European Journal of Sustainable Development (2025), **14**, 1, 1-20 ISSN: 2239-5938
Doi: 10.14207/ejsd.2025.v14n1p1

Sustainability and the Circular Economy through the Eyes of Students: A Comparative Analysis among Bulgaria, North Macedonia, Slovenia and Croatia

By Irina Kostadinova[1], Ana Todorova[1], Svilena Ruskova[1], Ana Tomovska Misoska[2], Marina Letonja[3], Marko Tomljanović[4]

ABSTRACT:
Higher education institutions are the catalyst for building tomorrow's leaders who will take responsibility for addressing environmental issues and shaping a more sustainable future. Along with learning the principles of the circular economy and sustainability, students build the skills and knowledge needed to take up leadership positions in a variety of fields, including business, politics and non-governmental organizations.
This article analyzes the understanding of issues of sustainability, circular and green economy through the eyes of business-oriented students from four European countries: Bulgaria, North Macedonia, Slovenia and Croatia. An international team of scientists researches the attitudes and expectations of students from different bachelor's and master's programs with the aim of both improving their knowledge, skills and competencies related to circular and green economy and sustainability, as well as upgrading and enriching educational programs and processes.
The research identified gaps in the educational process along with identified good practices implemented by specific partner organizations. Interrelationships were sought between the final results and the current geopolitical situation of the respective country in the context of its membership or not in the European Union. The study analyzed the content of various disciplines, focusing specifically on research areas such as the circular and green economy and sustainability. The findings aim to enhance curricula in fields like corporate social responsibility, economics, marketing, and related areas.

Keywords: sustainability, circular economy, green economy, education

1. Introduction

The circular economy has become a fundamental paradigm for sustainable development, offering an alternative to the traditional linear *take-make-dispose* model (Marković *et al.* 2023). In this context, exploring and implementing circular economy principles in the early stages of education and entrepreneurship is essential to stimulating economic growth and the transformation to a green economy.

The concept of a circular economy offers an innovative approach to reducing environmental impacts. To make this transition happen, the active participation of various stakeholders, including business and academia, is necessary. Although the role of the

[1]University of Ruse "Angel Kanchev", Bulgaria
[2]University American College Skopje, North Macedonia
[3]DOBA Business School Maribor, Slovenia
[4]University of Rijeka, Croatia

private sector in this process is well known, the importance of higher education is often underestimated. Higher education teachers play a crucial role in preparing future professionals who will contribute to building a more sustainable economy. Existing research shows that effective methods for teaching a circular economy include active forms of learning that stimulate critical thinking and encourage students to seek solutions to existing problems through participation and the use of real-life cases (Kirchherr & Piscicelli 2019).

Rather than simply analyzing existing social, economic and environmental challenges, sustainability education should prepare students and professionals to actively participate in transforming society. Its main goal is to build sustainability competencies and literacy, including communication skills, leadership, management and a holistic approach to problem-solving, as well as the ability to understand the complexity of sustainability through interdisciplinary and critical thinking (Liu *et al.* 2022).

This view is also shared by the participants of the Leaders of the Green Economy (LGE) project – an international scientific team comprising four independent educational institutions: – *University of Ruse Angel Kanchev* (Bulgaria), *University American College Skopje* (North Macedonia), *University of Rijeka* (Croatia), *DOBA Business School Maribor* (Slovenia). The consortium aims to build a sustainable university environment, stimulating the development of the circular economy concept among students of business-oriented specialties by strengthening the links between the entrepreneurial and academic environments and improving digitalization in higher education. Project activities provide an opportunity for students to develop knowledge, skills, and competencies about the circular and green economy and sustainability, which will prepare them for their future jobs and help them build more adaptive and sustainable business models (LGE n.d.).

The regions of Bulgaria, North Macedonia, Croatia and Slovenia, despite their common belonging to the Western Balkans, are distinguished by their specific historical, cultural, economic and political contexts. It is these differences that outline unique challenges for education and the transition to a circular economy in each of these countries. Three of the countries are part of the European Union family, and the third is a candidate member, which in itself predetermines the direction of the adopted and integrated policies of sustainable and green development in each of them. As similar challenges, although to varying degrees affecting the development of individual countries, can be identified: the lack of a coordinated strategy between educational institutions, businesses and governments to promote the circular economy; political instability; insufficient funding for educational programs, research and infrastructure necessary for the transition to a circular economy; low awareness among the general public, businesses and politicians about the principles and benefits of the circular economy; consumption habits based on the linear economy, which are deeply rooted in society and require significant efforts to change. All of this makes it relatively difficult not only to implement the principles of the circular and green economy but also to increase knowledge, skills, and competencies in this direction.

In this sense, one of the tasks of the project is to investigate the attitudes and knowledge of students from different specialties regarding the principles of sustainability and the circular and green economy model. This article examines some of the questions included in the research for the project and adheres to the following structure: 1) a brief literature review of the existing theory in the field of sustainability, the circular and green

economy and the role of educational institutions in the transformation process; 2) the research methodology is defined; 3) the obtained data are presented, analyzed and discussed; 4) relevant summaries and conclusions are synthesized.

2. Theoretical Background

Rapid technological progress and scientific achievements in recent decades have led to exponential growth in production and productivity, stimulating intensive exploitation and depletion of natural resources (Marković *et al.* 2023). However, this uncontrollable economic growth, ignoring the environment and human well-being, is based on the depletion of natural resources and ecological imbalance (Jakovac & Dodić 2024). The transition to the principles of green economy and sustainability – key to addressing these challenges – is becoming increasingly urgent (Mrsik *et al.* 2022).

In the most general sense, the circular economy as a concept involves the reuse, reduction and recycling of materials in production and consumption systems. The World Resources Institute claims that moving to a circular economy could reduce the use of new materials by 32% within 15 years and by 53% by 2050 (Awan & Sroufe 2022). To address the challenges of climate change and biodiversity loss, we need to make a fundamental shift in the way we produce and consume. However, this transition cannot be seen in isolation, as it is closely linked to broader social and economic issues. Inequalities, lack of access to basic resources and the increasing vulnerabilities of different social groups are just some of the challenges that need to be addressed (EUA 2023).

The circular economy itself requires a deep understanding of the infrastructure that supports recycling and remanufacturing. In addition, sustainable innovation, as part of diverse business models, should address increasing positive benefits (Stojanović *et al.* 2021; Mrsik *et al.* 2022), exploiting opportunities, and reducing negative impacts on society and the environment while promoting growth (UN n.d.). As a result, worldwide sustainability and environmental issues increasingly influence business models, decisions and activities of companies in the direction of greener production (Dimitrov & Venelinova 2019; Mrsik *et al.* 2022) and involve management teams at all levels – from top management through the managers of human resources, marketing, logistics, etc. to operational management (Hristova & Stevceska-Srbinovska 2020). This is emerging as a critical feature of the circular economy. Encouraging entrepreneurship has also emerged as an essential component of the economic development of cities, regions, and countries. In recent years, it has been increasingly associated with the construction, successful functioning, and measurement of entrepreneurial ecosystems (Deneva *et al.* 2022; Mrsik *et al.* 2022). Integrating the concepts of circular economy and sustainability is undoubtedly crucial to building a more sustainable and environmentally responsible society (Marković *et al.* 2023). It is for this reason that Ashida (2023) calls on businesses and governments to integrate the Sustainable Development Goals (SDGs) into their strategies to cover a wide range of global challenges, from poverty to climate change.

