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ROLE OF ROMANIAN HIGHER EDUCATION INSTITUTIONS IN ACHIEVING THE SDG 4 TARGETS THROUGH THE GREENMETRIC 2023 RANKING

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Abstract: This paper examines the alignment of Romanian higher education institutions with SDG 4. Using a Green Metric sustainability ranking, it explores the potential for implementing SDG 4. The study focuses on teaching and research and considers the position, scores, size, and geopolitical context of each university. The results revealed that the alignment of the ranked universities with SDG 4 is influenced by university size, sustainability policies, and resources. The originality of this research lies in conducting this type of analysis of Romanian universities' system in terms of sustainability and evaluating its contribution to the SDGs' broader context.

JEL classification: I2, Q51, O44

Keywords: higher education, Romania, SDG 4, green measure, sustainability ranking, quality education.

1.Introduction

In response to societal (Noth & Tonzer, 2022) and policy concerns (Franco et al., 2019), an increasing number of higher education institutions are integrating sustainability into their key functions (Veidemane, 2022). In 2023,1447 higher education institutions participated in the Green Metric sustainability rankings to reveal their contributions to the Sustainable Development Goals[1], which shows that universities are sensitive to the needs in society and are open to make an effort to embed sustainability.

Higher education establishments have the potential to advance sustainability by engaging in research, delivering education, and facilitating the sharing of knowledge, or through formal agreements. For example, documents such as the Talloires Declaration, the Halifax Declaration, the ODD Accord, and the Abuja Declaration are all designed to

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[1] https://greenmetric.ui.ac.id/rankings/rankings-overview

encourage sustainable development and education that supports sustainability. The issues regarding sustainability can be tackled by pledging to put it into practice (Lorenzo et al., 2015).

Achieving sustainability in higher education requires a unified strategy covering all aspects and areas of the sector. The focus of this article is on an area of high societal interest - education, and in particular education for quality SDG4 in the Romanian university system, using data from the Green Metric sustainability rankings for 2023.

Particular elements affecting the integration of sustainability in universities (Cuesta-Claros et al., 2022) are: university purpose and mission; national/European / international legislation and policies; the research-education-science nexus; regional culture; and, last but not least, global standards. Although some factors are not included in the category of specific factors affecting HEIs: the size of HEIs, limited funding, and competing demands from stakeholders, they have an impact on the adoption of sustainability in HEIs (Sepsi et al., 2018; De Iorio et al., 2022).

Approaches used in these rankings have been reviewed in a handful of articles (Lauder et al., 2015;Galleli et al., 2021; Ragazzi & Ghidini, 2017), but none of the studies covers Romanian universities, on the education and research component.

The presence of Romanian universities in the Green Metric rankings from the first edition (2010) to 2023 has registered a steady increase (from 1 university in 2011 to 11 universities in 2023), indicating the interest of Romanian universities in maintaining this ranking and, implicitly, aligning themselves with sustainability goals, implicitly SDG 4. Universities are implementing practices to promote SDG4 by developing curriculum, introducing sustainability-based topics, and participating in programs that can aid their communities in realizing the Sustainable Development Goals and play a role in creating a more sustainable future.

This research aims to analyze and investigate the following: I. Interpretation of educational and research components; analysis of worldwide and national geopolitical context of the ranked universities, as well as prospects for implementation of SDG 4 - Quality Education at the universities included in the Green Metric ranking, 2023; II. Status of the initiatives of the Romanian government for the implementation of the SDGs, especially SDG 4 in a university environment.

The uniqueness and innovative aspect of this research lie in the examination conducted to grasp the initiatives taken by Romanian universities regarding sustainability. It also explores a particular element recognized as a non-specific influencer on sustainability—the size of these universities—to determine its effect on the adoption of sustainability practices within the public universities of Romania and to pinpoint opportunities for enhancement. The study further investigates how Romanian universities contribute to the Sustainable Development Goals, as highlighted in the Green Metric 2023 rankings, and their role in promoting sustainable growth. By utilizing data from the Green Metric rankings, this research seeks to address the existing gap concerning the alignment of Romanian universities with sustainability objectives.

The conclusions reveal that Romanian universities are making efforts to maintain and steadily increase the implementation of Agenda 30, including SDG 4, as evidenced by the participation of many Romanian universities from the emergence of this ranking until 2023. The implementation of sustainable development in universities is also conditioned by their size (the larger the university, the higher the degree of implementation of sustainable development), by political factors, and by the resources

available to the university (since participating in the ranking is voluntary and the university has to make a financial effort to be able to secure its access to the ranking).

The article is structured as follows: introduction, review of the literature on the SDGs with a focus on SDG 4, presentation of sustainability goals, relevance of SDG 4 for universities, summary of relevant SDGs, presentation of government initiatives in Romania, data collection using the Green Metric (2023) ranking to assess the sustainability of universities, analysis of the geopolitical positioning of universities and interpretation of data on the education and research components of Romanian universities in the 2023 ranking. The paper concludes with results, discussions, limitations, and future research directions.

2.Theoretical framework

There is a consensus in the literature on the need for universities to follow the direction towards sustainability (Ferguson & Roofe, 2020;Sepsi et al., 2018; De Iorio et al., 2022; Adhikari & Shah, 2021; Sugiarto et al., 2022; Lazarov & Semenescu, 2022; Zanellato & Tiron-Tudor, 2021; Stoian et al., 2021).

