundwater and surface water is available, they display how much water is abstracted and used for different human activities,
- The environmental accounts are built on the same principles as the national accounts

for the economy, and use the same framework and

- Statistics on biodiversity and ecosystems provide important information on the status of the natural environment and of different habitats.

Figure 3 – Environmental Statistics

Source: EC, 2025. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Beginners:Environment

Statistical Indicators in the Context of SDG and Finance

By cross-referencing indicators for SDG and finance, the statistical system provides information on two indicators: General government gross debt and Real GDP per capita.
The Treaty on the Functioning of the European Union defines General government gross debt as the ratio of government debt outstanding at the end of the year to gross domestic product at current market prices.
Basic information about indicator: General government gross debt (Eurostat, 2024)

- Overall data coverage: 2000 - 2023
- Number of values: 1440
- Theme: Economy and finance
- SDG code 17_40

The significance of the indicator: key measure of a country's fiscal health and It is used to assess the sustainability of public finances
The significance of the indicator for the national economy: A high debt-to-GDP ratio may indicate that a government has taken on a significant amount of debt, which could be a concern for investors or policymakers which may indicate a high level of investment risk, especially if economic growth does not keep pace with debt accumulation.

The significance of the indicator for the fiscal administration of the European Union: specific limits on government debt are established under the Maastricht criteria which ensure that member states maintain sound public finances and avoid excessive deficits and debt levels. The data in the table show % government gross debt in 2023 and indicate a problem in several countries: Greece, Spain, France, Italy and Belgium (Table 5 and Figure 4).

Table 5

General government gross debt in 2023

Country	%
European Union - 27 countries (from 2020)	80,8
Euro area – 20 countries (from 2023)	87,4
Euro area - 19 countries (2015-2022)	87,5
Belgium	103,1
Bulgaria	22,9
Czechia	42,4
Denmark	33,6
Germany	62,9
Estonia	20,2
Ireland	43,3
Greece	163,9
Spain	105,1
France	109,9
Croatia	61,8
Italy	134,8
Cyprus	73,6
Latvia	45,0
Lithuania	37,3
Luxembourg	25,5
Hungary	73,4
Malta	47,4
Netherlands	45,1
Austria	78,6
Poland	49,7
Portugal	97,9
Romania	48,9
Slovenia	68,4
Slovakia	56,1
Finland	77,1
Sweden	31,5

Source: https://ec.europa.eu/eurostat/databrowser/view/sdg_17_40/default/table?lang=en