In the context of growing global challenges, universities are positioning themselves as key centres for the search for sustainable solutions. As institutions bringing together scholars, innovators and representatives of different sectors, they have the potential to play a leading role in overcoming current crises. Through education and

research, universities contribute significantly to achieving the Sustainable Development Goals (Diamadopoulos n.d.; EUA 2023; Todorova *et al.* 2024).

The Circular Economy Alliance (2023) also sees education as a key enabler of the transition to a circular economy, assigning it a leading role in several areas (Table 1). According to the alliance's researchers, education is essential for creating future generations who will work to build a more sustainable society. By integrating the principles of the circular economy into curricula, educational institutions play a crucial role in combating climate change and protecting the environment.

Table 1: The main areas where education should play a leading and active role in the transition to a circular economy are as follows. *Source*: Circular Economy Alliance 2023

Areas	Role
Building fundamental knowledge	At the earliest possible stage, students are introduced to the principles of the circular economy – reduce, reuse and recycle.
Developing critical thinking	Students learn to analyze environmental problems and propose innovative solutions.
Interdisciplinary approach	Education combines different fields of knowledge, such as economics, environmental science and design, to provide a holistic view of the circular economy.
Cultivating responsible citizenship	Students are encouraged to make sustainable choices in their daily lives.
Supporting research and innovation	Universities are exploring new technologies and methods to promote the circular economy.
Building partnerships	Educational institutions are collaborating with businesses, governments, and NGOs to implement circular practices.

Higher education institutions fully meet the goals and priorities set out in the 4th SDG – Quality Education, which calls for inclusive, fair and quality education. At the same time, through innovation in teaching and research and through the active participation of all academic stakeholders (teaching and research staff, but also students), universities must embrace the vision of the SDGs and respond to the problems posed by the 2030 Agenda (Diamadopoulos n.d.).

Universities not only create new knowledge but also play a key role in connecting different scientific fields to develop innovative solutions to the complex problems of modern society. According to recent studies, the future of higher education depends on universities' ability to respond to growing social and environmental challenges by adapting curricula and research. In addition, universities must be active participants in their local communities, demonstrating sustainable practices and promoting social justice (EUA 2023).

With the growing importance of the SDGs, the demand for specialists with deep knowledge in this field is also increasing. As responsible members of society, universities must adapt their curricula to prepare students to work towards these global goals (Ashida 2023). Finally, higher education institutions are faced with the complex task of training specialists to meet the ever-changing demands of the labor market. In the conditions of rapid technological and social transformation, students often prepare for professions that are not yet fully formed (Kirova & Yordanova 2024).

It is evident from the discussion so far that these processes naturally encourage external collaboration and reshape how organizations interact with their networks (Kunev *et al.* 2020). Companies are gradually realizing that they need to change the way they generate value (Stojanović *et al.* 2021) and understand and conduct business to achieve more sustainability and circularity (Awan & Sroufe 2022). However, changing business thinking also requires a shift in societal attitudes, particularly among students who will shape the future public order and entrepreneurial ecosystems of their respective countries. (Kunev *et al.* 2020). Therefore, not only business organizations but also educational organizations should initiate change among a wide range of stakeholders (Todorova *et al.* 2024). It follows, then, that integrating the concepts of sustainability and the circular economy into various disciplines and specialties in higher education is directly related to:

- raising awareness among young people and upgrading their environmental awareness and understanding of the importance of resource efficiency and environmental protection (Kunev *et al.* 2020);
- development of skills adequate to the expectations of the future, in which circular business models will become increasingly important, stimulating innovation and sustainable practices (Pavlov & Ruskova 2023);
- preparation and contribution to the transition to sustainable development and green economy, reducing dependence on exhaustible resources and minimizing waste (Marković *et al.* 2023);
- implementation of a system of incentives for sustainable regional and economic growth, creating new jobs and increasing competitiveness (Dimitrov & Venelinova 2019; Pavlov & Ruskova 2023).

Higher education institutions are encouraged to prepare students for the future by developing "key competencies" such as systems thinking, critical thinking, self-reflection, creativity, entrepreneurship and learning skills. They also include abilities in strategic planning, social responsibility, and effective partnerships in interdisciplinary contexts. Achieving sustainable development requires collaboration across disciplines, as global challenges cannot be solved within a single field of knowledge (Liu *et al.* 2022).

Dash *et al.* (2024) give specific examples of how universities can integrate the SDGs into their curricula through an interdisciplinary approach that demonstrates how different professional fields contribute to sustainable development. Engineering programs can include training related to SDG 7 (affordable and clean energy) by focusing efforts on the design of energy-efficient technologies. Business programs can explore the relationship between corporate responsibility and SDG 8 (decent work and economic growth), by emphasizing ethical labor practices and inclusive economic growth. Humanities, such as linguistics or philosophy, can engage with SDG 5 (gender equality) by analyzing cultural and social influences on gender roles or by discussing human rights and ethics. By integrating the SDGs into various academic programs, students gain a comprehensive understanding of the role of their profession in sustainable development and how they can contribute to social change.

In this sense, the recommendations of the European University Association to universities regarding the integration of sustainability in their curricula can be summarized in two specific steps: 1) performing an in-depth analysis of existing programs and 2) identifying areas for improvement. They can do this by gathering feedback from students,

faculty and external stakeholders. Interdisciplinary programs can then be created to respond to the current challenges of sustainable development. In addition, it is essential to promote international cooperation and develop programs that allow students to participate actively in the learning process (EUA 2023).

The relationship between universities and society is essential to address climate change. Student expectations reflect public interest in these issues and can stimulate universities to develop innovative educational programs. By continuously improving their offerings, universities can prepare graduates to be active participants in the transformation process (Todorova *et al.* 2024). Despite advances in the digitalization and internationalization of education, universities can still do more to promote an interdisciplinary approach. Furthermore, despite the growing awareness of the importance of sustainability, many institutions focus primarily on environmental aspects, neglecting the social and economic dimensions. Moreover, the assessment of knowledge and skills related to sustainability is often reduced to quantitative indicators, such as the number of students enrolled in specialized programs (EUA 2023).

In accordance with the recommendations of the European University Association, the participants in the international LGE Erasmus+ Project set themselves the goal of analyzing the existing programs in four higher education institutions in four regional countries. Through an in-depth study, both the knowledge and expectations of the students, as well as the gaps and advantages in the educational program of each of the four higher educational institutions, are identified. The goal is, through international cooperation and shared knowledge, to improve the educational framework and outline better and more effective opportunities for building circular/green and sustainable competencies among students.