Measurement and evaluation of sustainability in HEIs should include the following elements (Lorenzo et al., 2013; Lorenzo et al., 2015):

(i) Addressing and highlighting the appropriate aspects of sustainability at the HEI level;

(ii) when defining assessment indicators, HEIs should not limit themselves to eco-efficiency aspects, but should also consider economic and social aspects in their assessment;

(iii) the indicators need to be quantifiable and adaptable enough for organizations to utilize the same category of tool or metric;

iv) strategies in the sustainability process should be clear, and processes should be comprehensive.

In sustainability practice, we find a variety of global rankings (Orduna-Malea & Perez, 2021) designed to be able to measure the dimensions of universities, such as THE-WUR, OS-WUR and ARWU (Hazelkorn, 2015), but these have been criticised for their biases and limitations. These rankings take no notice of current societal issues, such as sustainability, diversity, and open science initiatives, which makes them difficult to use widely (Saf on, 2019). This is the main reason why we chose Green Metric Ranking as the assessment tool for this article.

This study aims, on the one hand, to analyze and evaluate the Green Metric methodology, in line with other studies in the literature that have focused on the analysis and evaluation of university ranking methodologies (Galleli et al., 2022; Saf on, 2019), including the coverage and scores specifically attributed to the teaching and research component. Instead, this study complements and actively responds to the needs identified in the literature (Chankseliani & McCowan, 2020), where there is a major gap in terms of deeper knowledge of sustainability and its implementation at the university level, especially for emerging countries (such as Romania).

Sustainable Development Goals – SDG4 Overview

The Sustainable Development Goals involve advancing sustainable progress by promoting well-being, fostering economic advancement, enacting sustainability laws, and encouraging educational improvement (Saini et al., 2022). In 2015, all UN member states embraced these 17 Sustainable Development Goals, which were formulated to address a diverse array of challenges pertaining to economic, societal, environmental, technological, and legal development. These goals are meant for every nation globally, not exclusively for those that are considered developing or emerging, as seen in the case of Romania (Chankseliani & McCowan, 2020; Alawne et al., 2021).

The Sustainable Development Goals, or SDGs, play an essential role in advancing sustainable development that is impactful and enduring (Mensah, 2019). In contrast to their earlier counterparts, the Millennium Development Goals established in 2000 (Battersby, 2017), the current SDGs introduced in 2015 are more effective and thorough, embodying a comprehensive and interconnected strategy for sustainable development that encompasses a diverse array of social, economic, and environmental aspects. SDG 4, which focuses on Quality Education, is one of the 17 Sustainable Development Goals, emphasizing the importance of providing inclusive and equitable quality education along with opportunities for lifelong learning (UN, 2015; Saini et al., 2022). This goal consists of several points or targets (7 in total), complemented by three means of implementation (Ferguson et al., 2018; McKay 2018) (see Table 1 and Figure 1).

Table 1. SDG 4 targets and implementation means

Outcome objectives	
4.1	By the year 2030, it is essential to guarantee that every girl and boy has access to free, fair, and high-quality education at both the primary and secondary levels, resulting in meaningful and successful learning achievements.
4.2	By the year 2030, guarantee that every girl and boy can receive high-quality early development, care, and preschool education to ensure they are ready for primary schooling.
4.3	By the year 2030, it is essential to guarantee that all individuals, regardless of gender, have equitable access to quality and affordable education at the technical, vocational, and higher education levels, which encompasses university education.
4.4	By the year 2030, there will be a significant rise in the population of youth and adults possessing essential abilities, such as technical and vocational competencies, necessary for employment, job opportunities, and entrepreneurship.
4.5	By the year 2030, eradicate all differences between genders in education and guarantee equal opportunities for everyone to access all educational tiers and job training, particularly for marginalized groups such as individuals with disabilities, indigenous communities, and children facing challenging circumstances.
4.6	By the year 2030, make certain that every young individual and a significant percentage of the adult population, regardless of gender, possess literacy and numerical skills.
4.7	By the year 2030, guarantee that every student obtains the essential knowledge and abilities to encourage sustainable growth. This includes, among other strategies, education that fosters sustainable practices and ways of living, the protection of human rights, the advancement of gender equality, the encouragement of a peaceful and nonviolent culture, global citizenship, and recognition of cultural diversity as well as the role of culture in achieving sustainable development.

Means of Implementation	
4.a	Construct and update educational spaces that are welcoming to children, considerate of gender, and accommodating for disabilities, ensuring a secure, non-violent, inclusive, and productive environment for every learner.
4.b	By the year 2020, there will be a considerable rise in the scholarships offered to small island developing nations and African nations aimed at facilitating enrollment in higher education. This includes vocational training, as well as programs focused on technical, engineering, and scientific information and communication technology, in both advanced and emerging countries.
4.c	significantly enhance the availability of skilled educators by the year 2030, which includes collaboration with other nations for the training of teachers in lesser-developed countries.

