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- Monitoring Minority Rights: Twenty-five Years of Implementation of the Framework Convention for the Protection of National Minorities
- Governance of Environmental Challenges in Post-Pandemic Era



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Governance of Environmental Challenges in Post-Pandemic Era discusses major changes in governance caused by recent turmoil due to the pandemic. The pandemic crisis was turbulent with high levels of uncertainties making planning and coordination hard to perform. Since a turbulent environment continues to exist after the pandemic, countries have to deal with them in the coming period, which makes the collection of papers relevant and useful.

Prof. Aleksandar Jovović

The authors of the collection of papers used quantitative and qualitative research methods that resulted in firm conclusions. The issue of “new governance” in a turbulent environment characterized by uncertainty and high volatility will be even more relevant in the coming period, which is marked as an era of “polycrisis”. The publication would be useful to both scientists and policymakers since the topics explored are scientifically relevant and contemporary.

Prof. Željko Požega

The results of the scientific research presented in the publication can serve as a guide for policymakers in their efforts to improve the governance of sustainable development. The authors' recommendations provide a significant contribution to the design of regulations required for sustainable development. The publication is focused on topics that are scientifically based, innovative and internationally relevant.

Prof. Marija Topuzovska Latkovikj



EDITORS: PREDRAG JOVANOVIĆ, NATAŠA DRVENKAR, BOJANA NAUMOVSKA

## GOVERNANCE OF ENVIRONMENTAL CHALLENGES IN POST-PANDEMIC ERA

The collection of papers Governance of Environmental Challenges in Post-Pandemic Era deals with changes in governance caused by new conditions created in the pandemic era. Post-pandemic recovery period was marked by the emergence of new types of crises, such as the war in Ukraine and in the Middle East. To have successful environmental and more broadly sustainable development policies, countries need to adapt their governance models to the “new reality” marked by sudden pattern changes, high variability and unpredictability. The publication is divided into nine chapters. The authors of the papers analyze modern governance challenges and responses comprehensively, including both vertical and horizontal (sectorial) perspectives. In a constantly and rapidly changing environment where the only certainty is uncertainty, the publication provides a new and fresh perspective on governance in turbulent, post-pandemic conditions. It could be useful to scientists as a basis for further research of “polycrisis” circumstances as well as to policy-makers in designing new, more appropriate and more efficient governance models.

*Predrag Jovanović  
Nataša Drvenkar  
Bojana Naumovska*

GOVERNANCE OF ENVIRONMENTAL CHALLENGES  
IN POST-PANDEMIC ERA

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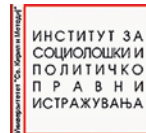
# GOVERNANCE OF ENVIRONMENTAL CHALLENGES IN POST-PANDEMIC ERA

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Predrag Jovanović

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## Foreword

The issue of governance has become crucial during the past few years. In the pandemic recovery phase, the world was faced with new crises such as the wars in Ukraine and the Middle East. The conflicts have generated political risks in the European countries involved in the Ukraine war, as well as in those with notable Muslim minorities. Moreover, economic conditions have deteriorated due to the supply chains broken during the pandemic, increased prices of energy, high inflation and huge public debts. All that has affected migration flows with significant social impacts.

In the post-pandemic period, governments have to deal with climate changes, pollution, natural resources exhaustion, and wars that require a “New modes of governance” approach. The period ahead of us is characterized by high variability and unpredictability. This makes it hard for authorities to predict, plan and prepare preventive and suppressive actions as previously. Traditional methods of governance became inappropriate and obsolete.

Governance requires a “Situational approach” where each situation is treated as unique and demands specific governance responses depending on contingencies. During the pandemic,



countries already started to apply the “dynamic resilience” approach with decentralization in decision-making and flexibility enabling continuous adaptation to rapidly changing conditions. In that manner, highly variable, inconsistent, unexpected, or unpredictable actions became a “new normality” in public governance.

The collection of papers covers selected areas of sustainable development that are affected by different kinds of crises and governance changes, as authorities respond to them. Climate changes’ influence on the world economy and society is becoming increasingly visible. The warmer climate affects the health and life of people, agricultural and energy production, the increasing occurrence of forest fires, etc., while on the other hand, heavy rainfall causes floods and landslides. Creating economic policy should include the reduction of greenhouse gases’ (GHG) emissions since it is the only way to ensure economic and environmental sustainability and the economy’s global competitiveness.

The authors show that investing in environmental protection and reducing pressures on climate change does not a priori imply slowing down of economic growth. The example of the EU proves that it is possible to invest in the environment and reduce GHG emission expressed in CO<sub>2</sub> equivalent, while keeping high rates of economic growth. In that context, different aspects of green policies are elaborated to provide policymakers with instruments and governance models for curbing climate change.

The collection of papers deals with Western Balkans (WB) specificities in achieving sustainable development goals (SDGs). The WB countries’ specific characteristics include: 1) problems related to their past socialist socio-political and economic system; 2) problems specific to the transition from socialist to capitalist economy; 3) Yugoslav War and its consequences and 4) problems concerning the inherited economic structure and development strategies.

Western Balkan countries are evaluated across different areas of sustainable development, both in terms of achievements and in terms of dynamics, by using SDG Index and SDG-specific scores. Both strengths and weaknesses of the Western Balkan countries are discovered, compared, discussed and contrasted with possible trajectories for each of the WB countries up to 2030. The analyses

proved that paradigm shifts in the WB countries are needed to accelerate their transition to meeting SDG targets.

One of the important findings was that the policymakers in WB countries are still tempted to focus more on the traditional economic and social development, with environment, climate and sustainability in general still often remaining left behind in favour of other, more pressing concerns. However, the EU accession process can play a significant positive role in stimulating SDG achievement, since SDGs have a high overlapping rate with the EU Acquis Communautaire. In other words, progress in the EU accession chapters implies progress in achieving SDGs, making both goals complementary for WB countries.

To overcome resistance to change, the new governance and policy models should not be incremental, but rather present paradigm shifts, and at the same time be universal, equal and equitable, as well as flexible enough for countries to be able to adjust them to national contexts and realities.

Governance at the local level was particularly explored in the collection of papers. Cities are recognized as the hot spots of population and economic growth, and are responsible for most environmental problems. “Smart city” is grasped not only in a digital context, but much wider, in its ability to improve its citizens’ living standard, to upgrade economic, social and environmental aspects of their lives, thus being considered the most appropriate concept for urban transition to a green economy.

Decentralization and governance gaps such as objectives gap, administration, policies, capacities and market ones are considered key challenges in the promotion of cities’ green transition. In the collection of papers, authors elaborate on one specific policy instrument – public procurement and its role in stimulating wider acceptance of green growth. “Green” public procurement requires significant changes in governance such as decentralized and flexible organization and decision-making models, curbed corruption, developed administrative capacities, adequate competencies of those who manage procurement processes as well as motivation mechanisms based on positive incentives, rather than sanctions.

In the collection of papers, the issue of public-sector investment in green infrastructure is elaborated. The authors highlight

the economic, environmental and health benefits of natural capital investment as essential not only for sustainable countries' COVID recovery but also for mitigation of the consequences of possible future pandemics. Based on experiences in the pandemic period, the recommendation for the post-pandemic era is clear: governments should integrate natural capital into economic policy-making and new governance models.

Furthermore, it is explored how national economic security may be strengthened through the development of green entrepreneurship. The recommendation is to combine integral analysis and the Radar method to assess specific factors that influence the integrated potential of the entrepreneurial segments of the green economy development and the possibility of substantiating the weaknesses and strengths in this field. Constraints for the development of entrepreneurial segments in the green economy limit the growth of the whole economy and thus should be regarded as an obstacle to the sustainable development of an economy rather than just a constraint for green growth. For that reason, it is suggested that policy-makers should focus on overcoming weaknesses which are bottlenecks that have a more powerful effect on green growth than unchanged support to the advanced sectors.

One of the key factors in the production life cycle that affects the environment is the supply function due to its impact on raw material exploitation, as well as to the level of recycling of already used materials and their reusing in the new production cycle. Adoption of the new concept of governance and organization of supply chain which means the transformation of a traditional (linear) supply chain to a sustainable (circular) supply chain is significant and demanding since it requires changing the culture and policies of stakeholders in the supply chain.

The important factor that favours the transition of the supply chain emerges from the global economic disruptions caused by political and other crises, which have slowed or completely disrupted the supply chains for the majority of productions. Slowing down the supply chain also leads to a diminishing ability to supply the resources needed for production, which makes recycling imperative. Moreover, the shortening of supply chains creates the need to

reuse resources since procuring resources from distant locations has become harder and more expensive.

The authors conducted a systematic review of the literature from the WOS and Scopus databases on articles analysing the circular economy and supply chain. The highest number of papers comes from the United Kingdom (278 papers), followed by Italy (215 papers) and China (170 papers). Most citations are from Sweden (56.38 citations on average) followed by France (51.83 citations on average) and Denmark (50.43 citations on average) that is not surprising keeping in mind those countries are at the forefront in promoting sustainable development. It is concluded that the interest in transforming supply chains towards circularity increased after 2016 and it has developed towards redesigning supply chains and their governance so that they could adapt to circular economy requirements.

The collection of papers researches sectorial aspects of sustainable development and its progress after the pandemic. The former deals with the role of education in promoting sustainability. Based on an in-depth, longitudinal single case study method, the author surveyed the benefits of the initiative of developing a new master profile and program in the Netherlands to improve the application of sustainability. Despite the huge potential contribution of higher education to sustainable recovery and development, there is still an astonishing gap between the pressing need for green transformation on the global level and the relatively closed world of higher education.

In most countries, current educational systems are still characterized by silos, hierarchical structures, fragmentation, departmentalization, and conventional ways of delivering the programmes, with a limited perception of what the role and impact of education and specifically universities, and its graduates, on sustainable development, can and should be. An author in the collection emphasises the paradox of changing “business as usual” while keeping education as usual.

In the paper, the author presents and discusses the Dutch example of fourteen Universities of Applied Sciences working together to create and deliver a joint master’s programme in sustainability transition on the national level. Detailed presentation of how

the master program was established, its achievements, and results could serve as valuable models for rethinking how to reform higher education towards meeting modern real-life requirements.

The issue of promotion of sustainability in the energy sector in Republika Srpska (Bosnia and Herzegovina) was discussed in one of the papers. To be considered sustainable, the energy should meet the following requirements: 1) affordability, which means it is available to citizens at an acceptable price, 2) availability, meaning that energy is supplied continuously over a long period and with satisfactory quality of services, and 3) acceptability which refers to the compliance with social and environmental protection goals.

To regulate the economy and achieve a transition to resource-sustainability, the EU relies primarily on state regulation instruments. However, Bosnia and Herzegovina is lagging far behind the EU in the implementation of legislation that promotes sustainable development. The authors suggest changes in governance and management processes as a prerequisite for the green transformation of the country. Again they emphasize the role of education in the implementation of ecological policy. The recently established Faculty of Ecology was used as a positive example of how modern education programmes and syllabi can be useful in raising awareness of young population. Authors advocate direct state regulation measures such as the introduction of ecological tax accompanied by the development of eco ("green") tax collection, monitoring and control capacities, and upgrading of their governance.

The third sector that could significantly contribute to sustainable development, as well as to the post-pandemic recovery, and is as such explored in the collection of papers, is tourism. Authors in the collection recommend new concepts where tourists are regarded as contributors to value creation, as possible collaborators, and marketers. Moreover, the researchers point out that Montenegro, which highly relies on the income from this industry, needs to prepare a more detailed categorization of tourists with distinct inclinations for sustainable tourism offerings, such as eco, rural, and geo-tourism. Furthermore, particular interest groups such as birdwatchers, hiking and biking enthusiasts, adventure seekers (rafting, paragliding, climbing, diving, etc.), and those seeking distinctive cultural and historical experiences (revival of

historical events and sites, etc.), as well as gastro tourists should be more accurately identified and approached in line with their specific characteristics. The authors conclude that success in the competitive environment is depending on factors such as quality of governance of the local community, backing and involvement of municipal authorities as well as support of the whole local community.

The collection of papers analyses modern governance challenges and responses in a comprehensive way, including both vertical and horizontal (sectorial) perspectives. In a constantly and rapidly changing environment where the only certainty is uncertainty, the publication provides a new and fresh perspective on governance in the turbulent, post-pandemic conditions. It could be useful to scientists as an inspiration for further research of the polycrisis circumstances, as well as to policy-makers in designing new, more appropriate and more efficient governance models.

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# Economic Development and Carbon Intensity: Evidence from the EU

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## Abstract

The adverse effects of greenhouse gases at the beginning of the XXI century raised concerns about the link between economic development and the environment. The paper examines the interdependence between GHG emissions (predominantly CO<sub>2</sub>) per unit of GDP and the level of economic development (measured by GDP per capita). The authors test the causality between these two variables on a sample of EU-27 countries in the period 1990-2020. The authors examine whether the national economies go “from left to right” or vice versa “from right to left” on the Environmental Kuznets Curve (EKC). The paper applies the Granger causality test between two variables: GDP per capita and CO<sub>2</sub> per unit of GDP. The results of this paper present a guide for creators of public policies to improve the efficiency of their countries in the context of sustainable development.

*Keywords:* CO<sub>2</sub> emissions, Economic development, Environmental Kuznets Curve

## Introduction

Climate change's influence on the world economy and society is becoming increasingly visible. The expected climate change will cause many harmful consequences for society and its economic development. The warmer climate affects the health and life of people, agricultural and energy production, an increasing occurrence of forest fires, etc. On the other side, heavy rainfall causes floods and landslides. These adverse effects directly endanger human lives and property and the security of supply and access to food, water, and energy. Climate change significantly affects the society and economy of developed and developing countries' various economic sectors and systems, so the need to adapt to changing climatic conditions and reduce greenhouse gas emissions



(GHG) should not be ignored. Creating economic policy should include those aspects because that is the only way to ensure economic and environmental sustainability and the economy's global competitiveness.

It should be understood that investing in environmental protection, improving the situation and reducing pressures on climate change, do not a priori imply slowing down of the economic growth. On the contrary, the EU example shows that it is possible to invest in the environment and reduce greenhouse gases' emissions expressed in CO<sub>2</sub> equivalent and simultaneously maintain economic growth. In 2018, EU countries had the lowest level of GHG emissions since 1990, reaching the reduction of 23% compared to the emissions from that year. In the same period, the EU-level GDP grew by 61%.

In the fight against climate change, the European Union plans to introduce a carbon tax as a classic import tariff (Rikalović & Molnar, 2017). According to the "EU Green Deal" from 2021, this tax will depend on the amount of carbon dioxide emitted in the entire production process and be applied to all products imported into the EU from third countries. As producers and exporters to the EU, developing countries will have high additional costs, so there is a danger that this tariff and old technologies will decrease their competitiveness significantly in the EU market. The paper aims to provide new quantitative and qualitative information that should enable the countries to achieve economic development without excessive threat to the environment and with the least possible use of production factors, but without worsening their competitive position in the European market. The results of this research could also serve as a guide in policymaking, with appropriate strategies to improve the economies' efficiency in sustainable development.

After the introduction and discussion of the connection between CO<sub>2</sub> emissions and economic growth in literature (both theoretical and empirical), the third part of the paper explains the methodology of data analysis. The fourth part of the paper analyses the obtained results, based on the econometric causality test between the level of economic development and carbon dioxide emissions. Finally, the fifth part contains the main conclusions and recommendations.

## Climate Change Mitigation – The Role of the EU in the Global Context

Slowing down the process of global warming and developing the economic sector with a low level of GHG emissions are considered among the priority goals of the world economy. The answer in addressing climate change and attaining the defined goals is found in the term “global decarbonisation”, i.e. the worldwide transition to low-carbon development. The expected outcome is a reduced demand for fossil fuels and increased usage of renewable and other “green” energy sources and technologies in the future.

Human activities, such as burning fossil fuels, certain industrial processes, agriculture, deforestation, as well as decades of inadequate waste treatment, are the causes of rising concentrations of greenhouse gases in the atmosphere. The latest research by the International Panel on Climate Change has confirmed that human activity has caused the increase of about 1.0°C in the mean global temperatures, and the trend will continue with the minimum increase of 1.5°C between 2030 and 2052, compared to pre-Industrial Revolution values. The report from the same panel confirms that it is necessary to stop the rise of the mean global temperatures at 1.5°C by the end of the century. This rate of increase in the mean global temperature will allow adaptation to changing climate conditions, i.e. the survival of the world as we know it today. Otherwise, the global mean temperatures will rise by 2°C and more, and put the world economy in a completely uncertain situation in terms of the possibility to adapt to the changing climate conditions.

On the other hand, national analyses for Serbia show the temperature increase of 0.5°C to 1.5°C in the period from 1998 to 2017, while from 2008 to 2017, the average annual temperature rose by more than 1.5°C, and in some parts of Serbia, by more than 2°C. The territory of Serbia is warming faster than the world average. At the same time, the maximum increase by 1°C is expected from 2016 to 2035, 2°C from 2046 to 2065 and more than 4.3°C by the end of the century.

The United Nations recognised this problem in the early 1980s, as well as in 1992 and established the International Panel on Climate Change and the UN Framework Convention on Climate

Change (Convention), identifying the need for global action as the only possible solution. The Convention aims to stabilise GHG concentrations at a level that will not cause negative consequences for human life, economic development and natural resources on Earth. The Convention defines the goal but not the methods of achieving that goal. These are, for different periods, defined in protocols and agreements under the Convention, such as the Kyoto Protocol (for the period 2008–2012), the Doha Amendment to the Kyoto Protocol (2013–2020) and the Paris Agreement (2021–2030).

The Paris Agreement (adopted in 2015) significantly creates further economic development and establishes international relations. The Paris Agreement involves 189 member states, while the Convention includes 197, and its ratification at the national level implies committing to reducing GHG emissions. The Agreement's specificities include giving equal importance to adaptation to changing climate conditions and mitigation, i.e. reducing of GHG emissions, and introducing obligations to reduce GHG emissions for all Member States, regardless of the level of economic development. The previous protocols and the Convention distinguish between industrially developed countries, which are obligated to reduce GHG emissions, and developing countries (including Serbia), which do not have such an obligation.

The countries that have not ratified the Paris Agreement even four years after its adoption include Turkey and four other countries, significant oil exporters. In addition, it should be noted that the US, which, after China, is the second largest emitter of GHG in the world, has initiated the procedure of leaving the Agreement (which entered into force on 4 November 2020). The lack of membership in the Treaty is largely a political issue. It is encouraged preservation of certain industries and the employees thereof, and acknowledged the advantages that these countries had due to their oil and fossil fuel reserves. However, numerous activities, especially at the level of the US states, are being implemented and contribute to fulfilling the goals of the Paris Agreement.

The use of fossil fuels is a key generator of harmful gases that cause the greenhouse effect and lead to global climate change, which is why managing the growing global energy demand is called one of the key priorities (Petrović, Nikolić & Ostojić, 2017).

Combating climate change is a general development priority for the EU based on resource efficiency and attainment of the so-called carbon neutrality by 2050, which includes reducing GHG emissions by 50–55% by 2030, compared to 1990 levels. The EU has embarked on a path of modernisation and transformation of the member states' economies into climate-neutral ones. Here it should be noted that climate neutrality i.e. the total carbon footprint equaling zero, can mean achieving a balance between the emissions of carbon dioxide equivalent and the sinks of that gas (through the oceans and forests), while directly reducing its emissions to zero.

That reducing GHG emissions does not directly mean reducing the benefits for the economy is confirmed by the example of the EU. Between 1990 and 2018, the EU reduced its GHG emissions by 23%, followed by economic growth of 61%. Such a development framework, which is in line with the requirements of the Paris Agreement, was defined by the EU in the “European Green Deal”, which was presented in late 2019. The mechanisms for achieving the objectives of the “European Green Deal” involve drafting the Law on Climate Change, which, according to the established deadlines, despite the situation caused by the COVID-19 pandemic, was presented by the European Commission on 4 March 2020.

It aims to support the efficient use of resources by moving to a clean, circular economy and mitigating climate change, revert biodiversity loss and cut pollution. All sectors of the economy, notably transport, energy, agriculture, buildings, and industries such as steel, cement, ICT, textiles and chemicals, are covered by this policy agenda. In July 2021, the “Fit for 55” plan further articulated the strategy and gave a draft to these transformative efforts. The “Fit for 55” creates a path for a green transition by using regulations, new initiatives, amendments to key legislation and key non-legislative communications. It touches on the EU goals of reducing net GHG emissions by at least 55% by 2030.

The EU will promote green growth strategies and implement ambitious environmental, climate and energy policies on that development path. The decision to set up a tax collection system in the way necessary to ensure the achievement of GHG emission reduction targets at the EU and global levels, clearly demonstrates such orientation. To prevent so-called carbon leakage, which involves

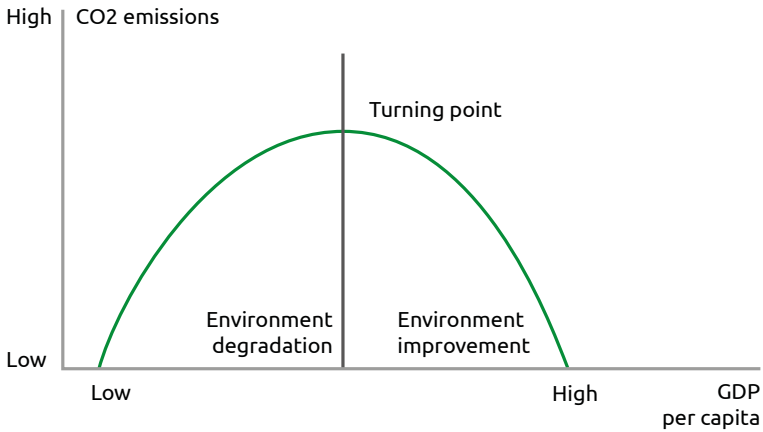
moving production from EU countries to other countries and replacing EU products with cheaper ones, but with their production cycles involving higher total GHG emissions, the EU plans to introduce GHG taxes (carbon taxes) at the EU borders, under the World Trade Organization and other international agreements of which the EU is a member.

## Literature Review

The relationship between economic growth and the environment has not been seriously critically during the very long period of development of economics as a science. However, the accelerated economic growth of the world economy at the end of the XX and the beginning of the XXI century (especially in developing countries) has led to increased concerns about the growing adverse effects of the greenhouse gases. Several different theoretical models have developed this connection, the most famous of which is the Environmental Kuznets Curve. This curve assumes a relationship between various indicators that measure environmental degradation and per capita income (Figure 1). In the initial phases of economic growth, ecological destruction increases and pollution grows. Still, after the level of per capita income (which is a turning point and varies depending on the indicator), the reverse trend begins. Increasing income levels enable economic growth to improve the environment. These consequences mean that each indicator that measures the impact on the environment is a function of per capita income in the form of an inverted U. From the aspect of the link between CO<sub>2</sub> emissions and economic growth, this would mean that the initial increase in GDP per capita is an increase in the CO<sub>2</sub> emission. However, as the economy moves from the predominantly industrial to the service-oriented one, the adverse effects of economic growth on the environment (damage) are gradually diminishing.

Illustratively speaking, the Kuznets curve in the previous figure initially describes the economy's transition from agricultural production in rural areas to industrial production in cities. As industrial production develops rapidly, it uses more energy, and as a result of burning fossil fuels, emissions of carbon dioxide, sulphur dioxide, and other greenhouse gases increase. However, as the

Figure 1. Kuznets environmental curve



Source: Adapted according to Stern (2004)

economy continues to develop, there is a transition from processing production to the development of service-oriented industries. Moreover, further economic growth leads to the introduction of newer and better technologies. At the same time, increased awareness of the importance of environment and the strengthening of adequate legislation and regulations in this area, lead to gradual reduction of environmental degradation.

Most research and scientific papers confirmed the link between CO<sub>2</sub> emissions and economic growth in the last two decades. Generally speaking, the authors concluded that since CO<sub>2</sub> emissions result from economic growth, reducing them may not be a desirable outcome. Furthermore, the link between these two quantities has significant implications for economic and environmental policy in a country.

Numerous analyses and research papers identified that economic growth has a disastrous impact due to pollution. Tao et al. (2008) analysed an inverted U-shaped link between economic growth and pollutants from 1985 to 2005 in China. The analysis of Franklin and Ruth (2012) for the USA over 200 years showed a continued upward trend in per capita CO<sub>2</sub> emissions connected to economic growth. Zhang and Wang (2013) explored the relationship between energy use, CO<sub>2</sub> emissions, and economic activity

from 1995 to 2009 and concluded that economic growth positively impacts CO<sub>2</sub> emissions in China. Azam (2016) analysed the relationship between environmental degradation (CO<sub>2</sub> emissions) and economic growth and concluded that environmental damage harms economic growth. Ayobamiji & Kalmaz (2020) also found that the economic practices based on economic growth contribute to emissions of pollutants. Borhan, Ahmed and Hitam (2013) analysed the relationship between pollution and economic growth and concluded that the Environmental Kuznets Curve has existed in eight Asian countries. Teng et al. (2020) found that GDP increased CO<sub>2</sub> emissions for ten different OECD economies between 1985 and 2018. Ahmed et al. (2020) revealed that GDP positively impacts CO<sub>2</sub> emissions in G7 economies. Also, Ahmad et al. (2021), analysing the link between CO<sub>2</sub> emissions and economic growth in 26 OECD economies (time series 1990–2014), discovered a positive interaction between CO<sub>2</sub> emissions and economic growth. Fujii and Managi (2013) analysed the relationship between CO<sub>2</sub> emissions and economic growth in different industries from 1970 to 2005. They concluded that some industries, such as paper, wood and construction, had an inverted U-shaped relationship.

However, there is still no consensus in the literature concerning the relation between GDP and CO<sub>2</sub> emissions. For example, Aye and Edoja (2017) found a negative link between GDP and CO<sub>2</sub> emission in 31 developing countries, while Salahuddin et al. (2018) showed no association between CO<sub>2</sub> and real output. Ozcan (2013) concluded that the direction of causality was mixed for different countries. He tested this relation for 12 Middle East countries using panel data for the period 1990-2008. These results showed the evidence for a U-shaped curve for five countries, an inverted U-shaped curve for three countries and no causal link between income and CO<sub>2</sub> emissions for the other four countries. Analysing the case of Nigeria, Zubair et al. (2020) discovered that no causal link between CO<sub>2</sub> emissions and economic growth existed. Also, Petrović et al. in their research concluded that an increase in GDP per capita growth rate of 1% leads to an increased CO<sub>2</sub> emissions growth rate ranging between 1.10% and 1.15% (Petrović, Nikolić & Ostojić, 2018).

## Research

To test for causality between GDP and CO<sub>2</sub> emission, we employed an econometric causality test on the panel with the procedure proposed by Dumitrescu and Hurlin (2012). To detect causality, we used data on carbon dioxide emissions as a by-product of the burning of fossil fuels and cement manufacturing. This data include the carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring. CO<sub>2</sub> emission data is given as a ratio, compared to how many kilograms of CO<sub>2</sub> are produced per US dollar at 2015 prices. Our second variable is GDP per capita in constant 2015 US dollars. Both variables are taken in the original form from the World Bank's World Development Indicators database. When choosing the countries for the sample, we had to make a trade-off between the number of countries and the maximum length of data available for the selected countries. This trade-off resulted in a sample of 30 countries for which we could compose balanced panel series from 1995 to 2018, giving us 720 points of observation. Our sample represents countries of the EU plus the UK, Switzerland and Norway.

When testing for the causality between the variables, the typical approach in econometric literature is based on the Granger causality test for time series. A similar procedure can be performed with the panel data, keeping in mind that the model needs to include an optimum number of lags and that potential cross-sectional dependence must be addressed. Granger (1969) proposes a methodology for analysing the causal relationship between time series in his paper. If  $x_t$  and  $y_t$  are stationary series, then model:

$$y_t = a + \sum_{k=1}^K \gamma_k y_{t-k} + \sum_{k=1}^K \beta_k x_{t-k} + \varepsilon_t$$

can be used for testing whether  $x$  is causing  $y$ . The suggested model is testing whether the past values of  $x$  can predict the  $y$  from the present even if we include past values of  $y$  in the model. If this is the case, then we can conclude that  $x$  is causally influencing  $y$ . To confirm this,  $H_0$  suggest that all  $\beta_k$  (for all  $k=1, \dots, K$ ) equal to zero needs to be rejected. If there is no causality from  $x$  to  $y$ , same



procedure can be repeated but with rotating places, so that we can test if there is causality from  $y$  to  $x$ . To use the same procedure for panel data, Dumitrescu and Hurlin (2012) modify the Granger model to:

$$y_{i,t} = a_i + \sum_{k=1}^K \gamma_{ik} y_{i,t-k} + \sum_{k=1}^K \beta_{ik} x_{i,t-k} + \varepsilon_{i,t}$$

where  $x_{i,t}$  and  $y_{i,t}$  are two stationary variables for the unit of observation  $i$  in the time period  $t$ . Selected lag order  $K$  is assumed to be identical for all individuals and the panel must be balanced.

After performing the suggested regression, the next step is to perform  $F$  test on the  $K$  linear hypotheses that are testing whether the coefficient  $\beta_{ik}$  is equal to zero (for all  $k=1, \dots, K$ ). From here, individual Wald statistic  $W_i$ , can be derived, which will be used for the calculation of the average Wald statistic  $\bar{W}$ . Under the assumption that the Wald statistics are independently and identically distributed across individuals, standardised statistic  $\bar{Z}$  will follow a standard normal distribution when  $T \rightarrow \infty$  and  $N \rightarrow \infty$ .

$$\bar{Z} = \sqrt{\frac{N}{2K}} \times (\bar{W} - K) \xrightarrow[T, N \rightarrow \infty]{d} N(0,1)$$

In cases with fixed time dimension  $T$  if  $T > 5 + 3K$ , the approximated standardised statistic  $\tilde{Z}$  will follow the standard normal distribution.

$$\tilde{Z} = \sqrt{\frac{N}{2K} \times \frac{T - 3K - 5}{T - 2K - 3}} \times \left( \frac{T - 3K - 3}{T - 3K - 1} \times \bar{W} - K \right) \xrightarrow[T, N \rightarrow \infty]{d} N(0,1)$$

If the values of these statistics are larger than standard critical values, the null hypothesis of no Granger causality should be rejected. With large  $N$  and  $T$  in the sample,  $\bar{Z}$  should be used for testing hypothesis, while for large  $N$  but relatively small  $T$ , one should use  $\tilde{Z}$ . An optimal number of lags can be chosen in line with the prior researcher's knowledge or by consulting one of the three information criteria (AIC/BIC/HQIC). To deal with the potential presence of cross-sectional dependence, Dumitrescu and Hurlin (2012)

suggested a bootstrap procedure to compute critical values for  $\bar{Z}$  and  $\bar{Z}$  instead of asymptotic critical values.

As the presented procedure suggests, we performed the stationarity test for our variables in the first step. As the cross-sectional dependency can be an issue for the panel unit root test of the first generation, besides Im-Pesaran-Shin test, we also implemented the Pesaran second-generation unit root test CIPS. Results of the first-generation unit root tests presented in the column two and three of Table 1 suggest that series are stationary in levels, since null hypothesis that all panels contain a unit root is rejected due to p-values being below 0.05 regardless of the information criteria being used for the choice of the optimal lag. Nevertheless, second-generation Pesaran CIPS test that considers the presence of the cross-sectional dependency suggests that the series of GDPpc have one unit root, since the null hypothesis of non-stationarity cannot be rejected due to the high p-value. This is confirmed by testing the stationarity of the first difference of this series, for which the null hypothesis is now rejected.

Table 1. Unit root test statistics

	IPS		CIPS		
	CO <sub>2</sub>	GDPpc	CO <sub>2</sub>	GDPpc	d.GDPpc
W-t-bar (AIC)	0.9486	0.9926			
W-t-bar (BIC)	0.9303	0.9874			
W-t-bar (HQIC)	0.8972	0.9907			
Zt-bar			-3.385***	-2.528	-13.253***

\*, \*\*, \*\*\*, represent the level of statistical significance at 10%, 5% and 1%

Source: Authors' calculation

We continue the procedure for testing the causality with our series of GDPpc transformed in the first differences. Using the same approach of considering all three information criteria for the optimal lag structure and calculating  $\bar{Z}$ , we present the results in columns two and three of Table 2. As can be seen, calculated values of Z-bar statistics for AIC and HQIC criteria of optimal lag structure suggest that H0 should be rejected, which would mean that economic growth does increase the level of CO<sub>2</sub> emission. Despite this, Z-bar test statistics with BIC choice of optimal lag structure

has p-value much higher than in the other two cases, which means that we cannot reject H0 of no causality from growth to higher CO2 emission. Since we have no definitive confirmation, we continue with the bootstrap procedure to control for the possibility of cross-sectional dependency in the data. Results of the Z-bar statistics obtained after 500 replications are presented in columns four and five of Table 2. Values of the Z-bar statistics in all three cases suggest that controlling for the protentional presence of cross-sectional dependence, we cannot reject null hypothesis that economic growth does not cause an increase in CO<sub>2</sub> emissions.

Table 2. Test statistics

	Original data		Computed using 500 bootstrap replications	
	Z-bar	p-value	Z-bar	p-value
AIC	5.0485	0.0000	5.0485	0.2260
BIC	0.5596	0.5757	0.5596	0.6600
HQIC	5.0485	0.0000	5.0485	0.2240

H0: GDP p.c. does not Granger-cause CO2 emission per \$ GDP

H1: GDP p.c. does Granger-cause CO2 emissions per \$ GDP for at least one country in the panel

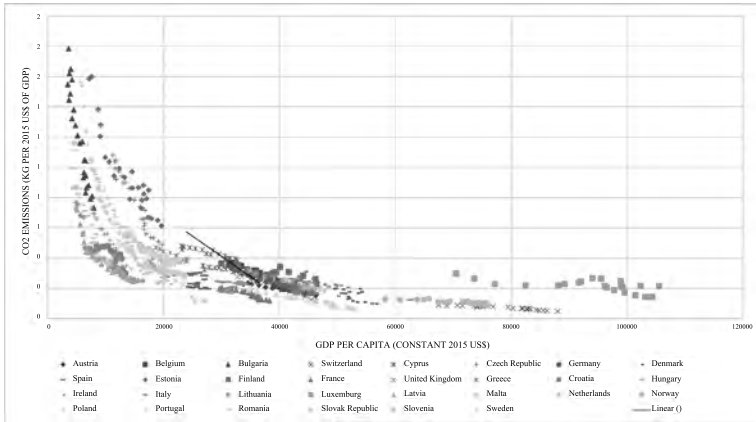
Source: Authors' calculation

## Discussion

The results we have obtained are not unequivocal. One possible reason is that the sample is not homogeneous in terms of carbon intensity.

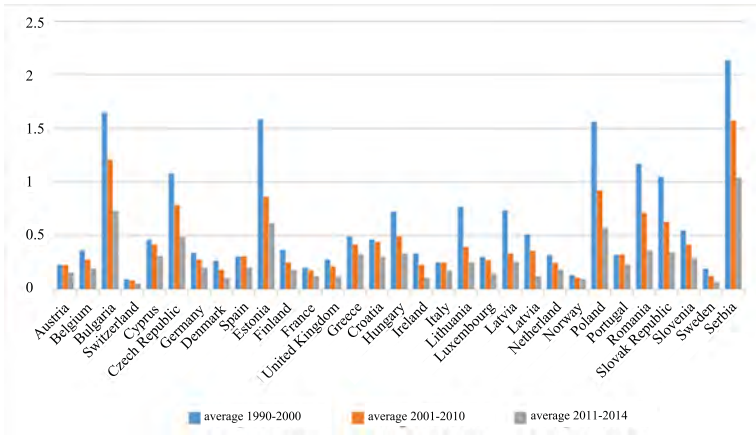
Although the scatter plot confirms the negative correlation (see the linear trend needed in Graph 2), the fact is that the econometric procedure for testing/investigating causality between the observed variables did not confirm it. Graph 3 presents the carbon intensity of the economies of EU member states and other selected countries.

Figure 2. Interdependence between CO<sub>2</sub> emission and level of economic development: EU member countries



Source: Authors' calculation and presentation using Stata

Figure 3. CO<sub>2</sub> emissions (kg per 2015 US\$ of GDP), selected countries 1990–2014



Source: Authors' calculation based on the World Bank database: <https://data.worldbank.org/indicator/EN.ATM.CO2E.KD.GD> (access: 3. 3. 2022)

It can be seen that the EU is not homogeneous concerning this issue, i.e. that EU countries are very different when it comes to the amount of carbon dioxide emissions per unit of GDP.

In all three observed sub-intervals (1990-2000; 2001-2010; and 2011-2014), the former transition countries stand out as having the highest amount of carbon dioxide emissions per unit of GDP. These are Bulgaria, Czech Republic, Slovakia, Estonia, Romania and Poland. If we compare the situation in Serbia, we come to the conclusion that the situation in our country is worrying. Although all countries recorded a decline in the amount emitted in the period after 1990, in parallel with the achieved economic development (i.e. GDP per capita growth), the countries in the sample differ significantly in the carbon intensity of GDP unit.

The obtained results represent a good starting point for new research in this field. In order to determine the interdependence in the EU between the level of economic development and carbon dioxide emissions, one of the possible directions for further testing is to separate the more developed EU countries (EU-15; "old Europe") and less developed countries (EU-12; "new Europe"). It is possible that those countries that are at a similar level of economic development reflect the interdependence between the observed variables. Also, some other eco-control variables should be included in the next iterations, such as the presence of renewable energy sources in the national energy mix and the like.