3. Methods

The research methodology is the result of the joint work of an international team of scientists from four educational institutions – the University of Ruse Angel Kanchev (URAK), University American College Skopje (UACS), University of Rijeka (EFRI), and DOBA Business School Maribor (DOBA) – united within the framework of the LGE Erasmus+ project, launched in November 2022 (Misoska *et al.* 2023). The main objectives of the project are (LGE n.d.):

1) A situational analysis of circular economy teaching and learning practices at the university level;

2) Establishing linkages and strengthening collaboration between academia and industry;

3) Creating a digital repository of circular economy knowledge, tools and activities;

4) Enriching the knowledge and skills of the University staff;

5) Empowering students to apply circular and green economy concepts in their future jobs.

The LGE consortium initiated a survey to understand students' knowledge, attitudes, and opinions regarding their readiness to participate in the circular/green economy and their experiences in relation to the teaching and learning process at the university level.

The survey was conducted between *December 2022* and *January 2023* using the Google Forms web application. Each respective institution sends a link to its students. The questionnaire collects data on students' experiences and opinions regarding teaching and learning about the circular/green economy in their respective programs. The following considerations were applied in forming the sample:

- The sample includes a small group of business students from four different countries at four universities, as the study aims to analyze in depth the motivations and attitudes of a specific target group related to business education. The selection of a limited number of participants allows for a more detailed study of the context and details, which would be difficult to achieve with a broader scope.
- The sample's limitations are due to project-resource factors, including time and financial frameworks, which limit the selection to four universities. This allows for in-depth analyses while ensuring the representativeness of participants from different cultural and educational contexts.
- The choice of a limited sample is determined also by the methodological approach of the study, which aims for a qualitative, rather than quantitative, understanding of the phenomena. The comparison between the four universities in different countries provides a unique opportunity to identify similarities and differences in the attitudes of students in business majors, which will serve as a basis for the next phase of the study, but with a broader scope.

The set of research questions in the present study includes eight statements aimed at assessing students' understanding of sustainability and the circular economy. All questions are answered using a 5-point Likert scale ranging from 1 – *Strongly Disagree* to 5 – *Strongly Agree*.

4. Results and discussion

University American College Skopje (N=99): 99 respondents responded to the questionnaire distributed among undergraduate and graduate students. Most of them are bachelor's degree students (75.8%), and nearly a quarter – (24.2%) – have master's degrees. There is a preponderance of male respondents – 58 (58.6%), compared to women – 41 (41.4%).

University of Rijeka (N=125): The study included 125 students from 2 professional fields. Slightly more than half of the respondents, 64 (51.2%), studied in a master's degree/master's study, and the remaining 61 (48.8%) in bachelor's degree/Bachelor's study.

University of Ruse Angel Kanchev (N=105): 105 students from 8 professional fields participated. According to educational level, the respondents were divided into 80 (76.2%) students in bachelor's majors and 25 (23.8%) students in master's programs. According to the demographic criterion of gender, there was a significant preponderance of respondents who indicated female – 80 (76.2%) compared to 25 (23.8%) who chose Male.

DOBA Business School Maribor (N=98): 98 people from 5 bachelor's and 5 master's programs responded to the survey, with 72 (73.5%) of the respondents being students in bachelor's programs and 26 (26.5%) of the respondents being students in master's

programs. Regarding the gender of the respondents – 68 (69.4%) of them are women, and 30 (30.6%) respondents are men.

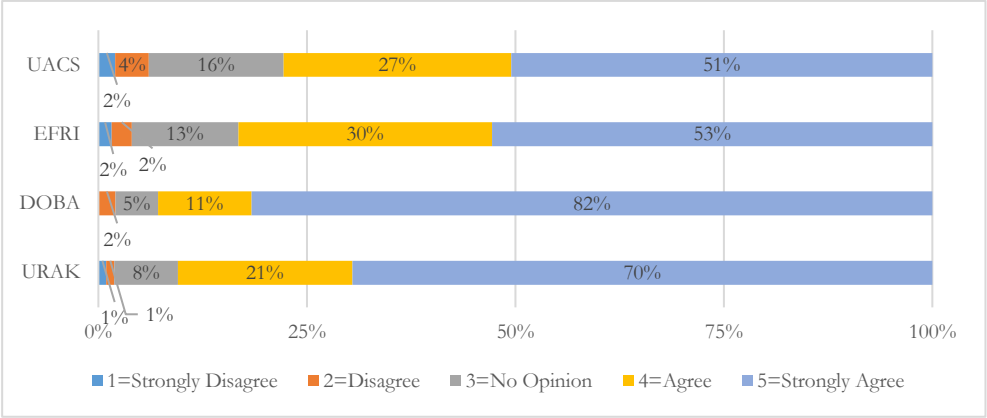

Figure 1: Student responses to the statement: Nature conservation is necessary for sustainable development. Source: Leaders of the Green Economy project, 2022-2023

It can be seen from the data presented in Figure 1 that DOBA students, to the greatest extent, strongly agree with the statement that *Nature conservation is necessary for sustainable development*. – 82% (80), followed by URAK – 70% (73), EFRI – 53% (66) and UACS – 51% (50). Respondents without an expressed opinion are, respectively, the largest share in UACS – 16% (16), followed by EFRI – 13% (16), URAK – 8% (8) and DOBA – 5% (5). The share of students who do not associate nature conservation and sustainability in a general concept is insignificant – UACS – 6% (6), EFRI – 4% (5), URAK – 2% (2) and DOBA – 0% (0). Satisfyingly, the more significant number of students from all four universities express a clear view that the sustainability of society and Earth is not possible without the conservation of the natural diversity around us.

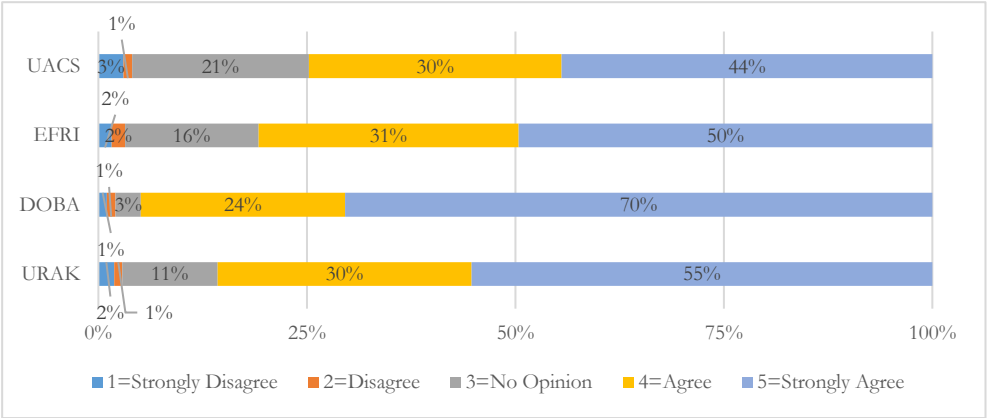

Figure 2: Student responses to the statement: Sustainable development requires a shift towards the usage of renewable natural resources. Source: Leaders of the Green Economy project, 2022-2023

According to 94% (93) of DOBA *Sustainable development requires a shift towards the usage of renewable natural resources* (Figure 2) – 70% (69) strongly agree with the statement, and 24% (24) – rather agree. The respondents from the other universities also strongly support the statement, as 85% (90) from URAK agree and strongly agree, EFRI – 81% (104) and UACS – 74% (74). The share of students without a clear position on the formulated statement is highest at UACS – 21% (21), followed by EFRI – 16% (20) and URAK – 11% (12). This indicator is the lowest among DOBA students, 3% (3). The arrangement of the disagreeing and categorically disagreeing respondents is similar: UACS – 4% (4), followed by EFRI – 4% (4), URAK – 3% (3) and DOBA 2% (2).