(source: Incheon Declaration and Action Framework to Implement Sustainable Development Goal 4)

The successful implementation of SDG 4 depends mainly on higher education institutions (Franco et al., 2019). Strengthening the competencies and skills of educational stakeholders is important for increasing teachers' ability to deliver quality and inclusive learning programmes. Higher education institutions can undertake several actions in the form of (Ferguson et al., 2018):

- create research that is pertinent to policy (implementation research) with the objective of supporting the attainment of set objectives and providing knowledge regarding education in a format that is accessible to decision-makers;

- developing sustainable capacities at the micro and macronational levels for qualitative and quantitative research;

- play a role in emphasizing advancements, suggesting alternatives or remedies, and recognizing effective methods that can be adapted, creative, and capable of expansion (Incheon Declaration and Framework for Action for the Implementation of Sustainable Development);

Three levels for fulfilling the objectives of Sustainable Development Goal 4, as noted by Boeren and colleagues in 2019, consist of the micro level involving individuals like parents, children, young people, and adult learners, the mezzo level concerning educational settings, and the macro level related to national standards and laws. At the micro level, the emphasis is placed on the value of vocational training and the development of skills. It is essential for parents to acknowledge the advantages of education, such as greater autonomy, which corresponds with SDG 4.1 and Goal 4.2, promoting free access to primary and secondary education as well as quality early childhood education. Bourdieu (2009) found that the middle class has a greater capacity for literacy and collaboration with educational institutions, supporting Goal 4 for building inclusive and safe schools. Trust in the education system is vital, especially for those who face exclusion, aligning with Goal 4.5 to eliminate discrimination in education. Furthermore, offering higher education scholarships and ensuring that qualified teachers in developing countries can improve their education systems, in line with according to objectives 4.b and 4.c, which focus on expanding scholarships and increasing the number of qualified teachers.

Mezzo levels in all SDG 4 targets can only be attained if education and training are accessible and of high quality. Educational institutions must provide quality education, attract qualified teaching staff, manage finances effectively, and build strong community

relationships for all levels of education. Higher education should diversify its offerings to include vocational and technical skills to support the goals of sustainable development. Nations with minimal engagement in adult education frequently offer restricted course options, resulting in a continuous pattern of low involvement (Boeren et al., 2017).

At the macro level, education is shaped by regulations that vary by country. Access to primary education is significantly higher in Western Europe (almost 100%) than in developing countries, which have much lower rates (UNESCO, 2017b), and to improve access where participation is low, governments need to legislate accordingly.

In countries with low educational achievement, governments must enact legislation to enhance access to education, aligning with Goal 4.1: Free primary and secondary education. Efficient financing through investment in education is essential to achieve all the goals of SDG 4. To align with target 4.4. increase the number of people with skills relevant to economic success, governments should invest in job creation and the development of competitive markets. Developed countries must recognise investments made to help other countries externally (align with goals 4.b Expand higher education scholarships for developing countries and 4.c Increase the number of qualified teachers in developing countries). This macrolevel could also be extended to active labour market policies that could influence the provision of training programmes.

Economic, social, and environmental dimensions of existence are regarded in the 2030 Agenda as a chance to unify them. The Sustainable Development Goals focus on creating balance among these three dimensions by ensuring high-quality, inclusive, and fair education and ongoing learning opportunities for everyone, regardless of their background, through realizing 10 specific objectives. Hence, this research seeks to assess and examine the methods employed in analyzing green metrics, the indicators utilized, the percentages given, and how SDG 4 will be executed within the Romanian public universities included in this ranking for the year 2023.

2. Research framework

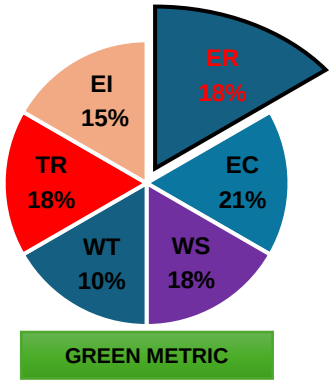
GreenMetric Ranking: A Methodological Approach

The necessity for examining the ecological consequences of universities has resulted in the creation of various metrics to measure this factor. Among these are the Green League launched in 2007 and the Environmental Social Responsibility Index introduced in 2009. Nevertheless, these measures fell short of achieving their intended outcomes, which led to the establishment of the Green Metric, an global ranking that correlates university performance with sustainability efforts. The Green Metric was initially introduced in 2010 by an institution in Indonesia, aiming to foster sustainability within higher education. This ranking encompasses an assessment of academic reputation and research, taking into account sustainability and environmental considerations, serving as a means to gauge the sustainability of university operations. The elements of this ranking are based on the three pillars of sustainability: environmental protection, economic viability, and social equity, reflecting the institution's actions regarding its influence on the environment.

Methodologically, ranking is based on specific sustainability indicators that measure the impact of universities on the environment, society, and economy. The ultimate aim of the Green University Ranking is to assess the commitment of universities to sustainability (Țimbaliuc & Gusuvati, 2021). The scores for each criterion are represented by a series

of responses given on a scale specific to the ranking. Each criterion is classified into a general information class, which in the final calculation transforms the raw scores into weighted scores to obtain the final score (see Figure 1).