## Conclusions

In December 2018, the European Commission proposed the European Green Deal for the European Union and its citizens. This commitment represents a new growth strategy to transform European Union countries into just and prosperous societies with a modern, efficient and competitive economy, separate from the use of resources to become carbon neutral by 2050. The European Green Deal Agreement (with key policies and measures to achieve the set goals) is today an integral part of the European Commission's strategy to implement the United Nations Sustainable Development Agenda until 2030 and the Sustainable Development Goals. European Union member states are obliged to harmonise their national policies with new development strategies and public policies. In the period from 2014 to December 2018, 14 out of 28

countries developed either a strategy or a roadmap or action plans for the transition to a green economy (Mitrović & Jandrić, 2021).

One of the basic conclusions of this paper is that future economic growth and development must take place in compliance with environmental standards imposed by the fight against climate change. By applying the “Green Deal”, the EU plans to introduce a carbon tax as an import tax. The essence of the import tax is the difference in GHG emissions that occur during the production of a good in a non-EU country (Serbia) (by using dirty energy sources and low energy efficiency technology), and those emissions that arose from the production of the same good in the EU country. It means that for all the products from Serbia for which low-calorie and lower quality coal is used in production, the producer or importer in the EU will have higher additional costs. The possible consequence of this would be the lower Serbian competitiveness in the EU market (Mitrović & Veselinov, 2018).

The countries on the way to the EU membership (among which is Serbia) face requirements that need to be implemented, arising from numerous chapters. This also applies to Chapter 27, which deals with the environment. Environmental policy is based on preventive activities, combating environmental hazards at their source, sharing responsibilities and integrating environmental issues into other EU policies. Policies and requirements related to environmental issues must be integrated into the process of creating and implementing all other EU policies and activities, primarily in terms of promoting the principles of sustainable development. The main instruments in the fight against climate change are decarbonisation, growth of energy efficiency and wider application / greater use of renewable energy sources (RES).

Decarbonisation means reducing the use of fossil fuels and increasing the EU’s energy independence. The basic principle of the EU’s environmental policy is the suppression of pollution at its source, based on the principle that “the polluter pays”. The policy of combating climate change has been accompanied by the improvement of standards related to industry work, especially sectors that are a significant source of pollution. This approach to policymaking and implementation and the associated costs are a particular

challenge for countries preparing for membership, such as Serbia (Vujačić et al, 2020).

In Serbia, modest progress has been made in the area of environmental protection and the field of climate change issues. However, it is necessary for Serbia to strengthen administrative capacities and strategic planning, and increase investments in connection with the priorities necessary for further harmonisation with EU policies (Rikalović et al, 2022).

Outcomes of this research have aided us in embracing the promotion of energy intensity diversification in Serbia. It can be seen and clearly noticed from Graph 3 that the situation in Serbia is very unfavourable in this regard in all the observed time intervals.

This could be achieved by implementing a more ambitious green energy initiative that will maintain the nation's economic momentum. The design and execution of successful policies to regulate Serbian energy and manufacturing sector practices will improve its sustainable growth. It will additionally regulate the CO<sub>2</sub> pollution levels of the nation if the government sets emission restrictions on the companies and factories that are emitting CO<sub>2</sub> emissions. The threat of punitive action or high taxes on infringers of this policy will deter environmental pollution. Also, energy usage should be embraced by incorporating sustainable (renewable) energy sources, including hydropower, oceanic, and wind energy sources.

Furthermore, Serbia should be careful when formulating policies that will stimulate economic growth at the expense of environmental degradation. Implementing the policies mentioned above will help maintain sustainable economic development and Serbia's proven environmental performance. This study's outcome could also be positive. Further studies can be conducted for other emerging nations while considering asymmetry in econometrics modelling or the use of micro-disaggregated data. Furthermore, other studies can account for other drivers of growth that have not been explored in this study.

Better law enforcement and strengthening inspections should lead to elimination of the existing inconsistencies and shortcomings in the field of legislation, which prevent better and more effective enforcement of regulations (Arsić, Ranđelović & Tanasković, 2016). The European Union, in its report, also emphasises the

need to strengthen judicial and environmental inspection capacity. In principle, more serious work has begun on priorities in the areas of environment and climate change because the EU requires readiness from future member states to implement the prescribed obligations. The Emissions Trading Directive is a key instrument for reducing greenhouse gas emissions. The climate-energy package includes a comprehensive revision of this Directive as well as the strengthening of the legislation underlying the emissions trading scheme. Major changes include the introduction of a single emission limit at the EU level instead of previous national limits.

The emissions trading system includes all combustion processes exceeding 20 MW, where it is not relevant whether they produce heat or electricity for sale or their own needs. According to the Renewable Energy Directive, Member States adopt binding national targets for increasing the share of renewable energy sources in their energy consumption. These targets also reduce greenhouse gas emissions and reduce the EU's dependence on energy imports. We should keep in mind the importance of the development of renewable energy markets, their positive impact on regional and local development opportunities, and the development of new generations of technologies in this area.

## REFERENCES

- Ahmad, M., Khan, Z., Rahman, Z. U., Khattak, S. I. & Khan, Z. U. (2021). Can innovation shocks determine CO<sub>2</sub> emissions (CO<sub>2</sub>e) in the OECD economies? A new perspective. *Econ. Innovation New Technol.* 30(1), 89–109. doi:10.1080/10438599.2019.1684643
- Ahmed, Z., Zafar, M. W. & Ali, S. (2020). Linking urbanization/urbanisation, human capital, and the ecological footprint in G7 countries: an empirical analysis. *Sustain Cities Soc.* 2020; 55:102064. doi: 10.1016/j.scs.2020.102064
- Arsić, M., Randelović, S. & Tanasković, S. (2016). Od makroekonomske stabilnosti do održivog rasta privrede Srbije Ekonomska politika Srbije u 2016. godini, Beograd: CID, Ekonomski fakultet, 79–116.
- Aye, G. C., Edoja, P. E. (2017). Effect of economic growth on CO<sub>2</sub> emission in developing countries: evidence from a dynamic panel threshold model. *Cogent Econ Finance* 5(1):1379239.



- Ayobamiji, A. A. & Kalmaz, D. B. (2020). Reinvestigating the Determinants of Environmental Degradation in Nigeria. *Ijepee* 13(1), 52–71. doi:10.1504/ijepee.2020.106680
- Azam, M. (2016). Does environmental degradation shackle economic growth? A panel data investigation on 11 Asian countries. *Renew. Sust. Energ. Rev.* 65, 175–182.
- Borhan, H., Ahmed, E. M. & Hitam, M. (2013). CO<sub>2</sub>, Quality of Life and Economic Growth in East Asian 8, *Journal of Asian Behavioural Studies*, 3, 13–24.
- Dumitrescu, E. I. & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic modelling*, 29(4), 1450–1460.
- Franklin, R. S. & Ruth, M. (2012). Growing up and cleaning up: the environmental Kuznets curve redux. *Appl. Geogr.* 32, 29–39.
- Fujii, H. & Managi, S. (2013). Which industry is greener? An empirical study of nine industries in OECD countries. *Energy Policy*, 57, 381–388.
- Granger, C. W. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica: journal of the Econometric Society*, 424–438.
- Mitrović, Đ. & Jandrić, M. (2021). Tranzicija ka cirkularnoj ekonomiji i promene na tržištu rada. U: A. Prašćević, N. Fabris (ur.), *Stanje i perspektive ekonomske misli – uticaj ekonomskih recesija u prvim decenijama XXI veka* (151–167). Beograd: Ekonomski fakultet. ISBN: 978-86-403-1677-4
- Mitrović, Đ. & Veselinov, M. (2018). Measuring Countries Competitiveness in Circular Economy – Composite Index Approach. In: J. Kočović, J. Selimović, B. Boričić, V. Kaščelan, V. Rajić (Eds.) *Quantitative Models in Economics* (417–440). ISBN 978-86-403-1561-6
- Ozcan, B. (2013). The nexus between carbon emissions, energy consumption and economic growth in Middle East countries: A panel data analysis. *Energy Policy*, 62, 1138–1147.
- Petrović, P., Nikolić, G. & Ostojić, I. (2017). Demografske determinante energetske potrošnje u Evropskoj uniji: rezultati ekonometrijske analize. *Stanovništvo*, 55(1), 1–20. <https://doi.org/10.2298/STNV170606003P>
- Petrović, P., Nikolić, G. & Ostojić, I. (2018). Emisija CO<sub>2</sub> u Evropskoj uniji: empirijska analiza demografskih, ekonomskih i tehnoloških faktora. *Stanovništvo*, 56(1), 63–82. <https://doi.org/10.2298/STNV180614005P>

- Rikalović, G. & D. Molnar (2017). Ključni ekonomski instrumenti redukcije štetnih gasova i klimatske promene: teorijsko-metodološki pristup. U: S. Grk i D. Molnar (ur.) *SVET I SRBIJA – VREME PROMENA* (91–110). Beograd: CID, Ekonomski fakultet u Beogradu.
- Rikalović, G., D. Molnar & S. Josipović (2022). The Open Balkan as a development determinant of the Western Balkan countries, *Acta Economica*, Vol. 20 No. 36, 31–51. doi 10.7251/ACE2236031R
- Stern, D. I. (2004). The Rise and Fall of the Environmental Kuznets Curve, *World Development*, 32(8), August, 1419–1439.
- Tao, S., Zheng, T. & Lianjun, T. (2008). An empirical test of the environmental Kuznets curve in China: a panel cointegration approach. *China Econ. Rev.* 19, 381–392.
- Teng, J. Z., Khan, M. K., Khan, M. I., Chishti, M. Z. & Khan, M. O. (2021). Effect of Foreign Direct Investment on CO<sub>2</sub> Emission with the Role of Globalization, Institutional Quality with Pooled Mean Group Panel ARDL. *Environ. Sci. Pollut. Res.* 28(5), 5271–5282. doi:10.1007/s11356-020-10823-y
- Vujačić, I., Petrović-Vujačić, J., Tanasković, S. & Miljković, M. (2020). Human development and convergence among the states of former Yugoslavia, *Acta Oeconomica AOecon*, 70(3), 361–380.
- World Bank database: <https://data.worldbank.org/indicator/EN.ATM.CO2E.KD.GD>
- Zhang, M. & Wang, W. (2013). Decouple indicators on the CO<sub>2</sub> emission-economic growth linkage: the Jiangsu Province case. *Ecol. Indic.* 32, 239–244.
- Zubair, A. O., Abdul Samad, A. R. & Dankumo, A. M. (2020). Does Gross Domestic Income, Trade Integration, FDI Inflows, GDP, and Capital Reduces CO<sub>2</sub> Emissions? An Empirical Evidence from Nigeria. *Curr. Res. Environ. Sustainability* 2, 100009. doi:10.1016/j.crsust.2020.100009



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# Sustainable Development in the Western Balkans\*

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## Abstract

This chapter presents the evolution of the concept of sustainable development in the international arena through the lens of the most important international treaties and frameworks, including introducing some of the new debates on the topic. The concept of sustainable development is then applied to the Western Balkans in an evidence driven manner. Using SDG Index and SDG specific scores and achievements, Western Balkan countries are evaluated across different areas of sustainable development, both in terms of achievements and in terms of dynamics. The strong points and bottlenecks for the Western Balkan countries are then compared and contrasted, their possible trajectories up to 2030 discussed, and peer-learning opportunities for accelerating sustainable development highlighted. The way forward for sustainable development is discussed and lessons, as well as the needed paradigm shifts and key steps to be considered, are identified in order for the Western Balkan countries to be able to accelerate their sustainable development progress, as well as the overlapping EU accession process. *Keywords:* Sustainable development, Western Balkans, Sustainable development goals-SDGs

## Introduction

■ Sustainable development is a global topic of relevance to all countries, including those in the region of Western Balkans (WB). The region is still struggling with all the recent and still lasting poly-crises of the world (beginning with the financial, environmental, climate and last but not the least, the health one, in the form of the recent COVID-19 pandemic). In short, the anthropocentric development model is in crisis.

The concept of the WB countries used in this chapter follows the European Union (EU) definition consisting of Albania, Bosnia

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\* The views expressed are those of the author and do not necessarily reflect those of the United Nations or STaR.

and Herzegovina, Kosovo,<sup>1</sup> Montenegro, North Macedonia, and Serbia.<sup>2</sup> These countries have experienced significant economic, political, and social changes in recent decades. They are all trying to progress in their sustainable development, as well as on their path towards the EU accession, with the two these agendas having a high overlapping. Despite some progress, the region continues to face challenges related to economic growth, social inclusion, and environmental protection.

Progress in sustainable development requires investment in key sectors, such as agriculture, industry, and tourism, while also protecting the natural environment. Many of these countries have abundant natural resources, including forests, water resources, and minerals. However, there is a need to manage these resources sustainably and avoid overexploitation, or degradation. There is also a need for more investment in sustainable infrastructure, such as renewable energy and public transportation. This requires significant resources, which may be challenging for some of the countries in the region.

The region has made progress in recent years, but there are still significant challenges related to economic growth, social inclusion, and environmental protection, among others. One of the main challenges is sometimes also the lack of true political will to implement sustainable policies and programs. In some cases, there is resistance to change from powerful interest groups controlling parts of the economy, high corruption, and nepotism resulting in states, or parts of society's subsystems being inefficient or, in many cases, captured. Another challenge is the lack of public awareness and engagement on sustainable development issues. Many people in the region are not aware of the importance of sustainable development or the impact of their actions on the environment. Priorities are given to traditional growth criteria based on the *pollute first, clean up later* model. "It underlines that a certain threshold of development should first be reached before a society is capable of understanding the adverse effects of large scale pollution" (Azadi et al., 2011).

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<sup>1</sup> As per UNSCR 1244 and without prejudice to differential country positions on its status.

<sup>2</sup> [https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/europe-world/international-cooperation/western-balkans\\_en](https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/europe-world/international-cooperation/western-balkans_en)

There is a need for more education and awareness-raising media campaigns, changes in personal values and finally improved leadership to promote sustainable practices and behaviours. Reducing income inequality can help building such a support for green policies, because people who feel economically marginalized or excluded from the benefits of economic growth may be less likely to support policies that are perceived as benefiting the rich more.<sup>3</sup> Such policies can include initiatives to promote recycling, reduce plastic waste, and conserve water. Sustainable development requires a holistic approach, taking into account economic, social, and environmental factors. International cooperation and collaboration are also important for promoting sustainable development in the WB region. It is important for governments, civil society, and international organizations to work together to address these challenges and promote sustainable development in the region.

The European Union has been actively supporting the sustainable development of the WB region. In 2018, the EU presented a strategy for the WB, which included a commitment to support sustainable development. The strategy aims to strengthen the region's economies, promote democratic governance, and foster regional cooperation. The EU has provided significant funding for projects related to energy efficiency, waste management, and water management. The EU also supports initiatives to promote sustainable tourism and sustainable agriculture in the region.

In addition to the EU, other international organizations, such as the World Bank and the United Nations, have also been supporting sustainable development in the WB. The World Bank has provided funding for projects related to renewable energy, water management, and environmental protection. The United Nations has been working with the governments of the WB countries to

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<sup>3</sup> Income inequality in the WB countries is higher than in the EU (averages for the most recent dates app. 34.5 for WB compared to 27.5). As much as 82 (out of 100) people in the WB think that the gap between the rich and the poor is increasing (79 out of 100 in 2017 (Balkan Barometer-BB, 2022)). Consequently, the major concerns of the poor and the middle class in particular is not how to reach the SDGs, but how to survive or improve the existing wellbeing in short term. People, who are struggling to make ends meet, focus more on immediate concerns, like paying bills and putting food on the table, and may be less likely to prioritize long-term environmental goals.

promote sustainable development through its Sustainable Development Goals (SDGs). The SDGs aim to address key global challenges, such as poverty, hunger, and climate change, and provide a framework for promoting sustainable development.

This chapter is structured as follows. Section 2 presents the development of the concept of sustainable development in the international arena through the lens of the most important international treaties and frameworks, including introducing some of the new debates on the topic. Section 3 applies the concept of sustainable development to the WB in several ways. The first part shows the current achievements of the WB across different areas of sustainable development, both in terms of the level of sustainable development achievement and its dynamics. It analyses the strong points and bottlenecks for the WB countries, compares and discusses their possible trajectories up to 2030 and looks for peer learning opportunities. The second part involves assessing the results in view of inherited problems, while the third part looks at the key lessons, necessary paradigm shifts, and the key steps to be considered, for the WB countries to be able to accelerate their sustainable development progress, as well as the EU accession process. Section 4 summarizes and concludes.

## Development of the Concept of Sustainable Development

The United Nations (UN), founded on 24 October 1945, is the main inter-governmental organization (IGO) that all the states in the world can potentially be members of, and has been as such described as the supreme type of an IGO by the International Court of Justice.<sup>4</sup> The UN is committed to economic and social development, as stated in its charter, particularly evident in Article 1<sup>5</sup> and

<sup>4</sup> International Court of Justice (1949): *Reparation of injuries suffered in the service of the United Nations*, Advisory Opinion

<sup>5</sup> "The Purposes of the United Nations are: (point 3) To achieve international co-operation in solving international problems of an economic, social, cultural, or humanitarian character, and in promoting and encouraging respect for human rights and for fundamental freedoms for all without distinction as to race, sex, language, or religion".

further elaborated in article 55 and Chapter IX of the UN Charter, The Economic and Social Council (ECOSOC). ECOSOC is responsible for implementing the commitment to economic and social development and discusses reports of specialized agencies, funds and programs of the UN. After the WWII reconstruction period, the economic issues had been given a very high priority, but this resoluteness was somewhat diluted later due to the changing political and economic context. The evaluation of the 10 most important UN documents throughout the decades of the UN existence has demonstrated that economic issues and coordination of global economic policies have not assumed such a high priority as initially perceived by one of the UN fathers Keynes (Svetličič, 2016: 43), although almost every organization within the UN system has some connection to the development. For instance, nearly 32% of the UN's annual budget in 2018 was devoted to the development assistance (going up to 80% if humanitarian assistance is also included).

This section discusses the development of views on economic, social and environmental development in the UN Secretariat, UN programs, and specialized agencies, through the prism of the four developmental decades, the Millennium Development Goals and finally the Sustainable Development Goals, with selected key declarations and events. They are being summarized in Table 1 in the chronological order and with more details for better use, with the UN Development Decades as well as the equivalent afterwards being bolded for salience.

The United Nations Development Decades were periods of focused global action aimed at promoting economic, social, and environmental development in developing countries, spanning from 1960 to 1990. They were characterized by a range of initiatives and programs aimed at promoting development across various sectors, albeit with a large emphasis firstly on economic development, and then on economic and social development, with the environmental protection and preservation being a slightly more parallel track and receiving less attention. Economic and social development ideas continued in the 1990s through the development of the first Human Development Index.

In the 2000s, the Millennium Development Goals (MDGs) were launched, which aimed to address poverty, hunger, disease,



and inequality by 2015. The MDGs were a set of eight goals, which included reducing poverty<sup>6</sup> and hunger, improving access to education and healthcare, and promoting environmental sustainability (to a lesser extent). These goals were met with mixed success, with some progress made in areas such as reducing poverty and improving access to education and healthcare, but with significant challenges remaining in the areas such as environmental sustainability and climate change.

Building on the MDGs, the United Nations launched the Sustainable Development Goals (SDGs) in 2015, which aimed to promote sustainable development in a more comprehensive and integrated way, and simultaneously bring together the three dimensions of sustainable development and the three parallel tracks of conventions, goals and commitments (on the economic, social and environmental issues). The SDGs are a set of 17 goals to be met by 2030, with 169 targets and 231 unique indicators. Unlike the MDGs, the SDGs are universal in nature, meaning that they apply to all countries, not just developing ones, and are equally strong with respect to the economic, social and environmental dimensions, as well as underpinned by peace, good governance and partnerships. The continued implementation of these initiatives, as well as the development of new and innovative approaches to development, will be critical to achieving the goal of a more sustainable and equitable world for all, and the acceleration towards meeting the SDGs is also needed and was called for by the UN Secretary General in 2020 with the UN Decade of Action for the SDGs.

The success of the developmental decades as well as various international conventions and treaties, and its impact on the most salient economic, social and environmental areas, has been mixed (Kunčič, 2016), with progress in some, and facing larger challenges

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<sup>6</sup> Poverty is, of course, a big social problem but it is in fact inequality, which lies behind the poverty. So, in the long run, inequality needs to be addressed as a more crucial issue. In the words of Sandrine Dixson-Declève, author and co-president of The Club of Rome “we are reaching dangerous levels of inequality: Do we want to create the first trillionaire or do we want to create functional, fair democratic societies? Ultimately, Earth for All is about building societies that value prosperity for all rather than profit for the few on a finite planet fit for the 21st century. Let us be clear, a more equal society benefits everyone, even the very rich” (Dixson-Declève et al., 2022).

in other areas, which inevitably also gave rise to the holistic idea behind United Nations Agenda 2030 and the SDGs.

Table 1. Selected key declarations and events marking the evolution of Sustainable Development

Dev. Decade	Key Moments	Year	Key Points
	United Nations Charter	1945	Establishment of the UN and recognition of the importance of economic and social development.
	ECOSOC Sub-Commission on Economic Development established	1946	Industrialization, technology, and trade diversification, established to help the member states develop their economic policies
	Universal Declaration of Human Rights	1948	Recognition of the link between human rights and development
	Prebisch-Singer Hypothesis	1950	Developed economies disproportionately gaining through trade, start of the Import Substitution Industrialization (ISI) policy
1960s	UN GA Resolution A/RES/1710 (XVI): United Nations Development Decade (First Development Decade)	1961	Economic growth, social and cultural changes, and better quality of life. Called for the 1960s to be recognized as the UN's "Development Decade" with the goal of accelerating economic growth in developing countries to at least 5% annually by 1970. Continuation of the ISI policy by some member states.
	The United Nations Development Decade: Proposals for Action	1962	Calling for policies that would achieve the intended growth
	A range of educational, health, water and sanitation goals set and also achieved	1960s	Polio reduced by 99% and chicken-pox by 74%
	World Employment Programme	1969	Recognition of the importance of employment for development by the ILO.

Dev. Decade	Key Moments	Year	Key Points
1970s	UN GA Resolution A/RES/2626 (XXV): International Development Strategy for the Second United Nations Development Decade	1971	Emphasis on a stronger role of the state, redistributive policies and structural changes to address inequalities in international economic relations. Developed countries to give 0.7% of the GDP for foreign aid, helping to achieve the targeted sustainable growth of 6% in developing countries. Continuation of the ISI policies by some member states.
	UN Declaration A/CONF.48/14/Rev.1: Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration)	1972	The first world conference to make the environment a major issue. The participants adopted a series of principles for sound management of the environment and it led to the establishment of the UN Environment Programme (UNEP)
	Programme of Action on the Establishment of a New International Economic Order	1974	Called for more equitable economic relations between developed and developing countries
	UN GA Resolution A/RES/3201 (S-VI): Deceleration on the Establishment of a New International Economic Order (NIEO)	1974	Call for a fairer global economic system and greater economic sovereignty for developing countries.
	The first UN conference on women	1975	Highlighted the need for gender equality and women's empowerment in development efforts.
	Basic Needs Strategy	1976	An ILO strategy on employment, growth and redistribution accepted widely
1980s	United Nations GA Resolution A/RES/35/56: International Development Strategy for the Third United Nations Development Decade	1980	Focus on poverty reduction and sustainable development. The international developmental arena dominated more by efforts of the WB and the IMF for adjusting macro-economic imbalances and inflation, thus developmentally also known as the "lost decade".

Dev. Decade	Key Moments	Year	Key Points
	World Conservation Strategy: Living Resource Conservation for Sustainable Development	1980	First international document on living resource conservation, arguing that sustainable development should support conservation
	Declaration on the Right to Development	1986	Linking development as a right within the human rights framework
	Our Common Future (Brundtland Report)	1987	The report defined the principle and definition of sustainable development still used today as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”, major milestone in the understanding of sustainable development
	The Intergovernmental Panel on Climate Change (IPCC) was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO)	1988	United Nations body for assessing the science related to climate change and assessing its impact on the world and the future.
1990s	United Nations GA Resolution A/RES/45/199: International Development Strategy for the Fourth United Nations Development Decade		More of the WB and IMF policies, but also UN reorientation back to the primacy of developmental priorities
	UNDP Human Development Index (HDI)	1990	First HDI published, combining income, health and education in one index
	UN GA Resolution A/CONF.151/26 at the Earth Summit in Rio de Janeiro, Agenda 21	1992	Development and environment, with drafting of three major treaties on climate change, biological diversity and combating desertification. Agenda 21 is a non-binding action plan of the United Nations with regard to sustainable development.

Dev. Decade	Key Moments	Year	Key Points
	United Nations Conference on Environment & Development: AGENDA 21 (Earth Summit)	1992	A comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations System, Governments, and Major Groups in every area in which human impacts on the environment
	United Nations Framework Convention on Climate Change (UNFCCC)	1992	UNFCCC established by an international treaty signed by 154 states, committing signatories to reduce atmospheric concentrations of greenhouse gases with the goal of "preventing dangerous anthropogenic interference with Earth's climate system".
	Convention on Biological Diversity (CBD)	1992	First global agreement to cover all aspects of biological diversity
	Convention on Desertification	1994	Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa
	World Summit for Social Development (Copenhagen)	1995	Governments reached a new consensus on the need to put people at the centre of development, focusing on poverty, full employment and social integration
2000s	UN GA Resolution 5A/RES/55/2: United Nations Millennium Declaration (MDGs)	2000	The adoption of the Millennium Development Goals, 8 economic and social goals with specific targets to be achieved by 2015
	UN GA Resolution Road Map towards the Implementation of the United Nations Millennium Declaration	2001	Operationalizing the Millennium Declaration and the MDGs
	UN World Summit on Sustainable Development (Johannesburg Summit)	2002	Adopted a Political Declaration and Implementation Plan which included provisions covering a set of activities and measures to be taken in order to achieve development that takes into account respect for the environment

Dev. Decade	Key Moments	Year	Key Points
2010s	UN General Assembly Resolution A/RES/66/288. The Future We Want (Rio+ 20)	2012	Commitments from Rio 1992 regarding environmental sustainability were not successful and were thus renewed
	UN GA Resolution A/RES/70/1: Transforming Our World: The 2030 Agenda for Sustainable Development (SDGs)	2015	Start of the United Nations 2030 Agenda and a set of 17 Sustainable Development Goals (SDGs) with 169 targets to be achieved by 2030, bringing together economic, social and environmental dimension for the first time, underpinned by peace, good governance and partnerships.
	Paris Agreement (COP21)	2015	Adopted by 196 parties at the UN Climate Change Conference (COP21) in Paris, aiming to combat climate change by reducing greenhouse gases' emission with the goal to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels."
	UN GA Resolution A/RES/69/313: Addis Ababa Action Agenda (AAAA)	2015	The outcome of the 2015 Third International Conference on Financing for Development, held in Addis Ababa, by 174 parties, representing a new global framework for financing sustainable development by aligning all financing flows and policies with economic, social and environmental priorities.
	UN GA Resolution A/RES/69/283: Sendai Framework for Disaster Risk Reduction (2015–2030)	2015	Focuses on the adoption of measures which address the three dimensions of disaster risk (exposure to hazards, vulnerability and capacity, and hazard's characteristics) in order to prevent the creation of new risk, reduce existing risk and increase resilience.

Dev. Decade	Key Moments	Year	Key Points
	UN Decade of Action for the SDGs	2019	UN SG launched the Decade of Action to accelerate progress towards achieving the SDGs by 2030, calling on all sectors of society to mobilize on three levels: global action, local action and people action

Source: United Nations General Assembly. 1960–2015c

Due to the limitations of the current high growth paradigm in developmental models, which brought about all the existing crises and the negative implications for the environment and climate, and exacerbated inequalities, the debates started questioning such anthropocentric consumerist focus in development. New paradigms are in the making, since the present models are biologically unsustainable, and so is the urgency to act and change the imbalances of broken socio-economic models. New approaches can be regarded as complementary to the last stage of the concept of sustainable development as defined above – the Sustainable Development Goals.

Such new approaches are radically questioning some basis postulates of the existing growth paradigms. The most radical one is the zero-growth or de-growth scenario, the idea behind which is to reduce emissions and other negative effects on climate and the environment by slowing down or even stopping growth. However, Damijan (2021) believes that this cannot resolve the problems but only freeze them, preserving the existing inequalities in the world, such as the poverty in LDCs. Nevertheless, de-growth mentality and thinking holds some potential, as lower growth sometimes also being associated with opportunities for eliminating the most polluting and climate damaging activities, as has already been happening in developed countries (see Svetličič, 2021), albeit this trade-off is not a must.

Another idea is to substitute the initial Limits to Growth idea (Club of Rome) with the Limits within Growth (Earth for All, 2022), emphasizing the growth in the values instead of volumes, and wellbeing instead of wealth, all in order to save the only planet we

have. Kate Raworth has started a similar path with her Doughnut economy model (2017) even earlier, calling for a complete transformation of the prevailing development model (of endless GDP growth), and making sustainability and social goals the top priority. In a doughnut economy, 12 social foundations are met without overshooting any of the nine ecological ceilings. The problem is however, that such an „*idealistic model might not be viable*“ (Milanović, 2018) on account that there is no single world welfare function we all subscribe to, nor perfect information, or perfect markets allowing for either a centrally planned or market based mechanism to maximize it.

Nevertheless, both the thinking around SDGs and new thinking models as the abovementioned, should be a welcome wake-up call to transform our growth maximization worldview into a more balanced, sustainable perspective that allows both humans and the planet to thrive. What is thus needed is to find a realistic way to achieve such ambitious goals and adjust them to the specific needs, values and priorities of each society, and its development stage (there is no one-fits-all strategy), just like developed countries did in their catching-up period. Such long-term sustainable goals seem achievable only if the entire global system is changed (Svetličič, 2021).

## **Analysis and Discussion of the Western Balkans**

### ***SDG Performance Comparisons in the Countries of the Western Balkans***

Sustainable Development Goals (SDG) monitoring and evaluation reports are essential tools for tracking the progress of countries. They provide a comprehensive analysis of the implementation of the SDGs at the national and international levels, and evaluate the progress made towards achieving the targets set for each goal, while they also identify areas where further action is required. They also need to include a set of indicators to measure the progress towards each goal, and assess the quality and availability of data on each indicator, and identify the data gaps that need to be addressed. In addition to monitoring progress, SDG evaluation



reports should also assess the effectiveness of the policies and interventions aimed at achieving the SDGs. They should provide recommendations for improving the implementation of the SDGs and identify best practices that can be replicated in other countries.

SDG monitoring and evaluation reports are produced by various organizations, including governments (through voluntary national reviews, presented in the High Level Political Forum every year at the UN headquarters in NY), international organizations (UN SG's annual Sustainable Development Goals Report; OECD's report, etc.), and civil society groups/NGOs. The reports are usually published annually or biennially and provide an important tool for tracking progress towards the SDGs and ensuring accountability. Unfortunately, not many are available that satisfy the criteria set in the paragraph above, and might allow a clear inter country and inter temporal comparison of SDG progress, achievements and bottlenecks. In fact, there is only one global report that allows that.

The Sustainable Development Report, formerly known as the SDG Index & Dashboards, is a global study that evaluates the progress of each country in achieving the SDGs. The report is a useful tool for both governments and civil society to identify priorities for action, understand key challenges, track progress, ensure accountability, and identify gaps that need to be closed to achieve the SDGs by 2030. The Sustainable Development Report is produced by the Sustainable Development Solutions Network, a non-profit launched by the United Nations in 2012 to promote the implementation of the SDGs, led by the Economist Jeffrey Sachs. It is not an official monitoring tool, but rather a complement to the official SDG indicators and voluntary country-led review processes. The report uses publicly available data from official data providers such as the World Bank, WHO, and ILO, as well as other research centres and non-governmental organizations. The popularity of the global SDG Index and Dashboards has inspired localized assessments of SDG progress around the world. It must also be noted that only some of the indicators used in the report are the official UN SDG Indicators, while many are proxies used in order to attain data availability and coverage across countries (Sachs et al., 2022).

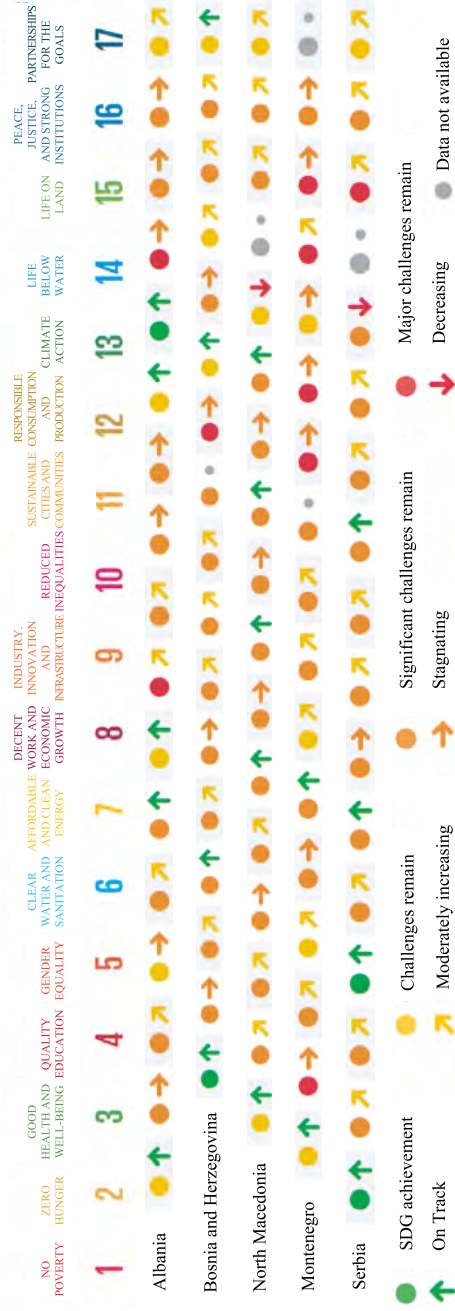
The 2022 Sustainable Development Report (SDR) ranks and scores 166 countries based on a composite score that estimates

their achievement of the 17 SDGs. The SDR tracks 120 indicators and specifies whether a given indicator or SDG are on track, or if challenges, significant challenges, or major challenges remain in the way of achieving the given SDG. It calculates SDG specific scores as well an overall SDG Index score. With respect to this, the highest-ranking WB country is Serbia on 35<sup>th</sup> place with the score of 75.9. It is followed by North Macedonia at 57<sup>th</sup> and the score of 72.3, which is very closely followed by Bosnia and Herzegovina and Albania at 59<sup>th</sup> and 61<sup>st</sup> place and respective scores of 71.6 and 71.7, and Montenegro which is much behind, being ranked 86<sup>th</sup> with the score of 68.8 (Sachs et al., 2022).

Table 2 shows an excerpt from the SDR 2022 SDG dashboard for WB countries, showing both SDG achievements and trends, for each SDG separately. Table 3 summarizes these results further by only looking at the extremes, both in terms of the levels and in terms of the dynamics. We can see that, in line with the SDG Index itself, Montenegro as the worst performer, has five SDGs with major challenges remaining and only two on track to meet the targets. North Macedonia has not achieved any SDGs yet. However, it is the only country in the WB that does not have any SDGs with major challenges remaining, and is situated strongly in between in terms of its SDG achievements while also being the second best in terms of dynamics, with five goals on track (and one – SDG 13, decreasing). Albania is the absolute winner in terms having five SDGs dynamically on track. Serbia is the other country apart from North Macedonia that also has a decreasing trend on the same SDG as North Macedonia. Finally, Bosnia and Herzegovina has achieved one SDG, while also experiencing major challenges concerning another one (SDG 11).

Across the WB, we can visually identify reduction of poverty (SDG 1) as the most successful goal both in terms of achievements, and dynamics, with all five countries being on track to meet the goal and two already meeting the goal. Another positive goal that stands out is SDG 6, where significant challenges remain in all countries, but all except Bosnia and Herzegovina are on track to meeting the targets. On the other hand, the worst ranking goals, where two or more countries are experiencing major challenges, are Sustainable cities and communities (SDG 11), Life below water (SDG 14)

Table 2. SDR 2022 SDG dashboard for WB countries (levels and trends)



Source: Adapted from Sachs et al. (2022). No data for Kosovo available. See online source for a colour adaptation.

and Life on land (SDG 15), i.e. very much the environmental goals. In terms of dynamics, we can see that SDG 11 achievements are stagnating (apart from Serbia showing a moderate increase). We further have two countries stagnating and three moderately progressing in SDG 15, while SDG 14 also shows unfavourable data for two countries, and stagnating or moderately increasing trends for the others.