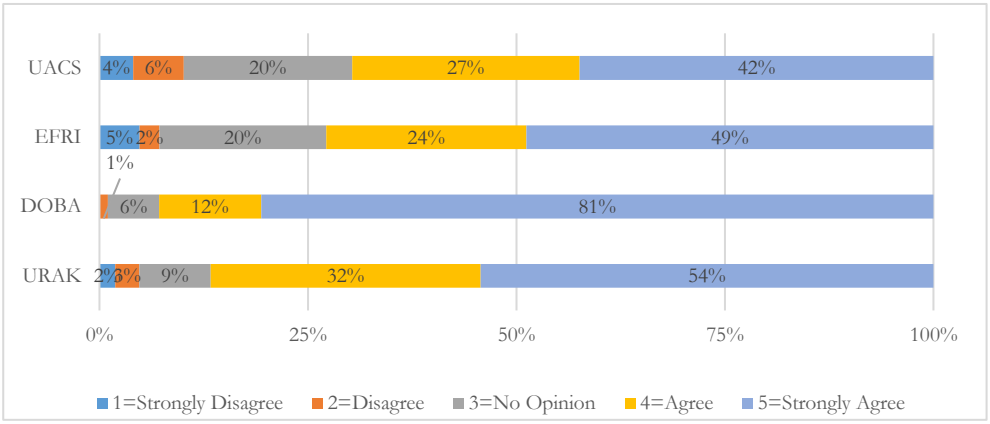

Figure 3: Student responses to the statement: The production companies have to strive towards reducing material usage, being less resource-intensive, and using as much waste as possible to create new materials. Source: Leaders of the Green Economy project, 2022-2023

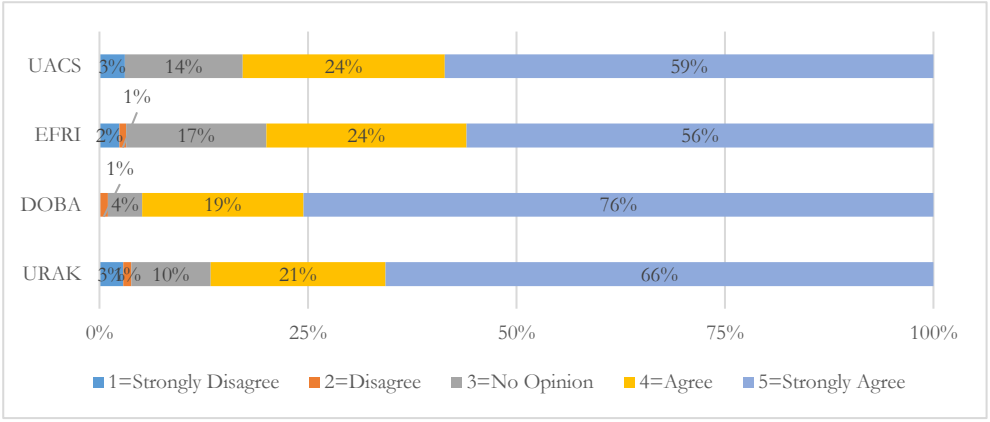

Figure 4: Student responses to the statement: The products have to be recycled, repaired, or reused rather than thrown away, and the waste from one process has to become an input into other processes. Source: Leaders of the Green Economy project, 2022-2023

In the data generated for the following statement (Figure 3) – *The production companies have to strive towards reducing material usage, being less resource-intensive, and using as much waste as possible to create new materials*. – again, the most definite are the DOBA students, of which 93% (91) agree to varying degrees. In the second place, according to the relative share of those who answered positively, are the respondents from URAK – 86% (91), followed by EFRI – 73% (91) and UACS – 66% (66). As stated in the literature review, the circular economy removes valuable materials from waste streams by prioritizing the reuse and repair of products and creating restorative industrial systems. Therefore, students' understanding of this problem is fundamental. The data show that a fifth of the respondents from the UACS – 20% (20) and EFRI – 20% (25) do not have an expressed position on this vital issue for sustainability and the circular economy – the reduction of waste and used resources. At the remaining two universities, significantly lower results are observed – 9% (9) from URAK and 6% (6) from DOBA chose the answer "I have no opinion". 10% (10) – UACS, 7% (9) – EFRI, 5% (5) – URAK and 1% (1) of DOBA are respectively those who disagree and strongly disagree.

On another critical issue for the circular economy – *The products have to be recycled, repaired, or reused rather than thrown away, and the waste from one process has to become an input into other processes*, the students involved in the research demonstrated results similar to the previous questions (Figure 4). The respondents from DOBA – 95% (93), followed by URAK – 87% (91), UACS – 83% (82), and EFRI – 80% (100) are the most agree and strongly agree with the statement. Students without an expressed opinion are respectively 17% (21) – EFRI, 14% (14) – UACS, 10% (10) – URAK, and 4% (4) – DOBA. In the results of those who disagreed and those who strongly disagreed, there were no significant discrepancies with the statements already analyzed: 4% (4) – URAK, 3% (4) – EFRI, 3% (3) – UACS and 1% (1) from DOBA.

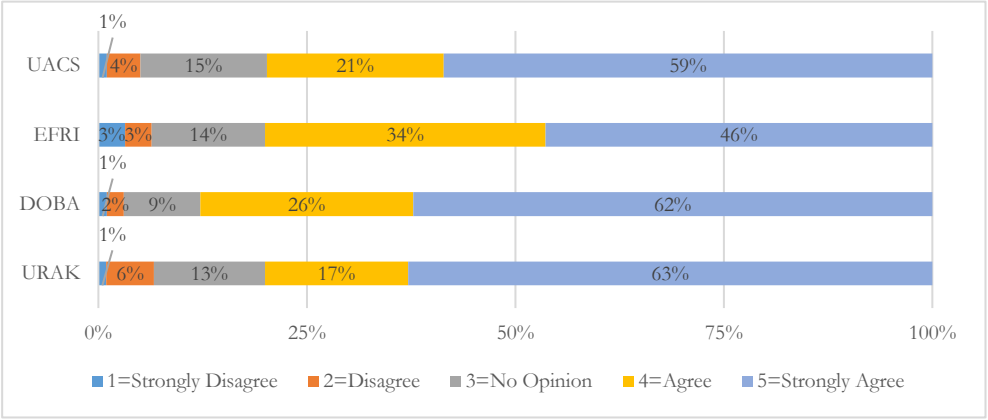

Figure 5: Student responses to the statement: Organizations should incorporate a circular economy mindset into their business models to get a sustainable world. Source: Leaders of the Green Economy project, 2022-2023

The next statement reflects whether, according to the students, *there is a relationship between the implementation of circular economy principles in organizations and the achievement of a more*

sustainable world (Figure 5). This opinion is most significantly and to varying degrees supported by DOBA students – 89% (88). In comparison, only 2% (2) of university students disagree. 8% (8) have no opinion. A significant share of students at URAK also agree to varying degrees – 83% (87), a smaller percentage – 4% (4) disagree and strongly disagree, 13% (14) have no opinion. Respondents from EFRI and UACS demonstrate similar positions – 79% (99), respectively, for the first, and 77% (76) for the second, to varying degrees express agreement with the statement. Disagree and strongly disagree respondents from the two universities are respectively 6% (7) and 4% (4), and without a clearly expressed position – 15% (14) and 18% (18).