Figure 1. GreenMetric Ranking Criteria and Weightings (Alawne et al., 2021)



The Education and Research (ER) criterion provides information on universities' efforts to create and support new generation concerns and sustainability issues.
The Environment and Infrastructure (EI) criterion offers details regarding the university's stance on ecological matters, encompassing green areas and actions aimed at environmental conservation along with strategies for sustainable advancement.
(source: own elaboration).

The Energy and Climate Change (EC) criterion provides information on how universities choose to pay attention to energy use and climate change issues, with the expectation that universities will increase energy efficiency efforts on buildings used nature and resources.

The Waste (WS) criterion provides information on waste management and recycling programmes, which are considered key factors in creating a sustainable environment, and universities need to closely monitor not only their own waste generation, but also recycling/reuse and recycling patterns.

The Water/Water Criterion (WT) provides information on universities' water consumption and water conservation and freshwater and habitat protection programs. The aim is to reduce water consumption and increase conservation programmes and habitat protection;

The Transportation/Transportation (TR) *criterion provides information on university policies to limit the number of vehicles on campus, the use of campus buses, and bicycles.* The aim is to promote healthy lifestyles and reduce carbon emissions.

The evaluation includes six key factors: the reputation of the academic institution, the perception from employers, citations of faculty work, the ratio of faculty to students, the ratio of international students, and the ratio of international faculty. By the year 2023, the QS Ranking plans to incorporate two additional categories that will assess how educational institutions contribute to sustainable development: social influence and ecological impact.

Regarding the explanations of the Sustainable Development Goals and the aspects of social influence and ecological effect, the category will be outlined as shown in Table 2.

Table 2. SDGs included in the 2023 GreenMetric ranking

Social Aspects	
Gender Equality	Reduced Inequalities
	
Environmental aspects	
Affordable and Clean Energy	Climate action
	
Sustainable Cities	Life below Water
	
Responsible Consumption and Production	Life on land
	

source: (Mejía-Manzano, 2023)

Table 3 displays the classifications and measurement metrics of the SGDs within the Green Metric rankings, organized into six major categories: campus environment (infrastructure and surroundings); electricity usage (energy and climate impact), waste handling, water preservation, sustainable public transport, and education on sustainability.

Table 3. The Specific GreenMetric Indicators and Categories

Category	**Indicator**
Setting and Intrastructure (SI)	-the ratio of open space area to total area; -area on campus covered in forest; -area on campus covered in planted vegetation; -area on campus for water absorbance; -the ratio of open space area divided campus population; -university budget for sustainability effort.
Energy and Climate Change (EC)	-use of energy-efficient appliances; - implementation of the smart building programme implementation;

Category	Indicator
	-number of renewable energy production toward total energy usage per year; -element of green building implementation; -greenhouse gas emission reduction programme; -the ratio of total carbon footprint divided by campus population.
Waste (WS)	-recycling programme for university waste; -program to reduce the use of paper and plastic in campus; -organic waste treatment; Inorganic Waste Treatment; -toxic waste treatment; -sewerage disposal.
Water (WR)	-water conservation programme; -water recycling programme; -the use of water-efficient appliances; -piped water consumed.
Transport Administration (TR)	-the ratio of total vehicles (cars and motorcycles) divided by total campus population; -shuttle services; -zero emission vehicles policy on campus; -TR 6 Transportation Programme designed to limit or decrease the ratio of zero-emission vehicles divided by total campus population; - ratio of parking area to total campus area - transportation programme designed to limit or decrease the parking area on campus for the last 3 years -number of transportation initiatives to decrease private vehicles on campus -Pedestrian policy on campus
Education (ER)	-quantifying student organisations' sustainability-related activities; - community sustainability services; - share of sustainability funding in total research funding; - number of sustainability-related start-ups; - number of sustainability-related events; -number of sustainability-related academic publications; - sustainability report; -ratio of sustainability courses to total number of courses/subjects Sustainability Report -sustainability website

(source: Alawne et al., 2021)

The GreenMetric 2023 ranking shows the global distribution of the participating universities (1182 participating institutions): Asia has the largest number of institutions, with 685 higher education institutions, representing more than half, and the number of educational institutions present (57.95%), followed by Europe with 295 HEIs, representing 24.95% of all HEIs present, Latin America with 145 HEIs, representing 12.26% of all HEIs present, North America with 12 HE Is, representing a share of only 0.66%, and Oceania with 2 HEIs, representing a share of only 0.11% of all HEIs present.

Figure 2. The global university ranking part of GreenMetric 2023 ranking

(source: own elaboration, data from https://greenmetric.ui.ac.id/rankings/ranking-by-region-2023)

The methodology for this ranking is based on general criteria accepted by universities interested in sustainability, such as education and research; collecting general information about universities (size and specificity); proportion of green space owned by universities; information on electricity consumption; information related to transport, water consumption, waste management, location and infrastructure, energy and climate change. The rankings are simple numerical counts broken down by each criterion/indicator, and at the end, the raw scores are weighted to arrive at the final score. It is also interesting to follow the distribution of the SDGs by continent (De Iorio et al., 2022), and thus we have:

Table 4. Implementation of SDGs implementation by continent

SDGs	AFRICA	ASIA	EUROPE	NORTH AMERICA	OCEANIA	SOUTH AMERICA
SDGs 1	44.203	47.598	52.983	76.611	71.118	54.69
SDGs 2	41.936	48.272	49.079	74.373	72.138	55.336
SDGs 3	49.986	53.032	60.036	72.49	87.396	58.302
SDGs 4	47.057	49.406	56.192	60.498	74.805	50.904
SDGs 5	40.189	42.47	54.842	65.888	78.443	49.615
SDGs 6	34.970	43.821	46.584	70.294	77.662	48.165
SDGs 7	49.514	54.859	61.193	71.042	81.647	56.01
SDGs 8	47.375	57.914	67.936	72.7	84.085	61.828
SDGs 9	40.507	52.381	56.796	74.76	70.938	38.635
SDGs10	41.228	44.057	60.789	70.685	80.223	41.233
SDGs11	45.775	52.286	59.989	81.252	83.532	48.635
SDGs12	37.295	48.48	59.387	78.679	79.873	47.124
SDGs13	40.438	38.975	52.836	65.455	72.173	42.822
SDGs14	33.221	40.951	51.441	75.765	75.700	47.816
SDGs15	32.722	44.227	55.246	77.725	83/106	47.776
SDGs16	48.319	50.000	65.917	81.362	84.363	54.492
SDGs17	48.186	47.737	54.886	69.797	86.152	48.956
GENERAL	**45.589**	**48.651**	**57.194**	**66.818**	**80.491**	**49.944**

(source: De Iorio et al., 2022)

As illustrated in the table above, Oceania ranks as the region exhibiting the most significant transparency in ODD, achieving an overall score of 80.491. Following Oceania are North America with a score of 66.818, and Europe at 57.194. In terms of the Quality Education aspect (SDG 4), Oceania once again leads with the highest disclosure level at 74.805, with North America next at 60.498, and Europe trailing at 56.192. The areas experiencing the least transparency regarding the SDGs consist mainly of developing nations, indicating that geographic factors significantly influence both the attainment and visibility of the SDGs, largely due to the economic conditions of various countries (De Iorio et al., 2022).

The other SDG related to SDG 4 (ie, SDG3 Health and well-being) have the highest disclosure in Oceania (87.396) and the lowest in North America (72.49). SDG5 (Gender equality) has the highest disclosure in South America (78.443) and the lowest in Asia (42.47). SDG 8: Oceania has the highest disclosure (84.085), and North America the lowest (72.49). SDG 12: Oceania has the highest disclosure (79,873), and Asia the lowest (48.48). SDG13: Mitigation of climate change. The highest level of disclosure in Oceania (72,173) and the lowest in Asia (38,975).

3. Methodology and database development

We utilize both summative and descriptive content analysis to fulfill the aims of this research project. This approach entails examining documents and texts in order to measure the content according to established categories in a methodical and replicable manner (Fuchs et al., 2023; Chankseliani & McCowan, 2023). Additionally, another piece of literature includes the work of Galleli et al., (2022) and Veidemane (2022), which assesses global university sustainability rankings through the lens of the Berlin Principles framework. The researchers evaluated two specific rankings, the UI Green Metric WUR and THE-WUR, noting that both possess certain shortcomings and potential for enhancement.

In particular, the methodology of the Green Metric Ranking 2023 was utilized to identify and analyze indicators concerning education and research. Descriptive statistical techniques were employed to outline the characteristics of the data set obtained. Specifically, the data available from the Green Metric 2023 was taken into account. All information was gathered directly from the official website in February 2024. Descriptive statistics were again applied to extract and examine the university name, the university region (country), and scores relating to performance, research, and education for each institution.

In 2010, the Green Metric ranking began with 95 universities around the world. In 2018, this number had grown to 719. The UI Green Metric World University Ranking for 2023 included 949 universities from 84 countries, with 230 new participants since 2018. This increase reflects a greater awareness of sustainability in higher education. Romanian universities are represented by 11 institutions in the 2023 ranking:

1. “Babeș-Bolyai” University, Cluj-Napoca;
2. “Lucian Blaga” University of Sibiu;
3. University of Medicine and Pharmacy Grigore T. Popa-Iasi;
4. Danube University of Galati;
5. University of Oradea;

6. Technical University of Cluj;
7. Petrolum – Gas University of Ploiesti;
8. University of Medicine, Pharmacy, Science and Technology of Targu-Mures;
9. Valahia University of Targoviste;
10. West University of Timișoara;
11. "Ion Mincu University of Architecture and Urbanism", Bucharest.