Table 3. Extreme achievements and trends for WB countries across the SDGs

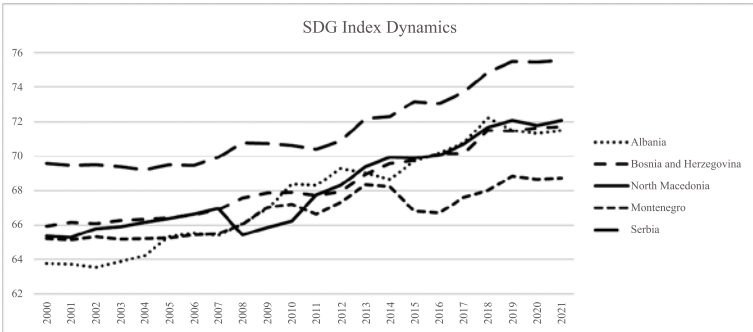
	# Achieved	# Major challenges remaining	Difference	# On track	# Decreasing	Difference
Albania	1	2	-1	5	0	5
Bosnia and Herzegovina	1	1	0	4	0	4
Montenegro	0	5	-5	2	0	2
North Macedonia	0	0	0	5	1	4
Serbia	1	1	0	4	1	3

Source: Own calculations and Sachs et al. (2022). No data for Kosovo available.

We next turn to the general dynamics of the SDG Index, where Figure 1 shows the progress in the overall SDG Index across the WB countries from 2000 to 2021. In the 22 years in question, the biggest progress was achieved by Albania, with a 12% increase, followed by North Macedonia with 10%, and Bosnia and Herzegovina and Serbia both with 9%, while Montenegro lags behind with 5%. Both Montenegro and North Macedonia also have a visible drops in that period. All these countries have also experienced yearly negative growths/setbacks in that period. The overall progress in sustainable development is visible in all WB countries and highly correlated, with highly significant pairwise Pearson Correlation Coefficients of more than 90% for all country pairs apart from North Macedonia and Montenegro (86%) and Montenegro and Serbia (88%).

We proceed with the application of the RCO-UNCT Economist Toolkit (Kuncic, Hamilton 2021) to the WB countries. The Toolkit includes three policy papers and statistical code in Stata

Figure 1. SDG Index dynamics



Source: Own representation and Sachs et al. (2022). No data for Kosovo available.

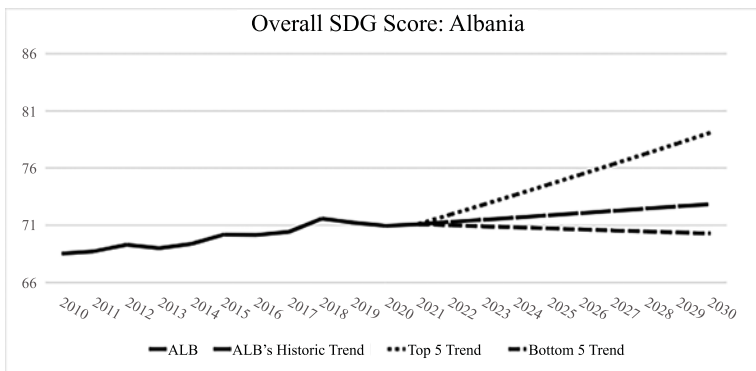
that enable governments and UNCTs to make macro SDG forecasts, assess SDG interlinkages, and evaluate human rights and LNOB quantitatively. The research aims to identify suitable policy interventions for SDG acceleration and consider the integrated nature of the SDGs, while focusing on vulnerable groups and human rights. The approach allows for forecasting macroeconomic SDG scores on a country level and comparing trajectories based on recent experiences of comparable countries. The Toolkit enhances analytical capabilities and promotes comparability amongst UN Common Country Analyses and UN Cooperation Frameworks for regional and global monitoring and reporting. Perhaps the most intriguing and useful characteristic of the Toolkit is that it provides not only the code and the data needed for implementation, but also has auto-programmed features in Excel with automatically delivering the SDG projections/simulations and Human Rights analyses for all the countries available (over 150).

The methodology for all three parts of the Toolkit (SDG projections/simulations; Human Rights and vulnerable groups overlap with SDGs analysis; and SDG interlinkages/network analysis) is available in Kuncic and Hamilton (2021, 2023). Here we just recap the main points of the analysis most interesting for our purposes, which we then continue to build on - the SDG projections/simulations for the WB countries. The Toolkit identifies the nearest neighbours (NNS) of a focus country based on their achievements in the SDGs over the past ten years. The toolkit uses the Sustainable

Development Report (Sachs, 2021) to generate composite SDG scores for each country and year, which are normalized and carried forward and backward to prevent synthetic variability based on data gaps, in essence staying true to the Sachs 2021 and 2022 methodology, but nevertheless with some deviations so there is no complete overlapping. The toolkit then calculates the growth rate and the nearest neighbour (NN) match score for each country. The SDG scores for the focus country are extrapolated to 2030 using the mean trend growth rate of the top five and bottom five NNs, as well as the focus country's historical annual growth rate. The toolkit also identifies the top five (most successful) and bottom five (least successful) NNs in the closest 15% nearest neighbour matches for each SDG, with the aim of facilitating peer learning and policy transfer, and SDG simulations.

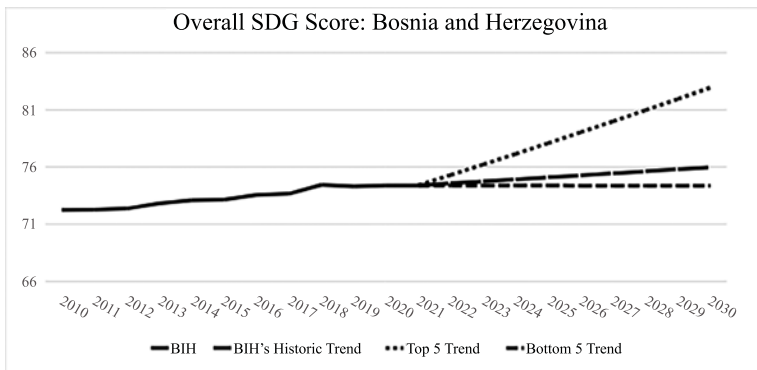
The results for each WB country are shown in Figures 2a-e), but only for the Overall SDG Score, which is an arithmetic mean of all 17 other SDG specific scores, so it shows the overall situation and possible pathways forward. These projections are however available, for each SDG separately, and it is there where the policies that we can identify through a NN approach become even more useful. It is shown for instance for the case of Saudi Arabia in a long paper on identifying peer learning opportunities and the exact SDG segregated policies using the NN methodology and

Figure 2a. SDG Simulations up to 2030; Albania



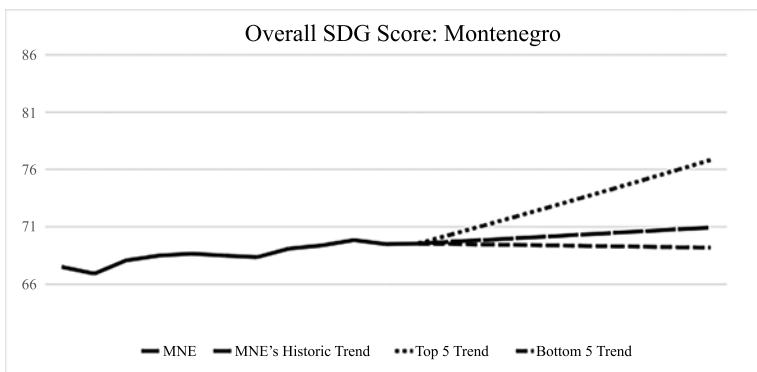
Source: Sachs et al. 2021, Kuncic and Hamilton 2021, and own calculations and simulations

Figure 2b. SDG Simulations up to 2030; Bosnia and Herzegovina



Source: Sachs et al. 2021, Kuncic and Hamilton 2021, and own calculations and simulations

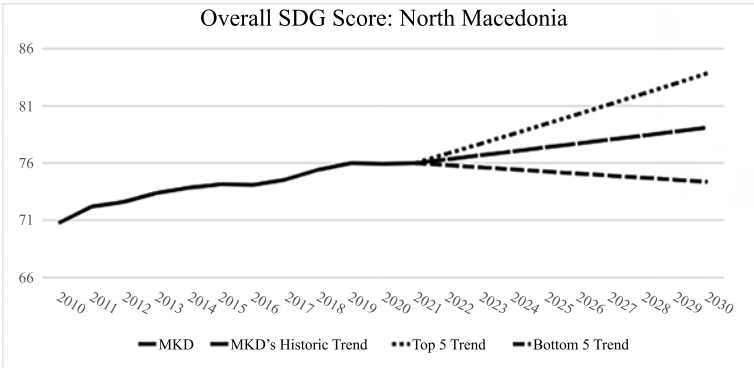
Figure 2c. SDG Simulations up to 2030; Montenegro



Source: Sachs et al. 2021, Kuncic and Hamilton 2021, and own calculations and simulations.

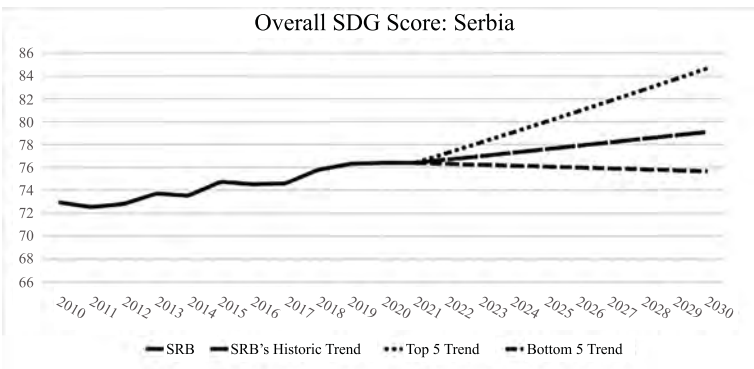
applying it to Saudi Arabian context (Shen et al., 2022). As such, an application demands the space and details, country by country; we present the overall situation with the Overall SDG Scores for the WB countries all together. Due to the nature of the simulations, it starts in 2021 and due to some differences in methodology, the scores do not overlap completely with Sachs et al. (2021), but the

Figure 2d. SDG Simulations up to 2030; North Macedonia



Source: Sachs et al. 2021, Kuncic and Hamilton 2021, and own calculations and simulations

Figure 2e. SDG Simulations up to 2030; Serbia



Source: Sachs et al. 2021, Kuncic and Hamilton 2021, and own calculations and simulations

rankings remain the same, with Serbia in the lead and Montenegro trailing behind.

Each country Figure below firstly presents the recalculated historical scores, and then offers three simulations for the future up to 2030. The first simulation is the historical pathway/trend of the country, the second one is the arithmetic average of the annual



growth rate of the five most successful (top) NNs, and the third one is the arithmetic average of the annual growth rate of the five least successful (bottom) NNs.

Table 4 provides a summary overview, where the 2021 scores are the SDR scores and the subsequently calculated simulation scores have been linearly adjusted (shifted) for that same amount. Now, we can answer an interesting question – where would our WB countries be in 2021, had they in fact grown at the rate of the Top 5 NNs in the preceding decade. Serbia would still be the absolute winner at the fantastic fourth place, only bested by Finland, Sweden and Denmark. It would be followed immediately and equally impressively by Bosnia and Herzegovina at the fifth place. North Macedonia would be at position 12, Albania at 24, and Montenegro, as the last in the WB group, at 36. In terms of ascending the greatest number of positions, Montenegro would in fact be the winner, as it rose by 49 places, while Serbia would be the last, with a rise of “only” 30 place (both not surprising due to the unconditional convergence basis of the simulation method).

Table 4. Counterfactual for 2021 had the countries grown at the rate of the Top 5 NNs

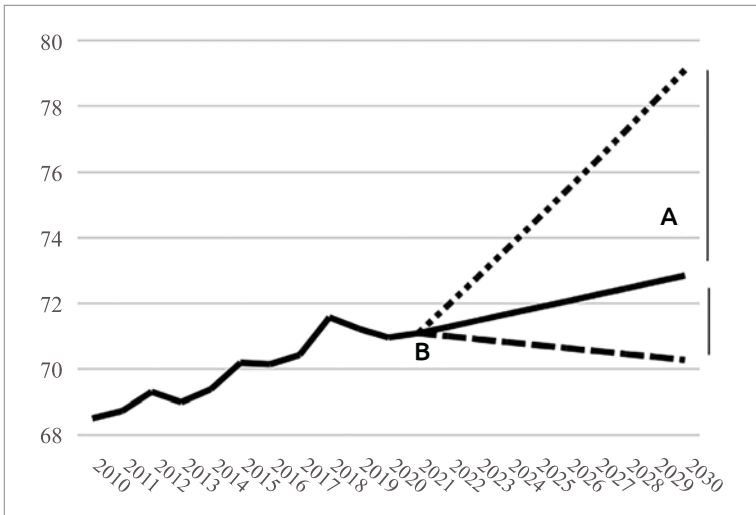
	Alba- nia	Bosnia and Herzegovina	Monte- negro	North Macedonia	Serbia
2021 SDG Index Score	71.0	73.7	68.2	72.5	75.6
2021 SDG Index Rank	64	47	85	54	34
Adjusted Max score (Top 5 NN)	79	82.2	75.5	80.4	83.8
Adjusted Max rank for 2021 (Top 5 NNs)	24	5	36	12	4
Increase in rank for 2021 (Top 5 NNs)	+40	+42	+49	+42	+30

Source: Sachs et al., 2021, Kuncic & Hamilton, 2021, and own calculations and simulations

Turning back again to the SDG simulations in Figure 2, showing potential pathways up until 2030, we want to be able to better evaluate what the opportunity cost of inaction is. In order to do that, we calculate the surfaces of the two triangles created by our SDG simulations, as in Figure 3. Triangle A represents the potential

gain between the historical trajectory up to 2030, and the trajectory based on the Top 5 NNs growth rates, i.e. the simulated trajectory indicating the development should a country put realistically optimal policies in place. In other words, we can understand this could imply a potential gain, or an opportunity cost in case of simply continuing on the historical path. On the other side, we also have the triangle between the historical trajectory and the trajectory based on the bottom 5 NNs growth rates. That one represents the situation where the country would be adopting the worst policy mix, based on the bad policy mixes in other countries, and can be understood as a potential loss.

Figure 3. Opportunity costs breakdown



Source: Own calculations and simulations

Table 5 shows the calculated areas A and B for each country, the potential gains and the potential losses. In terms of potential gain, Bosnia and Herzegovina has the largest potential, followed by Albania, Montenegro, Serbia and then North Macedonia at the end. On the other hand, of course, we also have the potential loss, where North Macedonia faces the largest threat, followed by Serbia and then the rest. Perhaps even more interesting is what is noted in the table as a Blind Benefit of Action (BBA) and is calculated

as a coefficient of  $A/(A+B)$  and expressed as a percentage number. It juxtaposes potential gains and potential losses in case the policies are drawn at random, and estimates the likelihood of them being successful. The higher the number, the more it makes sense for the country to implement different policies than it has so far, as the blind chance of accelerating sustainable development and moving from the historical trajectory towards the Top 5 NN trajectory becomes higher. Bosnia and Herzegovina as well as Montenegro both have very high BBAs of around 80%, followed by reasonably high BBA of Albania at a bit over 70%. Serbia trails behind with just over 60%. The last one is North Macedonia, where there is likelihood of 50% that a policy drawn at random would have an equal chance of getting the country closer to a higher sustainable development trajectory or closer to a lower trajectory.

Table 5. Potential gains (A) and losses (B) of implementing new policy mixes from the NNs

	Albania	Bosnia and Herzegovina	Montenegro	North Macedonia	Serbia
Potential gain (A)	28.4	31.05	26.55	21.6	24.75
Potential loss (B)	11.25	7.2	7.65	21.15	15.3
Blind Benefit of Action (BBA)	72%	81%	78%	51%	62%

Source: Own calculations and simulations

Luckily though, policies are not normally drawn at random, but are usually underpinned by expert opinion, are evidence based, designed in light of national priorities, and quite often, are based on the experiences/examples of other countries that have gone through that particular stage of development already. For each SDG and for each country in question, we have the list of Top 5 NNs that have implemented the policies in the last decade, which made tangible progress on that particular SDG possible. That is where the peer learning potential lies in, and that is where the countries should look from the very start for a collection of potential policies practically guaranteeing convergence towards the good developmental trajectory. We do not waste space by providing the tables

for NNs for all 17 SDGs, but show the concept on the example of a weak SDG across all WB countries: SDG 11.

Table 6 shows the NNs, as defined above, for the WB countries concerning the SDG 11 for the purpose of peer learning. Each country has had the Top 5 best performing NNs identified, as well as the average yearly growth rates of those countries in terms of SDG 11 score in the last decade. The sets of Top 5 countries differ from country to country, with some overlapping for those WB countries that currently have a similar SDG 11 score. We, of course, cannot expect that all the policies in such a set of countries will be relevant for the context of, let's say, Bosnia and Herzegovina. Looking at exactly what kind of policies made these five countries very successful, will result in an initial policy set for Bosnia and Herzegovina, which can then be further developed and applied as the specific context allows and as far as it makes sense. Shen et al. (2022) show the usefulness of such an approach for a country by collecting policies for each SDG for the case of Saudi Arabia, and developing a process that then filters those policies in terms of how appropriate they are for the context of Saudi Arabia.

Table 6. Nearest neighbours for the WB countries for SDG 11 – *Sustainable cities and communities*, for peer learning

	Albania	Bosnia and Herzegovina	Montenegro	North Macedonia	Serbia				
	Top 5 NNs	Top 5 NNs	Top 5 NNs	Top 5 NNs	Top 5 NNs				
Malta	1.30	Nicaragua	0.82	Tajikistan	1.20	El Salvador	0.89	Panama	0.91
Sri Lanka	1.28	Guatemala	0.76	Belize	1.08	Guatemala	0.76	El Salvador	0.89
Azerbaijan	1.27	Paraguay	0.63	Nicaragua	0.82	Paraguay	0.63	Kyrgyz Republic	0.75
Lao PDR	1.21	Honduras	0.61	Guatemala	0.76	Honduras	0.61	Paraguay	0.63
Paraguay	0.82	Eswatini	0.47	Honduras	0.61	Belarus	0.37	Ecuador	0.49
Average:	1.18	Average:	0.66	Average:	0.89	Average:	0.65	Average:	0.74

Source: Own calculations and simulations

Moreover, the important thing in such an exercise though, is that it is done SDG by SDG, rather than using the overall score as in this paper, which is the option chosen for brevity and illustration. The SDG by SDG simulations, as well as identification of country-SDG specific Top 5 NNs is where the more accurate simulations/projections and the largest peer learning potential lie. Looking at the NNs also implies that within the WB region peer learning potential may be limited. The grouping of the countries together based on anything but their respective performance in different facets of sustainable development – or in different SDGs – is less relevant or helpful for the purpose of SDG acceleration, as pointed out by Kuncic (2018) with an application of the SDG groups most appropriate for the Arab region (spoiler: they are SDG-specific and do not conform to any existing geographical classification normally used). Finally, there is a danger of not seeing the forest for the trees, namely that by focusing only on individual SDGs, important interlinkages and synergies are missed, which the policy maker should not only be aware of, but be able to take the full advantage of. Kuncic (2019) applies network analysis to the system of SDGs and shows the usefulness of such an approach to capture that relationship and identify positive and negative interlinkages, as well as sets of goals, which should be targeted by policy bundles. That kind of analysis, albeit exceeding the scope of this paper, would adequately complement country-specific sustainable development studies, as it could including more emphasis on the overlapping between human rights and vulnerable groups on the one hand and SDG policymaking on the other (Kuncic and Hamilton 2021).

### *Assessment of the Results in View of Inherited Problems*

Before comprehensively assessing the results the WB countries achieved in the realization of SGD goals, it is necessary to see them in the light of their starting positions, which were much different than those other European countries. This is of paramount importance, since:

“too often today’s realities in the diverse and dynamic region of the WB are sometimes only the excuse for underperformance in the economic and political area or are, at the other extreme totally neglected written off as mere legacies of the violent past” (Wentholt, 2020: 13).

In the modern euphoria of ethno-nationalisms, conflicts and differences are emphasized much more than similarities, often reaching far back in history. Such conflicts among political parties and civil society abound within the WB countries. Political instability and changes of governments are frequent. This is not surprising, since not all of the consequences of the disintegration and years of war and conflict on its territory could have been rehabilitated quickly. Therefore, a more realistic and balanced approach is necessary to understanding the context.

There are at least four sets of special circumstances influencing the WB countries’ paths of sustainable development (evaluated in the context of SDGs, within the latest international sustainable development framework which is currently in place), which we discuss in turn:

1. Problems related to their former socialist socio political and economic systems.
2. Problems specific to the transition from socialist to capitalist economy.
3. Yugoslav War and its consequences.
4. Problems specific to the inherited economic structure and development strategies.

**Ad 1.** All of the WB countries after WWII had turned to socialism, although in quite different ways, which led to having remnants of the socio-political and economic system even after the nominal transitions to democracies and market-based economies. The “socialism” of the successor states of Yugoslavia was quite unique, as “compared to the more rigid communist economies in Central and Eastern Europe, the Yugoslav experience of ‘market socialism’ offered a promising starting point for the envisioned socio-economic liberalisation. Especially in the 2000s, regional economic growth was solid and income per capita increased” (Wentholt, 2020: 13). Albania on the other hand had adopted a more radical

Marxist path of socialism, all until the death of Enver Hoxha in 1985, when the new regime of Ramiz Alia introduced some gradual measures of liberalization, and then granting the freedom to travel abroad in 1990. Albania has been for a long time politically and economically isolated from the world, while the successor states of Yugoslavia, with its non-aligned foreign policy and ever-stronger economic ties with the West (after the split with Stalin in 1948), have been much more outward oriented.

Uvalić (2018) nicely explains the specifics of the former Yugoslav countries. The legacies of Yugoslav socialist system have influenced the transition process and even further transformation to the capitalist economies, of course differently in each of the WB countries. Four elements had already made Yugoslavia different earlier, after its initial phase: transition from central planning to quasi market-oriented open economy,<sup>7</sup> self-management, decentralization and non-aligned foreign policy. *“From the early 1950s, the Yugoslav government implemented a series of economic reforms that gradually decentralized the economy, introduced elements of the market mechanism and developed workers’ self-management. Although planning was a permanent feature it was more a flexible system based on the planning basic proportions/targets”* (Uvalić, 2018: 6). After the initial period of centralized planning, the so called “Visible Hand” period from 1952 to 1965, Yugoslavia moved on to the “Market Self-management” era from 1965 to 1972 and the “Social Planning” period after 1974 (Estrin, 1983: 57). The last but relevant characteristics of the Yugoslav economy, which has also had an impact on today’s development strategies and the implementation of SDGs, is the principle of solidarity, utilised in order to reduce the differences in the level of economic development among the republics and two provinces. Based on such an inherited principle one can assume that people are keener on fighting for the realization of SDGs even today.

**Ad 2.** The so-called Yugoslav market socialism made it easier to start the transition in some ways, but at the same time also slowed down other reforms. *“The timing and speed of implementation of transition-related economic reforms varied considerably, to a*

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<sup>7</sup> Yugoslavia was the first socialist country to allow quasi-foreign direct investments (only joint ventures up to 49 % foreign ownership) in 1967.

*great extent determined by the very different political conditions in each country in the early 1990s primarily due to major political instability. Political issues were given precedence over the economic ones and implied extreme economic costs. ... The results were country-specific varieties of capitalism largely determined by the political orientation and priorities of the main political parties in power* (Uvalić, 2018: 31, 32, 34). The free market ideology has nominally replaced the socialist ideology in all countries. *"The introduction of the neo-liberal concept of development induced a strong process of deindustrialization, emerging due to the applied economic changes and the collapse of industrial development.... The reforms led to a dramatic reduction in industrial employment between 1989 and 2012, as well as a decline in the share of manufacturing in GDP from 44.5% to 18.43%"* (Zeković & A. Perić, 2023: 10–11). The industrialization intensity indices among countries were different, as were the levels of industrialization of the WB countries (a difference between them up to a factor of 4), the intensity of the reduction in the role of manufacturing (compared to 1990), as well as competitive industrial performance – CIP index (which differed up to 5 times among countries) (ibid., 2023: 15–16). Serbia was the last one to implement such reforms with very slow privatization and abolishment of social property. The nominal changes often failed, as the striving for independence was nationalistic in character (rather than liberty and human rights centred), and the old structures of power managed to preserve themselves using means other than the political ones.

This led to the last important characteristic of the transition in most of the successor states of former Yugoslavia, i.e. the concentration of ownership mostly in the hands of national tycoon capitalists (oligarchs), where the tycoons were frequently close to the political parties in power. It also led to the collusion between the economic and political elites, as well as very slow in implementation and consolidation of democracies, and having persistently suboptimal outcomes in the market, as shown for the case of Slovenia by Burger and Kuncic (2014). Such elites quickly changed Marx's Capital for "Dress for Success". Greed became an important motive, which at the same time had negative effects on the implementation of SDGs, making the majority of them secondary to economic



growth priorities.<sup>8</sup> Such a transition was later also accompanied by falling living standards, particularly during the Great Recession in the years after 2007. The consequence of the 2007/2008 global financial crises was also:

“Large-scale anti-government protests in cities all over the region from Belgrade to Tirana illustrating the democratic backsliding that has plagued the region. Governments all over the region move towards ‘illiberal politics’ and ‘competitive authoritarianism’, formally allowing for multiparty elections but maintaining a tight grip on power and limiting democratic rights... In a report that made international headlines, Freedom House concluded that Serbia and Montenegro are no longer democracies, but instead, like Bosnia and Herzegovina and Albania, “hybrid regimes”. Kosovo and North Macedonia showed progress on these criteria, but the most recent political turmoil in Kosovo confirms Freedom House’s “doubts about future progress” (Wentholt, 2020: 18).

The growing populism and a turn to authoritarianism, together with still very many alive ethno-nationalist conflicts among and within the WB countries, were deteriorating the socio-political environment for the implementation of the SDGs, which often became secondary on the political agenda.

**Ad 3.** Objective evaluation of the realization of SDGs cannot be made without taking into consideration huge cultural, historic and economic differences among the WB countries, which created the environment for multiple wars and conflicts on the territory of former Yugoslavia after the breakup of the country in 1991. The costs of disintegration, breaking up of economic ties, massive displacement of populations, international sanctions, and exclusion from international organizations donor programs for some of the successor states, made their starting position for the implementation of the SDGs much more difficult. Reconstruction of the economies was the immediate and first priority. Albania was obviously in a different situation, but surrounded with Kosovo and N. Macedonia with considerable Albanian populations as well, it did feel some spill over effects of the conflicts.

<sup>8</sup> According to Balkan Barometer 2022, 49 out of 100 WB citizens think that growth is a priority.

Inherited and transition-related differences in economic performance, new income inequalities adding to the already existing and inherited ones, and different levels of social standard, caused great social tensions, corruption, nepotism and high criminality. Environmental and climate problems are, according to Balkan Barometer (BB), not addressed as desired and 27 out of 100 WB citizens think that corruption is a big problem (more than in 2015). The result is a huge brain drain; as much as 67 out of 100 young people are thinking of leaving their country and working abroad. Poor institutional capacity of the governments made them incapable to address such mounting social and political problems, incurring high costs which “could indeed become much larger than the benefits provided so far by capitalism” (Popov, 2017). In addition, “over the years, clientele’s networks have ‘captured’ weak state institutions, using these official channels to protect their vested interests” (Wentholt, 2020: 20) since weak institutions extract wealth from the majority of citizens and redistribute it to the minority (Ostojčić, 2020: 130). Although there is almost a political economy consensus on the need for a strong state for long term development (Dell et al., 2017), it has also been demonstrated that states are not necessarily drivers of welfare gains, particularly if they rest in the hands of powerful elites, as the captured state model explains. The consequences also include misalignments of incentives of government officials, weakening states’ capacities, and frameworks of widespread corruption (Trebbi & Washington, 2023).

**Ad 4.** A major characteristic of the former Yugoslav economies, and even more so of Albania, was underdevelopment. Substantial differences among republics and provinces continued to exist. The share of agriculture was much higher than in other European countries. Public and state ownership prevailed. Industrialization was characterized by a mix of heavy industry and consumer goods production, with a focus on self-sufficiency. Heavy, energy intensive industries were gradually transformed to the more developed manufacturing-oriented ones, with an increasing role of lighter industries (metallurgy, chemicals, textiles, automobile, furniture, electronics and food-processing sectors). Labour intensive manufacturing activities gradually became important export sectors of the economies. The industrial share of the social product (now GDP)

was gradually and substantially increasing, and consequently that of agriculture was decreasing. Its share ranges nowadays (in 2021) from the lowest in Kosovo at 12% of GDP, and 16% in Montenegro, to the highest of 26% in Serbia, followed by 24% in North Macedonia and 23% in B&H (EU average is 25%). Before the 1990s, industrial sectors across the WB countries were over-staffed and the capacities underutilized. Therefore, the productivity was low. Inflation rate, although volatile, was very high on average, reaching its peak just before the breakup of former Yugoslavia (2,685% in December 1990; 1240% annual rate; World Bank, 1990). The stabilization program was adopted in late 1989, when Yugoslavia was hit by hyperinflation. Unemployment was much higher than in the EU. Yugoslavia was highly indebted. By 1981, it had incurred \$18.9 billion in foreign debt<sup>9</sup> also affected by the negative trade balances. Initially, a rather closed, self-sufficient, autarky economy started to open up after the major economic reform of 1965. More outward oriented strategy, with export becoming the development priority gradually enriched initial import substitution strategy. Manufacturing sectors were nevertheless highly protected for too long. Many of them had consequently not been able to meet international competition after the total opening up during the transition, and they collapsed.

What was specific for Albania prior to 1991 was that the Communist Party controlled the entire economy through five-year plans, with state control over the entire production, collectivized agriculture, nationalized industry, and with no private enterprises allowed. Foreign aid and investment were also forbidden, contributing to Albania's reputation as an isolationist country. After communism, there was a shift towards decentralization and lifting of private trade restrictions, leading to increased foreign investments in the mid-1990s, accompanied with a rapid economic growth. However, setbacks such as the pyramid finance scheme of 1997 and political polarization, hampered economic development, and even more so, sustainable economic development throughout the 1990s. In comparison with the other WB countries, Albania consistently had a higher share of agriculture value added, which was for instance over 36% in 1966, falling down to 18% in 2021, but still employing

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<sup>9</sup> OECD Economic Surveys: Yugoslavia, 1990: 34.

about half of the total work force. Apart from Agriculture, Albania's economy today is based on services at around 50% – a half of which representing tourism, and the industrial sector at around 25%. The economy has been characterized by high unemployment (12%, youth unemployment at 21%), a large informal sector of around 30%, and a high public debt-to-GDP ratio of over 80%. Export revenues represent around 30% of the GDP, which makes the country relatively self-reliant and less affected by external factors.

In spite of all these starting difficulties, table 7 reveals that all WB countries have achieved quite impressive results in increasing their GDP p.c. throughout the transition, but less so in improving their human development index (HDI) or rank.

Table 7. GDP per capita and HDI index of Western Balkan countries

Country	GDP pc (current US dollars)		HDI index rank		Improvement of
	1995 or the latest available	2021	1995	2021	
Albania	586	6,493	75	67	8 places
Bosnia and Herzegovina	498	7,143	81	74	7 places
North Macedonia	2,373	6,695	82	78	4 places
Montenegro	1,627 (2000)	9,466	48	49	1 place
Serbia	2,208	9,164	66	63	3 places
Kosovo	1,088 (2000) <sup>10</sup>	5,270	n.a.	84	n.a.

Source: World Bank Country Insights and Human Development Reports (undp.org)

This only confirms that the priority was given to traditional development objectives (extensive growth based on existing economic/industrial structures), while the restructuring of industry, greening of the economy, or improving other aspects of the standard of living, quality of life, health or climate, were not a priority. Governments were afraid of causing big social socio-economic problems because such industries have employed a large number of workers. Unfortunately, in addressing different crises, governments looked for solutions mainly within the existing economic structures,

<sup>10</sup> [KosovoSnapshotApr2020.pdf \(worldbank.org\)](https://www.worldbank.org/docs/default-source/kosovo-snapshot-apr-2020.pdf)

rather than looking towards structural transformation of the economy, while aiming at reducing pollution, which is one of the greatest problems in the region, and greening of the economy in general.

### *Implications for the Way Forward*

Western Balkan countries have made substantial, although different achievements concerning the SDGs, particularly in view of the heavy burdens of the past and the still ongoing ethnic frictions within and among them. Different results were a consequence of the differences in the inherited economy structures, speed of transition and homogeneity or heterogeneity among their political parties, as well as the competences and capacities of their governments. Those able to consolidate the political system, reach consensus about development priorities and transform short term focus into more long-term goals, achieved better results.

External zeitgeist played a substantial role in slowing down the process of the implementation of SDGs objectives. Countries had just recovered from the Great Recession when the COVID-19 pandemic started, with the environmental and climate crisis also looming, which all finally contributed to major social crises. The war in Ukraine added to the culmination of all these crises, being historically among the worst at one single moment. In such a catastrophic external environment the “old normal” policies prevailed and dominated, as the policy makers reached for the toolbox that had been used in the global financial crisis of 2007 and 2008, creating an unfavourable climate for the acceleration of SDGs. Not only have the WB countries “stepped back”, if we may use the famous Dončić’s basketball move as an analogy. Survival came first while long term greening of the economies was postponed for *better times*, even though they may be helpful in getting out of the present multiple crises. Switching from short to long-term orientation got an additional blow. Policy makers are still far from realizing that by undertaking long-term inclusive sustainable growth strategies they can in fact be addressing the present short-term pressing problems as well.

Since all WB economies are strongly interlinked with the EU, as are their political ambitions, the slowdown in the accession process had particularly negative effects on the realization of SDG

objectives. Enthusiasm among the WB's populations, as expressed by the public opinion, has been recently drying up, accompanied by many frustrations or even disappointments regarding the EU membership prospects (EU enlargement fatigue). For the first time since 2015, support for the EU membership has stopped growing and decreased across the WB region. In 2016, as much as 62% citizens, according to the BB 2021, endorsed the membership with huge differences by countries<sup>11</sup>. It was also a reflection of the unresolved local economic problems, among which unemployment was still considered as the main one (39 out of 100 in 2021, but substantially less than in 2015 when it was 64 out of 100; BB 2022). Nevertheless, EU membership is in general still the overarching goal for the WB countries. It is understandable, since the EU countries are major trading partners, leading investors and donors in the WB.

The EU is also claiming to be fully committed to the EU integration of the WB. Accession talks are underway with Montenegro and Serbia. In March 2020, the Council agreed to open accession negotiations with North Macedonia and Albania, which had their first Inter-governmental Conference in July 2022, after the Bulgarian blockade of North Macedonia was lifted. Bosnia and Herzegovina became formally a candidate, while Kosovo formally submitted its application to become a candidate country in December 2022. The Tirana declaration reconfirmed EU's "full and unequivocal commitment to the EU membership perspective of the WBs and calls for the acceleration of the accession process, based upon credible reforms by partners, fair and rigorous conditionality and the principle of own merits" (EU's summit in Tirana – Consilium (europa.eu)).

SDGs have, as indicated in the Table 8, very high overlapping with the accession chapters of the EU Acquis Communautaire. Successful closing of each of the chapters would in fact also imply the progress in achieving SDGs, so both achieving the SDGs and the EU accession can be seen as complementary overarching goals for the WB countries.

Table 8. EU Clusters, Chapters and SDGs mapping

<sup>11</sup> The strongest support in 2016 was in Kosovo and Albania (89 and 87% respectively), followed by N. Macedonia 41%, Montenegro 35% and B&H 30%, while in Serbia it was only 24% (BB 2015).

Cluster	Chapter	SDGs
1. Fundamentals	5 – Public procurement	1, 2, 5, 16
	18 – Statistics	
	23 – Judiciary and fundamental rights	
	24 – Justice, Freedom and Security	
	32 – Financial control	
2. Internal Market	1 – Free movement of goods	3, 5, 12
	2 – Freedom of movement for workers	
	3 – Right of establishment and freedom to provide services	
	4 – Free movement of capital	
	6 – Company law	
	7 – Intellectual property law	
	8 – Competition policy	
	9 – Financial services	
	28 – Consumer and health protection	
3. Competitiveness and inclusive growth	10 – Information society and media	2, 4, 5, 3, 9, 10
	16 – Taxation	
	17 – Economic and monetary policy	
	19 – Social policy and employment	
	20 – Enterprise and industrial policy	
	25 – Science and research	
	26 – Education and culture	
	29 – Customs union	
4. Green agenda and sustainable connectivity	14 – Transport policy	5, 7, 11, 13, 14
	15 – Energy	
	21 – Trans-European networks	
	27 – Environment and climate change	
5. Resources, agriculture and cohesion	11 – Agriculture and rural development	5, 6, 14, 15
	12 – Food safety, veterinary and phytosanitary policy	
	13 – Fisheries	
	22 – Regional policy & coordination of structural instruments	
	33 – Financial & budgetary provisions	
6. External relations	30 – External relations	5, 17
	31 – Foreign, security & defense policy	

Source: European Commission, 2020

In November 2020, the Green Agenda for the WB was signed, and financial resources were allocated for its implementation “to help the WB countries to prepare for the EU accession, through the adoption of harmonized standards and the definition of development priorities”. One important thing to note for the future is that there is a need to place SDGs together with “*human rights, environment, planet, nature, above the rights of corporations, above the rights of the extremely wealthy. This means moving away from the notion that markets can deliver all of the outcomes that we want, and recognizing that they have to be constrained, regulated in the public good, in the common interest, in order to meet our other goals. ...We have to see this as a global public investment that requires a global approach, because climate change doesn't recognize visas, passports, or national borders*” (Ghosh, 2023).