Respondents from the four universities also show relatively similar results regarding the following statement from the questionnaire: *We need stricter laws and regulations to protect the environment* (Figure 6). A similar share – 80% of the students from UACS (79), EFRI (100), and URAK (84) agree to varying degrees and support the opinion. With DOBA, the share of those who agree and strongly agree is again the highest – 88% (86). 3% (3) of students in DOBA, 5% (5) UACS, 6% (8) EFRI and 7% (7) of URAK are of the opposite opinion, and 9% (9) – DOBA, 13 % (14) URAK, 14% (17) EFRI and 15% (15) UACS.

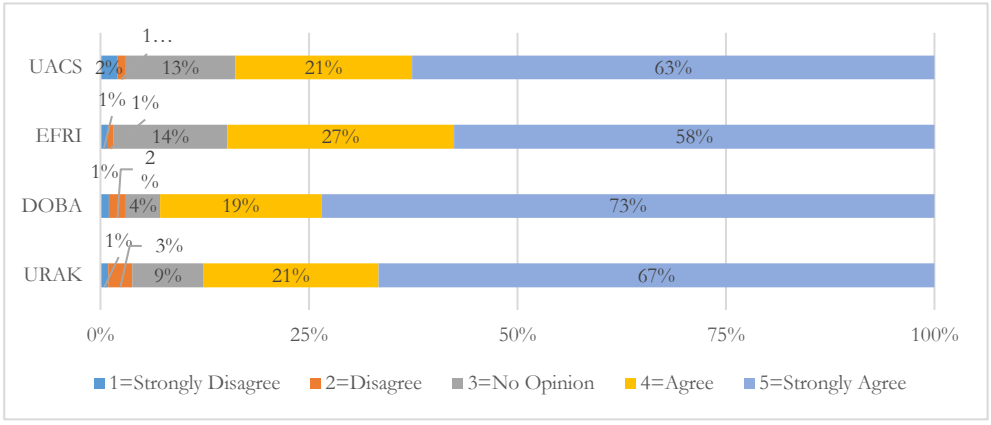

Figure 6: Student responses to the statement: We need stricter laws and regulations to protect the environment. Source: Leaders of the Green Economy project, 2022-2023

The statement that *Everyone should have the opportunity to acquire the knowledge and values necessary for sustainable living* also finds significant confirmation among students (Figure 7): 92% (91) – DOBA, 88% (92) – URAK, 85% (106) – EFRI and 84% (83) – UACS agree or strongly agree with the formulated question. 3% (3) – DOBA, 4% (4) – URAK, 2% (2) – EFRI and 3% (3) – UACS are of the opposite opinion, respectively disagree and strongly disagree. 4% (4) – DOBA, 9% (9) – URAK, 13% (13) – UACS and 14% (17) – EFRI remain without opinion. This question and the responses generated primarily reflect the respondents' desire for more information on circular economy issues. Proactivity on the part of the students is of utmost importance for the formation of values postulating a life in accordance with sustainability and the protection of nature, and above all, values in accordance with the leading maxim of sustainable development, namely that "*meeting the*

needs of the present without compromising the ability of future generations to meet their own needs" (UN n.d.).

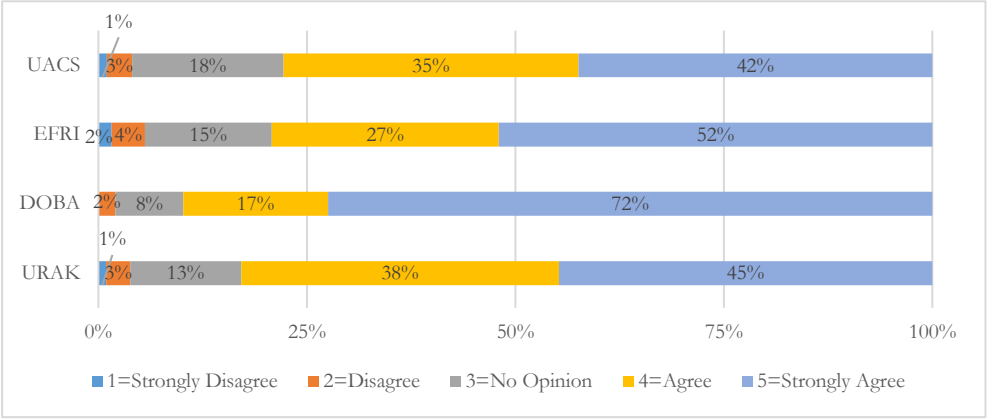

Figure 7: Student responses to the statement: Everyone should have the opportunity to acquire the knowledge and values necessary for sustainable living. Source: Leaders of the Green Economy project, 2022-2023

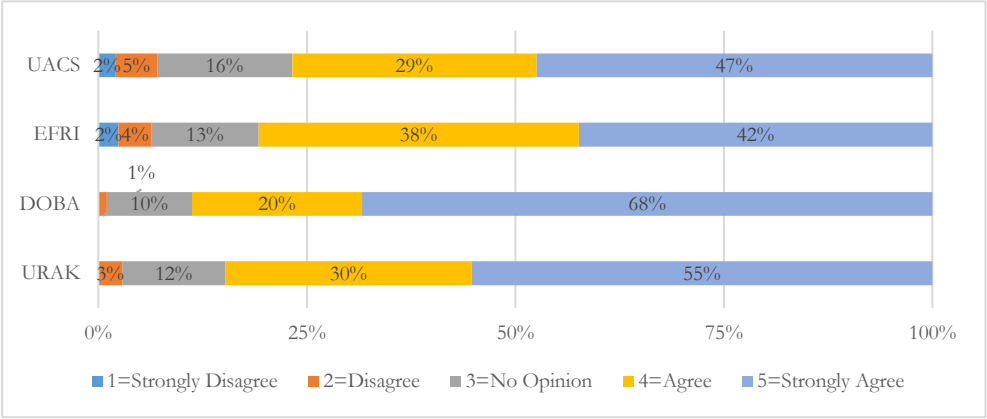

Figure 8: Student responses to the statement: We need more people ready to challenge the status quo and present a plan to shift the world. Source: Leaders of the Green Economy project, 2022-2023

The last statement in the questionnaire examines *the personality of people who would be a potential driver of the transformation towards sustainability and a green economy*. A significant share of students, 88% (87) – DOBA, 85% (89) – URAK, 80% (101) – EFRI and 76% (76) from UACS, believe that *we need more people ready to challenge the status quo and present a plan to shift the world*. From URAK and DOBA, there are no unequivocally disagreed with the statement, and the results of those who disagree are 1% (1) for DOBA and 3% (3) for URAK, respectively. 2% of both EFRI (3) and UACS (2) categorically disagree with the statement, and 4% (5) and 5% (5) disagree, respectively. The share of respondents without

a definite position continues to demonstrate stable results – 10% (10) for DOBA, 12% (13) for URAK, 13% (16) for EFRI and 16% (13) for UACS. The students' answers regarding the last statement (Figure 8) show that the respondents are convinced that sustainable transformation can be realized by individuals with a vision, ready to leave comfort behind, and purposefully fighting for a positive transformation of business and life.