Romania, through the Ministry of Education, has developed a series of national programmes for the period 2016-2023 to support sustainability in the university environment [2]:

- **Social programmes** for graduates from rural areas include special places, scholarships, subsidised accommodation and meals, and partial transport costs. For 2022-23, 200 places have been allocated to graduates from rural areas (1,207 have been filled). 5,000 bachelor's and 4,500 master's places have been allocated for the development of Romania's priority areas. Places have been allocated for bachelor's (312), master's (64) and doctoral studies (6).
- **The ROSE programme**, created to encourage secondary school graduates to continue their studies, in the form of a university scholarship scheme, has reached the maximum number of scholarships allowed under the competitive Student Support Scheme;
- **StudyinRomania,** a promotion tool for higher education, will be launched in 2022 as a phone application for 18-30 Romanians and foreigners interested in studying in Romanian universities. The VR application 'StudyinRomania Journey' will also be implemented. Promotes public universities through 46 videos, including a Trivia game about Romania, an exploration of Romanian cities, and a VR video promoting the application;
- **The Educated Romania project,** embraced by the Romanian government, brings together strategic directives and outlines the vision for higher education aimed at 2030. It encompasses the National Strategic Framework for Education and Training across all tiers, which has received approval from the European Union via the European Commission, to meet the financial commitments of Europe for the years 2021-2027. The overarching aims include: involvement in higher education and continuous learning, global integration of the Romanian education framework, oversight of national policies, independence of universities, doctoral education, and promoting an ethical atmosphere within the education sector. Action and monitoring plans have been developed for the effective implementation of this project;
- **Support for Ukraine** is one of the measures related to the academic years of pandemic (2021-2022; 2022-2023). This includes facilitating academic mobility and providing scholarships to those choosing to study in the Romanian university system. Teaching in Romanian or English, with 525 Ukrainian students enrolled (1436 international students were enrolled at Babeș-Bolyai University, Cluj-Napoca in the 2021-2022 academic year)[3].

[2] file:///C:/Users/dell/Downloads/Reforme%20na%C8%9Bionale%20%C3%AEn%20domiul%20%C3%AEnv%C4%83%C8%9B%C4%83m%C3%A2ntului%20superior%20.pdf
[3] https://www.ubbcluj.ro/ro/infoubb/documente_publice/files/raport-rector/Raportul_Rectorului_2022.pdf?v=23

4. Results

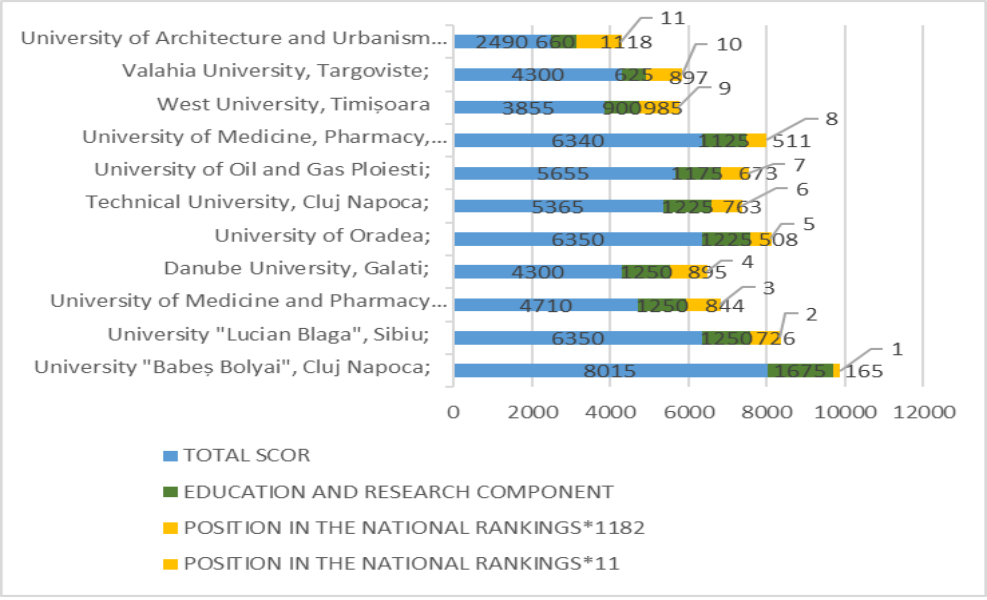
GreenMetric Geopolitical Analysis 2023

At the national level, we can see where the public universities included in the ranking are (see Figures 3 and 4). They are spread over eight counties out of 41 in Romania. The county of Cluj-Napoca is in the ranking with two nationally and internationally recognized universities. The Babeș-Bolyai University of Cluj-Napoca is at the top of the national rankings, with an overall score of 8.015. In the Education/ Research component, it has a score of 1675, which puts it 165th out of 1182 universities worldwide. The Technical University, another university in Cluj-Napoca County, is ranked 6th out of 11 universities nationally and 7th out of 1182 worldwide, with an overall score of 5365 and a score of 1225 for education/research.

The University "Lucian Blaga" in Sibiu holds the second place in the ranking, sitting at 726th out of 1,182 universities, with a total score of 5,355 and 1,250 points in the education and research component. Third is the University of Medicine and Pharmacy "Grigore T. Popa" in Iași, ranked 844th overall, with a total score of 4,710 and the same score of 1,250 in education and research.

The University of the Danube, Galati is in fourth place in the ranking of the 11 national universities. It is ranked 895 out of 1182 universities, with an overall score of 4330 and a score of 1250 for teaching and research. The University of Oradea, the county town of Bihor, is ranked 508 out of 1182 universities, with an overall score of 6350 and a score of 1225 for education/research.