The first precondition for faster and more efficient implementation of SDGs is thus the change of the mind-sets, theories, way of life, competencies, and strategies, in order to overcome such a persistent resistance to changes in most organizations and individuals. Secondly, policies installing the wellbeing of the population first instead of growth in terms of volumes need to be put in place. New circumstances demand qualitatively new approaches, paradigm shifts, and speedy action, not incrementalism. In other words, the anthropocentric consumerist development model needs to be supplemented with the inclusive one, because costs of inaction are much higher than the consequences and even of the costs of imperfect actions. In the words of Dixson-Declève et al. (2022) in the book *Earth for All*, the only viable and achievable scenario is The Giant Leap, where “societies adopt unprecedented and immediate action across five interconnected turnarounds:

- Ending poverty through reform of the international financial system, lifting 3-4 billion people out of poverty.
- Addressing gross inequality by ensuring that the wealthiest 10% take less than 40% of national incomes.
- Empowering women to achieve full gender equity by 2050.
- Transforming the food system to provide healthy diets for people and planet.
- Transitioning to clean energy to reach net zero emissions by 2050.”



In other words, The Giant Leap scenario is the realization of SDGs in all their three dimensions – economic, social, and environmental, underpinned by peace, good governance, and partnerships.

Such a long-term strategy of the region is possible in the end only in the appropriate external institutional environment, which would give enough place for nationally specific strategies adjusted to specific local conditions and socio-economic priorities, much like the United Nations Agenda 2030 with its SDGs, which are to be contextualized and adapted for every country. Namely, there is no single fit-all strategy. Multilateral frameworks in place have to allow for flexibility in adopting multilateral rules and principles; a combination of some obligatory rules and a system of rules or principles to be adopted in the future. Countries should have more policy space, and flexibility in adopting some rules more gradually if their situation still does not allow adopting them immediately, and concurrently accepting the obligation to adopt them at a certain time in the future. In short, a fox-like type of open, adaptable, and flexible system of voluntary measures and binding rules, not a hedgehog type of with, a single prevalent, right idea, (Svetličič, 2022).

## Conclusion

This chapter explores the evolution of the concept of sustainable development in the international arena, focusing on key international treaties and frameworks, through the four UN Developmental Decades, the 1990s marked by Human Development Index, 2000s marked by Millennium Development Goals, and finally the Sustainable Development Goals (SDGs) after 2015. The SDGs are nowadays the prevalent framework of both international and national ambitions for sustainable development, including both economic, social and environmental dimensions, and support by good governance peace and partnerships.

We apply the concept of sustainable development to the WB through a data-driven approach. With the SDG Index and SDG-specific scores, we evaluate the progress of the WB countries in various areas of sustainable development, considering both the achievements and the dynamics. In spite of many past and current difficulties, we find that the WB countries have achieved, substantial

progress in the realization of SDG goals, although the achievements vary depending on the selected issue and the country. We find that across the WB countries, the reduction of poverty (SDG 1) has been the most successful goal in terms of both achievements and dynamics, with all five countries being on track, or having already met the target. SDG 6, related to clean water and sanitation, also shows significant progress in most countries. However, the environmental goals of sustainable cities and communities (SDG 11), life below water (SDG 14), and life on land (SDG 15) have experienced major challenges in two or more countries, with stagnating or moderate progress. In terms of individual rankings, Serbia is the highest-ranking WB country, followed by North Macedonia, Bosnia and Herzegovina, Albania, and Montenegro.

Using the RCO-UNCT Economist Toolkit, which includes policy papers and statistical code on SDG simulations, we find out that, had the WB countries adopted the best policy mix already successfully tried out in other countries during the past decade, two of them would be able to rank in the top five, second only to some Scandinavian countries, and all of them would have made jumps of thirty places or more in the ranking. We also developed a measure that tells us what the likelihood of a policy change would be for each WB country to accelerate its sustainable development – the Blind Benefit of Action (BBA). It shows us that Bosnia and Herzegovina, as well as Montenegro have very high values and should both act, followed by a reasonably high value of Albania, and finally, Serbia and North Macedonia. All countries though, would be well advised to adopt policies that have worked elsewhere already, in order to accelerate their SDG progress. We showed how such an approach is inevitably SDG-specific and demonstrated it on the example of SDG 11, where we identified the countries most suited for peer learning for each of the WB countries. We should all learn from the most successful stories within the region and globally.

We discussed these findings also in light of the four sets of special circumstances influencing the WB countries' paths of sustainable development: 1) Problems related to their past socialist socio-political and economic systems; 2) Problems specific to the transition from socialist to capitalist economy; 3) Yugoslav War and its consequences and 4) Problems specific to the inherited economic

structure and development strategies. All four sets of circumstances have, of course, contributed to a much more gradual sustainable development in the WB countries than elsewhere. We find that all WB countries have achieved quite impressive results in increasing GDP p.c. throughout the transition, but less so in improving their human development index (HDI) or rank, and in other facets of sustainability.

The way forward for sustainable development in the WB was examined; including lessons learned, necessary paradigm shifts, and key steps to be considered, taking into account the overlapping EU accession process, as well as the confluence of the many crises the world has been facing. We find that under extraordinary conditions, policy makers are still tempted to focus more on the traditional economic and then social development, with environment, climate and sustainability in general still often remaining in the back seat when compared to other, more pressing concerns.

The EU membership remains a key goal for the WB countries, as the EU is a major trading partner, investor, and donor in the region. SDGs also have high overlapping with the EU Acquis Communautaire, and successful progress in the EU accession chapters would imply progress in achieving SDGs, making both goals complementary for the WB countries.

Finally, true progress in sustainable development and reaching of Sustainable Development Goals require a change in mindsets, theories, competencies, as well as strategies of overcoming the resistance to change. Policies are needed that are not incremental, but instead represent paradigm shifts, while they are simultaneously universal, equal and equitable, as well as flexible enough for the countries to be able to tailor them to national contexts and realities.

## REFERENCES

- Acemoglu, D., James R. & Thierry V. (2012b). Can't We All Be More Like Scandinavians? Asymmetric Growth and Institutions in an Interdependent World. Accessible at [https://www.urosario.edu.co/urosario\\_files/1a/1ab5f36b-2789-49ea-8c31-597218e6dfc2.pdf](https://www.urosario.edu.co/urosario_files/1a/1ab5f36b-2789-49ea-8c31-597218e6dfc2.pdf), 13. 2. 2022.
- Azadi, H., Verheijke G. & Witlox, F. (2011). Pollute first, clean up later? *Global and Planetary Change*, August 2011, 78(3): 77–82.
- Burger, A. & Kuncic, A. (2014). Slovenian economy between "national interest" and the European market. *Studia Historica Slovenica*. Vol 14 (1), pp. 137–155.
- Balkan Barometer (2015). *Public Opinion Survey*. Sarajevo: Regional Cooperation Council.
- Balkan Barometer (2022). *Regional Cooperation Council*. Sarajevo: Balkan Barometer Welcome (rcc.int).
- Damijan, P. J. (2021). Zeleni marksizem ali nižja neenakost. *Dnevnik*, 20. 8. 2021.
- Dell, M., Lane, N. & Querubin, P. (2017). The Historical State, Local Collective Action, and Economic Development in Vietnam. Working Paper 23208, March 2017.
- Dixon-Decleve, S., Gaffney, O., Ghosh, J., Randers, J., Rockstrom, J. & Stoknes, P. E. (2022). *Earth for All: A Survival Guide for Humanity, 2022* by New Society Publishers.
- Estrin, S. (1983). *Self-management: Economic Theory and Yugoslav Practice*. Cambridge: Cambridge University Press.
- EU (2022). EU-Western Balkans summit in Tirana, 6 December 2022. Western Balkans summit in Tirana – Consilium (europa.eu).
- Ghosh, J. (2023). Multilateralism in a Fragmented World. <https://progressive.international/blueprint/ccd13812-0487-4d80-8b8a-629a64563aeb-ghosh/en>
- Kuncic, A. (2016). Razvojna politika v OZN: od predpisovanja razvojne politike do merjenja človekovega napredka in postavljanja ciljev. *Teorija in praksa*. Vol. 53, no. 1.
- Kuncic, A. (2018). SDG-Specific Country Groups: Subregional Analysis of the Arab Region. *Review of Middle East Economics and Finance*, vol. 14, no. 2.
- Kuncic, A. (2019). Prioritizing the Sustainable Development Goals Using a Network Approach: SDG Linkages and Groups. *Teorija in Praksa*, Vol. 56, Special Issue.

- Kuncic, A. & Hamilton, A. G. (2021). RCO-UNCT Economist Toolkit, UN in Saudi Arabia. <https://saudiarabia.un.org/en/127383-rco-unct-economist-toolkit>
- Kuncic, A. & Hamilton, A. G. (2023). United Nations Development Analysis at the Country Level: A Toolkit for SDG Forecasting and Interlinkages with Human Rights and Vulnerable Groups Analysis. Mimeo (Under Review).
- International Court of Justice (1949). Reparation of injuries suffered in the service of the United Nations, Advisory Opinion.
- International Labor Organization (1969). World Employment Programme. ILO Report.
- International Labor Organization (1976). Employment, Growth and Basic Needs: a One World Problem. ILO Report.
- International Union for Conservation of Nature and Natural Resources, ed. (1980). World Conservation Strategy: Living Resource Conservation for Sustainable Development. IUCN–UNEP–WWF.
- Milanović, B. (2018). Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist by Kate Raworth. *Brave New Europe*, 25. 6. 2018. Accessible at: <https://braveneweuropa.com/doughnut-economics-seven-ways-to-think-like-a-21st-century-economist-by-kate-raworth> (Accessed 31. 5. 2021).
- OECD (1990). OECD Economic Surveys: Yugoslavia 1990, Paris.
- Ostojčić, I. (2020). Inkluzivne i ekstraktivne institucije kao faktori ekonomskog rasta. In I. Arsić & V. Mentus (Eds.) *Promišljanja aktuelnih društvenih izazova: Regionalni i globalni kontekst* (pp. 126–141). Belgrade: Institute of Social Sciences.
- Popov, V. (2017). *Socialism is dead, long live socialism*. Working paper.
- Prebisch, R. (1950). The Economic Development of Latin America and Its Principal Problems. *Economic Bulletin for Latin America*, 7, 1–12.
- Raworth, K. (2017): *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist*. London and New York: Random house.
- Sachs et al. (2022). From Crisis to Sustainable Development: the SDGs as Roadmap to 2030 and Beyond. Sustainable Development Report 2022. Cambridge: Cambridge University Press.
- Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G. & Woelm, F. (2021). The Sustainable Development Goals and COVID-19. Sustainable Development Report 2020. Cambridge: Cambridge University Press.

- Shen, Y., Yanaizu, S., Kuncic, A. & Hamilton, A. G. (2022). Accelerating SDG Progress in the Kingdom of Saudi Arabia Through Peer Learning, Working Paper, UN in Saudi Arabia.
- Singer, H. (1950). The Distribution of Gains between Investing and Borrowing Countries, *American Economic review, Papers and Proceedings*, 40, 473–485.
- Svetličič, M. (2016). The United Nations and the International Economy, with special emphasis on the role of Developing Countries and Transnational Enterprises. *Teorija in praksa*, 1(2016), pp. 38–55.
- Svetličič, M. (2021). Searching for a Real New Normal after Covid-19. *Družboslovne razprave*, Ljubljana, št. 98 (letnik 37) dec. DR98-WEB.pdf (sociolosko-drustvo.si).
- Svetličič, M. (2022). Lessons of the New International Economic Order for the Contemporary World Economy. *TEORIJA IN PRAKSA*, let. 59, 2/2022, 411–442.
- Trebbi, F. & Washington, E. (2023). Program Report: Political Economy. The Reporter: No. 1.
- UNDP. 1990. Human Development Report 1990. Published for the United Nations. Development Programme (UNDP). New York, Oxford: Oxford University Press.
- UNDP Human Development Report 2016 and 2023.
- United Nations (1945). Charter of the United Nations, 24 October 1945, 1 UNTS XVI, available at: <https://www.refworld.org/docid/3ae6b3930.html>
- United Nations (1962). The United Nations Development Decade: Proposals for Action. New York: The United Nations.
- United Nations (1972). Declaration of the United Nations Conference on the Human Environment. A/CONF.48/14/Rev.1. Report of the Conference. New York: The United Nations.
- United Nations (1992). Convention on Biological Diversity. New York: The United Nations.
- United Nations (1994). Convention on Desertification. New York: The United Nations.
- United Nations (1995). Report of the World Summit for Social Development. Report: A/CONF.166/9 (96.IV.8). New York: The United Nations.
- United Nations (2002). Report of the World Summit on Sustainable Development. A/CONF.199/2. New York: The United Nations.

- United Nations (2015). Conference of the Parties, Adoption of the Paris Agreement, U.N. Doc. FCCC/CP/2015/L.9/Rev/1 (Dec. 12, 2015).
- United Nations General Assembly (1960). "A/RES/1710 (XVI)" United Nations Development Decade: A Programme for International Economic Co-operation. UN General Assembly Resolution.
- United Nations General Assembly (1970). "A/RES/2626 (XXV)" International Development Strategy for the Second United Nations Development Decade." UN General Assembly Resolution 24: 10.
- United Nations General Assembly (1980). "Resolution A/RES/35/56": International Development Strategy for the Third United Nations Development Decade." UN General Assembly Resolution 5: 12.
- United Nations General Assembly (1986). "A/RES/41/128": Declaration on the Right to Development. General Assembly Resolution.
- United Nations General Assembly (1988). "UN General Assembly Resolution 43/53". General Assembly Resolution.
- United Nations General Assembly (1990). "Resolution A/RES/45/199" International Development Strategy for the Fourth United Nations Development Decade." UN General Assembly Resolution 21: 12.
- United Nations General Assembly (1992). "Report of the United Nations conference on environment and development." A/CONF.151/26 (Vol. I). New York: United Nations General Assembly.
- United Nations General Assembly (2000). "A/RES/55/2" United Nations Millennium Declaration. UN General Assembly Resolution 8: 9.
- United Nations General Assembly (2001). "Road Map towards the Implementation of the United Nations Millennium Declaration." A/56/326. New York: United Nations General Assembly.
- United Nations General Assembly (2012). The Future We Want. A/RES/66/288. New York: United Nations General Assembly.
- United Nations General Assembly (2015a). "Addis Ababa Action Agenda of the Third International Conference on Financing for Development (Addis Ababa Action Agenda)," A/RES/69/313, New York. United Nations General Assembly.
- United Nations General Assembly (2015b). Transforming our world: The 2030 Agenda for Sustainable Development. A/RES/70/1. New York: United Nations General Assembly.
- United Nations General Assembly (2015c). Sendai Framework for Disaster Risk Reduction (2015–2030). A/RES/69/283. New York: United Nations General Assembly.

- United Nations World Commission on Environment and Development, ed. (1987). Report of the World Commission on Environment and Development: Our Common Future. Oxford: Oxford University Press.
- UN Intellectual History Project (2010). Briefing Note Number 7. New York: The United Nations. <http://www.unhistory.org/briefing/7UNand-DevStrategies.pdf>
- Uvalić, M. (1992). *Investment and Property Rights in Yugoslavia. The Long Transition to a Market Economy*. Cambridge: Cambridge University Press.
- Uvalić, M. (2018). The Rise and Fall of Market Socialism in Yugoslavia Contribution to the project of the *Dialogue of Civilizations Research Institute* (DOC RI) "Inequalities, Economic Models and the Russian October 1917 Revolution in Historical Perspective". University of Perugia 20 March 2018.
- Zeković, S. & Perić, A. (2023). Regional Industrial Policy in the Western Balkans: Neither Specialization nor Spatialization? *Eastern European Economics*.
- Wentholt, N. (2020). The EU and the Western Balkans: challenges changing shape, 15 sep 2020. <https://spectator.clingendael.org/en/publication/eu-and-western-balkans-challenges-changing-shape>
- World Bank (1990). Inflation and Stabilization in Yugoslavia; by Roberto de Rezende Rocha. Working paper, No 752.
- World Bank Country Insights and Human Development Reports (undp.org).





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# Green Growth of Smart Cities – Governance Challenges\*

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## Abstract

The need to overcome interlinked challenges of environmental degradation, social inequity, and economic volatility calls for a new model of economic development that is both green and inclusive, serving as an alternative way to increase human well-being while reducing environmental risks. Cities are now the hot spots of population and economic growth and are responsible for most environmental problems. “Smart city” is grasped not only in a digital context, but also in its much wider capacity to improve its citizens’ living standards and upgrade the economic, social, and environmental aspects of their lives. Therefore, it is considered the most appropriate concept for urban transition to a green economy. Decentralisation and governance gaps such as objectives, administrative, policy, capacity, and market gaps are key challenges in promoting cities’ green transition. Local authorities use different levers to stimulate green growth, such as programs/projects and various forms of incentives/disincentives. In the past decade, public procurement was increasingly used by governments as a smart governance instrument to promote green growth at both central and local levels.

*Key words:* Green economy, Smart cities, Governance, Green growth, Green public procurement

## Introduction

Contemporary living conditions, causing an ever-increasing number of inhabitants, depletion of limited natural resources, as well as numerous ecological problems, have necessitated dealing with the issue of sustainable development. Current generations that use natural resources should allow future generations the

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same right to reap the benefits of nature, and it is the only concept of economic development that can be considered sustainable (Ostojić, 2020). During the past decade, the adverse effects of climate change have become more visible and threatening. In 2021, floods in Northern Germany, Belgium and the Netherlands caused a record increase in river levels, putting citizens in that part of Europe at risk. Moreover, according to a study, by 2070, sea levels could be expected to rise by 50 cm, tripling the population exposed to coastal flooding and inducing a ten-fold increase in the value of assets exposed, accounting for 9% of global GDP (Nicholls et al., 2008).

Furthermore, projections suggest a rise in global temperature in the range of 1.7°–2.4° Celsius by 2050 due to global emissions of greenhouse gases (Hammer et al., 2011). That would result in more frequent heat waves, droughts, storms, and floods that cause severe damage. Increasing the availability of green and climate finance and developing clear, coherent, and supportive policies are crucial for all economies to recover quickly and continue sustainable growth and development (Ostojić, 2023).

Raising interest in a new model of economic growth that would enable us to avoid those negative scenarios led to the recent fast development of the concept of a “green economy”. At the same time, the OECD and World Bank use the term “green growth” to describe how the world economy should develop in the future. One of the key factors why economic growth negatively affects the environment is a failure in the valuation of natural resources and inaccurate reflection of that value in economic activity (Nikolić & Kovačević, 2019). In other words, the current market system reflects neither the inherent value of ecosystem services and natural capital nor the true costs of their degradation. Natural capital is undervalued and consequently mismanaged (OECD, 2011b).

If the actual value of the ecosystem were reflected in the market, economic activity would be more resource-efficient and less environmentally damaging. Thus, one of the key preconditions for the green economy is the accurate valuation of natural capital that drives appropriate management of environmental resources (UNEP, 2011), which leads to green growth. As a result, the notions of the green economy and green growth are closely interlinked and frequently used interchangeably.

## Literature Overview

The concept of a green economy was introduced at the end of the last century (Pearce et al., 1989). However, soon after the financial crisis of 2008, it became apparent that a new model of economic development is required. Leading international organisations, the scientific community, and environmental groups have made significant efforts to turn the concept of a green economy into a new opportunity or pathway that can overcome the crisis (Balaban, 2019).

Major international organisations active in supporting economic development worldwide, the Organisation for Economic Co-operation and Development (OECD), the World Bank and the United Nations Environment Programme (UNEP), have called for a radical transformation of development practices and transformation towards a green economy. Clark (2013) pointed out that the UN Conference on Sustainable Development 2012 (also known as the Rio+20) recognised the need to address the linked challenges of environmental degradation, social inequity, and economic volatility. Moreover, she emphasised the conference's conclusion that future economic development must be both green and inclusive, proposing the green economy as an alternative model to increase human well-being while reducing environmental challenges and risks.

UNEP defines a green economy as “the economy that results in improved well-being and social equity, while significantly reducing environmental risks and ecological scarcities” (UNEP, 2011). The European Environment Agency defines a green economy as one that “generates increasing prosperity while maintaining the natural systems that sustain us” (EEA, 2014).

At the same time, the OECD and World Bank define the term “green growth” as to mean “economic growth and development ensuring that the natural assets continue to provide the resources and the environmental services on which our well-being relies. To achieve this, it must catalyse investment and innovation which will underpin sustained growth and give rise to new economic opportunities” (OECD, 2011b). “Green growth is qualitative growth that is efficient in its use of natural resources, clean in that it minimises pollution and environmental damages and resilient in that

it explains natural hazards” (World Bank, 2012). These definitions show that a green economy is an “umbrella” concept that encompasses different implications concerning growth and well-being, or efficiency and risk reduction in the use of natural resources (Loiseau et al., 2016).

The use of fossil fuels is a key generator of harmful gases that cause the greenhouse effect and lead to global climate change, which is why managing the growing global energy demand is one of the key priorities (Petrović, Nikolić & Ostojić, 2017). The concepts of green economy and green growth were elaborated in three reports from leading international organisations: UNEP’s “Towards a Green Economy”, the World Bank’s “Inclusive Green Growth”, and the OECD’s “Towards Green Growth”. The core assumption of the green economy concept is that environmental progress cannot be separated from economic growth. Decelerating growth or ignoring the economy will not lead to meaningful environmental improvement. This is stated explicitly in all three reports (Borel-Saladin & Turok, 2013). More specifically, “good economic policy lies at the heart of any strategy for green growth” (OECD, 2011c).

One of the studies confirmed that population growth, growth of gross domestic product per capita, and energy intensity cause an increase in CO<sub>2</sub> emissions (Petrović, Nikolić & Ostojić, 2018). The green growth of an economy critically depends on large urban areas. The reasons are twofold. Significant shares of national GDP, employment, and consumption are generated in cities. At the same time, cities are responsible for most environmental problems due to their existing production and consumption patterns. Although urban areas occupy only 2% of the earth’s land surface, they account for two-thirds of the total energy consumption and are responsible for three-quarters of carbon dioxide (CO<sub>2</sub>) emissions from global final energy use (REN21, 2021). The climate changes are worsened by the urban heat effect (the so-called “islands of heat”), thus increasing the chances of extreme temperatures and drying that hurt both the economy and the health of those who live in cities (OECD, 2013a).

## Research

### *Cities and Green Growth*

According to the World Bank, more than 80% of global GDP is generated in urban areas (World Bank, 2020). On the other hand, cities are accountable for most energy consumption and pollution. Thus, cities have enormous potential to be pillars of green economy development. Cities' positive influence on countries' economic development is based on the following factors: human capital, infrastructure, innovation, economies of agglomeration and proximity to markets (OECD, 2012a). Cities are characterised by a concentration of highly skilled labour, which is one of the key factors of competitiveness. Locations with higher attractiveness should be able to grow more quickly than peer locations, attracting investments and trade flows (Delgado et al., 2012).

Furthermore, innovation and infrastructure are more developed in urban areas than in others, thus enabling cities' dynamic growth of knowledge-intensive and high-tech industries that are generators of economic growth and green economy (OECD, 2009; Nikolić, 2019). Economies of agglomeration may be interpreted as advantages that businesses gain in cities due to proximity to their suppliers and competitors (OECD, 2013a). The concentration of competitors from the same industry is important for businesses as it can be the fastest way to obtain information on competitors' moves. Proximity to suppliers is also paramount as it enables a business to respond to market changes quickly by upgrading its product in close cooperation with suppliers. Finally, proximity to the market reduces heavy transport and other transaction costs for manufacturers and merchants.

Due to the significant advantages offered to businesses and workers in cities, urban areas attract many of both, resulting in concentration. Cities are now the hot spots of population and economic growth, making them the engines of the global economy. Moreover, we are in the "second wave of urbanisation" which indicates that most of the projected population of 9 billion by 2050 will live in African and Asian cities where city growth rates are the highest (UNEP, 2012). The current wave occurs mainly in Africa and Asia,

followed by Latin America and the Caribbean. Africa's city growth rates are the highest in the world while Asia's cities are growing by the highest absolute number of people. Although growing at slower rates than African and Asian cities, European urban areas are faced with migrations and increasing numbers of refugees as well as legal and illegal immigrants (UNEP, 2011). If not reduced, the negative impact of urban air pollution on citizens' health might become the top environmental cause of premature death worldwide (OECD, 2012b). Increasing risks for the well-being of urban populations due to pollution and negative climate changes created the need to develop "smart cities" (Urošević et al., 2020).

### *Smart Cities*

The reality that cities have become places where most of the world's population is living and where most resource consumption takes place has generated increasing pressure to find ways to reconcile economic growth, well-being, and the sustainable use of natural resources. The main challenge is to find a way to decouple urban development and rising resource consumption rates, in other words, to make "resource decoupling" (UNEP, 2013). The decoupling will require innovations for more efficient management of resource flows and use. That could be done with active support for sustainability-oriented innovations, including reorganising governance models and institutions in cities. Since technological progress and innovation play a central role in the transition to a green economy, a "smart city" could be the most appropriate concept for urban transition to a green economy (Balaban, 2019).

"A smart city uses digital technologies to enhance performance and well-being, to reduce costs and resource consumption and to engage more effectively and actively with the citizens. Key smart sectors include transport, energy, health care, water, and waste. Interest in smart cities is motivated by major challenges, including climate change, economic restructuring, retail, and entertainment services moving online, aging populations, and pressures on public finances" (Ferrara, 2015). The broader definition of a "smart city" is a city where state-of-the-art Information Communication Technologies (ICT) are applied to the design of urban space

and to the provision of major urban services to make the city more efficient, sustainable, and liveable (Balaban, 2019). A “smart city” has the following characteristics (Franchina et al., 2021):

- Uses ICT tools management and governance to improve the system’s efficiency and the quality of life of its citizens.
- Uses (near) real-time information and creatively exploits both tangible (i.e. physical resources and infrastructure) and intangible resources (i.e. human capital, education, and knowledge).
- Raises citizens’ awareness.
- Involves users and multiple stakeholders (with the help of public-private partnerships) connecting and empowering them.
- Is adaptable to users’ needs, promoting sustainable development considering the needs of future generations.

As can be seen from its characteristics, a “smart city” is not only synonymous with digital. Instead, the “smartness” of the city lies in its ability to improve citizens’ living standards, improving economic, social, and environmental aspects of their lives (Silva et al., 2018). To cover all relevant aspects of a “smart city”, Giffinger and Gudrun (2010) identified the following six characteristics: smart economy, smart people, smart governance, smart mobility, smart environment, and smart living. Improvement of the characteristics mentioned above implies upgrading and mutual enhancing of economic, social, and environmental systems. Cities’ increasing energy and resource efficiency, as well as product and process innovations, such as sustainable supply chain management, clean technologies, and environmental product design, require radical innovations that not only reduce quantities of resource turnover and emissions but also change the quality and structure of industrial production (De Jong, 2015).

Being aware that the transition of cities’ specific sectors, such as reduction of energy consumption, low-carbon transport, “smart and green” buildings, improved waste management, etc., rely on intensive use of information technologies and innovations, “smart city” stands out as the most appropriate concept that could shape the urban transition to a green economy (Balaban, 2019).



As Balaban (2019) further points out, the conceptual foundation of a “city green economy” can be based on the idea of a “smart city”.

### *Governance and Green Growth in Smart Cities*

Governance is a critical prerequisite for successful green economy transition of cities. In this section, we will discuss major governance challenges in urban green growth such as (de)centralisation and governance gaps.

#### *Decentralisation*

In the USA and United Kingdom the process of decentralisation in public administration governance started four decades ago with the New Public Management doctrine under the neoliberal “zeitgeist” introduced by Thatcher and Reagan in the 1980s (Cvetičanin, Blagojević, 2019). The rationale was that “lowering” the decision-making process and bringing it closer to the point of service delivery would improve the quality of services that governments provide to their citizens. Moreover, decentralisation was expected to improve efficiency by reducing bureaucracy usually linked to centralised hierarchical systems.

Higher responsibilities of local governments have led to increased expectations to deliver better quality of services more quickly and in needed quantity using limited resources. At the same time, the central government retains crucial responsibilities relevant to the local self-government operations, including those concerning green policy. Decades-long quests for improving efficiency in local governance are now even more complex due to additional ecological targets and goals.

The need for delegation of authority and decentralisation comes from differences in roles in practically every operation process in the public sector. It is possible to recognise who is responsible for a certain process, who is entrusted to implement it, and who has the benefit of its execution (Jovanović et al., 2022). General responsibility for operations and tasks usually falls on politicians entrusted to fulfil general strategic goals they promised to citizens who elected them. However, they must rely on lower hierarchical

levels to implement more specific goals and tasks that form part of broader objectives. That requires the top-level officials to delegate narrower, more specific responsibilities to lower-level officials. Since the highest levels of government feel accountable for achieving strategic goals, they tend to keep lower-level authorities under control as much as possible, resulting in decision-making centralisation (Jovanović, 2020). That leads to the establishment of a formal hierarchical structure with centralised decision-making to keep those who execute tasks at a lower level under control. Besides those who are accountable and responsible, there is a third category – those who benefit from certain activities. That could be a citizen, or some other end user of a service provided by the government.

The difference between accountability for a task and the expected benefit from its execution is an indicator of focus on goals. The large gap between accountability and benefit can lead to organisational decoupling (Meyer & Rowan, 1977). In such a situation, organisations symbolically adopt a policy, but the implementation of that policy is only superficial. The practice is known as policy-practice decoupling. The organisational facade visible to external institutions and participants differs significantly from what the organisation is doing.

Recent research has developed another concept of “means–ends” decoupling, where an organisation complies with a policy but fails to achieve the envisaged goals intended by that policy (Jovanović et al., 2022). If accountability is not expected to lead to benefits, a rational question can be posed: Why should a responsible person bother to achieve anything more than the mandatory? The difference between the work invested and the expected benefits is an indicator of motivation. A significant gap between the level of engagement and expected benefits will lead to demotivated employees. Similarly, as in the previous case, if those engaged in “production of service” do not perceive benefits, they will have no motivation to increase performance and service quality, including reduction of environmental impact.

## *Governance Gaps*

Governments around the world face major challenges, such as climate change, pandemics, etc., that are complex and require a broad, multi-sectorial approach to addressing them. The new approach requires cooperation not just among different government sectors, but between different levels of government, both central and local ones (Charbit & Michalun, 2009). A strict hierarchical approach with superior authority “commanding” the lower-level administration is no longer efficient for coping with modern crises and sustainable growth challenges. The need to better mobilise local resources and raise their motivation to participate in solving problems led to the increasing application of the “place-based” approach. It became clear that “going green” or “going inclusive” requires “going local” first (Charbit, 2020).

The need to efficiently coordinate operations within different sectors of the government in a more decentralised way raised an issue of multi-level governance (MLG) (OECD, 2019). MLG must address substantial governance gaps that limit achieving strategic government goals, including sustainable green growth at the local self-government level. Major governance gaps that public authorities should overcome are as follows (Charbit, 2011):

- The objective gap arises when goals and targets of different levels of public administration or among ministries/agencies at the same horizontal level diverge or contradict each other.
- An administrative gap refers to a mismatch between the green growth challenge and administrative boundaries that create policy constraints. Administrative boundaries (at the municipal, regional, and state levels) rarely match environmental challenges, resulting in further mismatches at the sub-national level, hindering policy coherence (Moss, 2007).
- Policy gap means sectorial fragmentation of policy making across ministries and public agencies within the national government administration or across departments within sub-national government administrations (this is also referred to as a “silo approach” to policy making).

- Information gap arises when there is uneven dissemination of information between and across different levels of government in designing, implementing, and delivering public policies. It also refers to situations when information on implementation on the ground is not shared with higher authorities.
- A capacity gap means insufficient technical expertise, infrastructure, or other resources to achieve planned objectives.
- Market gap refers to the misalignment between policy-making goals defined by authorities and the ability of private sector stakeholders to deliver what is expected from them.

In the next section, we will discuss how authorities can close the abovementioned governance gaps and what additional levers a government could use to stimulate green growth in cities.

## Discussion

### *Closing Governance Gaps*

Closing governance gaps described above requires authorities to deal with two network patterns. The first network refers to the interdependency of multiple issues of green growth, such as biodiversity, livelihoods, and markets. Those issues are tackled by various governance stakeholders with different roles, interests, and capacities such as local administration, ministries, agencies, and companies that create a collaborative network of actors managing the issues. Both interdependent and collaborative networks should be considered in the pursuit to bridge governance gaps (Bergsten et al, 2019).

The government's failure to address the intersection of collaboration among different actors with interdependencies increases the risks of the inefficiency of governance response and its adverse consequences (Bodin & Nohrstedt, 2016). In other words, governance gaps emerge when those responsible fail to recognise how multiple issues and actors are interlinked (Bergsten et al., 2019). Thus, in proposing how governance gaps should be

overcome, the intersection of the two network patterns should be kept in mind.

Closing the objectives gap requires harmonisation of long-term “green” goals set by a central government with short-term goals related to local communities. National strategies and action plans seek to coordinate different levels of government – national, regional, and local. Moreover, there is a need to harmonise government objectives with the objectives and interests of the private sector and citizens in local communities. Otherwise, local businesses may relocate their production to avoid new requirements being imposed on them. Complementarity of goals should be based on a clear understanding of all relevant stakeholders, what they must change, and how they will benefit from such a change.

The capacity gap related to green growth in cities exists in all countries, including the most advanced ones. Generally, administrative capacities are more limited at the local level than at the national level. However, the capacities of ministries and other central government bodies are uneven, too. Thus, one of the key goals of the capacity-building process is to build “green growth personnel” who understand inter-sectorial linkages and trade-offs between short-term economic imperatives and long-term sustainability goals (OECD, 2013a). Moreover, the staff should have room to apply a new innovative approach instead of being tightly constrained by unnecessary bureaucracy (“red tape”) (Jovanović et al., 2022).

Identifying “bottlenecks” in government capacities and ways to overcome them should be a primary concern of national strategic documents. When preparing strategies and action plans, particular attention should be paid to making sure that existing, as well as projected capacity growth, match planned goals and activities. In many cases, capacities lag behind overoptimistic objectives and targets. Gaps between capacities and goals are common causes of failure during the implementation phase. Disappointed local communities raising doubts about the feasibility of green growth have become an additional limiting factor.

Closing the information gap by sharing relevant information on green growth is essential to not only upgrade coordination among different stakeholders, but also to strengthen their feeling of “ownership of the process”, and their true commitment.

Information sharing can be seen as a test of “partnership trust-worthiness” and quality of coordination within the government. If local authorities are poorly informed from the top and are given predominantly commanding instructions, then the chances for decoupling that we discussed earlier are high. In other words, if local stakeholders are expected to understand and remain committed to long-term goals which require sacrifice in the short run, they need reliable and timely information. Otherwise, they will abandon the green policy (although they formally will remain “on track” due to fears of openly opposing a higher authority) and turn to standard, short-term economic goals anew. At the same time, if a higher-level authority has no proper feedback from the implementation side, creating a successful and sustainable green policy can become nearly impossible.

Closing the policy gap refers to the need for governments to overcome traditional policy fragmentation, i.e. the tendency to work in “policy-making silos” (OECD, 2013a). In Serbia, for example, policy in the area of public-private partnership (PPP), which is an important instrument for promoting green growth in cities, is led by the Ministry of Economy. At the same time, the Ministry of Finance has certain authorities in the implementation phase thus using PPP for implementation of its sectorial policy. Moreover, there is a governmental body – the Commission for Public-Private Partnership – acting in the same field, while cities, especially bigger cities like Belgrade, design PPPs according to their policies.

Policy differences between the central and local levels of administration or among their parts (ministries, agencies, etc.) could be overcome by setting up a single governmental entity entrusted to create a policy and coordinate its implementation. The alternative solution for closing policy gaps may be “networked governance” that will include all relevant stakeholders for a specific issue, such as public sector agencies, private companies, and NGOs. Moreover, interdependencies among different aspects of green growth should also be considered. Although the “network” approach requires more meetings and negotiations compared to the “institutional” one, it brings some significant benefits, such as more robust and enduring policy implementation that can outlast political cycles and achieve multi-sectorial objectives which are

particularly needed in areas of climate change and green growth (OECD, 2013a). The practice of Stockholm – Citybanan (a railway tunnel through Stockholm) and the Stockholm Agreement on future transport infrastructure in the region, demonstrate the advantages of “networked governance” (OECD, 2013b).

The solution for overcoming policy gaps largely depends on the public administration structure and its tradition. In countries with a highly centralised hierarchical structure of governance in the public sector and strict formalism, the “institutional” solution, with its prioritisation of simplicity over the possible “analysis-paralysis” caused by an abundance of choice (Blagojević, 2019) would be more efficient than the “network” solution. However, in countries with a more decentralised decision-making process and where the form is less weighted against final results, “networked governance” would be a more appropriate choice.

Closing the market gap means harmonisation between government and private sector objectives. The private sector has multiple roles in green growth. Companies are the government’s key partners in implementing green policy as they provide “green” goods and services through innovation and operational shifts.