Overall, the study and the comparison of the results demonstrate positive attitudes and a desire for real change among students from the four nationalities studied. It is, therefore, the responsibility of higher education institutions and academic staff to transform this enthusiasm into opportunities for fundamental green transformation. This involves, for example, developing curricula that include practical tasks related to sustainable development, such as creating green campus initiatives, installing energy-saving technologies or designing sustainable solutions in local communities. Ways should also be sought to encourage students to organize green clubs, campaigns or events that raise awareness and create measurable results, such as recycling, reducing waste or planting trees. In addition, it is vital to establish collaborations between universities and companies or local organizations to implement sustainable projects in which students can actively participate. The latter should lead to the provision of internships and career opportunities in companies and organizations oriented towards the green economy, renewable energy, circular economy and ecological entrepreneurship.

Part of the *Leaders of the Green Economy* project's activities included participation in green schools on the campuses of some of the partner schools. This encouraged creative thinking, leadership, and collaboration among students despite the unfamiliar environment and transnational participants. Despite the challenges and stepping outside their comfort zone in their own country, the students worked together to solve significant problems faced by international companies that participated in the project with current business cases. Other options to encourage enthusiasm and direct students' efforts in the right, sustainable direction would be:

- Providing scholarships, grants or awards to students who create innovative sustainable solutions or implement significant green projects.
- Integrating the topic of sustainability into courses in all fields – from engineering and economics to the arts and social sciences – so that students understand how they can contribute to a green future from the perspective of their major.
- Providing leadership and project management training opportunities so that students can effectively lead green initiatives.
- Creating incubators for green start-ups and supporting students in developing sustainable business ideas that can be put into practice.
- Organizing hackathons, competitions, conferences, green schools, workshops and discussions that bring together students, teachers and experts to exchange ideas and inspire action in the field of sustainability.
- Project-based learning that require students to apply theoretical knowledge in practice.

The summary of the answers to the eight formulated statements shows that the students from Slovenia (DOBA) are the most stable in their position. University

respondents overwhelmingly agree and demonstrate an understanding of critical topics directly related to sustainability and circular economy issues. They are followed by students from Bulgaria (URAK), Croatia (EFRI) and North Macedonia (UACS). In some of the statements, there are significant differences – in the order of 10% to 15% between the results of the four universities. The reasons for this can be sought in various directions, but an attempt will be made to analyze the most visible ones.

Three of the countries participating in the consortium are part of the European Union (EU), and the fourth is a candidate member: Slovenia has been an EU member state since 2004, Bulgaria since 2007, Croatia since 2013, and North Macedonia is a candidate member. Coincidentally or not, this "ranking" is also consistent with the results of the study.

As a possible explanation, the active policies of the EU in the direction of sustainability, green business and circular economy can be pointed out. Although with different intensity, these policies invariably become part of the internal legislation and regulations of the respective member countries of the union. They invariably influence the business climate, educational programs, and citizen attitudes. Therefore, it is understandable that the transformations in general policies also lead to changes in the understanding of students in the respective countries and universities.

At the same time, the results of the recent report on Sustainable Development in Europe 2023/24 (5th edition), providing an independent quantitative assessment of the progress of the European Union, its Member States and partner countries towards the SDGs, do not support this conclusion (SDSN Europe n.d.). Countries in the report are ranked by their overall score, which measures their progress towards achieving all 17 of the UN's SDGs. The overall score is defined as the percentage of SDG achievement, and a score of 100 indicates that all SDGs have been achieved. According to the results for 2023/24, the best performing among the countries participating in the Leaders of the Green Economy project is Slovenia with a score of 73.74, followed by Croatia with 69.96, North Macedonia – 62.19, and Bulgaria – 59.48. Visibly with the lowest index is Bulgaria – chronologically the second country in a row (from the consortium) admitted to the EU. This shows that a significant correlation should not be assumed only between the membership of a country in the EU and the achievement of sustainability in its policies and practices. Still, connections should be sought in other directions as well.

In addition, this ranking also reflects another problem – students from Bulgaria demonstrate a high level of knowledge regarding the principles and issues of sustainability and the circular economy, but the country is not satisfactorily dealing with the implementation of the SDGs. Therefore, it is not enough in itself for higher educational institutions in the respective countries to fulfil their commitment and educate the next generations on sustainable and green business thinking. Active policy by the government and the governing bodies of the specific country, as well as support from the civil sector and society, is needed to stimulate an environment conducive to the deployment of circular and sustainable business initiatives.

A significant prerequisite for the results obtained in the study can be found in the curricula of the higher educational institutions participating in the project (Misoska *et al.* 2023). DOBA lists 19 courses that cover one or more of the target topics: sustainability (17), the green economy (7) and the circular economy (7). Apparently, sustainability topics,

including Corporate Social Responsibility (CSR), are strongly represented in the curriculum. This, as the DOBA team points out, is in line with their vision to be an agent of change in the field of innovative learning, the development of modern knowledge and research for sustainable growth. The team also notes that there are still gaps in the green and circular economy, especially in programs other than Smart City Management. At the same time, as an advantage, they point out that they have included local examples of already integrated sustainability principles in their teaching materials.

URAK identified five academic disciplines whose content aligns with sustainability and the circular economy: Corporate Social Responsibility, Design Management, Planning and Forecasting, Fundamentals of Management and Social Entrepreneurship. The courses Corporate Social Responsibility (CSR) and Design Management stand out in terms of the most significant number of topics. The purpose of the CSR course is for students to acquire knowledge and skills for applying the methodology and tools for improving the organizational approach, corporate planning and eco-efficient quality management in building socially responsible and socially oriented businesses. The Design Management discipline is intended for bachelors who are specialists in applied industrial design. The main focus of the course is an introduction to the principles of the circular economy and the place of industrial design of products and industrial services in sustainable development. A significant shortcoming of URAK is that the educational materials do not provide students with the opportunity to study and discuss examples of local organizations.

EFRI has identified 25 courses covering topics on sustainability, green and circular economy. Of these, 10 are the courses conducted by the members of the project team and examining the researched thematic areas – sustainability (18), green economy (15) and circular economy (13). Most of them are related to the EU and specific micro and macro policies. This approach within the EFRI curricula is mainly motivated by the contemporary EU approach, in which the concepts of sustainable development, green and circular economy and other aspects are integrated into all policies. Within the selected courses, the most important topics are integrated through lectures on the EU Budget, EU Development Strategies with a particular focus on the European Green Deal, as well as all aspects of agriculture, industry and entrepreneurship in the EU. EFRI is also the university whose students have the most incredible opportunity to study local good practices, as such examples are included in the educational material.