Figure 3. GreenMetric 2023 Romanian university ranking



(source: eventual own elaboration based on data UI Green Metric World University rankings. Welcome to UI Green Metric. Available online at https://greenmetric.ui.ac.id/rankings/ranking-by-region-2023)

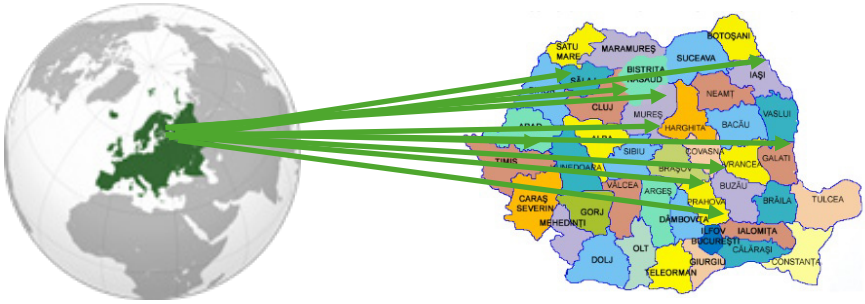
The University of Oil and Gas, Ploiesti, is ranked 673rd out of 1182 universities, with an overall score of 5655 and an education/research component score of 1175. The University of Medicine, Pharmacy, Science and Technology, Targu Mures, is ranked 511 out of 1182 universities, with an overall score of 6340. Valahia University, Targoviste, is ranked ninth. 897 out of 1182 universities, a total score of 4300 for the education/ research component.

The Western University of Timisoara is in 10th place and administratively belongs to Timis County. Administratively part of Timis County, it is ranked 965 out of 1182 universities, with a total score of 3855 and a score of 900 for education/research. The University of Architecture and Urbanism "Ion Mincu", Bucharest, is ranked 1118th out of 1182 universities, with a total score of 2490 and a score of 660 for education/ research.

Cluj is the only county with two universities of national and international prestige because it is a recognized university centre with a high concentration of universities offering a wide range of specializations. This attracts students from other areas of Romania and international students to study in Cluj-Napoca.

Research shows the Romanian economy is still factor-based, but some regions are transforming into innovation-driven economies, e.g. Cluj-Napoca. The ICT sector is leading this transformation, embracing new technologies and adopting innovative practices to improve products and services. These regions are becoming integrated into the global innovation network, fostering collaboration and knowledge sharing. These developments will drive growth and create new opportunities in Romania. This is another reason why Cluj is the only county with two universities in the Green Metric Ranking 2023.

Figure 4. The national geographical position of Romanian universities part of GreenMetric (2023)



(source: own elaboration).

Analysis of the Education/Research component of Romanian universities

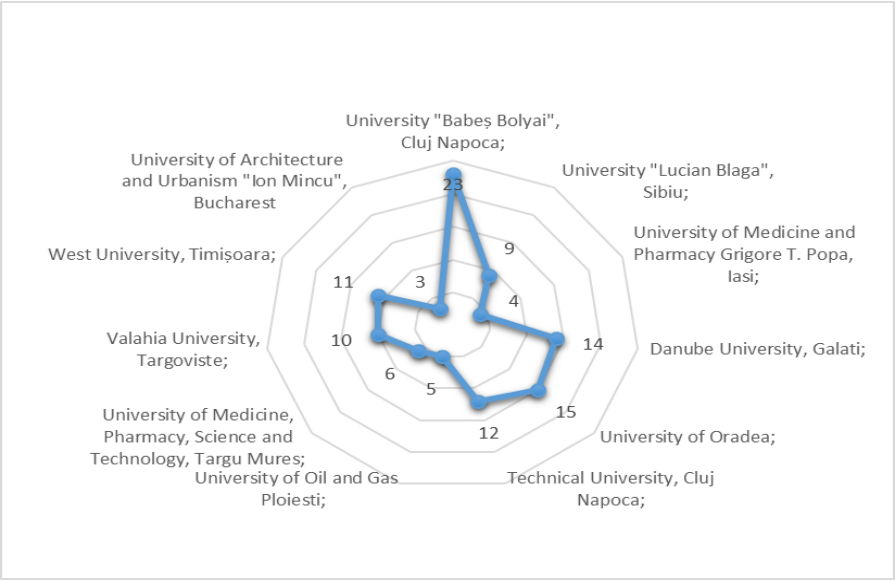
This analysis is based on the achievement of the highest possible cumulative score (according to the classification methodology) for each indicator that makes up the Green Metric Education/Research component (see Table 3).

The figure shows the "Babes-Bolyai" University, Cluj-Napoca (1675) achieving the highest score in the Education/Research component. This means that it has the highest scores for all indicators among the 11 universities that are part of Green Metric 2023. The "Lucian Blaga Sibiu" University, UMF "Grigore T. Popa" and the "Dunărea de

Jos" University, Galati follow at a distance with the same score (1250). The next with a score of 1225 are the Universities of Oradea and the Technical University of Cluj-Napoca.

We analyzed the size of each university to see if the number of faculties influences the implementation of sustainability (alignment with the SDGs, implicitly SDG 4 - quality education).

Figure 5. Dimensions of universities in the Green Metric 2023 Ranking



(source: own elaboration).