In closing the market gap, aligning short-term and long-term objectives is particularly demanding. If the government is not consistent in the long run and after some time makes a turnaround regarding taxing pollution, for example, it may dissuade businesses from investing in green growth. However, with the implementation of CBAM in the EU, this becomes urgent and not a matter of choice (Nikolić, 2023). Furthermore, the government should take into account the cost structure of private companies in the green economy. For example, solar/wind/hydroelectric power has a high capital cost that must be covered upfront but, in turn, incurs low operating costs. Thus, any subsequent change in government policy that would neglect the dynamics of “environmental costs” would dissuade companies from implementing green policies. Understanding private sector specifics is a precondition for closing the objectives gap between the two crucial stakeholders in the green economy – the government and the business sector.

## Government Instruments for Supporting Cities' Green Growth

In countries championing green growth, such as Denmark, the Netherlands, Austria, and Slovenia, the green economy transition was goal-oriented, with visions and goals of the state-guided public actors guiding the strategic decisions of private actors (Kemp & Rotmans, 2004). Loorbach & Romans (2006) suggest that the transition to a green economy is a non-linear process with different phases, shifting from one dynamic equilibrium to the other. They recognise the following four phases, each with a distinctive role of the government:

- A *pre-development phase* where there is very little visible change at the systems level but a great deal of experimentation at the individual level. The government assists companies by providing them with consultation and expertise needed for the proper selection of opportunities and for assessing comparative advantages to make the most favourable choice. There is no direct interference from the government in this phase.
- A *take-off phase* is where the process of change starts to build up, and the system begins to transform due to reinforcing innovations. The government supports projects with a potentially high impact on green growth. Moreover, the government mobilises and assists in the coordination of key stakeholders such as academic and research institutions, companies, investors, and NGOs.
- An *acceleration phase* is characterised by structural changes in economic, ecological, and institutional domains. Instead of directly controlling the vigorous processes, an authority tries to coordinate them and “nudge” participants in the desired direction and pace.
- A *stabilisation phase* begins when the speed of changes starts to decrease, and a new dynamic equilibrium is reached. The role of a government is primarily to monitor and evaluate the process and its outcomes, and promote best practices. The regulatory framework is set in full compliance



with legislation in environmental, fiscal, and other interrelated areas.

Green growth in large cities may be more demanding and complex than that on a national level since it requires the involvement of local authorities national authorities. In meeting green growth objectives at the local level, national and local authorities have rules and regulations at their disposal as direct methods of influence. Regulatory instruments are the easiest to create and, being legally binding, have significant potential for a change.

The key weakness of using regulation to stimulate green growth in cities lies in its rigidity and difficult implementation. Since regulation relies on formality and hierarchical structure, there is a risk of inefficiency. Moreover, regulation usually comes from the top (national) level and requires raising awareness of activities at the local level and comprehensive information on causes and benefits it is expected to bring to a local community. Otherwise, city authorities will formally accept new legislation (because they have no choice), but implementing the new “green” regulation will be only superficial. Such practice is known as policy-practice decoupling.

Furthermore, monitoring and enforcement costs of regulatory instruments are usually high due to the complexity of defining environmental standards and ambient quality (Cohen, 1999). Besides, regulatory measures provide poor incentives for exceeding targets once the minimum threshold is met, even if their implementation is cost-effective. To overcome the abovementioned weaknesses of regulatory instruments, incentives/disincentives and enabling levers are introduced. They do not directly influence the decision-making process of businesses and citizens; rather, they indirectly internalise environmental externalities. In other words, pollution costs are attributed to those who generate them, e.g., charges or fees on units of gas emissions are introduced for manufacturers, affecting their decisions regarding operations.

Governments can use a wide range of economic instruments such as charges, subsidies, grants, taxes, tax concessions, etc., to stimulate behavioural change (Rasul, 2013). For example, a shift towards broad adoption of renewable energy technologies in Germany, particularly photovoltaic panels, was based on widespread

subsidies between 2000 and 2008 in the form of low-interest loans offered to investors (Jacobsson & Lauber, 2006; Frondel et al., 2008).

Cities use different types of levers depending on ownership and control over their assets. If a city has a high level of ownership and control, it will be more prone to use public procurement to promote green growth than other instruments, such as incentives, for example. A study of green growth in 66 large cities across the world indicates that cities relied mainly on programs and projects (68%) as well as public procurement (22%) in stimulating green transformation, while incentives/disincentives (5%) and policies (5%) represented only one-tenth of total levers used (C40 & ARUP, 2015).

The role of the public procurement lever is expected to rise in the future due to its high potential to promote green growth. This instrument could be used to influence both the demand and supply sides within local markets. A shift towards green standards and criteria in local government procurements encourages manufacturers to adapt to new requirements to get contracts with the government, thus generating more profound changes in the local economy. Furthermore, new ecological requirements in public procurement increase awareness in local communities and urge changes in their consumption patterns. By purchasing environmental-neutral products and services local governments promote sustainable green growth in a credible manner that citizens and businesses should follow.

The EU legal framework provides plenty of opportunities for the application of “green public procurement” (GPP), including the evaluation of the impact of purchased subjects on the environment during the entire period of their exploitation when selecting the most favourable bid (Directive 2014/24/EU). However, in practice, the use of GPP is uneven and far from satisfactory (Badell & Rosell, 2021). Recent research indicated that factors such as organisational model, control of corruption, human resource capacities, motivation and awareness have a more decisive influence on public procurement performance than legislation (Čudanov et al., 2018). Considering that the strengthening of procurement’s “green” aspect is a feature of its upgraded performance, it is clear which factors, besides legislation, should be improved to achieve the goal of higher GPP uptake in the future.

## Conclusions

Negative climate changes, economic crises a decade ago and the present pandemic require changes in the model of economic development that would allow the economic growth to be both “green” and inclusive. The main challenge of transition to a green economy is to find a way to decouple economic development and rising resource consumption rates, i.e. achieve “resource decoupling”. In the second wave of urbanisation, cities play an increasingly important role in both production and consumption of resources that affect the environment. Therefore, “going green” or “going inclusive” means “going local” first.

Since technological progress and innovations play a central role in “resource decoupling”, the concept of a “smart city” could be the most appropriate for urban transition to a green economy. “Smart city” is not only synonymous with digital; instead, the “smartness” of a city lies in the reduction of resource turnover and emissions, a change in production and consumption quality and structure and transformations of governance models and institutions.

Decentralisation and governance gaps are key governance challenges in encouraging green growth in cities. To successfully remove these two potential constraints, the interdependency of multiple issues of green growth and the collaboration of different stakeholders participating in the process, such as ministries, local authorities, and businesses, should be considered.

Governments can use different levers, such as regulatory instruments, incentives/disincentives, and enabling policies, to spark green growth in cities. Empirical evidence of the green transformation of 66 large cities on a global scale proved that governments preferred direct instruments such as projects/programs and public procurement compared to indirect ones (incentives and enabling policies). Since public procurement accounts for around 19% of the EU GDP, its potential to stimulate green growth is clear.

More comprehensive application of green public procurement requires more decentralised and flexible organisation and decision-making models, curbed corruption, developed administrative capacities, adequate competencies of those who manage

procurement processes, and motivation mechanisms based on incentives rather than sanctions.

## REFERENCES

- Badell, D. & Rosell, J. (2021). Are EU Institutions Still Green Actors? An Empirical Study of Green Public Procurement. *Journal of Common Market Studies*, 59(6), 1555–1572. <https://doi.org/10.1111/jcms.13204>.
- Balaban, O. (2019). Smart cities as drivers of a green economy. In: S. Acar & E. Yeldan (Eds.), *Handbook of Green Economics*. (pp. 69–92). <https://doi.org/10.1016/B978-0-12-816635-2.00005-5>
- Bergsten, A., Jiren, T. S., Leventon, J., Dorresteyn, I., Schultner, J. & Fischer, J. (2019). Identifying governance gaps among interlinked sustainability challenges. *Environmental Science & Policy*, 91, 27–38. <https://doi.org/10.1016/j.envsci.2018.10.007>
- Blagojević, M. (2019). Faith, ideology and the information age: the universal spirituality of generation Y. In: M. Blagojević & Z. Matić (Eds.) *Different forms of religiosity and the modern world* (pp. 41–55). Belgrade: Institute of Social Sciences, Požarevac: Department of Education and Culture, Serbian Orthodox Diocese of Braničevo.
- Bodin, O. & Nohrstedt, D. (2016). Formation and performance of collaborative disaster management networks: Evidence from a Swedish wildfire response. *Global Environmental Change*, 41, 183–194. <https://doi.org/10.1016/j.gloenvcha.2016.10.004>
- Borel-Saladin, J. M. & Turok, I.N. (2013). The Green Economy: Incremental Change or Transformation? *Environmental Policy and Governance*, 23(4), 209–220. <https://doi.org/10.1002/EET.1614>
- Bouwer, M., Jonk, M., Berman, T., Bersani, R., Lusser, H., Nappa, V., Nissinen, A., Parikka, K., Szuppinger, P. & Viganò, C. (2006). Green public procurement in Europe 2006 – conclusions and recommendations. Haarlem: Virage Milieu & Management. [https://ec.europa.eu/environment/gpp/pdf/take\\_5.pdf](https://ec.europa.eu/environment/gpp/pdf/take_5.pdf)
- C40 & ARUP (2015). Climate Action in Megacities 3.0. <http://www.cam3.c40.org/images/C40ClimateActionInMegacities3.pdf> (accessed 2 Sept 2021).
- Clark, H. (2013). What Does Rio+20 Mean for Sustainable Development? *Development* 56, 16–23. <https://doi.org/10.1057/dev.2013.13>

- Charbit, C. (2020). From 'de jure' to 'de facto' decentralised public policies: The multi-level governance approach. *The British Journal of Politics and International Relations*, 22(4), 809–819.  
<https://doi.org/10.1177/1369148120937624>
- Charbit, C. (2011). Governance of Public Policies in Decentralised Contexts: The Multi-level Approach. Paris: OECD Publishing (OECD Regional Development Working Papers 2011/04)  
<https://doi.org/10.1787/5kg883pkxkxhc-en>
- Charbit, C. & Michalun, M. V. (2009). Mind the gaps: Managing mutual dependence in relations among levels of government. Paris: OECD Publishing (OECD Working Papers on Public Governance, No. 14).  
<https://www.oecd.org/gov/43832931.pdf>
- Cohen, M. A. (1999). Monitoring and enforcement of environmental policy. In: T. Tietenberg & H. Folmer (Eds.) *International yearbook of environmental and resource economics*, volume 3. Cheltenham: Edward Elgar Publishers. [https://www.researchgate.net/publication/281594872\\_Monitoring\\_and\\_enforcement\\_of\\_environmental\\_policy\\_in\\_International\\_Yearbook\\_of\\_Environmental\\_and\\_Resource\\_Economics](https://www.researchgate.net/publication/281594872_Monitoring_and_enforcement_of_environmental_policy_in_International_Yearbook_of_Environmental_and_Resource_Economics)
- Cvetićanin, N. & Blagojević, M. (2019). Unutrašnji konflikti i spoljna politika SAD između intervencionizma i izolacionizma. *Srpska politička misao*, 65(3), 43–62. <https://doi.org/10.22182/spm.6532019.2>
- Čudanov, M., Jovanović, P. & Jasko, O. (2018). Influence of the Public Procurement Procedure Type on the Duration of Public Procurement. *Lex localis – Journal of Local Self-Government* 16(2), 361–378.  
<https://doi.org/10.4335/16.2.361-378>
- De Jong, M., Joss, A., Schraven, D., Zhan, C. & Weijnen, M. (2015). Sustainable-smart-resilient-low carbon-eco-knowledge cities; making sense of a multitude of concepts promoting sustainable urbanization. *Journal of Cleaner Production*, 109, 25–38.  
<https://doi.org/10.1016/j.jclepro.2015.02.004>
- Delgado, M., Ketels, C., Porter, M. E. & Stern, S. (2012). The Determinants of National Competitiveness. Cambridge, MA: National Bureau of Economic Research (Working Paper 18249). <http://www.nber.org/papers/w18249> (accessed 9 Sept 2021).
- Directive 2014/24/EU. *On public procurement and repealing Directive 2004/18/EC*. European Parliament, Council of the European Union.  
<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0024>
- EEA (2014). Resource-efficient green economy and EU policies. European Environment Agency. <http://www.eea.europa.eu/themes/economy/>

- Loiseau, E., Saikku, L., Antikainen, R., Droste, N., Hansjürgens, B., Pitkänen, K., Leskinen, P., Kuikman, P. & Thomsen, M. (2016). Green economy and related concepts: an overview. *Journal of Cleaner Production*, 139, 361–371. <https://10.1016/j.jclepro.2016.08.024>
- Ferrara, R. (2015). The Smart City and the Green Economy in Europe: A Critical Approach. *Energies*, 8, 4724–4734. <https://doi:10.3390/en8064724>
- Franchina, L., Calabrese, A., Inzerilli, G., Scatto, E., Brutti, G. & Bonanni, M.V. (2021). Thinking green: The role of smart technologies in transforming cities' waste and supply Chain's flow. *Cleaner Engineering and Technology*, 2, 100077. <https://doi.org/10.1016/j.clet.2021.100077>
- Frondel, M., Ritter, N. & Schmidt, C. M. (2008). Germany's solar cell promotion: dark clouds on the horizon. *Energy policy* 36(11), 4198–4204. <https://doi.org/10.1016/j.enpol.2008.07.026>
- Giffinger, R. & Gudrun, H. (2010). Smart cities ranking: an effective instrument for the positioning of cities? *ACE: Architecture, City and Environment*, 4(12), 7e25. <https://core.ac.uk/download/pdf/301204045.pdf>
- Hammer, S. et al. (2011). Cities and Green Growth: A Conceptual Framework. OECD Publishing (OECD Regional Development Working Papers 2011/08). <http://dx.doi.org/10.1787/5kg0tflmzx34-en>
- Jacobsson, S. & Lauber, V. (2006). The politics and policy of energy system transformation—explaining the German diffusion of renewable energy technology. *Energy Policy* 34(3), 256–276. <https://doi.org/10.1016/j.enpol.2004.08.029>
- Jovanović, P., Delibasic, B. & Čudanov, M. (2022) Organizational Archetypes in Public Procurement. *Lex localis – Journal of Local Self-Government*, 20(1), 101–127. <https://doi.org/10.4335/20.1.101-127>
- Jovanović, P. (2020). Challenges of management and motivation in public sector in Serbia. In: P. Jovanovic & S. Stojkovic-Zlatanovic (Eds.) *Challenges of Sustainable Development in Serbia and European Union* (pp. 118–139). Belgrade: Institute of Social Sciences.
- Kemp, R. & Rotmans, J. (2004). Managing the transition to a sustainable mobility. In: B. Elzen, F. Geels & K. Green (Eds.) *System Innovation and the Transition to Sustainability: Theory, Evidence and Policy* (pp. 137–167). Cheltenham: Edgar Elgar.
- Loorbach, D. & Rotmans, J. (2006). Managing Transitions for Sustainable Development. In: *Understanding Industrial Transformation* (187–206). Dordrecht: Springer. [https://doi:10.1007/1-4020-4418-6\\_10](https://doi:10.1007/1-4020-4418-6_10)

- McCormick, K., Anderberg, S. & Neij, L. (2013). Sustainable urban transformation and the green urban economy. In: R. Simpson, M. Zimmermann (Eds.) *The Economy of Green Cities: A World Compendium on the Green Urban Economy* (pp. 33–43). Heidelberg, New York, London: Springer. [https://doi.org/10.1007/978-94-007-1969-9\\_5](https://doi.org/10.1007/978-94-007-1969-9_5)
- Melon, L. (2020). More than a nudge? Arguments and tools for mandating green public procurement in the EU. *Sustainability* 12(3), 988. <https://doi.org/10.3390/su12030988>
- Meyer, J. W. & Rowan, B. (1977) Institutionalised organisations: Formal structure as myth and ceremony, *American Journal of Sociology*, 83(2), 340–63, <http://www.jstor.org/stable/2778293>
- Moss, T. (2003). Solving Problems of 'Fit' at the Expense of Problems of 'Interplay'? The Spatial Reorganisation of Water Management Following the EU Water Framework Directive. In P. P. Mollinga, A. Dixit & K. Athukorala (Eds.) *Integrated Water Resources Management: Global Theory, Emerging Practice and Local Needs* (pp. 85–121). New Delhi: Sage Publications, London: Thousand Oaks.
- Nicholls, R. J. et al. (2008). Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes: Exposure Estimates. OECD Publishing (OECD Environment Working Papers No. 1). <https://doi.org/10.1787/011766488208> (accessed 8 Sept 2021).
- Nikolić, I. (2019). *Stanogradnja u Srbiji – razvojni potencijali i ograničenja*. Beograd: Ekonomski institut.
- Nikolić, I. (2023). *Ekonomija Srbije praćena optikom MAT-a u period 2020–2023*. Beograd: Ekonomski institut. doi:10.5281/zenodo.8286348.
- Nikolić, I. & Kovačević, M. (2019). Prospects and limits to growth: The importance of investment efficiency? *Ekonomika preduzeća*, 67(5–6), 298–318, doi: 10.5937/EKOPRE1906297N.
- Nissinen, A., Parikka-Alholaa, K. & Ritab, H. (2009). Environmental criteria in the public purchases above the EU threshold values by three Nordic countries: 2003 and 2005. *Ecological Economics* 68, 1838–1849. <https://doi.org/10.1016/j.ecolecon.2008.12.005>
- OECD (2019). *Making Decentralisation Work: A Handbook for Policy-Makers*. Paris: OECD Publishing (OECD Multi-level Governance Studies). <https://doi.org/10.1787/g2g9faa7-en> (accessed 7 Sept 2021).
- OECD (2013a). *Green Growth in Cities*. OECD Green Growth Studies, OECD Publishing. <http://dx.doi.org/10.1787/9789264195325-en> (accessed 15 Sept 2021).

- OECD (2013b). Green Growth in Stockholm, Sweden. OECD Green Growth Studies, OECD Publishing. <https://doi.org/10.1787/9789264195158-en> (accessed 3 Sept 2021).
- OECD (2012a). Promoting Growth in All Regions. Paris: OECD Publishing. <https://doi.org/10.1787/9789264174634-en> (accessed 1 Sept 2021).
- OECD (2012b). OECD Environmental Outlook to 2050: The Consequences of Inaction. Paris: OECD Publishing. <https://doi.org/10.1787/9789264122246-en> (accessed 9 Sept 2021).
- OECD (2011a). OECD Regional Outlook 2011: Building Resilient Regions for Stronger Economies. Paris: OECD Publishing. <https://doi.org/10.1787/9789264120983-en> (accessed 2 Sept 2021).
- OECD (2011b). Towards Green Growth: Monitoring Progress. OECD Indicators, OECD Green Growth Studies, OECD Publishing, Paris. <https://doi.org/10.1787/9789264111318-en>
- OECD (2009). How Regions Grow: Trends and Analysis. Paris: OECD Publishing. <https://doi.org/10.1787/9789264039469-en> (accessed 8 Sept 2021).
- Ostojić, I. (2020). Institucionalna komponenta održivog razvoja Srbije. In P. Jovanović & S. Stojković Zlatanović (Eds.) *Izazovi održivog razvoja u Srbiji i Evropskoj uniji* (pp. 100–117). Beograd: Institut društvenih nauka.
- Ostojić, I. (2023). Zeleno finansiranje, klimatske finansije i koncept zelene ekonomije. In S. Nikolić Popadić & M. Milenković (Eds.) *Klimatske promene – pravni i društveni izazovi* (pp. 196–213). Beograd: Institut društvenih nauka.
- Pearce, D. W., Markandya, A. & Barbier, E. B. (1989). *Blueprint for a Green Economy*. London: Earthscan.
- Petrović, P., Nikolić, G. & Ostojić, I. (2017). Demografske determinante energetske potrošnje u Evropskoj uniji: rezultati ekonometrijske analize. *Stanovništvo*, 55(1), 1–20. <https://doi.org/10.2298/STNV170606003P>
- Petrović, P., Nikolić, G. & Ostojić, I. (2018). Emisija CO<sub>2</sub> u Evropskoj uniji: empirijska analiza demografskih, ekonomskih i tehnoloških faktora. *Stanovništvo*, LVI(1), 63–82. <https://doi.org/10.2298/STNV180614005P>
- Pilipczuk, O. (2020). Sustainable Smart Cities and Energy Management: The Labor Market Perspective. *Energies*, 13, 6084. <https://doi.org/10.3390/en13226084>



- Rasul, G. (2013). Policy Instruments for Promoting a Green Urban Economy: The Changing Role of the State. In: R. Simpson & M. Zimmermann (Eds.) *The Economy of Green Cities* (pp. 161–174). Heidelberg: Springer. <https://doi:10.1007/978-94-007-1969-9>
- REN21 (2021). Renewables in Cities 2021: Global Status Report. Paris: REN21 Secretariat. [https://www.ren21.net/wp-content/uploads/2019/05/REC\\_2021\\_full-report\\_en.pdf](https://www.ren21.net/wp-content/uploads/2019/05/REC_2021_full-report_en.pdf) (accessed 1 Sept 2021).
- Silva, B. N., Khan, M. & Han, K. (2018). Towards sustainable smart cities: a review of trends, architectures, components, and open challenges in smart cities. *Sustainable Cities and Society*, 38, 697–713. <https://doi.org/10.1016/j.scs.2018.01.053>
- Simpson, R. (2013). Introduction: a green economy for green cities. In: R. Simpson, M. Zimmermann (Eds.) *The Economy of Green Cities: A World Compendium on the Green Urban Economy* (pp. 13–16). Heidelberg, New York, London: Springer.
- UNEP (2013). City-Level Decoupling: Urban resource flows and the governance of infrastructure transitions. United Nations Environment Programme (A Report of the Working Group on Cities of the International Resource Panel). <https://www.resourcepanel.org/reports/city-level-decoupling>
- UNEP (2012). Sustainable, resource-efficient cities – Making it happen! United Nations Environment Programme. <https://sustainabledevelopment.un.org/content/documents/11245ustainableResourceEfficientCities.pdf>
- UNEP (2011). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication: A Synthesis for Policy Makers. Nairobi: United Nations Environment Programme. <https://wedocs.unep.org/20.500.11822/32245>
- Urošević, V., Jovanović, P. & Ostojić, I. (2020). Predicting of Citizens' Well-Being in Large Cities. In: D. Starcevic & S. Marinković (Eds.) *Proceedings of the XVII International Symposium: Business and Artificial Intelligence* (pp. 114–122). Belgrade: University of Belgrade Faculty of Organizational Sciences.
- World Bank (2020). Urban development. Washington, DC: The World Bank. <https://www.worldbank.org/en/topic/urbandevelopment/overview> (accessed 2 Sept 2021).
- World Bank (2012). Inclusive Green Growth: The Pathway to Sustainable Development. Washington, DC: The World Bank. <https://openknowledge.worldbank.org/handle/10986/6058>, p. 171. (accessed 6 Sept 2021).





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# Investment in Natural Capital as a Factor for Sustainable Post-COVID 19 Recovery\*

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## Abstract

The COVID-19 pandemic has become an unprecedented phenomenon in the modern history of the world economy, causing the deepest decline in the economic activity since the mid-20th century. As a result, countries had to implement measures to prevent the spread of coronavirus infection. This crisis has been distinguished not only by a significant decline in economic activity, wide territorial coverage and underlying causes that lie outside the economy, but also by a variety of recovery paths in different countries and regions due to their structural heterogeneity. Large scale restrictions imposed to curb the coronavirus disease have significantly affected the performance of enterprises in most sectors of the economy. Public-sector investments in green infrastructure are considered to be of key importance for short-term economic recovery around the world as they have the potential to drive demand for new skills and technologies. The authors highlight the economic, environmental and health benefits of natural capital investment as essential, not only for the post-COVID recovery of sustainable countries, but also for the mitigation of consequences of possible future pandemics. Within the scope of the analysis of positive effects of this type of investment, the authors showcase the 'greenness' of pandemic recovery among a selected group of countries.

*Keywords:* COVID-19 pandemic, anti-crisis measures, green recovery, green transition, natural capital investment

## Introduction

Since the World Health Organization declared the coronavirus pandemic on March 11, people have been forced to live in emergency conditions as the spread of the infection affected all

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aspects of their lives. Countries had to introduce measures aimed at maintaining physical distance between people and restricting their movement, as well as reducing certain economic activities. The overall goal was to contain the number of infections and prevent further spread of the COVID-19 pandemic. Large-scale social restrictions had a significant impact on the performance of companies in most sectors of the economy. Tertiary sector companies faced serious financial destabilisation or even closure, while a significant number of industrial companies were forced to make adjustments in their work organisation. Consequently, global investment levels and potential output declined during the pandemic, although this was less pronounced than during the Great Recession (Doleshel and Manu, 2021). The vast majority of countries are characterised by a high degree of interconnectedness and involvement in world economic relations, which certainly affected the speed and depth of the crisis during 2020 and its 'aftershock' in the second half of 2021.

Although investigations into the origin of COVID-19 conducted at the global level have not led to the adoption of a unified stance on the source of infection and the ways it spreads among people, the scientific community is of the opinion that individuals are responsible for this pandemic. This primarily refers to their destructive impact on natural habitat changes, biodiversity loss and ecosystem disruption. SARS-CoV-2 is a zoonosis – a disease transmitted from animals to humans, largely attributed to the destruction of ecosystems.

COVID-19 highlights the critical association between the health of nature and human well-being, raising questions about the depletion of natural capital. Natural capital can be defined as "our planet's stock of natural resources, both renewable and non-renewable". It provides us with the variety of ecosystem services such as water, food, fibre, fuel and wood, regulates environmental conditions and supports recreation, along with other cultural practices (Woetzel et al. 2020). According to the World Economic Forum (WEF) estimates, more than half of global GDP is moderately or highly dependent on nature and its services. In addition, there are over 1.2 billion jobs in nature-based sectors worldwide, such as farming, fisheries, forestry and tourism. Their normal functioning depends on healthy and resilient ecosystems (Lieuw-Kie-Song

& Perez-Cirera, 2020). Considering the aforementioned facts, it is of crucial importance to take into account these dependencies and links when developing policies, strategies and action plans to preserve natural wealth for future generations.

Unfortunately, people continue to neglect the importance of natural capital by engaging in activities which lead to its degradation. The Dasgupta Review (2021) highlights that the global value of stock of natural capital per capita has fallen by 40% over the past 25 years. Moreover, large portions of natural capital are under the threat of deforestation or natural disasters. Climate change is also the main culprit for the acceleration of natural capital depletion. According to the Global Assessment Report on Biodiversity and Ecosystem Services released in 2019, human activity has endangered about 25% of our assessed plant and animal species. Additionally, in low-income countries, dependence on natural capital accounts for approximately 23% of their wealth (World Bank, 2021). The degradation of nature (including assets like forests, water, fish stocks, minerals, biodiversity and land) and climate change continues, which indirectly or directly affects state power. A number of poor and vulnerable countries are facing the risk of their ecosystems collapsing due to a decline in biodiversity and related ecosystem services. This results from the fact that investing in nature still remains marginal to economic decision-making, and countries make little effort to change the current situation (Zvezdanović Lobanova et al., 2018; Zvezdanović Lobanova et al., 2021). Taking into account the adverse effects of global warming, key greenhouse gas emitting countries should make decisive steps forward in order to mitigate human impact on the climate (Zvezdanović Lobanova & Lobanov, 2023).

## Literature Review

The natural capital depletion is a result of growing number of factors. Global demand for nature far exceeds what the ecosystem can regenerate in a single year. Consequently, we are facing increasing environmental indebtedness. The costs of this overconsumption are becoming more visible day by day and they are reflected in deforestation, water scarcity, degradation of productive

land, food shortages, loss of biodiversity and accumulation of carbon dioxide in the atmosphere (World Economic Forum, 2015). According to the Living Planet Report 2020, human activities with a destructive effect on nature, pose a serious threat to both wildlife populations and human health. Unfortunately, these interventions in natural ecosystem create a transmission pathway for the spread of disease. Decreasing barriers between humans and wildlife increase the risk of zoonotic disease (Everard et al., 2020). This occurs as a result of natural resource degradation which is crucial in managing the transmission.

The COVID-19 pandemic has had a profound effect on the environment and has affected all aspects of people's well-being. Lawler et al. (2021) indicate that this pandemic is intricately linked to the current problems such as biodiversity loss and ecosystem health. Therefore, they also point out that it is necessary to apply integrative approach (One Health approach), which takes into account the close relationship between the health of our planet and the human health. This concept implies that people's health is closely linked to the health of animals and our shared environment. A similar viewpoint is reflected in research conducted by Talmage et al. (2022), who believe that natural and cultural capital could play a significant role in addressing serious challenges caused by the COVID-19 pandemic. They emphasise that it is crucial to reimagine the connection between nature and culture and to bolster sustainability. Countries are unlikely to achieve the United Nations' Sustainable Development Goals (SDGs) and the targets outlined by the Global Health Security Agenda if they fail to adopt an integrated approach to mitigate the effects of disease emergence relating to environmental change (Calabrese et al., 2020). Moreover, the long lasting negative economic impact of this pandemic will affect state influence growth, market concentration, geopolitical tensions, deglobalisation, education, investment and labour market.

Hepburn et al. (2020) demonstrate that policies focused on building efficiency retrofits, clean physical infrastructure, investment in education and training, natural capital investment and clean R&D have high potential in both economic multiplier and climate impact metrics. The authors stress the necessity of implementing natural capital policies that provide for ecosystem

resilience and regeneration, including the restoration of carbon-rich habitats and climate-friendly agriculture.

Despite the fact that COVID-19 anti-crisis measures have plunged the global economy into a deep contraction and have significantly altered the global energy outlook, they have also provided environmental benefits. While the lockdown measures were in force, restrictions imposed on human activity generated benefits for the biodiversity (Corlett et al., 2020). One group of authors (Zambrano-Monserrate et al., 2020; Berman and Ebisu, 2020; Zander et al., 2020) point out that the COVID-19 pandemic had positive effects on the environment, such as the improvement of air quality improvement, cleaner beaches and a reduction of environmental noise level. Industrial facilities and power plants stopped their production and the use of vehicles decreased considerably. This led to an intense decline in the concentrations of particulate matter and nitrogen dioxide (NO<sub>2</sub>) in China and the reduction of air pollution in Europe (Kumar et al., 2020). Unfortunately, COVID-19 lockdown had a negligible effect on climate change mitigation as the intensive use of fossil fuels continues. As a unique social experience, the coronavirus lockdown has also influenced our perception of nature since people began to appreciate spending more time outdoors.

An increasing number of researchers (Gillespie et al., 2021; Akinsorotan et al., 2021) take the position that this crisis could be the trigger of invention, suggesting that it should be able to provide the reorganisation of agriculture, ecosystem restoration, short-term disruption in wildlife trafficking, reduction in air and water pollution, as well as wealth distribution, which could enhance environmental protection and prevent climate change. Openness to innovation, a push for digitization, the stability of value-added chains, risk diversification, promotion of human capital, etc., are some of the positive long-term effects of the coronavirus pandemic (Gromling, 2021). This pandemic has highlighted the necessity of changing the current economic model which is based on fossil resources and addicted to 'growth at all costs', and transitioning towards a circular bioeconomy dedicated to sustainable well-being (Palahi et al., 2020). It is believed that the circular bioeconomy could be crucial for achieving the SDGs, the aims of the Paris Climate Agreement as



well as the post-COVID-19 recovery and economic transformation. Galanakis et al. (2022) propose COVID-19 recovery approach which includes technological innovations, food systems, rural economies, environmental considerations, 'biocities' and tourism to create a bioeconomy. Unfortunately, both the implementation of this approach and the maintenance of biodiversity conservation, are hampered by problems such as increased human dependence on natural resources, indiscriminate exploitation of wildlife resources, staff absenteeism and/or poor performance (Akinsorotan et al., 2021).

## Natural Capital

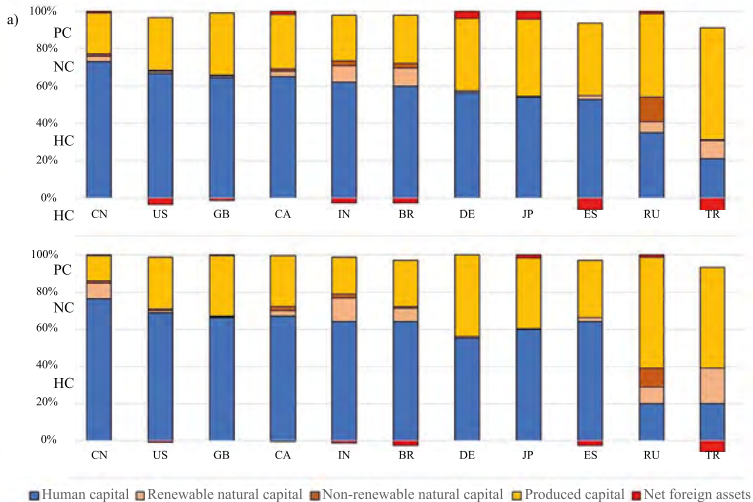
Disregard for sustainable development principles and weak state control over natural resources lead to their predatory exploitation and inevitable depletion. This represents a significant risk to national economic security and ultimately provokes a deterioration of the standard of living. The most serious challenges include agricultural land degradation, mineral resources depletion, water pollution, deforestation, biodiversity loss and reduction of the number of wildlife species. Changes like these are very difficult to assess economically, making it challenging to identify threats to natural capital (Petrović & Lobanov, 2021).

The establishment of prerequisites for the transition to circular economy is an extremely important aspect of natural capital conservation (it allows the reuse of goods through partial processing). Efficient use of the available resource potential, the introduction of resource-saving technologies and the establishment of the circular economy foundations will ultimately increase the level of economic security and reduce public and private costs associated with the exploitation of natural resources in both developed and developing countries (Petrović & Lobanov, 2022). It is necessary to develop incentives for the application of circular economy principles, primarily, in large developing countries that consume considerable amounts of natural raw materials to support their economic growth. Otherwise, insufficient efforts placed in resolving problems related to processing and disposal of industrial and domestic waste, will cause a gradual degradation of the territory, including a decrease in its economic and residential potential.

According to the World Bank’s estimates, natural capital accounts for about a quarter of the total wealth in developing countries. In most of these countries, there is an absolute decline in natural capital, which is not offset by the accumulation of other types of national wealth – human capital and other social intangible assets (for example, the development of education and health systems) and produced capital (industrial and transport infrastructures). A number of scientific papers indicate a direct relationship between the overall level of well-being and the effective application of measures aimed at preserving natural capital, as well as the availability of an appropriate institutional framework.

Our calculations illustrate that changes in the wealth structure in the majority of developed and developing countries are slow (see Figure 1). Based on the World Bank’s data, we analysed the wealth structure of eleven countries in 2000(b) and 2018(a).<sup>1</sup>

Figure 1. The composition of total wealth in selected countries in 2000(b) and 2018(a), %



Source: Author’s work based on the World Bank’ data

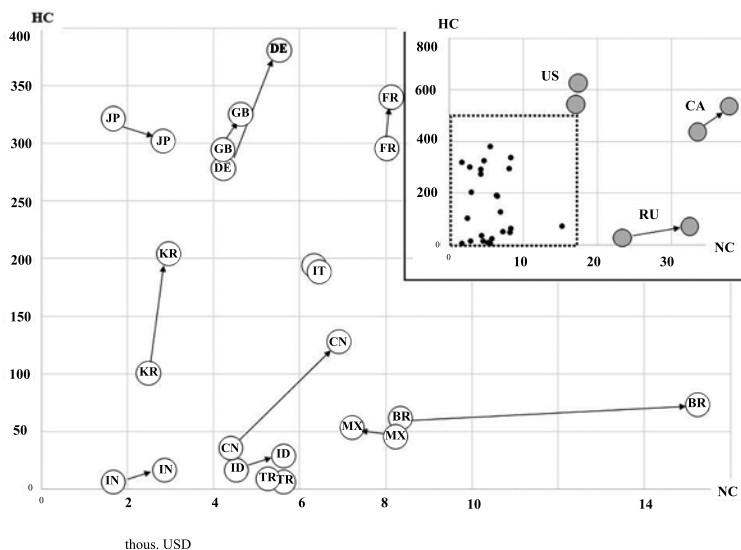
<sup>1</sup> According to the World Bank’s methodology, total wealth is calculated as the sum of human capital (value of future earnings for the working population over their lifetimes), produced capital (value of machinery, buildings, equipment, etc.), renewable and nonrenewable natural capital, and net foreign assets.

The share of accumulated human capital reaches 60-65% both in developed countries (such as the USA, Canada, Japan, UK, Germany) and in some key developing countries (China, India, Brazil), and it has not changed much in the last twenty years (Zvezdanović, 2022). In the case of above-mentioned developing countries, this is mainly due to the absolute number of skilled labour resources, while in the case of developed countries, this is caused by the advancements in health and education systems. In turn, the share of human capital in Turkey remained at the level of 20%, while in Russia, it almost doubled to 40%. Production capital plays an important role in developed countries with industrial specialisation (e.g. Germany and Japan – up to 40%), as well as in countries which actively attracted investments in infrastructure projects (Russia and Turkey – 45–50%). As for natural capital, its low share in a number of developed countries (less than 1–2%) is explained not only by the actual scarcity of natural resources (Japan), but also by the predominant reliance on human and industrial capital (USA, UK, Germany). In turn, the share of natural capital in the wealth of India, Brazil and Turkey reaches 10–15%, in Russia – 20%. It is noteworthy that in all the countries listed above, with the exception of Russia, renewable natural capital (land and forest resources) noticeably prevails over non-renewable natural capital (mineral resources).