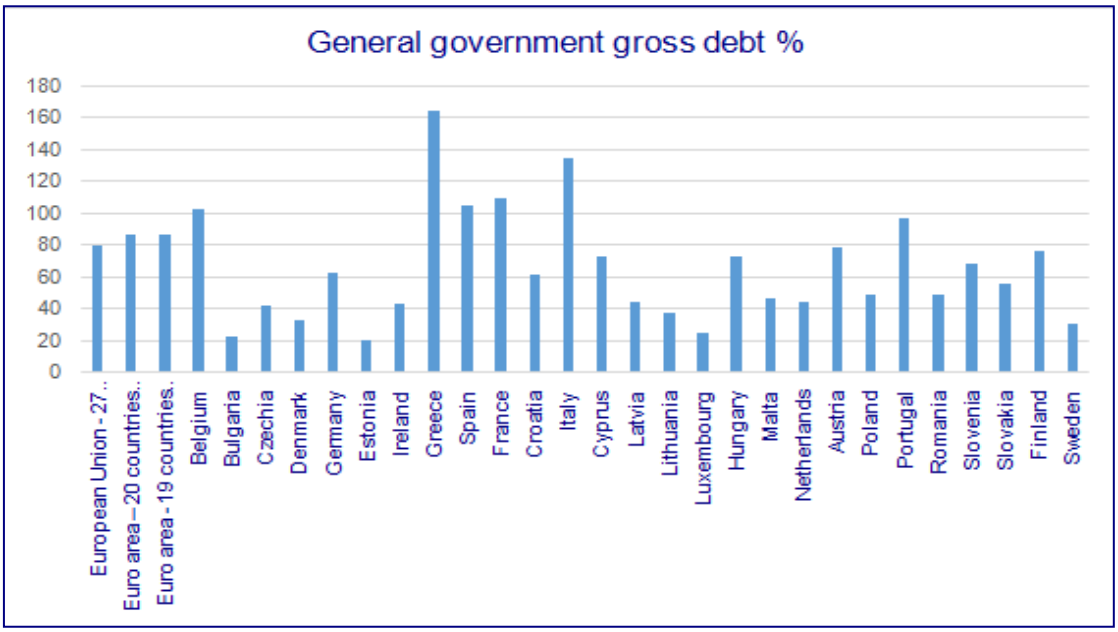

Figure 4 – General government gross debt (%)

Source: https://ec.europa.eu/eurostat/databrowser/view/sdg_17_40/default/table?lang=en

2) Real GDP per capita is calculated as the ratio of real GDP to the average population of a specific year.
Basic information about indicator: Real GDP per capita (Eurostat, 2025)

- Overall data coverage: 2000 - 2023
- Number of values: 1847
- Theme: Economy and finance
- SDG code 08_10

The data show that the countries with a Real GDP per capita above the EU 27 average are: Belgium, Denmark, Ireland, France, Luxembourg, Netherlands, Austria, Finland and Sweden (Table 6).

Table 6

Real GDP per capita in 2023

Country	Euro per capita
European Union - 27 countries (from 2020)	31.030
Euro area – 20 countries (from 2023)	34.100
Euro area - 19 countries (2015-2022)	-
Belgium	40.340
Bulgaria	8.850
Czechia	18.240
Denmark	55.280
Germany	39.380
Estonia	18.200
Ireland	82.780
Greece	18.800
Spain	25.730
France	35.260
Croatia	14.970
Italy	30.730
Cyprus	29.150

Latvia	15.020
Lithuania	16.840
Luxembourg	95.660
Hungary	14.740
Malta	29.500
Netherlands	46.240
Austria	41.770
Poland	15.280
Portugal	20.090
Romania	11.170
Slovenia	23.170
Slovakia	17.240
Finland	40.810
Sweden	48.850

Source: https://ec.europa.eu/eurostat/databrowser/view/tipsna40/default/table?lang=en

The use of the indicator is limited because it does not take into account social well-being or environmental sustainability, which is why it should be analyzed alongside other indicators.

Conclusions

The adoption of the 2030 Agenda marked the beginning of a transformative path for national economies towards sustainable and inclusive development. A key step in tracking the progress of economies towards a sustainable development model is the definition of 17 Sustainable Development Goals, with targets and indicators. As early as 2016, the first SDG Progress Report was published, with an established practice of releasing one report annually. The report includes statistical indicators as aggregate measures of achievements.

Analysis of the reports reveals the existence of numerous gaps; for example, the first reports did not cover all SDGs, and statistical systems had not developed mechanisms to monitor all indicators, among other issues.

Official statistical platforms present data on SDGs and the progress in achieving them. The UNSD platform enables the use of AI to generate responses for interested parties. Additionally, there is a dedicated SDG platform that allows for the monitoring of indicators from the 2030 Agenda.

The Eurostat platform provides a wide range of statistical data on the SDGs for various stakeholders. The data is presented in textual, graphical, and tabular formats. The platform offers the possibility to search across different indicators that can be cross-referenced, allowing for reports such as SDG and Finance. When using financial data, users are advised to consider several different indicators, such as environmental and social ones, to provide a more realistic view of development progress. The advantage of the Eurostat statistical system lies in the existence of a platform Environmental Statistics that offers visually appealing and graphically accessible insights into key indicators in this area.

In addition to the developed statistical framework for covering data within the SDG statistics, there are still gaps in terms of coverage and representation of all indicators. While statistical platforms provide different approaches to SDG data, enabling broader public access, this is important for the purposes of informing, analyzing data, and improving reporting.

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