5. Discussion

Universities are becoming more sustainable because they are focusing on environmental issues (Brandli et al., 2020; Pires & Pereira, 2023). Reputation, teaching and research are no longer the only things that world-class universities are judged on. Many are also now participating in sustainability rankings. Various studies, mainly in the Global North, have examined university performance on these platforms (Filho et al., 2021; Parvez & Agrawal, 2019). Romania is a leader in adopting a sustainability agenda, but there are few studies on the participation of Romanian universities in sustainability rankings. We investigated how Romanian universities performed on Green Metric 2023, a complex global university sustainability ranking.

The university sector is changing, with new strategic orientations, key values and modes of operation. This has led to restructuring and reorientation. The trend of universities operating like corporations is a concerning issue stemming from reduced government support, the significance of academic rankings, a focus on management practices, and globalization. This shift indicates that universities prioritize their own needs over those of the community, making performance evaluation frameworks critical.

The 17 Sustainable Development Goals from the UN's Agenda 2030 present universities with the chance to generate public value and illustrate their engagement in sustainable growth. It is essential for universities to incorporate the Global Agenda into their core operations, melding the three SD missions into their frameworks and fostering a cultural shift towards objectives beyond financial gain.

While the Green Metrics Ranking is focused on evaluating sustainability concerns, this research aims to clarify the approaches, scope, and geopolitical elements (by nation/area) associated with this emerging ranking, which also aligns with the Sustainable Development Goals.

The minimal involvement of other areas such as Oceania, Africa, and North America can be attributed to the voluntary nature of participation in this ranking, along with insufficient motivation and financial support.

The environment is a pressing issue. It has put universities around the world in a complicated position. They must lead the sustainable development agenda (Pires & Pereira, 2023). Reducing the environmental impact of university activities is essential to achieve university sustainability. International rankings can provide important information. They can help universities assess their individual environmental policies.

The dimensions of an institution play a crucial role in its ranking on the Green Metric 2023 list (refer to Figure 5). Babeș-Bolyai University Cluj-Napoca leads the rankings, featuring 23 departments that provide a variety of specialties and respond to the evolving demands of the local labor market in Cluj-Napoca. This indicates that the scale of the university significantly affects its approach to sustainability. The university's top ranking is due to several factors, including its presence in international and national rankings, which attracts the best students and professors, thus ensuring a high-quality education. The university's focus on innovation, on attracting funds, on developing and training the workforce to meet societal needs, its diverse academic offerings, and the city's attractiveness for students seeking a high-quality, diversified education.

Second is the University of Oradea with 15 faculties. Several factors, such as the diversity of academic programs (social sciences, humanities, engineering, medicine), high degree of Internationalization, the modern infrastructure and facilities, and the strong focus on research, contributed to this university's second place.

Third is the Danube University of Galati with a total of 14 faculties. Several factors, such as the diversity of the university's academic programs (social sciences, humanities, engineering, medicine), the acceleration of partnerships through which the university contributes significantly to the local economy, and the quality of the teaching staff, contributed to this university's third place in the ranking.

The involvement of universities in the UI GreenMetric 2023 ranking has important political consequences: they become key players in implementing environmental and educational policies, helping to achieve national and international sustainability goals (Kiryluk et al., 2024). To be in line with GreenMetric, institutions must use clear strategies, follow the rules of green governance, and work with both central and local authorities (Stoian, et al., 2021). At the same time, performance in the rankings is used as a political and image tool, legitimizing both university leadership and public policies on education and sustainable development (Kiryluk et al., 2024).

6. Conclusions

This study demonstrates that academic institutions are going through a structural change, with sustainability emerging as a key component alongside reputation, teaching, and research. The findings demonstrate that Romanian universities are following the global trend of incorporating the Sustainable Development Goals of the UN, especially SDG 4-Quality Education, into their institutional strategies. Despite positioning itself as a proponent of the sustainability agenda, Romania's universities' overall participation in the UI GreenMetric Ranking 2023 is still low, primarily because of a lack of funding and resources.

The analysis emphasizes that, as demonstrated by Babeș-Bolyai University, University of Oradea, and Danube University of Galaţi, institutional size and program diversity are critical factors in sustainability performance. Academic diversification, internationalization, research capability, modern infrastructure, and responsiveness to labor market demands are all factors that contribute to their high rankings. These results show that universities that are bigger and more diverse have an advantage when it comes to supporting sustainability objectives.

However, the study also highlights the regional and geopolitical differences in GreenMetric participation: Oceania, Africa, and North America are marginally represented, while Asia, Europe, and Latin America are heavily represented. This illustrates the ranking's voluntary nature as well as some regions' dearth of institutional support. Increasing the number of Romanian universities participating in these rankings could improve sustainability's overall integration into higher education policies as well as its visibility and credibility.

The study's final conclusion is that global rankings like GreenMetric are useful resources for evaluating social and environmental responsibility in higher education. Universities can enhance their international standing and make a significant contribution to long-term sustainable development and public value creation by implementing sustainability-based performance evaluation frameworks.

Our research is restricted to the data that is presently accessible on university webpages as of 2024. The way in which websites present information can significantly impact the study findings. We chose to collect the information disseminated by the universities because this is the main information channel considered in other studies. Another limitation of the methodology used in this study is that only data from the 2023 rankings were used. Future studies could consider adding new sources of information and extending the analysis period. This would lead to a more complex presentation and analysis that would involve more sources of information.

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