The level of provision of national wealth components can be assessed using per capita indicators. Let us consider, for example, the change in human capital per capita and natural capital per capita in the fifteen largest global economies in the 21st century (from 2000 to 2018).

The highest value of human capital per capita was recorded in the United States (USD 621,000) and Canada, while the highest value of natural capital per capita was recorded in Canada and Russia. The relative supply of natural capital in the 21st century increased significantly in these two countries – from USD 34 to 38,000 in Canada, and from USD 24 to 33,000 in Russia. Other countries are less endowed with these two types of wealth. Natural capital per capita ranges from USD 3,000 in Japan, the Republic of Korea, and India to USD 15,000 in Brazil, while human capital per capita ranges from USD 11,000 in Turkey to USD 382,000 in Germany. Brazil reached the most visible success in increasing the level

Figure 2. Human capital per capita and natural capital per capita in top-15 national economies in 2000 and 2018 (thousand USD)



Note: JP – Japan; GB – United Kingdom; CN – China; IN – India; IT – Italy; DE – Germany; TR – Turkey; KR – Korea; ID – Indonesia; MX – Mexico; BR – Brazil; FR – France; US – United States; CA – Canada; RU – Russia.

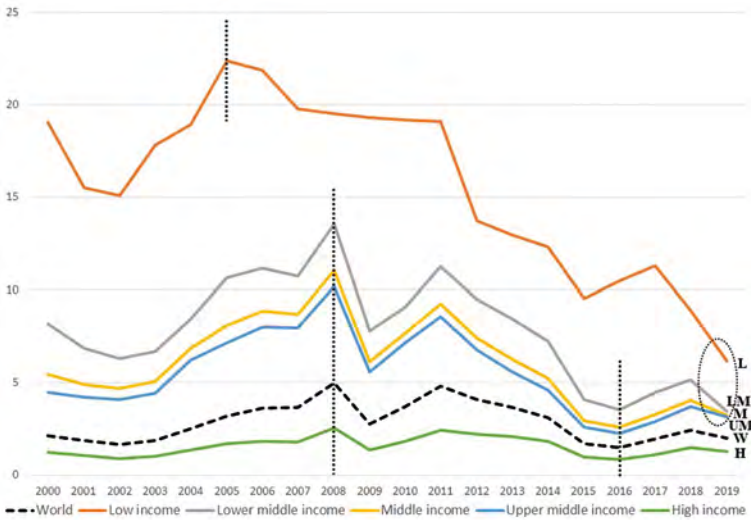
Source: Author's work based on the World Bank's data

of provision with natural capital in the 21st century (besides Russia and Canada), while Canada, USA, Germany, Republic of Korea and China recorded comparable results in terms of human capital.

An important indicator of a country's natural resource endowment is the ratio of natural rent to GDP, which shows the contribution of the resource base to economic growth.<sup>2</sup> In particular, the World Bank's experts include the rents derived from the exploitation of oil, natural gas, coal and other mineral resources, as well as from the use of forest resources in the assessment of total natural resources rents.

<sup>2</sup> Natural resources rents are calculated as the difference between the price of a commodity and its production cost.

Figure 3. Total natural resources rents to GDP in different groups of countries in the period 2000–2019 (%)

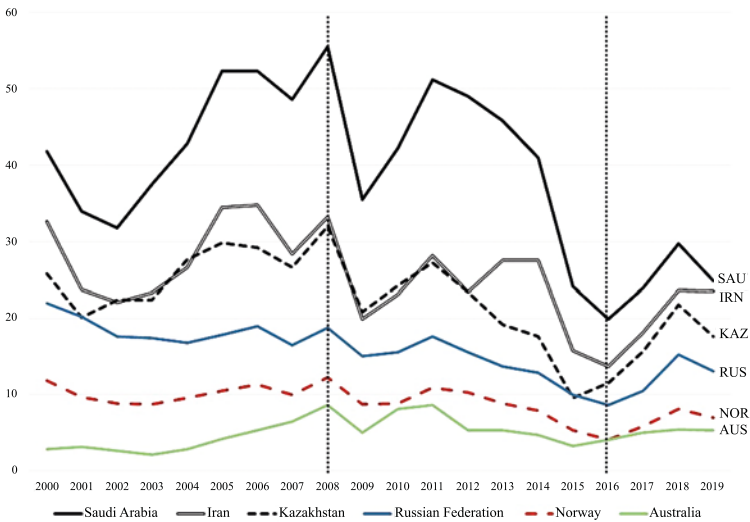


Source: Author's work based on the World Bank's data

As of the end of 2010s, in several Asian and African countries specialised in oil and gas extraction, natural resources rents reached 30–40% of GDP. According to our calculations, this indicator for the global economy grew until the crisis of 2008–09 and then declined by the mid-2010s from 5 to 1.5% of GDP. Similar trends were observed for income-differentiated groups of countries as well. Notably, a convergence occurred: in 2008, this indicator for high-income and lower-to-middle income countries differed by 11% (13.5 and 2.5%), but in 2019 – only by 2% (3.5 and 1.3%). In the world's poorest countries which are dependent on the natural resources exploitation (lower-income countries), the total natural resources rents to GDP ratio decreased from 22.3 to 6.2% in the period 2005–2019.

A downward trend in the contribution of the natural resource base to economic growth was also observed in countries belonging to the group of major producers of hydrocarbons. Following the crisis in the late 2000s, the total natural resources rents to GDP in Saudi Arabia fell from 56 to 25% over a decade, in Iran

Figure 4. Total natural resources rents to GDP in selected countries in the period 2000–2019 (%)



Source: Author's work based on the World Bank's data

– from 33 to 24%, in Kazakhstan – from 32 to 18%, in Russia – from 19 to 13%. For comparison, in a number of other countries specialised in the export of mineral resources, the ratio of natural rent to GDP remains low (for example, in Australia and Norway – about 5–6%).

## Natural Capital Investments during the Pandemic

The benefits of natural capital investments could have a significant role not only in fostering sustainable post-COVID-19 recovery but also in averting future pandemics. The research conducted by GGKP (2021) found that the benefits of meeting selected targets of the SDGs linked to natural capital, far outweigh the financial costs. These benefits can be grouped into three main categories:

1. Economic benefits. This type of investment is perceived to have a high economic multiplier effect, as well as strong potential to crowd-in private investment (O'Callaghan

and Murdock, 2021). According to the WEF's White Paper (2022), investments in nature could generate over USD 10 trillion in new annual business value and create more than 395 million jobs by 2030. The financing of natural capital projects, such as afforestation and natural capital restoration programmes, can lead to the creation of new jobs characterised by low-skill labour requirements, which could have a positive impact on the vulnerable population sectors (O'Callaghan et al., 2021).

Natural capital investments also have a positive impact on vulnerable industries, highly dependent on nature - agriculture, tourism, food and beverages, water supply, etc. It is a widespread belief that investment in nature could help countries that rely heavily on tourism and hospitality - sectors most affected by the negative effects of the coronavirus pandemic (Lobanov et al., 2022). Tourism revenues make up a significant share of the GDP in certain developing countries. The imposed restrictions, especially in the service sector, have not only significantly weakened international trade and tourism demand, but have had a negative impact on household income and the activities of small and medium-sized enterprises.

2. Health benefits. Natural capital investments also have the potential to improve people's well-being and ensure healthy lives (Kim and Maia, 2021). By conducting activities aimed at reducing global air pollution, boosting biodiversity, increasing food security, providing access to safe and readily available water, as well as facilitating access to high-quality green and blue spaces in cities (parks, riverbanks and coastlines), people's physical and mental health as well as their social well-being would be significantly improved. For example, benefits generated from using local green spaces for social interactions, relaxation, physical exercise and mental restoration may contribute to reduced risks of childhood obesity, lower rates of depression in adults and better cardiovascular health (European Environment Agency, 2022). The severity of COVID-19 infection may be exacerbated in countries with the highest PM2.5 levels. The research conducted by Wu et

- al. (2020) indicates that high levels of air pollution may increase the risk of dying from COVID-19 infection.
3. Environmental benefits. Investments in natural capital could directly or indirectly reduce the climate risks and promote green economy. Building and preserving natural capital are especially important for countries struggling with floods (e.g., India, Bangladesh, China, Vietnam, Pakistan, and Indonesia) and wildfires (e.g., US, Australia, and Brazil) (Kim and Maia, 2021). For example, climate change is causing more frequent and extremely high temperatures, thus further worsening the conditions and drying vegetation, making it more susceptible to burning, which contributes to greater fire intensity. This type of investment could boost the resilience of the affected countries and help combat climate change in the future.

Environmental fiscal policies aimed at restoration have been recognised as crucial for fostering accountable and sustainable COVID-19 relief and recovery. However, the funds allocated for green spending were not on the expected levels. Natural capital investment opportunities were limited because the pandemic minimised further financing of projects related to environmental preservation, which could have consequences in the coming years. Despite the growing interest in green recovery initiatives and an increasing number of funds established for their implementation, countries are still not on the right track to reorient their economies toward green future.

According to the Global Recovery Observatory<sup>3</sup> analysis of stimulus spending for 2020, the 50 largest economies have set aside USD14.6tn in fiscal measures to address the crisis, of which USD 11.1tn was dedicated to immediate rescue efforts, USD1.9tn to long-term recovery measures, and USD 1.6tn was categorised as

<sup>3</sup> The Global Recovery Observatory is an initiative which keep track of global government spending (fiscal rescue and recovery spending) during the COVID-19 crisis in 89 economies (50 leading economies and/or countries in Latin America and Caribbean region). This is joint initiative between the University of Oxford and the Green Fiscal Policy Network (the United Nations Environment Programme (UNEP), the International Monetary Fund, and the Deutsche Gesellschaft für Internationale Zusammenarbeit).

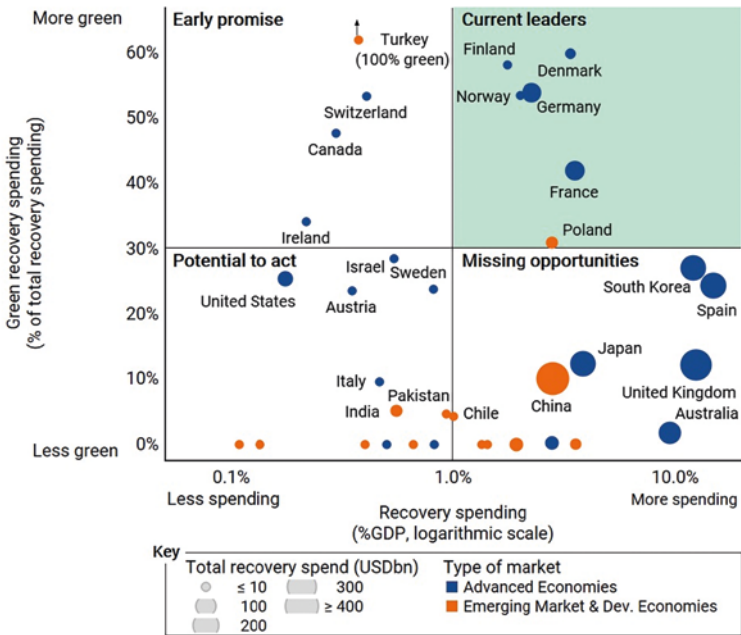


'unclear spending'. Considering the total spending, only USD 368bn was allocated to green initiatives focused on reducing greenhouse gas emissions and protecting natural capital. Essentially, a small number of governments in high-income countries earmarked less than 3% of COVID recovery spending for the green economy. Estimates by O'Callaghan et al. (2021) suggest that only 3% of recovery spending has a positive impact on natural capital, while up to 17% may cause negative influence, mainly through expanded road transportation and defence services. According to the UNEP (2021), in 2020, countries allocated their COVID-induced spending as follows:

- green energy spending (new renewable generation, hydrogen power, transmission infrastructure) USD 66.1bn;
- green transport spending (investment in public transport, cycling and walking infrastructure, electric vehicle transfers) USD 86.1bn;
- green building updates and energy efficiency spending USD 35.2bn;
- natural capital (ecosystem regeneration initiatives and reforestation) USD 56.3bn;
- green research and development (renewable energy technologies and technologies for decarbonizing sectors) USD 28.9bn.

Looking at the total amount of recovery spending and green initiative spending packages as % of total recovery spending, we see the positioning of four types of countries in Figure 5. The countries positioned in the upper right corner are denoted as global leaders because they have made significant progress toward a green and resilient recovery from COVID-19 (Belgium, Denmark, Finland, Germany, France, Norway, and Poland). South Korea, Japan, Spain and United Kingdom are marked as countries that have missed their opportunities for green recovery. The largest share of green recovery spending as % of total recovery spending has been recorded in Canada (55%), Germany (46%), Japan (43%), USA (43%) and France (38%). As expected, advanced economies have allocated significantly larger resources in both short-term rescue measures and long-term recovery measures compared to Emerging Markets and Developing Economies. In addition, green spending is

Figure 5. Green recovery spending as a % of total recovery spending, versus recovery spending as % GDP



Note: The x-axis represents the value of government COVID-19 recovery spending as a % of GDP. The y-axis represents green recovery spending as a % of total recovery spending. The size of the bubble represents total recovery spending in US billion dollars.

Source: O’Callaghan and Murdock (2021).

concentrated in wealthier countries and populations, threatening to reinforce dangerous pre-pandemic inequities (UNEP, 2021).

Governments should consider possible benefits from natural capital investment and try to address crucial challenges such as climate change, biodiversity conservation and attainment of the SDGs. The alarming fact is that countries were not able to achieve many of the SDGs even before the outbreak of the pandemic. Therefore, investing in nature is necessary in order to achieve the SDGs and the Paris Climate Agreement goals and support poverty reduction (Steele, 2017). In this regard, the Glasgow Climate Pact was reached at the UN Climate Change Conference in Glasgow in November 2021. This new global agreement obliges the signatories to

accelerate their actions towards the goals of the Paris Agreement and UN Framework Convention on Climate Change. The signatory countries are expected to urgently reduce emissions and increase spending for developing countries which bear greater costs related to limiting global warming. Within the European Union, member states have adopted two strategies which place great emphasis on natural capital and the circular economy: the EU Biodiversity Strategy for 2030 and the EU Forest Strategy for 2030. In addition, through the World Bank's Wealth Accounting and Valuation of Ecosystem Services Global Partnership, countries are encouraged to realise the potential of their renewable natural capital in order to ensure environmentally sustainable and resilient COVID-19 recovery.

## Concluding Remarks

The outbreak of the global health crisis caused by the COVID-19 has paralysed economies around the world, causing huge economic losses. At the same time, countries are facing an economic recession and climate change acceleration; hence, the need to achieve a green and sustainable recovery from COVID-19 is becoming increasingly important. Since the world is approaching 'critical point of no return' on climate change, it is necessary to change the existing models of economic growth that rely on over-exploitation of natural resources. Modification of unsustainable patterns of resource consumption is possible with investments in nature, green business, and transition to green economy. Post-COVID-19 recovery should be based on natural capital, meaning that countries should conserve nature in their recovery strategies by applying policies which envisage natural capital spending, such as the support for forestry, waterways, and general conservation initiatives. COVID-19 recovery packages based on natural capital investment should be set up to include solutions that can stimulate the economic recovery and simultaneously provide a positive impact on environment. The benefits of natural capital investment would be multiple, including reduction of climate risks, job creation, development of new skills, crowd-in effect on private investment, greater opportunities for innovation, transformation of agro-food industry, reduction of economic and social inequalities, etc.

Countries should find tools which facilitate the integration of natural capital into economic decision-making, as well as ways to finance these investments from different sources (public and private; domestic and international finance). Carbon reduction initiatives should play a significant role in future strategies, enabling the transition of current economies towards sustainable, resilient, climate-neutral, green and circular economies. Comprehensive responses to this crisis must be based on policies and activities directed towards the protection and restoration of natural systems, making us more resilient to the impacts of climate change. Anti-crisis policies should introduce nature-positive recovery measures to mitigate the inevitable negative consequences on human health and the real economy, both in developed and developing countries.

#### REFERENCES

- Akinsorotan, O. A., Olaniyi, O. E., Adeyemi A. A. & Olasunkanmi, A. H. (2021). Corona Virus Pandemic: Implication on Biodiversity Conservation. *Frontiers in Water*, 3, pp. 1–5, <https://doi.org/10.3389/frwa.2021.635529>
- Berman, J. D. & Ebisu, K. (2020). Changes in U.S. air pollution during the COVID-19 pandemic. *Science of The Total Environment*, 739, pp. 1–4, 139864, <https://doi.org/10.1016/j.scitotenv.2020.139864>.
- Calabrese, G., Bilali, H. E. & Raeli, M. (2020). Exploring the nexus between pandemics and natural capital: Covid-19 and other zoonoses, *New Medit*, 19(4), pp.145–151.
- Corlett, R. T., Primack, R. B., Devictor, V., Maas, B., Goswami, V. R., Bates, A. E., Koh, L. P., Regan, T.J., Loyola, R., Pakeman, R.J., Cumming, G.S., Pidgeon, A., Johns, D. & Roth, R. (2020). Impacts of the coronavirus pandemic on biodiversity conservation. *Biological Conservation*, 246, pp. 1–4, <https://doi.org/10.1016/j.biocon.2020.108571>
- Dasgupta, P. (2021.) *The Economics of Biodiversity: The Dasgupta Review*. London: HM Treasury.
- Doleschel, J. & Manu, A. (2021). Scarring effects of the COVID-19 pandemic on the global economy –reviewing recent evidence. *ECB Economic Bulletin*, 7/2021.
- European Environment Agency (2022). How green are European cities? Green space key to well-being – but access varies, available at: <https://www.eea.europa.eu/highlights/how-green-are-european-cities>

- Everard, M., Johnston, P., Santillo, D. & Staddon, C. (2020). The role of ecosystems in mitigation and management of Covid-19 and other zoonoses. *Environmental Science & Policy*, 111, pp. 7–17. <https://doi.org/10.1016/j.envsci.2020.05.017>.
- Galanakis, C. M., Brunori, G., Chiamonti, D., Matthews, R., Panoutsou, C. & Fritsche, U. R. (2022). Bioeconomy and green recovery in a post-COVID-19 era. *Science of the Total Environment*, 808, pp. 1–8, <https://doi.org/10.1016/j.scitotenv.2021.152180>.
- GGKP (2021). Markandya, A. & S. Galinato. *The Natural Capital Gap and the SDGs: Costs and Benefits of Meeting the Targets in Twenty Countries* (Geneva: Green Growth Knowledge Partnership), available at: [https://www.greengrowthknowledge.org/sites/default/files/downloads/resource//GGKP%20%282021%29.%20The%20Natural%20Capital%20Gap%20and%20the%20SDGs\\_Costs%20and%20Benefits\\_20%20Countries.pdf](https://www.greengrowthknowledge.org/sites/default/files/downloads/resource//GGKP%20%282021%29.%20The%20Natural%20Capital%20Gap%20and%20the%20SDGs_Costs%20and%20Benefits_20%20Countries.pdf)
- Gillespie, T. R., Jones, K. E., Dobson, A. P., Clennon, J. A. & Pascual, M. (2021). COVID-Clarity demands unification of health and environmental policy. *Glob. Change Biol.*, 27, pp. 1319–1321. <https://doi.org/10.1111/gcb.15508>
- Grömling, M. (2021). COVID-19 and the Growth Potential. *Intereconomics* 56, pp. 45–49. <https://doi.org/10.1007/s10272-021-0950-4>
- Hepburn, C., O’Callaghan, B., Stern, N., Stiglitz, J. & Zenghelis, D. (2020). Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?. *Oxford Review of Economic Policy*, 36(1), pp. S359–S381, <https://doi.org/10.1093/oxrep/graa015>
- IPBES (2019). Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. 1148 pages. <https://doi.org/10.5281/zenodo.3831673>
- Kim, J.A. & Maia, R. (2021). Investing in Natural Capital For a Greener and Fairer Recovery, Green Fiscal Policy Network, available at: <https://greenfiscalspolicy.org/blog/investing-in-natural-capital-for-a-greener-and-fairer-recovery/>
- Kumar, A., Malla, M. A. & Dubey, A. (2020). With Corona Outbreak: Nature Started Hitting the Reset Button Globally, *Front. Public Health*, 8, pp. 1–10, <https://doi.org/10.3389/fpubh.2020.569353>
- Lawler, O. K., Allan, H. L. Baxter, P. W. J., Castagnino, R., Corrella Tor, M., Dann, L. E., Hungerford, J., Karmacharya, D., Lloyd, T., Lopez-Jara, M. J., Massie, G., Novera, J, Rogers, A. M. & Kark, S. (2021).

The COVID-19 pandemic is intricately linked to biodiversity loss and ecosystem health, *The Lancet Planetary Health*, 5(11), pp. 840–850, [https://doi.org/10.1016/S2542-5196\(21\)00258-8](https://doi.org/10.1016/S2542-5196(21)00258-8)

- Lieuw-Kie-Song, M. & Perez-Cirera, V. (2020). Nature Hires: How Nature-based Solutions can power green jobs recovery. Joint ILO/WWF publication.
- Lobanov, M., Zvezdanović Lobanova, J. & Zvezdanović, M. (2022). Typologization of industrial systems in the countries of Central-Eastern and South-Eastern Europe. *Journal of the New Economic Association*, 4(56), 92–122. DOI: 10.31737/2221-2264-2022-56-4-5
- O’Callaghan, B. & Murdock, E. (2021). *Are We Building Back Better: Evidence from 2020 and pathways to inclusive green recovery spending*. United Nations Environment Program.
- O’Callaghan, B., Kingsmill, N., Waites, F., Aylward-Mills, D., Bird, J., Roe, P., Beyer, J., Bondy, M., Aron, J. & Murdock, E (2021). *Roadmap to Green Recovery*, Oxford.
- Palahí, M., Pansar, M., Costanza, R., Kubiszewski, I., Potočník, J., Stuchtey, M., Nasi, R., Lovins, H., Giovannini, E., Fioramonti, L., Dixon-Decleve, S., McGlade, J., Pickett, K., Wilkinson, R., Holmgren, J., Trebeck, K., Wallis, S., Ramage, M., Berndes, G., Akinnifesi, F.K., Ragnarsdóttir, K.V., Muys, B., Safonov, G., Nobre, A.D., Nobre, C., Ibañez, D., Wijkman, A., Snape, J. & Bas, L. (2020). *Investing in Nature as the true engine of our economy: A 10-point Action Plan for a Circular Bio-economy of Wellbeing*, Knowledge to Action 02, European Forest Institute.
- Petrović, P. & Lobanov, M. (2021). Impact of financial development on CO2 emissions: improved empirical results. *Environment. Development and Sustainability*. ISSN 1387-585X eISSN 1573-2975
- Petrović, P. & Lobanov, M. (2022). Energy intensity and foreign direct investment nexus: Advanced panel data analysis. *Applied Energy*, 311, (118669), ISSN 0306-2619 eISSN 1872-9118, <https://doi.org/10.1016/j.apenergy.2022.118669>
- Steele, P. (2017). Investing in natural capital to deliver SDGs and reduce poverty. Available at: Investing in natural capital to deliver the SDGs and reduce poverty | International Institute for Environment and Development (iied.org).
- Talmage, C. A., Allgood, B., Ashdown, B. K., Brennan, A., Hill, S., Trevan, E. & Waugh, J. (2022). Tethering Natural Capital and Cultural Capital for a More Sustainable Post-COVID-19 World. *International Journal of Community Well-Being*. <https://doi.org/10.1007/s42413-021-00151-5>

- UNEP (2021). Are we on track for a green recovery? Not yet available on: <https://www.unep.org/news-and-stories/press-release/are-we-track-green-recovery-not-yet>
- Venter, Z. S., Aunan, K., Chowdhury, S. & Lelieveld, J. (2020). COVID-19 lockdowns cause global air pollution declines, *Proceedings of the National Academy of Sciences*, 117(32), 18984–18990; DOI: 10.1073/pnas.2006853117
- Woetzel, J., Pinner, D., Samandari, H., Engel, H., Krishnan, M., Kampel, C. & Von der Leyen, J. (2020). Reduced dividends on natural capital? McKinsey Global Institute. <https://www.mckinsey.com/business-functions/sustainability/our-insights/reduced-dividends-on-natural-capital>
- World Bank (2021). The Changing Wealth of Nations 2021: Managing Assets for the Future. Washington DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/36400>
- World Economic Forum (2022). Scalling Investments in Nature: The Next Critical Frontier for Private Sector Leadership.
- World Economic Forum (2015). Which countries are in ecological debt?, available at: <https://www.weforum.org/agenda/2015/08/which-countries-are-in-ecological-debt/>
- Wu, X., Nethery, R. C., Sabath, M. B., Braun, D. & Dominici, F. (2020). Air pollution and COVID-19 mortality in the United States: Strengths and limitations of an ecological regression analysis, *Science advances*, 6(45), p.eabd4049.
- WWF (2020). Living Planet Report – 2020: Bending the curve of biodiversity loss. Almond, R. E. A., Grooten M. & Petersen, T. (Eds). Switzerland: WWF, Gland.
- Zambrano-Monserrate, M. A., Ruano, M. A. & Sanchez-Alcalde, L. (2020). Indirect effects of COVID-19 on the environment. *Science of The Total Environment*, 728, 138813, ISSN 0048-9697, <https://doi.org/10.1016/j.scitotenv.2020.138813>
- Zvezdanović Lobanova, J. & Lobanov, M. (2023). Problems and perspectives of the European Green Deal with the focus on the SEE countries and Serbia. *The Review of International Affairs*, LXXIV (1188). pp. 51–77. [https://doi.org/10.18485/iipe\\_ria.2023.74.1188.3](https://doi.org/10.18485/iipe_ria.2023.74.1188.3)
- Zvezdanović Lobanova, J., Kračun, D. & Kavkler, A. (2018). Effects of cross-border mergers and acquisitions on GDP per capita and domestic investment in transition countries. *Journal of Business Economics and Management*, 19(1), pp. 124–137, <https://doi.org/10.3846/16111699.2017.1408677>

Zvezdanović Lobanova, J., Lobanov, M. & Zvezdanović, M. (2021). Governance and civil and political rights as FDI determinants in transition countries. *Proceedings of Rijeka Faculty of Economics: Journal of Economics and Business*, 39(1), pp. 59–86, <https://doi.org/10.18045/zbefri.2021.1.59>

Zvezdanović, M. (2022). *Korporativne strategije u procesu akvizicije*. Beograd: Akademija za nacionalnu bezbednost u Beogradu i Službeni glasnik Republike Srbije. ISBN 978-86-519-2712-9



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# Methodology of Economic Security Analysis when Passing to Green Entrepreneurship for the Purpose of Sustainable Development

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## Abstract

In the rapidly changing environment of the modern world, to ensure and safeguard national security is a priority task for governments. Not only does it determine the level of the long-term development and competitive performance of a country but it also insures a higher standard of living. The present article lays a foundation for the development and implementation of special mechanisms that will promote an increase in the effectiveness of climate change adaptation. These mechanisms aim to ensure the economic safety and sustainable development by stimulating the development of green entrepreneurship segments. With this aim in view, it is obligatory to carry out a thorough analysis and keep track of the climatic situation to ensure the national economy security. The present research is grounded on an author-developed methodology that was elaborated while analyzing relationships between the instruments of the green entrepreneurship used to ensure the national economy security and sustainable development of territories, combining the radar method and the integral analysis method. It was demonstrated that the presented methodology gives an opportunity to decompose threats and perspective characteristics of economic security on the regional level while complying with sustainable development principles.

*Keywords:* Economic security, Sectors of the green economy, Green entrepreneurship, ESG factors, Sustainable Development Goals, Integrated index, Climate change, Greenhouse gas emissions

## Introduction – Academic Perspectives on Health Security

Climate change and its negative impacts on the environment and sustainable growth, including threat to the economic security, are considered to be among the gravest global challenges and threats. The global community and large businesses join efforts to

soften anthropogenic burden on ecology, while paying attention to innovative instruments that could raise effectiveness of the measures taken in adapting to climate change. Integration of the international efforts against global warming is regulated by the Paris Agreement,<sup>1</sup> which postulates the fossil fuel neutrality in the member countries by 2100. The provisions of the Agreement stipulate the following: limiting the growth of the average global temperature significantly below 2°C compared to the pre-industrial level; continuing efforts to limit temperature rise to 1.5°C above the pre-industrial levels; alignment of financial flows with the needs of development, accompanied by low greenhouse gas emissions and strengthened resistance to climate change; all parties are obliged to adopt “nationally determined contributions” and to determine domestic measures in order to achieve this goal; all countries undertake to submit regular reports on their emissions and progress achieved in the implementation of “nationally determined contributions”; the obligations of developed countries determined by the Framework Convention to support the efforts of developing countries are reaffirmed; all countries are obliged to submit new “nationally determined contributions” every five years; the mechanism for responding to losses and damages caused by climate change is being expanded; a new mechanism that would allow the reduction of emissions in one country to be counted in the “nationally determined contributions” of another country is established.

The world is already facing many problems caused by climate change, and according to predictions, these challenges will certainly multiply and intensify in the coming decades. The climate is changing rapidly and radically. The climate change creates additional pressure, increasing the existing risks to living conditions, biodiversity, health and safety of people, infrastructure and food systems. The intensity of extreme weather events – heat waves, forest fires, floods and droughts – has increased significantly over the past half-century. These phenomena have occurred before, but today they happen every year, or even several times a year. Namely, current levels of global warming are associated with a moderate

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<sup>1</sup> Paris Agreement of March, 2016: [https://www.economy.gov.ru/material/file/04a533fab96b645ac4c038913623653c/parizhskoe\\_soglashenie.pdf](https://www.economy.gov.ru/material/file/04a533fab96b645ac4c038913623653c/parizhskoe_soglashenie.pdf)

risk of increased water scarcity in arid areas, soil erosion, vegetation loss, fire damage and yield declines. Also, the stability of food supplies will decline as the severity and frequency of extreme weather events that disrupt the food chain increase. With the current increase in average global temperature of approximately 1°C above the pre-industrial levels, it is clear that global warming is pervasive. What we can do is to stop global warming at 1.5°C–2°C relative to the pre-industrial average. Frenetic changes in climate conditions have already made human life impossible in many places on the planet, resulting in millions of people being displaced by climate-induced disasters in countries around the world. Air pollution and rising temperatures, as a result of climate change, are associated with an increase in health problems, and we witness daily how global warming affects people's health in various ways. An obvious way in which changes in climate conditions harm human health is through their negative impact on air quality. Although the burning of fossil fuels directly pollutes the air, global warming also causes large fires, which further increase the amount of carbon dioxide and pollutants. The sudden increase in carbon dioxide emissions led to the formation of a global consensus on the need to reduce greenhouse gas emissions in order to prevent and/or mitigate climate change. This clearly indicates that, if urgent measures are not taken to combat them, the impacts of climate change on health will bring further disruptions, and endanger people's lives and safety. Although climate change has already begun to affect our health and well-being, it is not yet too late to act and fight against its influence and mitigate harmful effects. It is necessary to consider measures that can contribute to reducing the occurrence of climate change, but it is also necessary to consider the possibility of adaptation to the changed climatic conditions. Understanding that climate change is a risk management challenge opens up a wide range of possibilities for adaptations to changed natural circumstances with the development of various initiatives to limit future warming. All countries in a certain way participate in activities that contribute to climate change and all are exposed to its negative consequences. The problem of climate change is also related to various social issues, among which the issue of responsible attitude towards future generations. Therefore, the transition to a low-carbon economy, effective

monitoring, reporting and verification of greenhouse gas emissions are key to making progress in achieving emission reduction goals. The general development priority is based on the efficient use of resources and the achievement of carbon neutrality by 2050, which implies a reduction of greenhouse gas emissions by 2030 by about 50% compared to the levels of emissions from 1990. Stabilizing climate change means reducing net carbon dioxide emissions to zero. As a concept, net zero emissions were introduced more than a decade ago to minimize society's impact on the climate and the environment. If we consider the fact that CO<sub>2</sub> remains in the atmosphere for hundreds of years (even thousands) as long as we emit more than nature can absorb with oceans, forests and other vegetation, CO<sub>2</sub> concentrations in the atmosphere will increase and the climate will warm. Decarbonization of the economy implies major changes in technology and industry, the development of new patterns of energy production and consumption, new business models and more circularity in the ways of production and consumption.

Russia is ranked fourth in terms of the volume of world's greenhouse gas emissions per country (China taking the lead with 27.6% of the overall CO<sub>2</sub> emissions, the USA producing 15.2%, India 7% and Russia 4.6% of the total greenhouse gas emissions respectively) (State Report, 2019) which makes the country's participation in the climate change discussion topical and urgent.

Aiming to put to practice the obligations under the Paris Agreement in the Russian Federation, the Executive Order of November 4, 2020 No. 666 "On greenhouse gas emissions reduction" was issued, which stresses out "the necessity to reduce greenhouse gas emissions to 70% of the level of 1990 by 2030, based on largest possible absorbing capacity of forests and other ecosystems on the assumption of sustainable and well-balanced socio-economic development of the Russian Federation".<sup>2</sup>

Furthermore, National Security Strategy of the Russian Federation (p. 26)<sup>3</sup> emphasizes that provision and protection of na-

<sup>2</sup> Decree of the President of the Russian Federation of November 04, 2020, N 666 "On reducing greenhouse gas emissions". <http://kremlin.ru/acts/bank/45990>

<sup>3</sup> Decree of the President of the Russian Federation of July 02, 2021, N 400 "On the National Security Strategy of the Russian Federation". <http://publication.pravo.gov.ru/Document/View/0001202107030001?index=9&rangeSize=1>

tional interests is executed through the strategic national priorities implementation which incorporate “environmental security and rational use of natural resources”.

Special tools that proved to be efficient in adapting to climate change and securing economic safety are sector-specific forces, e.g. green entrepreneurship, which are the prime movers in economic development (Shchuplova & Rybin, 2018). Among the most widely used measures for climate change adaptation, we can first single out economic diversification and creation of new ecologically-friendly production facilities incorporating green economy principles and ESG factors (environmental, social and governance principles used to assess an organization’s business performance in terms of its sustainability, impact on the environment and ethical issues, e.g. creating beneficial social environment, honesty towards employees and clients and good governance) (Smirnov, 2020). Secondly, energy efficiency and green energy use (Berezkin & Sinyugin, 2019) and finally, personnel qualification development will be necessary for the implementation of the sustainable development standards and ESG factors in business activity.

The above-mentioned requires special mechanisms to be developed and implemented in order to increase the effectiveness of climate change adaptation by reducing emissions of pollutants into the air, which can be executed with green instruments development (Houghton et al, 2001). Therefore, in public sector not only that anti-crisis measures should be actively developed, but also preventive ones, which is stipulated by the menacing threat to sustainable development from climate change. That lies within the methodology of decomposing threats and perspective characteristics of economic security when passing to green entrepreneurship for sustainable development.

## Literature Overview

Among the mechanisms that stimulate the development of green entrepreneurship segments in terms of the climate agenda, there are so-called green financing and economic incentives (tax concessions). In this regard, the criteria for classifying projects as green and, consequently, gaining access to concessional financing,

are fully developed and on the table, with the fundamental criterion of having the emissions reduced by at least 20% and otherwise conforming to the ESG factors.

The annual 2020 report “Green Finance in Russia” prepared by a group of experts states that, as of the end of year 2020, 36 methodologies were developed in the field of green finance and sustainable development for the Russian market. Out of these, 19 methodologies were designed for the ESG-assessment of companies, constituent entities of the Russian Federation and financial instruments in the field of sustainable development of six bond rating agencies, while 17 various indicators were prepared in the field of sustainable development, including the ESG-rankings of companies, constituent entities of the Russian Federation, stock indices, environmental openness ratings, fundamental efficiency ratings, etc. The aforementioned methodologies and instruments were elaborated by 10 companies, including, without limitation, the rating agencies. As prescribed by the developed methodologies, the rating agencies evaluate green financial instruments in conformity with internationally recognized principles and standards.

Scientists laid a foundation for the following promotional and restraining instruments recommended to be used in public administration to ensure economic security amid the climate change (Tetushkin, 2017; Porfiriev et al., 2011; Konstantinov, 2014):

- Tax instruments, duties and fees directly targeting CO<sub>2</sub> emissions reduction, since they impose additional cost on hazardous businesses;
- Quotas for tradable energy, which also have a direct impact on carbon-dioxide emissions’ reduction, as they limit emissions from industrial enterprises by regulation;
- Subsidies and other special conditions for the functioning of green organizations, which have an indirect impact on the emissions reduction, since they are preferential measures aimed at developing the organization itself and stimulating its activities while taking into account the environmental impact.

International practices have also proven the effectiveness of economic instruments (fiscal instruments and emission trading) in

limiting and reducing carbon dioxide emissions, since they directly affect carbon price formation (Gafurov et al., 2017).

One of the widely accepted methodological approaches to the economic security monitoring and evaluation is use of recommendations for monitoring the economic security indicators' dynamics within the range of the accepted value (threshold, critical etc.). In scholarly circles there exist several approaches to defining the threshold value for economic security evaluation (Shekhovtsova & Zinakov, 2018) such as: levelling at the worldwide average values; using targeted or historically worth values of upper and lower limits within the range. Many approaches to integrated indices estimation in economic safety, as the aggregate consolidated index based on a range of characteristics, have been developed (Dolmatov, 2006; Utkin & Denisov, 2002; Dyuzhenkova, 2001; Mityakov, 2012).