UACS indicates a total of 8 disciplines offering students a basis for developing knowledge and skills related to sustainability: Entrepreneurship, Organizational Behaviour, Corporate Finance, Business Planning and Strategy, Business Ethics, Business Law, Contract Law, Introduction to Marketing, Principles of Project Management and Operations Management. However, the university notes that very few topics related to the green and circular economy are included in the curricula. Only Business Ethics and Entrepreneurship contain topics related to the circular economy. Even in these cases, students spend relatively few hours studying them. Like URAK, UACS students rarely have the opportunity to learn about the green and circular economy from local examples.

This current situation in Bulgaria and North Macedonia regarding the implementation of the 17 SDGs gives students who enter the workforce or start their own

businesses the opportunity to change existing models. This enables them to become agents of change or, at the very least, to act as accelerators in the process.

It is evident from the programs provided by the higher educational institutions themselves that it is not the number of disciplines but their content that affects the attitudes and knowledge of the students themselves. DOBA identifies a total of 19 disciplines, of which almost 90% advocate sustainability topics. At URAK, the key disciplines are 2, but they are closely profiled in the field of corporate social responsibility and sustainable production. EFRI has the most significant number of courses correlating with the leading research topics, with a strong emphasis on EU policies. Although the UACS indicates 8 disciplines affecting sustainability and the circular economy to varying degrees, the team admits that these topics are too little represented and discussed in the educational material.

Theoretical and practical implications

The results of the research provide a better and more complete understanding of the students' knowledge of a critical problem for our society – sustainability. This knowledge will enable the improvement of educational processes and programs, incorporating local examples into the academic content of certain universities. The best practices identified among partners will enhance existing educational content, making it more relevant to contemporary needs and aligned with students' expectations.

At the same time, understanding the level of student knowledge regarding the principles of the circular economy and sustainability within the university is essential for several reasons. On the one hand, it fosters critical thinking and problem-solving skills. Students learn to analyze complex systems, identify sustainable solutions, and apply their knowledge to real-world situations. These skills are valuable not only in addressing environmental issues but also across various fields, including business, engineering, politics, and more. Therefore, students will be much better prepared for the labor market and to face the challenges of the workplace.

On the other hand, by discussing and analyzing the principles of circular economy and sustainability, students develop a deeper understanding of the interrelationship between the environment, society, and the economy. This heightened awareness is likely to inspire them to adopt more sustainable lifestyles and take action to protect the environment.

The results will enable universities to re-design their curricula, placing a stronger emphasis on environmental thinking and the principles of the circular economy. This will improve the preparation of future specialists to cope successfully with the challenges of the modern labour market. The study will complement existing knowledge in the fields of corporate social responsibility and sustainable development.

In addition, the present study was carried out at an early stage and was the first one implemented within the project. Potential changes that have occurred both in the educational programs of the partner higher education institutions and the attitudes and competencies of the students are to be identified as a result of the various activities implemented within the project, including conducting seminars with teachers on the creation of digital resources, organizing camps in Rijeka (Croatia) and Skopje (North Macedonia), implementing virtual and hybrid student exchange programs, as well as

distributing educational programs. In the context of the curricula, a "White Paper" was prepared, which includes an analysis of the current situation and proposals for improvement in teaching and learning related to the circular economy. As a critical result, digital materials in the form of case studies were developed, which will be used in university education for future development.

Limitations and future research

Firstly, the research does not offer a satisfactory explanation of the causal relationships between university education and the survey results. Future researchers are encouraged to analyze these correlations further, considering factors such as EU membership, local examples included in educational content, the number of relevant disciplines, and other contextual influences.

The second limitation concerns the generalizability of the findings. The Leaders of the Green Economy project, within which the survey of students' experiences and opinions was conducted, involved four countries but was limited to four higher educational institutions and a small sample of students. This suggests exercising caution when summarizing and generalizing the results and their underlying causes.

The anonymity of the questionnaires prevents follow-up discussions with each student to understand the reasons behind their answers. This is particularly relevant for those who disagreed or strongly disagreed with the statements, expressing a reluctance to engage in the circular economy. Understanding their potential concerns would be a valuable starting point for developing an educational approach to enhancing students' confidence and willingness to participate in the circular economy.

Since this study focused primarily on business students, the results may not fully represent the perceptions and knowledge of students from other disciplines regarding sustainable development. Nevertheless, the data gathered provide a valuable foundation for further research that could encompass a broader range of students and academic fields. The goal of the LGE project is to enhance education in sustainable development by focusing on disciplines directly related to this topic. In the universities analyzed, these disciplines are primarily business-oriented.

Additionally, this study did not examine correlations between students' attitudes towards the circular economy and demographic characteristics such as the age and gender of the respondents. The next phase of the project will search for and examine such relationships, and the information will provide valuable feedback on whether and how different demographic groups perceive the principles of sustainability and the circular economy. These analyses could reveal whether targeted educational strategies tailored to the needs and characteristics of certain groups are needed to stimulate greater engagement and understanding of sustainable practices. In that way, the project research would contribute to the development of more effective and personalized approaches in education for sustainable development.

The limitations identified here provide a solid basis for future international studies and collaboration supporting a more engaged society and fostering a greener future generation of European entrepreneurs.

5. Conclusion

Today, the world faces numerous environmental challenges, including climate change, resource depletion, and pollution. The circular and green economies, along with sustainability principles, provide a framework for addressing these issues and building a more sustainable future. This research emphasizes the importance of integrating circular economy concepts early in the educational process to foster sustainable economic growth by uniting environmental, social, and economic benefits. University graduates equipped with knowledge in these areas will be more competitive in the labor market, as an increasing number of companies seek employees who understand and can implement sustainability principles.

Additionally, universities play a crucial role in preparing future leaders who will be responsible for tackling environmental challenges and building a more sustainable future. By studying the principles of the circular economy and sustainability, students acquire the skills and knowledge needed to assume leadership roles in various sectors, including business, politics, and non-governmental organizations.

It is important to emphasize that the goal of both the research and the Leaders of the Green Economy project, within which the student survey was conducted, is not to create competition between countries or higher educational institutions but rather to build bridges and facilitate the exchange of best practices. This includes introducing local examples of organizations that have embraced sustainability and green economy principles and refining academic disciplines to a smaller, more focused number. Implementing EU policies at the local level and putting them into practice also supports the transformation of civic and business mindsets toward a more sustainable and greener future for all stakeholders.

In addition, this study highlights the critical role of institutional and societal support in transforming students who have graduated from sustainability-related majors into active participants in the green transition. Despite the progress made, significant gaps still exist that require further research. Future studies could focus on the long-term effects of different types of support, the role of cultural and social factors, and the development of tools to measure the impact of sustainability education initiatives.