It should be noted that, in our opinion, levelling at the worldwide average values in economically developed countries is not sufficient in choosing threshold values of economic security, as there is an obvious difference between the institutional level of economic security and resources, and what is required. That inevitably disables developing countries from attaining the above-threshold values. At the same time, the use of the target and lower values to elaborate the threshold values fluctuation interval, makes it more difficult to estimate objectively the moment when a threat to the economic safety appears. That's because approaching the worst value, or moving away from the target value don't always become critical in economic security estimation.

International practices have resulted in a range of indicators of economic security thresholds. For instance, natural rate of unemployment is advised to be kept at the level of no more than 6.5–7%, with the range of permissible values of 15–20% if the country's economy is experiencing dramatic structural changes at the time, but for a short period only.

Alongside with the accumulated methodological economic security estimation basis, there is another ill-conceived issue of the green economic instruments survey, with emphasis on the compliance with sustainable development principles.

This article continues a series of long-lasting scientific studies (Kozhevina & Belyaevskaya-Plotnik, 2020; Belyaevskaya-Plotnik,



2020; Belyaevskaya-Plotnik, 2021) which were carried out within the framework of state assignments and grants, and aimed at finding a relationship between economic security of a certain territory and sustainable development in the context of ecological factors. Consequently, methodology of decomposing threats and perspective characteristics of economic security on the regional level will be presented through the example of using separate economic security instruments within climate change aspect, including green entrepreneurship.

## Research

Study of the relationships between economic security and environmental factors, including the green economics, was carried out in a number of researches (Belyaevskaya-Plotnik, 2020; Golovanov et al., 2018; Glazev, 1998; Demchenko, 2006; Dyuzhenkova, 2001; Gurbarkov & Tikhomirova, 2020; Zimenkova, 2017). Widely-recognized are the approaches that, in macroeconomic and sectoral aspects, interpret the green economy which has been presented to the general public by the UN and the European Community (Towards a green economy in Europe, 2013; Environmental indicator report, 2012). For example, selected conceptual EU documents consider the green economy as a combination of the economic, ecological and social spheres. Agreeing with the above-mentioned approach, the author hereafter gives their interpretation of the relationship between the green economy and economic security (Table 1).

Table 1. Structural components of the relationship between the green economy and economic security

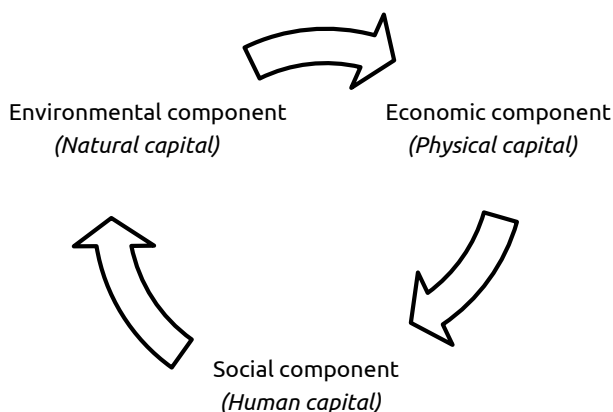
Components	Structure	Aim	Instruments
Environmental component	Natural capital	Ensure sustainability of ecological systems and ecological stress reduction	Promotion of renewable energy sources; the development of the entrepreneurial segments in agriculture stimulation
Economic component	Physical capital	Ensure equipment efficiency and lean production	Use of energy-efficient technologies; reduction of the harmful polluting enterprises rate

Components	Structure	Aim	Instruments
Social component	Human capital	Promote ethical consumption and reduce inequality	Promotion of the knowledge and information-based economy, so as to overcome the compensatory problem of natural resources and inequality using and developing the most powerful resource – human knowledge and competence

Source: Belyaevskaya-Plotnik, 2020.

Broadly defined, the green economy aims to create an environmentally sustainable economy. Its role in ensuring economic security can be reduced to increasing the efficiency of physical capital utilization and reducing risks and threats from environmental factors. Moreover, reduction of social inequality also lies among the tasks of ensuring economic security of our country as a whole, and its territories. An issue that still remains unsolved is the hierarchy of the presented methodology components, namely, the cause-and-effect relationships between them. Proceeding from the aforesaid, it is assumed that such a relationship between the structural components is rather cyclical than hierarchical (Figure 1).

Figure 1. Cyclical relationship between the structural components of the green economy and economic security



Source: Belyaevskaya-Plotnik, 2020.

Inasmuch as it is shown in the table, the connection between the components of the green economy and economic security is cyclical and established; their further analysis in the regional context appears to be relevant and appropriate.

In general, the indicators for assessing the state of economic security can characterize simultaneously or separately, one or another structural component of the green economy and economic security. In addition, instruments of the economic component (the use of energy-saving technologies; reducing the share of “harmful” polluting enterprises), which is presented in the table above, are aimed, among others, at stimulating the development of the entrepreneurial segments in the green economy. Likewise, this statement is also applied to the instruments of the environmental component in relation to the agricultural entrepreneurship in a certain region (Tseng & Lee, 2020; Chan, 2001).

In the context of economic security development, with regard to the green entrepreneurship, the authors of this article (Kozhevina & Belyaevskaya-Plotnik, 2020) have rationalized 9 groups of characteristics for national sustainable development goals (out of 17 internationally defined Sustainable Development Goals created (SDGs)<sup>4,5</sup>), which altogether form a scope of 26 characteristics, grouped by their corresponding SDGs. The above-mentioned grouping of SDGs was used to define areas of the green entrepreneurship in demand of foremost support.

According to the authors (Kozhevina & Belyaevskaya-Plotnik, 2020), a model of development support of the entrepreneurial segments in the green economy in the framework of sustainability and economic security should do the following:

- Calculate integrated indices within SDGs paradigm;
- Build strategic profile of the entrepreneurship development potential of the green economics;
- Define strengths and weaknesses of a field development at a particular period;

<sup>4</sup> THE 17 GOALS. <https://sdgs.un.org/goals>

<sup>5</sup> National Sustainable Development Goals. Federal State Statistics Service. <https://gks.ru/sdg/data>

- Differentiate risks and threats to the field development within the framework of sustainable development and economic security.

Input data for the present analysis are the data of formal statistical observation within the aforementioned SDGs. The conclusions made after using the aggregated managerial model of development support of the entrepreneurial segments in the green economy should be considered when managing weaknesses, preventing them from transforming into threats to the economic security of regions.

## Discussion

In order to efficiently prioritize things within the realm of state support of the green economy, with an aim to provide sustainable development and economic security of regions, a methodology has been suggested of building a strategic profile of the entrepreneurial segments of the green economics development potential (hereinafter –profile). It allows visualizing strengths and weaknesses of a certain economy sector on the national and regional levels that, when properly managed, will provide opportunity to strengthen the economic security of regions and allow their sustainable development.

Building a profile of the entrepreneurial segments of the green economics development potential involved using the radar method (Litvinova, 2012) which presented visual highlights for the spheres that require the first-priority support from the state or regional authorities. To do so, a circumference considered as a strategic profile of the entrepreneurial segments of the green economics development potential is divided equally into radial estimation segments. The number of segments equals the number of sustainable development goals expressed verbally. Whereas some goals are defined by a complex of characteristic values, integrated aggregated index should be calculated for each goal using integral analysis method which aggregates different-sized values to a single non-dimensional value by comparing them to a defined “standard” value (Chichkanov & Belyaevskaya-Plotnik, 2022; Chichkanov et al., 2020; Pluta, 1989). Thuswise, the axes of a radar will show the integral

SDGs values estimation where lower values of the radar approaching the estimation profile center will be interpreted as a weakness in green economy development, that require the use of urgent measures from the authorities.

Radar area calculation  $S_r$  and generation of composite index for the profile area of an object under scrutiny ( $S_{ob}$ ) allow making final assessment of the development potential for the entrepreneurial segments in the green economy of the object under scrutiny (Litvinova, 2012).

Integrated index of the sustainable development goal is positive and tends to the value of one. The calculated value of this index is interpreted in the present investigation as follows: attainability of a goal is higher in a period where the integrated index is closest to the value of one (Table 2).

Table 2. Values of the integrated index for each SDGs for Russian Federation

The period	SDG1	SDG2	SDG3	SDG8	SDG9	SDG10	SDG11	SDG12	SDG17
2019	0,33	0,12	0,35	0,30	0,15	0,57	0,50	0,43	0,42
2020	0,72	0,28	0,84	0,57	0,36	0,93	0,58	0,65	0,66
2021	0,44	0,34	0,99	0,32	0,44	0,48	0,99	0,99	0,99

Source: Author's calculation and presentation

Decoding of symbols<sup>6,7</sup> in the Table 2:

SDGs1 – Goal 1: No poverty.

SDGs2 – Goal 2: Zero hunger (No hunger).

SDGs3 – Goal 3: Good health and well-being.

SDGs8 – Goal 8: Decent work and economic growth.

SDGs9 – Goal 9: Industry, Innovation and Infrastructure.

SDGs10 – Goal 10: Reduced inequality.

SDGs11 – Goal 11: Sustainable cities and communities.

SDGs12 – Goal 12: Responsible consumption and production.

SDGs17 – Goal 17: Partnership for the goals.

<sup>6</sup> THE 17 GOALS. <https://sdgs.un.org/goals>

<sup>7</sup> National Sustainable Development Goals. Federal State Statistics Service. <https://gks.ru/sdg/data>

Based on the calculated integral values for the chosen goals of sustainable development, a strategic profile was elaborated of the entrepreneurial segments of the green economics development potential for the Russian Federation as a whole, as well as for Moscow Oblast, Leningrad Oblast, Sverdlovsk Oblast, Novosibirsk Oblast, Krasnodar Krai and Altai Krai (Table 3).

Table 3. Ranking position of the Russian Federation Regions

Region of the Russian Federation	Radar area	Ranking position
Moscow Oblast	0,62	1
Novosibirsk Oblast	0,59	2
Sverdlovsk Oblast	0,57	3
Krasnodar Krai	0,57	4
Leningrad Oblast	0,54	5
Altai Krai	0,53	6

Source: Author's calculation and presentation

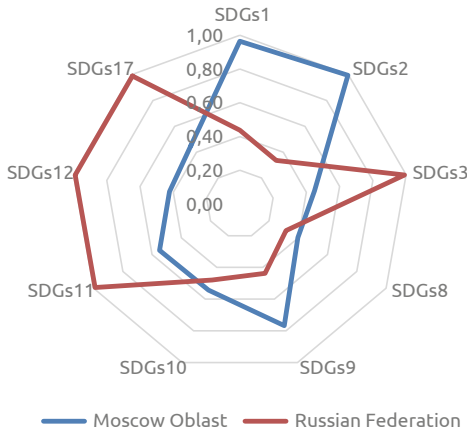
In order to conduct a comparative analysis of the regions on the base of the entrepreneurial segments of the green economics development level within the framework of sustainable development and economic security based on the sustainable development goals,<sup>8</sup> it is necessary to elaborate a strategic profile of the entrepreneurial segments of the green economics development potential. The highest practicality will be achieved not through an individual profile of a constituent entity of the Russian Federation but through its in-parallel placement in the same estimation field as a federal-level profile, elaborated earlier in this research.

A comparative analysis of the two profiles will thus visually show the level of goals attainment in the constituent entity of the Russian Federation contrasted with the SDGs goals attainment for the whole country. This will provide rationalization for the "narrow" areas of the regional development that require additional attention and effort from regional authorities (Kozhevina & Belyevskaya-Plotnik, 2020). Hereafter are presented strategic profiles

<sup>8</sup> Authoring based on National Sustainable Development Goals. Federal State Statistics Service. <https://gks.ru/sdg/data>

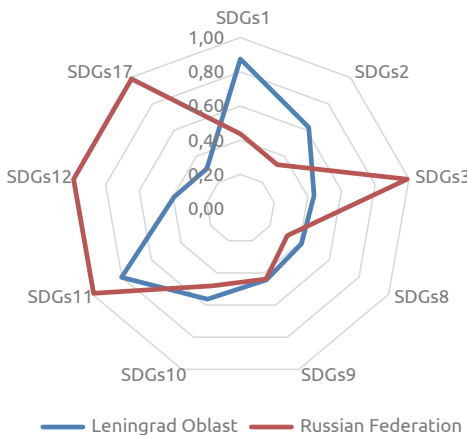
of the entrepreneurial segments of the green economics development potential in the chosen constituent entities of the Russian Federation, as compared with the respective values for the country as a whole (Figures 2–7).

Figure 2. Strategic profile of the entrepreneurial segments of the green economics development potential in Moscow Oblast



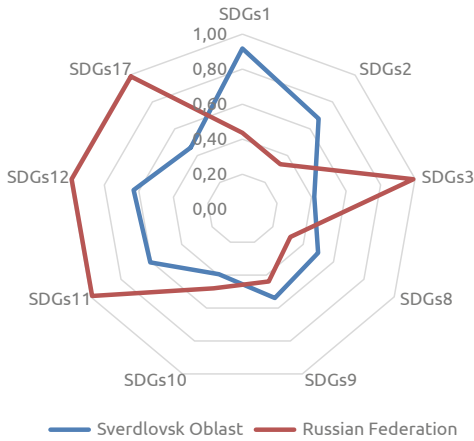
Source: Author's calculation and presentation

Figure 3. Strategic profile of the entrepreneurial segments of the green economics development potential in Leningrad Oblast



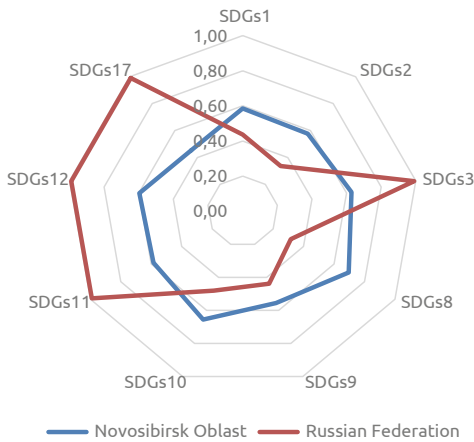
Source: Author's calculation and presentation

Figure 4. Strategic profile of the entrepreneurial segments of the green economics development potential in Sverdlovsk Oblast



Source: Author's calculation and presentation

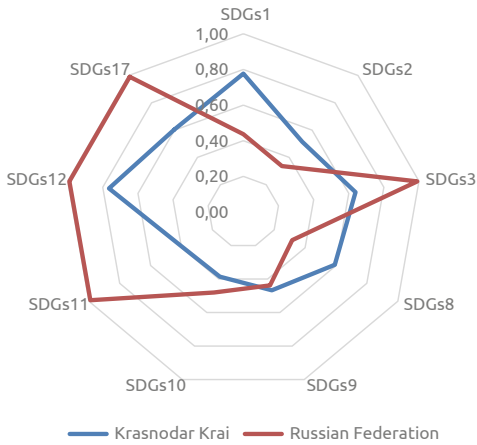
Figure 5. Strategic profile of the entrepreneurial segments of the green economics development potential in Novosibirsk Oblast



Source: Author's calculation and presentation

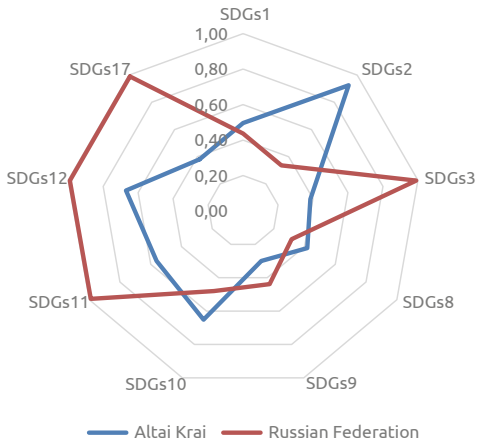


Figure 6. Strategic profile of the entrepreneurial segments of the green economics development potential in Krasnodar Krai



Source: Author's calculation and presentation

Figure 7. Strategic profile of the entrepreneurial segments of the green economics development potential in Altai Krai



Source: Author's calculation and presentation

According to the results, Moscow oblast ranks 1<sup>st</sup> in the rating of the Russian Federation regions.

The leading position was provided by high values of indicators for achieving such sustainable development goals as no poverty, zero hunger, as well as industrialization, innovation and infrastructure.

Thuswise, the area of close attention from the local authorities in Altai Krai will include such goals of sustainable development that have low values as zero hunger, good health and well-being, industry, innovation and infrastructure, sustainable cities and communities, responsible consumption and production, as well as partnerships to achieve the goal. These goals synchronously characterize a low level of green economy development in the region and low level of economic security. Consequently, to foster green economy development and provide the required level of economic security it is necessary to address the aforementioned issues.

## Conclusions

Summing up, among the perspective characteristics of economic security there are proposed the following instruments of increasing the effectiveness of climate change adaptation when passing to green entrepreneurship segments:

1. Introduction of a tradable energy quotas system to regulate greenhouse gas emissions and stimulate renewable energy sources' development (currently planned as a pilot project on Sakhalin to be recommended, when completed successfully, for implementation throughout the country), which makes it possible to create a climate-responsible market in Russia.
2. Creation of a scientifically grounded system of payments for the pollution of the environment which, as contrasted with the system now in force, would enable a polluting enterprise to use the pollution charges (partially or in full) to carry out environmental and/or conservational activities, as well as implement state-of-the art technologies in their business activities in order to reduce the carbon intensity of their products.
3. Development and implementation of a carbon footprint labelling system (similar to energy efficiency labeling), which

will provide Russian goods with a competitive advantage in international markets and expand their promotion and distribution channels, thereby ensuring the required level of economic security through transparency and stability of our home country's export.

4. Withdrawal and use of a defined portion of export duties demanded for environmental causes, by establishing a special-purpose accumulation fund that aims at subsidizing and supervising the implementation of measures designed to reduce carbon dioxide emissions and other ways of ecological monitoring.
5. Adjusting the criteria of sustainable development projects (including the green ones) in the Russian Federation (the green and adaptation projects taxonomy) so as to expand the list of projects that can attract additional finance from the national green financing system. The list of criteria is suggested to be continued with the following projects:
  - Financial support of scientific research in the new-technologies elaboration field, that aim at reducing hydrocarbon emissions (energy saving technologies and technologies for harmful emissions capturing);
  - Projects that create organizational, preventive and technological measures in the fire protection of forests and agricultural fields, which include waste rate setting and waste disposal in land-use and forest-use.
6. Primary advantage and usefulness of the suggested methodology of decomposing threats and perspective characteristics of economic security when transitioning to green entrepreneurship for sustainable development, which combines integral analysis and the Radar Method, is the possibility of assessing specific factors that influence the integrated potential of the entrepreneurial segments of the green economy development, as well as the possibility of substantiating the weaknesses and strengths of this field as the result of comparing heterogeneous indices in the same estimation field proved to be demonstrative and complex.

7. The weaknesses of a field development defined within a strategic profile elaboration are considered here to be constraints for the development of entrepreneurial segments in the green economy. These constraints are regarded as a lever to take the whole economy to a higher level of sustainable development, rather than just encumbrances for the green economy development.
8. The sustainable development goals which after the calculations are estimated to be below the accepted values in dynamics, should become an area of close attention from the local authorities, so that new growth points could be identified while removing the constraints on green ecology development. The research defined that alternating the influence on several disincentive factors of the green economy development in order to eliminate them, demonstrates the highest efficiency in contrast with the stimulation of the field's strengths.

## REFERENCES

- Belyaevskaya-Plotnik, L. A. (2021). Substantiation of perspective parameters of economic security in the transition to segments of "green" entrepreneurship, taking into account the climate agenda. *Economics and management: problems, solutions*. 1(11): 61–66. doi: <http://doi.org/10.36871/ek.up.p.r.2021.11.01.008> (in Russian).
- Belyaevskaya-Plotnik, L. A. (2020). Evolution of methodological approaches to assessing the state and dynamics of the level of economic security. *Economic security*. 3(4): 443–456. doi: <http://doi:10.18334/ecsec.3.4.110852> (in Russian).
- Belyaevskaya-Plotnik, L. A. (2020). Ensuring the economic security of territories in the context of assessing the market potential for the development of entrepreneurial segments of the "green" economy. *Scientific Research and development. Economy*. 4: 4–11. doi: [10.12737/2587-9111-2020-4-11](https://doi.org/10.12737/2587-9111-2020-4-11) (in Russian).
- Berezkin, M. Yu. & Sinyugin, O. A. (2019). Prospects for low-carbon development of the Russian energy sector. *Environment and energy science*. 2: 4–12 (in Russian).

- Chichkanov, V. P. & Belyaevskaya-Plotnik, L. A. (2022). Estimating the Multiplier Effect of Investment Projects of the Far Eastern Federal District on Regional Socio-Economic Development. *Economy of region*. 18(2): 369–382. <https://doi.org/10.17059/ekon.reg.2022-1-5> (in Russian).
- Chichkanov, V. P., Belyaevskaya-Plotnik, L. A. & Andreeva, P. A. (2020). Modelling the Assessment of the Impact of Industry Factors on the Level of the Territories' Socio-Economic Development and Economic Security. *Economy of region*. 16(1): 1–13. <https://doi.org/10.17059/2020-1-1> (in Russian).
- Demchenko, S. A. (2006). The theory of economic growth in connection with the concept of the multiplier. *Problems of modern economics*. 2: 85–89 (in Russian).
- Dolmatov, I. V. (2006). Formation of a regional system for ensuring economic security. M. 150. (in Russian).
- Dyuzhenkova, N. V. (2001). System of criteria and indicators for assessing the state of economic security. *Information business in Russia*. 42. (in Russian).
- Environmental indicator report (2012). Ecosystem resilience and resource efficiency in a green economy in Europe. European Environment Agency, Copenhagen: <https://www.eea.europa.eu/publications/environmental-indicator-report-2012/environmental-indicator-report-2012-ecosystem>
- Gafurov, A. M., Osipov, B. M., Gatina, R. Z. & Gafurov, N. M. (2017). Possible ways to reduce carbon dioxide emissions. *Energy problems*. 9–10: 21–31. (in Russian).
- Chan, R. Y. K. (2021). Determinants of Chinese consumers' green purchase behavior. *Psychology & Marketing*. 18(4): 389–413. <https://doi.org/10.1002/mar.1013>
- Glazev, S. Yu. (1998). Genocide. Russia and the new world order. Economic growth strategy on the threshold of the 21st century. M.: Terra.187. (in Russian).
- Golovanov, E. B., Mikhailina, L. M. & Ekimova, K. V. (2018). Role and importance of environmental pressure in the system of regional economic security. *Bulletin of the South Ural State University. Series: economics and management*. 12(4): 14–25. doi: 10.14529/em180402. (in Russian).
- Green Finance of Russia. Annual Report (2020). [https://www.ra-national.ru/sites/default/files/analitic\\_article/INFRAGREEN\\_Green\\_Finance\\_Russia\\_29122020.pdf](https://www.ra-national.ru/sites/default/files/analitic_article/INFRAGREEN_Green_Finance_Russia_29122020.pdf)

- Gubarkov, S. V., Tikhomirova, E. S. (2020). The Current Situation and Prospects for the Development of the Innovation Environment in the Subjects of the Far Eastern Federal District. *Customs policy of Russia in the Far East*. Retrieved from: [http://vfrta.customs.ru/vfrta/images/stories/journal\\_2020-1\\_06gubarkov.pdf](http://vfrta.customs.ru/vfrta/images/stories/journal_2020-1_06gubarkov.pdf) (Date of access: 10.06.2023) (in Russian).
- Houghton, J. T., Ding, Y., Griggs, D. J. et al. (eds.) (2001). *Climate Change 2001: The Scientific Basis. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*. Cambridge: Cambridge University Press: 881. <https://doi.org/10.1093/ije/dyg059>
- Konstantinov, A. V. (2014). The role and place of anthropogenic climate change in the system of ensuring economic security in economic sectors. *Socio-economic phenomena and processes*. 8: 61–66. (in Russian).
- Kozhevina, O. V. & Belyaevskaya-Plotnik, L. A. (2020). Management model of economic security of the territory in the context of sustainable development goals. *National interests: priorities and security*. 16(12): 2234–2253. doi: 10.24891/ni.16.12.2234. (in Russian).
- Litvinova, V. A. (2012). Graphic research methods in the analysis of the level of competitiveness of products. *Bl*. 4: 53–56. (in Russian).
- Mityakov, E. S. (2012). Classification of mathematical models of sustainable development and economic security. *Economics*. 1: 128–131. (in Russian).
- Pluta, V. (1989). Comparative multidimensional analysis in econometric modeling. M.: Finance and Statistics. 174. (in Russian).
- Porfiriev, B. N., Kattsov, V. M. & Roginko S. A. (2011). *Climate change and international security*. M.: RAS, Department of Social Sciences. 2011. 291. (in Russian).
- Shekhovtsova, Yu. A., Zinakov, E. A. (2018). Strategy of economic security of the Russian Federation for the period up to 2030, its advantages and ways of improvement. *Economics, Management, Finance*. 34–37. (in Russian).
- Shchuplova, I. S., Rybin, D. V. (2018). Global climate change as a challenge to energy policy and energy security. *European science*. 6(38): 14–18. (in Russian).
- Smirnov, V. D. (2020). Management of ESG risks in commercial organizations. *Management Sciences*. 3: 6–20. (in Russian).

State Report "About the state and environmental protection of the Russian Federation in 2019" (project) // Ministry of Natural Resources and Ecology of the Russian Federation.

Tetushkin, V. A. (2017). Analysis of climate policy trends as an element of economic security of the Russian Federation: International aspect. *Regional economy: theory and practice*. 6(441): 1173–1186. doi. Org/10.24891/re.15.6.1173. (in Russian).

Towards a green economy in Europe. EU environmental policy targets and objectives 2010–2050 (2013). European Environment Agency. Copenhagen: <https://www.eea.europa.eu/publications/towards-a-green-economy-in-europe>

Tseng, P.-Y., Lee, S.-F. (2020). The Influence of Environmental Concern on Intention of Green Consumption – Moderating Effects of Moral Consciousness. *Sustainable Innovation in Education and Technology. Education and Awareness of Sustainability*. 3: 871–874. [https://doi.org/10.1142/9789811228001\\_0195](https://doi.org/10.1142/9789811228001_0195)

Utkin, E. A. & Denisov A. F. (2002). *State and regional administration*. M.: IKF "EKMOС". 320.

Zimenkova, E. N. (2017). The impact of environmental changes on the formation of economic security. *Regional problems of transforming the economy*. 7(81): 55–63. (in Russian).







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# The Importance of Circular Economy in the Supply-Chain-Bibliometric Analysis

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## Abstract

The circular economy's significance and importance are expanding along with the society's growing concern over wasteful resource consumption or pollution that results from the expansion of industry and other processes. If the supply chain and circular economy are linked, it will be possible to see how the two are interconnected, because the supply chain includes all activities that are typical of raw material and product producers and those that can use recycled resources in production, increasing the supply chain's sustainability. Additionally, the primary objective of this paper is to identify the present status of the literature and to provide an overview of the bibliometrics connected to the topic of sustainability and the supply chain, given the growing significance of the circular economy. The authors discovered through their research that there is a link between sustainability and the supply chain and that efforts to promote sustainability can significantly affect the supply chain in the context of enhancing sustainability.

*Keywords:* Circular economy, Supply chain, Sustainability

## Introduction

■ The need to analyze the circular economy is becoming imperative due to the growing concerns about uncontrolled resource consumption, i.e., excessive use of available resources. Accordingly, the interest of scientists in researching the circular economy is growing, which has led to the emergence of new concepts that link the circular economy with sustainability and sustainable development (Geissdoerfer et al., 2017). Circular economy implies functioning of the economy so that already used resources are reused, i.e., it emphasizes the need to recycle and reuse once used resources (Rizos et al., 2017). The need to increase the efficiency of resource use arises through the goals of sustainable development emphasized by the UN (Biermann et al., 2017).

Furthermore, given the importance of the supply chain and its role in satisfying the requirements of stakeholders (Alkier et al., 2023), it is necessary to ensure that the resources used in the supply chain are environmentally friendly (Raian et al., 2022), i.e., sustainable, because otherwise a risk would occur of negative environmental impact and unsustainability. The sustainable effects of the efforts are reflected in shorter supply chains (no middlemen) and a smaller carbon footprint while stimulating the small local economy (Alkier et al., 2023a). Therefore, designing the supply chain according to the principles of circular economy is of particular importance and requires changing the culture and policies of stakeholders in the supply chain (Bastas & Liyanage, 2018), as well as developing strategies that will transform the traditional (linear) supply chain into a sustainable (circular) chain (De Angelis et al., 2018). The supply chain transformation strategy must be systematic because a different approach will result in only partial improvements in sustainability. Such strategies must develop policies and a culture that are based on sustainability and the sustainable use of resources (Iqbal et al., 2020).

Given the global distribution of supply chains, or the current paradigm that emphasizes the development of expanded supply chains due to lower costs and greater availability of resources needed for the normal functioning of the chains, the challenge of ensuring the sustainability of the supply chain is growing. The fundamental reason for this can be found in different legislations of different countries in which the organizations involved in the supply chain operate. In other words, the diversity of legislation in the context of waste management, resource use, and the like can determine the sustainability of the entire supply chain, as well as what can affect the disruption of the circular economy. But most importantly, the establishment of a circular economy is of particular importance as it can reduce the need for resources necessary for the conduct of production and other processes in the supply chain.

Green economy concept is recognized as a means to achieve sustainable development (Ostojić et al., 2022). If existing papers in the field of circular economy and supply chain are analyzed, it is identified that the authors primarily deal with the “green transition” of the supply chain, which means the use of environmentally friendly technologies in the supply chain, i.e., environmentally

friendly management and use of resources, and how the “green transition” can affect the creation of a circular economy (Ying & Li-jun, 2012), use and development of green packaging, i.e., sustainable packaging in the supply chain (Meherishi et al., 2019), the impact that the circular economy has on supply chain management in general (Del Giudice et al., 2020; Buntak et al., 2019), indicators that can be used to analyze the performance of the circular economy (Howard et al., 2019), as well as aspects of the supply chain types, aspects of their design and impact on the circular economy (Kiss et al., 2019). Furthermore, it is identified that the authors deal with the development of strategic frameworks, i.e., models by which they connect the circular economy and sustainability, i.e., sustainable development, which is of particular importance, since sustainable development can be based on circular economy settings and rationality in resource use (Pieroni et al., 2019). With this in mind, two research questions were defined in the paper:

Can the supply chain be designed according to the principles of the circular economy?

What does the circular economy mean in the context of the supply chain?

The paper is divided into five chapters. In the first chapter, an introduction to the topic is given, where the context and importance of the topic are clarified. In the second chapter, the used methodology is described, as well as the formulas used in calculating the parameters for the analysis. The third chapter describes the research results. The fourth chapter is a discussion chapter in which the obtained results are discussed, while the last fifth chapter is a concluding chapter in which recommendations for future researchers are defined, i.e., research limitations.

## Theoretical Framework

### *Circular Economy*

The significance and importance of the circular economy are growing with the increase in society’s concern about excessive use of resources, i.e., pollution that occurs as a result of the

development of production and other processes (Velenturf & Purnell, 2021). Due to the scarcity of natural resources, enterprises must rely more on the circular economy and as the awareness of the importance of the circular economy and more intensive involvement in the green transition process grows, so will the need for greening the economy (Ostojić, 2023). However, the importance of the circular economy development is also significant due to the need to reuse, i.e., recycle the used resources. The fundamental reason for this is the lack of resources, in addition to the decreasing amount of available resources necessary for the normal development of business and social processes (Morseletto, 2020). The establishment and encouragement of the establishment of a circular economy lead to significant changes in existing production paradigms that require consideration of the processing of used products, as well as a reduction in the total amount of harmful gases released into the atmosphere (Zeng et al., 2022). The newly established paradigm must contain product design settings so that the products can, after their use, be reused, i.e., recycled. In other words, it means extending the life cycle of the product as well as the life cycle of the materials used in production (Neves & Marques, 2022).

The circular economy is one of society's responses to the problems of sustainability, primarily the ecological component thereof, which is of increasing importance in view of the global challenges related to climate change, such as rising air temperatures and the like (Rödl et al., 2022). This has been proven by the promotion and encouragement of the circular economy development by the countries that are global leaders in the context of the production of goods and services, such as China, the European Union, Japan, the United States of America, etc. (Korhonen et al., 2018). However, despite the circular economy being emphasized as a response to sustainability problems, it is necessary to highlight that the adoption of the principles of the circular economy, as well as the general paradigm shift from a linear economy to a circular one, also implies significant challenges, such as financial profitability, the need to change the design of products, i.e., production technology in general, structural changes in society, changes in customer attitudes, etc. (Ritzén & Sandström, 2017). In other words, the existing production procedures that are adapted to the linear

economy must be changed. That is, they should be adapted to the new characteristics of the recycled resources used in the production. Recycling of resources and their adaptation for reuse involve the need to use thermodynamic and chemical processes (Jubinville et al., 2020) which in turn implies a potential negative impact on the environment, i.e. the release of greenhouse gases (Ross, 2019). Therefore, promoting recycling and reuse of used resources can have a positive impact on the environment and sustainability on the one hand, but on the other, a risk of a potential negative impact may occur (Kalyani et al., 2021). Essentially, the circular economy is based on efficient and effective waste management, i.e., the waste management realized in such a way that waste can be reused as a resource in production in the future (Ranjbari et al., 2021). This brings with it the need to establish a different waste management system, based on the classification of waste at the place of its origin, i.e., the households where the largest share of the waste is produced in most cases (Tomić & Schneider, 2020). The introduction of a different waste management system also has the potential to increase costs for households, which may lead to resistance from the population itself (Di Foggia & Beccarello, 2020). However, in order to make waste management easier, i.e., to create a basis for encouraging recycling at the places where the waste is generated, the European Union through its directives, such as the EU Circular Economy Action Plan (COM/2020/98), has created a basis on which all member states can develop plans and foundations for the establishment of a circular economy (Calisto Friant et al., 2021). One of the fundamental reasons for the European Union emphasizing the need to establish a circular economy is the projection that indicates an increase in the amount of waste production of 70% by 2050. This increase brings with it a significant risk of a lack of space to accommodate this amount of waste, but also the risks of air and water pollution associated with a large increase in production and the amount of disposed waste.

So, in essence, the circular economy implies reuse of the previously used resources, which is especially significant when it comes to the resources such as water (Macedonio & Drioli, 2022), the lack of which can significantly threaten agricultural production, plastic, and especially microplastic, the presence of which can cause the

pollution of flora and fauna (Payne et al., 2019) i.e., generally, all types of hazardous waste the disposal and presence of which in the environment can cause major environmental disasters (Zhang et al., 2022). Although scientists are still debating the establishment and definition of the concept of circular economy (Prieto-Sandoval et al., 2018), there is no doubt that the fundamental principles advocated by the circular economy are aimed at increasing environmental sustainability, which is of particular importance given the growing concern (Roblek et al., 2021) and the importance that sustainability has, and will preserve in the future due to the culture of consumerism (Coderoni & Perito, 2020). Likewise, it should be emphasized that the circular economy affects all branches of activity (Fukumoto & de Vasconcelos, 2022), and with the properly defined policies and laws, it will affect the increase in sustainability will in the future.

### *Supply Chain and Sustainability*

The importance of a sustainable supply chain is growing as sustainability concerns grow. A green supply chain implies sustainable flow of materials, i.e., resources and information, including sustainable development of products (Zhu & He, 2017), a sustainable way of securing the necessary resources for production (Peng et al., 2022), sustainable way of production (Junaid et al., 2022), sustainable way of disposing of resources (Sarkar et al., 2022), i.e., their reuse (Mardani et al., 2020). Ensuring the sustainability of the supply chain, i.e., the transformation of the existing supply chain, often unsustainable by nature and design, into a sustainable chain, is a significant challenge due to the systematic approach (Samper et al., 2022). In other words, a sustainable supply chain must be based on the sustainability of all stakeholders involved in the chain, and cases of unsustainability of one of the stakeholders in the chain, division in the supply chain according to the life cycle of the product has been written about (Mardani et al., 2020). This can result in unsustainability of the entire supply chain. In this context, in order to achieve supply chain's sustainability, one of the mechanisms available to organizations is digital transformation (Samper et al., 2022; Seuring et al., 2022). With the development of

Internet technologies and the ability to communicate through the Internet, many technological innovations developed within Industry 4.0 use the Internet to transmit information (Kovačić et al., 2022a). Through digital transformation and application of the Industry 4.0 technologies, the efficiency of processes in the supply chain can be influenced (Núñez-Merino et al., 2022; Khan et al., 2021), implying less need for resources, better optimization of transport routes, greater safety of employees involved in processes within the supply chain, etc. (Junge & Straube, 2020). To use digital technologies and to have digital innovations, organizations must have supportive organizational culture (Kovačić et al., 2022b). However, it is necessary to emphasize again that for a complete digital transformation of a supply chain, it is necessary to carry out digital transformation of each of the stakeholders in the supply chain (Guandalini, 2022). Implementing digital transformation in the supply chain can require significant financial resources (Yang et al., 2021), i.e., financial investments, which is also the reason why organizations located in the countries with a worse economic situation and those lacking infrastructure and knowledge, may lag behind in terms of digital transformation compared to developed countries (Chen et al., 2021). A sustainable supply chain, i.e., a green supply chain, involves a fundamental challenge related to the impact on the ecological component of sustainability, while researchers (Hong et al., 2018) believe that a sustainable supply chain does not have a significant impact on the economic and social components. This is partly true, since solutions within a sustainable supply chain address parameters such as waste management during the production (De Angelis et al., 2018), release of harmful gases into the atmosphere (He et al., 2019), etc. All of the above may, of course, also affect the economic component of sustainability, which is confirmed (El Amrani et al., 2021) and adds that a sustainable supply chain has the least impact on the social component, which is also in line with the attitude (Hong et al., 2018) that is, in accordance with the recommendations it defines (Zhang et al., 2018).