The study's results clearly show that closer collaboration between academia, government, and industry is needed to achieve a large-scale shift towards a more sustainable future. The authors recommend the development of national and international strategies for sustainable education that provide the necessary resources and support for universities and colleges. In addition, it is essential to create incentives for businesses that encourage investment in innovation and green technologies developed by young professionals.

In conclusion, universities can contribute to a more sustainable, just, and prosperous future by providing education that aligns with real-world challenges. Learning the principles of the circular economy and the sustainability at university level is essential not only for preparing students for their future careers but also for fostering a better society for all.

Acknowledgment: This study is financed by the European Union-NextGenerationEU, through the National Recovery and Resilience Plan of the Republic of Bulgaria, project №BG-RRP-2.013-0001-C01.

References

Ashida, A. (2023). The Role of Higher Education in Achieving the Sustainable Development Goals. In: Urata, S., Kuroda, K., Tonegawa, Y. (eds) *Sustainable Development Disciplines for Humanity. Sustainable Development Goals Series*. Springer, Singapore. DOI: 10.1007/978-981-19-4859-6_5.

Awan, U., & Sroufe, R. (2022). Sustainability in the Circular Economy: Insights and Dynamics of Designing Circular Business Models. *Appl. Sci.* 2022, 12, 1521. DOI: 10.3390/app12031521.

Circular Economy Alliance (2023). *The Role of Education in Promoting Circular Thinking*. Online: https://circulareconomyalliance.com/cea-blogs/the-role-of-education-in-promoting-circular-thinking/ Accessed 17 October 2024.

Dash, S., Rao, G., & Kumar, P. (2024). *Embedding the SDGs into curricula via an interdisciplinary approach*. Times Higher Education. Online: https://www.timeshighereducation.com/campus/embedding-sdgs-curricula-interdisciplinary-approach Accessed 17 October 2024.

Deneva, A, Hristova, V., Pavlov, D., Blazheva, V., Kostov, I., Angelova, D., & Petrova, M. (2022). The Geographical Location as a Limitation for Starting Entrepreneurial Initiatives and Career Development. *European Journal of Sustainable Development*, 11 (3), 124-136, DOI: 10.14207/ejsd.2022.v11n3p124.

Diamadopoulos, E. (n.d.). *What is the role of universities in fulfilling the United Nations Sustainable Development Goals?* Online: https://www.eurecapro.eu/what-is-the-role-of-universities-in-fulfilling-the-united-nations-sustainable-development-goals/ Accessed 17 October 2024.

Dimitrov, M., & Venelinova, N. (2019). Smart, Secure and Safe Energy Management Approach – An Education Framework Improving the Competence Grid of the Professionals in the Energy Sector. *25th International conference knowledge-based organization*, 25 (1) 213-218, DOI: 10.2478/kbo-2019-0034.

EUA (2023). *A Green Deal Roadmap for Universities. European University Association*. Online: https://www.eua.eu/downloads/publications/eua%20green%20deal%20roadmap.pdf Accessed 17 October 2024.

Hristova, S., & Stevceska-Srbinovska, D. (2020). Green HRM in pursuit of sustainable competitive advantage. *University American College Skopje*, Skopje, 53-63, DOI: 10.5281/zenodo.4393537.

Jakovac, P., & Dodić, A. (2024). Zelena ekonomija i održivi razvoj u hrvatskoj: koncepti, strategije i financiranje – jesmo li? *Deset godina Republike Hrvatske kao članice EU: stanje I perspektive? Ekonomski fakultet Sveučilišta u Rijeci*. https://bit.ly/3AkXiAe Accessed 17 October 2024.

Kirchherr, J., & Piscicelli, L. (2019). Towards an Education for the Circular Economy (ECE): Five Teaching Principles and a Case Study. *Resources, Conservation and Recycling*, 150, 104406. DOI: 10.1016/j.resconrec.2019.104406.

Kirova, M., & Yordanova, D. (2024). Training of Personnel for Industry 5.0 through University Clubs Following the Example of the University of Ruse. *Strategies of educational and scientific policy*, 3s, 61-71, DOI: 10.53656/str2024-3s-6-tra.

Kunev, S., Fleaca, B., Antonova, D., & Dráb, R. (2020). Fostering the innovative university student-centred learning by application of ICT tools together with stakeholders: a project methodology overview. *7th International Conference on Energy Efficiency and Agricultural Engineering* (EE&AE), Ruse, 2020, 1-4, DOI: 10.1109/EEAE49144.2020.9279026.

Liu, J., Watabe, Y., & Goto, T. (2022). Integrating sustainability themes for enhancing interdisciplinarity: A case study of a comprehensive research university in Japan. *Asia Pacific Education Review*, 23 (4), 695. DOI: 10.1007/s12564-022-09788-z.

LGE (n.d.). *Leaders of the Green Economy Erasmus official website*. Online: https://sites.google.com/view/leadersofthegreeneconomy/ Accessed 17 October 2024.

Marković, M., Popović, Z., & Marjanović, I. (2023). Towards a circular economy: Evaluation of wastemanagement performance in European union countries. *Serbian Journal of Management*, 18 (1), 45–57. https://aseestant.ceon.rs/index.php/sjm/article/view/40073/22704 Accessed 17 October 2024.

Misoska, A. *et al.* (2023). *Learning about Circular Economy: Report from the curriculum mapping and student survey*. University American College Skopje, ISBN: 978-608-4607-60-1. Online: https://bit.ly/454zv2G Accessed 17 October 2024.

Mrsik, J., Srbinoska, D., Bundaleska, E., & Bezhanoska, M. (2022). Sustainability reporting in the telecommunications sector: A comparative study. *Journal of Entrepreneurship & Innovation* (JEI), Issue 14, Year XIV. https://jei.uni-ruse.bg/Issue-2022/Mrsik-JEI-article-2022.pdf Accessed 17 October 2024.

Pavlov, D., & Ruskova, S. (2023). The Role of Entrepreneurial Universitiesin Supporting Intergenerational Family Businesses. *International Journal of Euro-Mediterranean Studies*, 16 (1), 51-72, https://ijems.emuni.si/index.php/home/issue/view/16-1/16-1 Accessed 17 October 2024.

SDSN Europe (n.d.). *Rankings: The overall performance of European countries. Europe Sustainable Development Report* Online: https://eu-dashboards.sdgindex.org/rankings Accessed 17 October 2024.

Stojanović, A., Mihajlović, I., Safronova, N., Kunev, S., Schulte, P. (2021). The multi-criteria analysis of corporate social responsibility: A comparative study of Russia, Bulgaria and Serbia. *Journal of Management & Organization*, Published online by Cambridge University Press: 12 January 2021, 1-21, DOI: 10.1017/jmo.2020.40.

Todorova, A., Kostadinova, I., & Stevcevska Srbinoska, D. (2024). Student Attitudes towards the Circular Economy: A Comparison between Bulgaria and North Macedonia. *Proceedings of the International Conference on Economics and Social Sciences*, 6 (1), 392-401, DOI: 10.24818/icess/2024/039.

UN (n.d.). *Sustainability, United Nations*. Online: https://www.un.org/en/academic-impact/sustainability Accessed 17 October 2024.