There is no doubt that sustainable supply chains are in their infancy and that the importance that sustainable supply chains will have in the future is growing (Koberg & Longoni, 2019) due to the potential risks associated with the scarcity of resources such



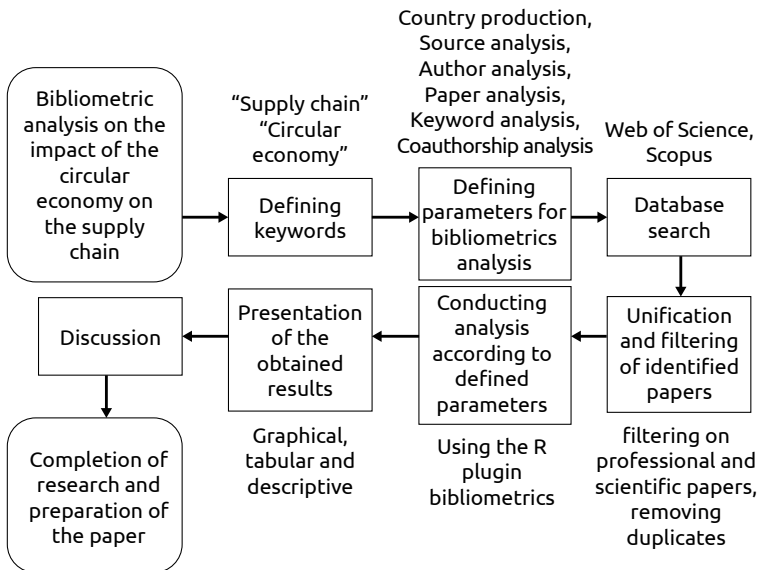
as water (García-Cáceres et al., 2019), as well as energy sources such as gas and electricity, due to an increase in demand caused by the transition from fossil fuels to the use of electricity (Makholm, 2022), i.e., before the complete transition to electricity, the lack of fossil fuels, primarily oil, (Ghorbanpour et al., 2022). In other words, in order to ensure a successful transition towards sustainable energy sources, it is necessary to ensure that the entire energy supply chain is sustainable (Safarzadeh et al., 2022), which means ensuring that all stakeholders in the supply chain are sustainable and do not use transformation and production mechanisms that are unsustainable, as may be the case with electricity production. Namely, with the increase in demand for electricity due to the imperative of the transition to electric vehicles, it is necessary to take care that the electricity produced comes from sustainable, i.e., clean, sources (Kovačić et al., 2022; Mutavdžija et al., 2022). Otherwise, a risk would occur of an insufficiently successful transformation since, in the case of using sources of electricity that are not sustainable, a similar amount of harmful gases will be released into the atmosphere as in using fossil fuel cars (Zeng et al., 2021). Considering the large number of stakeholders that belonging to global supply chains, it must be emphasized that it is necessary to ensure transparency (Montecchi et al., 2021) in the supply chain on the basis of which it is ensured that all interested parties have the possibility of insight into the origin and the way in which resources are provided, i.e., the way in which waste is disposed of and managed in the supply chain (Apeji & Sunmola, 2022). In the context of transparency, it should be emphasized that transparency can be linked to ensuring the equality of all stakeholders, since through transparency, a basis is created for identifying potential benefits to stakeholders in the supply chain. This also affects the social component of sustainability (Gardner et al., 2019), and it can be achieved based on the application of technologies developed in the context of Industry 4.0, such as blockchain (Kshetri, 2021; De Carvalho et al., 2022). The application of blockchain technology in the supply chain affects the security of transactions carried out in the supply chain, as well as the ability to ensure satisfactory quality of products and services, information security, etc. (Azzi et al., 2019). Therefore, the creation of a sustainable supply chain in the future is today's imperative,

and it will affect all industries with regard to sustainability requirements, the potential of applying Industry 4.0 to increase efficiency and effectiveness in the supply chain, thereby reducing costs (Birkel & Müller, 2021; Khan et al., 2022) that is, due to the imperative of establishing a circular economy, which can be established precisely through the creation, i.e., the design of a sustainable supply chain (Manavalan & Jayakrishna, 2019).

## Materials and Methods

The research methodology is shown in Figure 1. Before the start of the research, the key words used in browsing scientific databases were defined, namely “supply chain” and “circular economy.” After defining the keywords, the parameters for conducting the analysis were selected. All the selected parameters and the way in which the selected parameters were used are described in chapter 2.1. when it comes the analysis of the productivity of the

Figure 1. Phase of conducted research



Source: Authors presentation

states; 2.2. analysis of the relevance of sources; 2.3. authors' analysis; 2.4. paper analysis; and 2.5. keyword analysis. After the parameters were selected, the WoS and Scopus databases were searched for the defined keywords in the period from 2006 to 2022. During the search, a total of 1481 articles were identified, after which the articles were filtered according to the parameters of focusing exclusively on scientific and professional articles, i.e., removing duplicates and reading abstracts. From the total number of identified papers, 739 articles were taken into account, which has been the basis for conducting the research. Likewise, it should be emphasized that only articles in English were taken into account.

After filtering the articles, the obtained results have been presented graphically, tabularly, and descriptively, this also being the basis for the discussion chapter. It should be emphasized that the methodology used in the research is similar to the methodology used by (Kovačić et al., 2022; Mutavdžija et al., 2022) that is, the methodology used by (Sombultawee et al., 2022; Gonçalves et al., 2022; Marôco et al., 2022).

### *County Productivity Analysis*

When analyzing countries, the variables that are considered are the number of papers coming from each country, the total number of citations, or the average number of citations per paper coming from the country being analyzed. The total number of countries considered in the analysis is 10. The results of the analysis of countries are presented in corresponding tables and descriptions. The average number of citations was calculated as the ratio of the total number of papers from each country and the total number of citations recorded for each paper coming from the observed country, which is shown in expression 1.

$$\text{Average Article Citations} = \frac{\text{Total number of papers}}{\text{Total number of citations}} \quad (1)$$

### *Source Analysis*

The indicators h-index, m-index and g-index were used for the analysis of the source. In addition, the analysis considered the

number of papers published in each journal. The number of journals considered in the analysis is 10.

To calculate the h-index, the expression 2 was used:

$$h - index = \frac{\text{Total number of produced papers}}{\text{Total number of cited papers}} \quad (2)$$

m-index is used for analysis of h index per year since the first publication of the paper. To calculate the m-index, the expression 3 was used:

$$m - index = \frac{h - index}{\text{Number of years since the publication of the first paper}} \quad (3)$$

### *Analysis of the Authors*

When analyzing authors, the parameters considered are the number of papers that the author produced in the period from 2006 to 2022, the country that the author comes from, the institution where the author is engaged, or works, the number of citations that each author has, or Articles Fractionalized. The expression 4 was used to calculate Articles Fractionalized:

$$Frac Freq (AU_j) = \sum_{h \in AU_j} \frac{1}{n \text{ of CoAuthors } (h)} \quad (4)$$

### *Analysis of Papers*

When analyzing the papers, the parameters considered are the total number of citations for each paper, the total number of citations that each paper has in a year and Normalized TC. The total of 10 papers with the highest number of citations were considered. Papers are presented in the table according to the total number of citations from the paper with the highest number of citations, down to the paper with the lowest number of citations. Each paper is accompanied by a reference.

When calculating the total number of citations in a year, the expression 5 was used:

$$TC \text{ per year} = \frac{\text{Total number of citations}}{\text{Number of years since the publication of the paper}} \quad (5)$$

Furthermore, when calculating Normalized TC, the expression 6 was used:

$$NCL_i = \frac{\sum_f \sum_t \sum_{ift} p_{ift} RCR_{ift}}{\sum_f \sum_t p_{ift}}$$

### *Keyword Analysis*

When analyzing keywords, they are categorized into clusters. The clusters are divided according to the similarity of the keywords and their interconnectedness. Each keyword is associated with a circle the size of which is determined by the number of the keyword's appearance. The higher the keyword's incidence, the larger the circle size, and vice versa. Furthermore, all keywords are inter-related. The thickness of the line that connects the circles with the keywords denotes the association of the keywords, where greater thickness of the line implies the greater the association of the keywords and vice versa. When analyzing keywords, cluster names were formed based on keywords, and sub-themes were defined within each cluster.

### *Co-authorship Analysis*

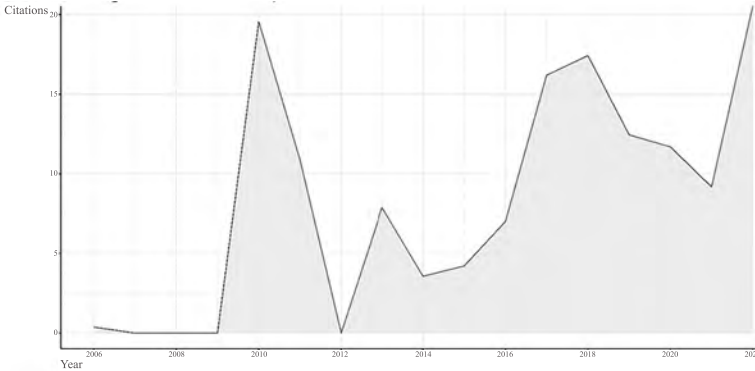
The analysis of co-authorship is based on the consideration of cooperation between authors. All authors, depending on the collaboration and the topics they deal with, are categorized into clusters. Each cluster has a different color, and within each cluster the author who has the greatest influence is defined. The influence of the author is shown by the size of the circle. The larger the circle, the greater the influence of the author, and vice versa. Furthermore, all authors within the cluster are interconnected. The larger and thicker the number and the lines connecting the clusters, i.e., the authors within the cluster, the more pronounced is the cooperation between the authors and vice versa.

## **Results**

Figure 2 shows the analysis of the average number of citations of papers in the observed period from 2006 to 2022.

The average number of citations varies depending on the year. The highest number of average citations was recorded in 2010, after which there was a significant decline. However, after 2014, there was an increase in the number of average citations of papers.

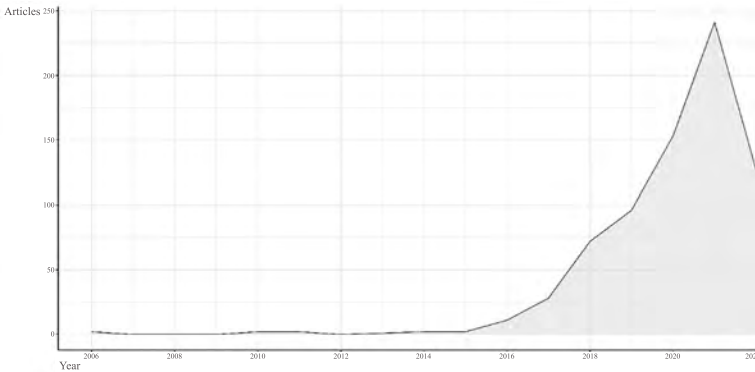
Figure 2. Average number of citations



Source: Authors' research

Figure 3 shows the total number of papers produced in the period from 2006 to 2022. It is evident that the number of papers is growing and that the number of papers has increased, especially since 2016 from which point the number of papers has been constantly increasing.

Figure 3. Total number of produced papers



Source: Authors' research

If we look at other information related to the papers, the results of the research showed that the average increase in the number of papers per year is 41%. Of the total number of analyzed papers, 37.08% were created based on international cooperation between authors. The average number of authors per paper is 3.94, and the total number of papers authored by a single person is 50. If we are talking about citations, the average citation per paper per year is 6.61 while the average citation per article is 24.62.

### Country Analysis

Table 1 shows the analysis of the productivity of countries, i.e., the analysis of citations of papers from individual countries. As it can be seen from Table 1, the country with the highest number of citations is the United Kingdom with the total of 4164 recorded citations followed by Italy with 1750 citations and China with 1731 citations. If we talk about the average number of citations per paper, the largest average number per paper is in Sweden (56.38 citations) followed by France (51.83 citations) and Denmark (50.43 citations). On the other hand, if we talk about the number of papers by country, the largest number of papers comes from the United Kingdom (278 papers in total), followed by Italy (215 papers in total) and China (170 papers in total).

Table 1. Country productivity analysis

Country	Total Citations	Average Article Citations	Number of papers
United Kingdom	4,164	42.93	278
Italy	1,750	17.68	215
China	1,731	25.84	170
USA	1,128	34.18	142
France	933	51.83	77
India	908	25.94	123
Sweden	733	56.38	40
Netherlands	716	37.68	51
Denmark	706	50.43	37
Brazil	513	19.73	84

Source: Authors' research

## Source Analysis

Table 2 shows the analysis of the source. The journal with the largest number of papers was the *Journal of Cleaner Production* (United Kingdom) with the total of 125 published papers and the h-index of 232. It is followed by *Sustainability* (Switzerland) with the h-index of 109 and the total of 78 published papers. The third in terms of the number of published papers is the journal *Resources Conservation and Recycling* (Netherlands) with the total of 52 published papers and the index of 150.

Table 2. Source analysis

Sources	Articles	H-index	G-index
Journal of Cleaner Production	125	232	66
Sustainability (Switzerland)	78	109	48
Resources Conservation and Recycling	52	150	25
Business Strategy and the Environment	24	115	23
International Journal of Production Research	23	153	23
Sustainable Production and Consumption	20	38	15
International Journal of Production Economics	18	197	12
Science of the Total Environment	14	275	12
Production Planning and Control	12	85	11
Journal of Industrial Ecology	10	112	10

Source: Authors' research

## Analysis of the Authors

Table 3 shows the analysis of the authors. The author with the largest number of citations is Lauri Jäämaa (Finland, Aalto University School of Science, Industrial Engineering and Management) with the total of 115 citations followed by Riikka Kaipia (Finland, Aalto University School of Science, Industrial Engineering and Management) with also 115 citations in total. Hendrik Birkel (Germany, Friedrich-Alexander Universität Erlangen-Nuremberg) is the third concerning the number of citations with the total of 85 citations, followed by Maximilian Gebhardt (Germany, Friedrich-Alexander



Universität Erlangen-Nuremberg) with the total of 85 citations. It should be emphasized that authors with the same number of citations have the same significance.

Table 3. Author citation analysis

Author	Citations	Country	Institution
Lauri Jäämaa	115	Finland	Aalto University School of Science, Industrial Engineering and Management
Riikka Kaipia	115	Finland	Aalto University
Hendrik Birkel	85	Germany	Friedrich-Alexander Universität Erlangen-Nuremberg
Maximilian Gebhardt	85	Germany	Friedrich-Alexander Universität Erlangen-Nuremberg
Alexander Spieske	85	Germany	Friedrich-Alexander Universität Erlangen-Nuremberg
Mikael Skou Andersen	57	Denmark	Aarhus University
Maria Emilia Brassesco	56	Portugal	Universidade Católica Portuguesa
Ezequiel Coscueta	56	Portugal	Universidade Católica Portuguesa
Manuela Pintado	56	Portugal	Universidade Católica Portuguesa
Aman Kumar	55	Taiwan	National Taiwan University

Source: Authors' research

The analysis identified that the most cited authors come from same institutions and that only Mikael Skou Andersen (Denmark, Aarhus University), Riikka Kaipia (Finland, Alto University) and Aman Kumar (Taiwan, National Taiwan University) come from different institutions, since ten authors have been considered in total. Furthermore, it should be emphasized that if we look at the country from which the authors come, the authors with the largest number of citations come from the countries of the European Union and Europe.

In addition to the analysis of citations of authors, an analysis of the productivity of authors was also conducted. The results of the analysis are shown in Table 4. As can be seen from the table, the author with the largest number of papers is Yigit Kazancoglu (11 papers in total) from the Yaşar Üniversitesi and Articles Fractionalized in the amount of 2.74, followed by Aman Kumar from National Taiwan University (10 papers), Sachin Kumar Mangla from the OP Jindal Global University (10 papers in total) and Yingli Wang from the Cardiff University (10 papers in total). It should be emphasized that the authors who have the same number of articles have the same importance regardless of their position in the table.

Table 4. Authors' productivity analysis

Authors	Articles	Country	Institution	Articles Fractionalized
Yigit Kazancoglu	11	Tukey	Yaşar Üniversitesi	2.74
Aman Kumar	10	Taiwan	National Taiwan University	2.16
Sachin Kumar Mangla	10	India	OP Jindal Global University,	2.23
Yingli Wang	10	United Kingdom	Cardiff University	2.45
Liu Yang	9	United Kingdom	University of Birmingham	2.14

Source: Authors' research

### *Papers Analysis*

Table 5 shows the analysis of the papers and contributions by the authors. It should be emphasized that the 10 most significant papers were excluded from the total number of articles included in the research. One also needs to bear in mind that the largest number of papers is directed towards the analysis of the existing research, with a few papers based on primary research, i.e., describing conceptual models.

Table 5. Contribution analysis of the most cited papers

Reference	Goal of the paper	Type of Paper /Method	Contribution of the Paper
Genovese et al. (2017)	Defining a hybrid methodology for life cycle assessment	Article	In the article, the authors describe the methodology that can be used for the analysis, that is, provide the assessment of the total emissions of harmful gases that can occur during the life cycle of a product. The methodology includes the analysis of direct emissions of harmful gases, indirect emissions of harmful gases, or total emissions of harmful gases in the supply chain. The authors come to the realization that the establishment of a green supply chain, that is, a circular economy, has a significant positive impact on the environment, but it can be economically questionable from the aspect of profitability.
Kalmykova et al. (2018)	An overview of the strategies and practices of establishing a circular economy	Literature review	The authors come to the realization that civil associations and consulting agencies have the greatest influence on the development of the circular economy. However, despite emphasizing the importance of establishing a circular economy, there are no solid foundations in the context of clear strategies for the development of a circular economy. In addition, the authors analyze the tools that are available for creating a circular economy and divide the obtained tools into categories of strategies for implementation tools. Furthermore, the authors emphasize the special importance of establishing a circular economy in the supply chain in order to influence the increase in sustainability.

Reference	Goal of the paper	Type of Paper /Method	Contribution of the Paper
Lopes de Sousa Jabbour et al. (2018)	Overview of the impact of Industry 4.0 on the circular economy	Literature review	In the paper, the authors provide an overview of the impact that the Industry 4.0 technologies have on the creation of a circular economy. The authors come to the realization that the establishment of a circular economy is more efficient and effective with the application of the Industry 4.0 technologies. In addition, the authors analyze the impact of ReSlove's business model on the establishment of a circular economy through the Industry 4.0 technologies, which represents a new approach and a new framework in the study of the circular economy.
Govindan & Hasanagic (2018)	Overview and analysis of the drivers of establishing a circular economy	Literature review	Through a systematic review of the literature, the authors analyze the relationship between interested parties and the circular economy. The paper identifies 13 drivers in total that influence and encourage the creation of a circular economy; 34 practices that indicate how the drivers influence the creation of a circular economy; and the total of 39 barriers. In addition, the paper describes a multi-perspective model of the interested parties that can be used to analyze the influence that the interested parties have on the establishment of a circular economy.
Geissdoerfer et al. (2018a)	Defining a framework for understanding how the circular economy affects the supply chain	Literature review/case study	In the research, the authors present four different case studies and describe how different models of establishing and managing the circular economy affect the performance of the established circular economy, that is, business

Reference	Goal of the paper	Type of Paper /Method	Contribution of the Paper
			in general. The authors have identified significant advantages to establishing a circular economy, but they also emphasize that there are a significant number of challenges associated with the transition from linear to circular economy.
Zhu et al. (2010)	Analysis of different supply chain management practices	Article	In the article, the authors analyze organizations located in the Chinese economy and their management practices in establishing a circular economy, or a green supply chain. The authors come to the realization that a particularly significant role in the establishment of a circular economy is played by management systems, i.e. management system policies such as the environmental management system. On the other hand, the authors come to the realization that the state government also has a special significance, since it can encourage organizations to establish a circular economy through laws and policies defined at the state level.
Geissdoerfer et al. (2017)	Analysis of the circular economy as a new dominant paradigm of sustainability	Literature review	In the research, the authors emphasize that the circular economy is a regenerative approach that includes reducing the amount of emitted greenhouse gases, that is, all types of waste. Also, the research identifies a significant increase in the interest of researchers related to the circular economy. The authors also come to the realization that there is no significant difference in the literature between the terms of sustainability and

Reference	Goal of the paper	Type of Paper /Method	Contribution of the Paper
			circular economy. But despite this, the authors conclude that the circular economy is the basis of sustainability and sustainable development.
Despeisse et al. (2017)	The authors analyze the possibility of using 3D printers to achieve circular economy	Article	In the research, the authors look at the possibilities offered by application of 3D printers in the context of reducing the amount of required resources. One of the insights that the authors come to is that significantly larger amounts of sustainable products can be created by using 3D printers, that is, products that are based on the reuse of the already used resources, but which in this context are adapted for reuse.
Mangla et al. (2018)	Analysis of barriers to establishing a circular economy	Literature review	In the research, the authors analyze the barriers that can have a significant impact on the establishment of a circular economy in the context of India. It has been identified that one of the fundamental barriers that arises is the lack of legal legislation that would define the need for the establishment of a circular economy, which is why there are not enough initiatives by organizations related to the establishment of such a system. In other words, the authors emphasize that it is particularly important for governments to define the need for the establishment of a circular economy through the definition of legislation, since this will affirm the obligation of all organizations to act in accordance with the law.

Reference	Goal of the paper	Type of Paper /Method	Contribution of the Paper
Moktadir et al. (2018)	Analysis of the circular economy in the textile processing industry	Article	In their research, the authors analyze how the circular economy affects the leather industry in Bangladesh, which is considered one of the largest polluters of the environment. In the research, the authors present a methodology related to the transformation of industries such as textile industry, leather industry, and the like, i.e., introducing the entire supply chain of such industries into a circular economy in order to reduce their impact on the environment.

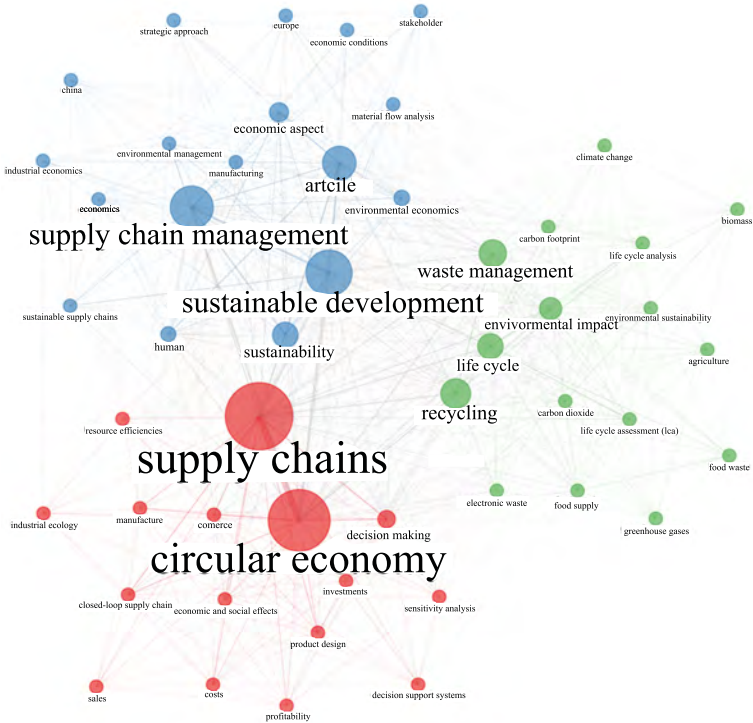
Source: Authors' research

### Keyword Analysis

Figure 3 shows keyword analysis. As can be seen in Figure 3, the keywords can be categorized into three clusters which are shown and explained in Table 6. The dominant themes in the observed area include sustainable development, supply chains and waste management. Within the mentioned clusters there are several sub-topics that can be categorized into the topics of waste and waste management (green), circular economy and the links that production and product design have to the functioning of the circular economy (red). In the third cluster (blue), the dominant themes are reduced to sustainable development and the impact that sustainable development has on the supply chain, as well as the on production and the environment.

If we are talking about the interpretation of Figure 4, the larger the size of the circle, the higher the occurrence of the keyword and vice versa. On the other hand, the greater the thickness of the link between the keywords, the greater the link between the keywords or clusters with the corresponding keywords.

Figure 4. Keyword analysis



Source: Authors' research

Table 6. Keyword and sub-topic analysis in clusters

Cluster name	Under topics	Keywords
Red Cluster: Circular Economy and Supply Chain	Influence of product design and production on the supply chain	Supply chains Circular economy Resource efficiencies Industrial ecology Manufacture Commerce Decision making Closed-loop supply chain Sales Costs Profitability Product design Design support systems Sensitivity analysis



Cluster name	Under topics	Keywords
Blue Cluster: The Impact of Sustainable Development on Supply Chain Management	Supply chain and environment	Supply chain management Sustainable supply chains Sustainability Economic aspect Economic conditions Environmental economics Environmental management Manufacturing Industrial economics Economics Economic conditions
Green cluster: Waste management	Impact of waste management on sustainability and ecological environment	Waste management Environmental impact Life cycle Recycling Electronic waste Food supply Greenhouse gases Food waste Carbon dioxide Environmental sustainability Life cycle analysis Climate change

Source: The table is the work of the author

### *Red Cluster – Circular Economy and Supply Chain*

In the red cluster, the dominant topic addressed by the authors is the relationship between the circular economy and the supply chain, and the subtopic identified within the red cluster is the impact of the product design and production on the supply chain. The transition to a circular economy brings with it several challenges that are primarily related to the development of strategies that will enable the production of environmentally friendly products. This includes defining a resource procurement strategy, i.e., selecting a supplier who will provide all the resources necessary to produce a sustainable product (Bocken et al., 2016). This is followed by research conducted by Den Hollander, M. C., Bakker, C. A., and Hultink, E. J., in which the authors describe the importance of recycling and reusing once used products, as otherwise

the challenge of failing to provide sufficient resources for the production occurs. In this context, the authors emphasize the need to develop strategies that will enable a different provision of all materials needed for production. (Den Hollander et al., 2017). To ensure such a strategy, it is necessary to develop strategic frameworks for product design and production (Van den Berg & Bakker, 2015). The development of product production strategies using recycled materials also affects resource efficiency. In other words, due to the growing market demand for raw materials and materials that can be used in production, the reuse of resources, i.e., recycling of materials can reduce the cost of purchasing resources needed for production (Di Maio et al., 2017). Furthermore, one of the mechanisms that encourages the reuse of resources, i.e., increases the efficiency of the use of available resources, is the legislation that state governments can define. One example of this is the European Union, which defines recommendations for the reuse of resources, i.e., recycling, which has proven to be a good measure that has resulted in reduced waste production and increased use of recycled resources (Domenech & Bahn-Walkowiak, 2019). Resource reuse, i.e., recycling of used resources, also results in changes in the supply chain design. In other words, there is the development of so-called closed loop supply chain which means reuse of used resources, i.e., their recycling. This also implies the need to adapt the organizations involved in the supply chain in the context of defining the mechanisms by which the used units will be reused in production. This means that it is necessary to develop return logistics that will enable the collection and classification of the used resources that have been collected, as well as the selection of those resources that can be reused in production (Guide et al., 2003). By closing the supply chains the circular economy effect is achieved, as all used products are returned to the supply chain, i.e., recycled. Thus, organizations involved in a closed supply chain may have lower costs due to lower requirements for resources, as once-used resources are recycled.

## *Blue Cluster – The Impact of Sustainable Development on the Supply Chain Management*

Sustainable development is based on the economic, environmental, and social pillars, which implies the importance of caring for a reduced impact on these components (Omer, 2008). In other words, sustainable development means a development that considers the needs for resources of the current generation, without compromising the ability of future generations to meet the same needs. This is particularly pronounced when it comes to the supply chain, as the supply chain must provide all the resources necessary to meet the identified needs. Irrational use of resources can result in unsustainability, as well as in the increase of the negative impact that the supply chain can have on the environment. To increase sustainability, i.e., rational use of resources, it is necessary to develop and encourage a culture of all stakeholders in the supply chain related to the sustainability and efficiency of resource use (Zimon et al., 2020). However, to promote the sustainability and rational use of resources in the supply chain, it is necessary to develop policies aimed at sustainability and sustainable development. The implementation of such policies brings with it several challenges, but on the other hand, it can also affect the reputation of the organization, as well as the entire supply chain (Oelze et al., 2014). The development and implementation of sustainability policies in the supply chain can also be encouraged by legislation, as is the case in the context of the European Union, i.e., the food supply chain. In other words, sustainability and social responsibility become the basis for the functioning of supply chains, such as the food supply chain in which there is a risk of disposing of large amounts of resources due to the expiration date, i.e., maintaining the market price of resources. With this in mind, the development of strategies and policies aimed at sustainability and promoting social responsibility can be a mechanism through which vertical integration of stakeholders in the supply chain, as well as easier implementation of environmental management policies (Stranieri et al., 2019) are achieved. However, care exclusively for the environmental segment is insufficient, since sustainability also includes economic and social segment. The social segment primarily refers to the concern for the human factor that is included in the supply chain

by reducing the risk of labor exploitation, taking care of inclusion and equal opportunities and the like. On the other hand, the economic segment of sustainability refers to the manner of resources' procurement, market performance, as well as the communication of organizations involved in the supply chain with the market.

### *Green Cluster – Waste Management*

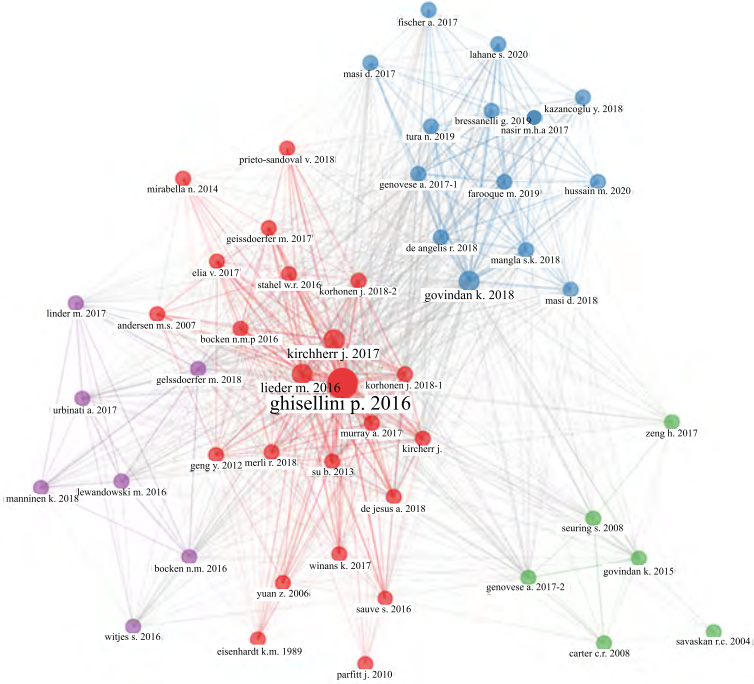
Waste management is the basis of ensuring a circular economy. The main reason for this is the need to have mechanisms in place that enable the sorting of waste, so that the part of the waste that can be reused is processed and sent back into the production process, or the part of the waste that cannot be reused is disposed of safely. The existence of waste management mechanisms influences the creation of so-called reverse supply chain (Mahajan & Vakharia, 2016). The need to develop mechanisms that will enable waste management is particularly pronounced in the industries where there is significant waste production, such as textile industry (Li & Ding, 2021), food industry (Papargyropoulou et al., 2014), or electronics industry, which is characterized by the production of large amounts of hazardous waste that can significantly negatively affect the environment (Rezayat et al., 2020). One of the mechanisms that can be used in waste collection, i.e., waste management, is the return logistics. The return logistics allows the creation of the so-called closed-loop supply chain, thus creating the basis for the establishment of a circular economy (Govindan et al., 2015). However, even though the establishment of a circular economy, i.e., reuse of once used resources causes lower needs for new resources, i.e., the production of new resources and the inability to fully recycle resources result in the need to dispose of non-recyclable resources in special landfills, depending on the type of the resource being disposed of (Reno, 2015). This means that there is a risk that the disposed resources would pose a threat to the environment, i.e., that they can negatively affect the environment in the phase of disposal, i.e., their decomposition. However, it should be emphasized that with proper waste management, the amount of such resources is lower than, the in the cases where all of the used resources are disposed of without recycling. This approach to waste management

can also reduce carbon dioxide emissions from the production of new resources, i.e., reduce carbon dioxide emissions through proper waste management and disposal (Qiyong & Jiaojia, 2011). Thus, it is evident that proper waste management can provide a basis for the establishment of a circular economy, i.e., that the amount of waste produced in the supply chain can be reduced, thus also reducing the carbon dioxide emission of the production of necessary resources, or decomposition of landfilled waste.

## Co-atorship Analysis

Rawls reminds us that political pessimism precipitated the fall of the Weimar Republic; people “no longer believed a decent liberal parliamentary regime was possible,” and Nazism followed (Rawls, 1993: lxi–lxii). Fascism has crept back into politics and now seriously threatens democratic stability. This is profoundly troublesome but also an opportunity to fortify liberal accounts of social stability with a conception of resilience by taking seriously the domestic-expansive problems that polarize societies. Although these problems are not among the ones for which liberalism was devised, liberal theorists have long used their experiences and observations to develop the tradition. J. S. Mill saw the tyrannical potential of the people, whereas previous generations of liberals saw only the tyrannical power of government (Mill, 2002). John Dewey reimagined liberalism’s enduring values for an industrial age that, up until then, lacked the conceptual resources for protecting liberty from the marketplace (Dewey, 1935: 5–6). Rawls resuscitated Kant’s account of liberal legitimacy to explain how citizens might come to share the same conception of justice for moral reasons despite their incommensurable yet reasonable conceptions of a good life. The COVID-19 pandemic has demonstrated how deeply engrained human-induced risks have become in the functionality of societies. Liberals must now reimagine the tradition for a set of new, cross-cutting challenges that cascade across global, regional, and local systems of governance. Developing the tradition to meet today’s challenges will require discussions on a concept of resiliency, and those discussions will certainly reverberate back into the way we think about justice and stability.

Figure 5. Co-authorship analysis



Source: Authors' research

Within the red cluster, the authors who have the greatest influence are Ghisellini, P., Ripa, M. and Ulgiati, S. with the paper “Exploring Environmental and Economic Costs and Benefits of a Circular Economic Approach to the Construction and Demolition Sector, A Literature Review”. The mentioned authors describe the basic settings of the circular economy, as well as its importance in the context of reducing the negative impacts that the traditional economy has. Also, the authors talk about the need to adopt a methodology that would be used in the transformation of the traditional economy into a sustainable economy, or an economy based on recycling, i.e., reuse of once used resources. (Ghisellini et al., 2018) Furthermore, within the red cluster it was identified that the paper “Conceptualizing the Circular Economy: An Analysis of 114 Definitions” by Kirchherr, J., Reike, D. & Hekkert, M. is the second paper in terms of significance. In the mentioned paper, the authors describe

114 conceptual definitions of circular economy and analyze in detail the content of each of the conceptual definitions. The authors conclude that circular economy is the basis for reducing the negative impact that the traditional functioning of the economy has (Kirchner et al., 2017).

When it comes to the purple cluster, it was identified that out of 7 included authors in total, not one significantly differs from others in terms of influence. However, the authors who represent a significant link with the red cluster are Geissdoerfer, M., Vladimirova, D., and Evans, S. with their paper entitled "Sustainable Business Model Innovation: A Review" in which they provide an overview of the literature related to innovation and the impact that innovation has on the development of system sustainability (Geissdoerfer et al., 2018b). Furthermore, if we talk about the authors who are links to other clusters, a particularly significant article that connects the purple cluster with the green cluster is the paper by Witjes, S., and Lozano, R. titled "Towards a More Circular Economy: Proposing a Framework Linking Sustainable Public Procurement and Sustainable Business Models, in which the authors link sustainability and the circular economy, and emphasize that the circular economy is the basis for increasing sustainability.

Like the purple cluster, the green cluster does not have a significant author who would address the area of sustainability, i.e., the circular economy. However, despite this, it was identified that the authors Genovese, A., Acquaye, A. A., Figueroa, A., and Koh, S. L. in their paper "Sustainable Supply Chain Management and the Transition to a Circular Economy: Evidence and Some Applications" emphasize the importance of the development of circular economy, i.e. green supply chain, and that the development of green economy is imperative given the increased consumption of resources (Genovese et al., 2017). The mentioned paper, i.e., its authors, are the link between the green cluster and the red cluster, i.e., the green cluster and the purple cluster. In addition, the second most important paper within the green cluster is the one by Seuring, S., & Müller, M entitled "Core Issues in Sustainable Supply Chain Management – a Delphi Study" in which the authors describe the results of research conducted using the delphi method, where four basic problems were identified, namely the pressure to transform the

supply chain into a sustainable chain, the need to measure the sustainability of supply chain development, supplier management, and supply chain management as a whole (Seuring & Müller, 2008).

## Discussion

Ensuring the sustainability of supply chains becomes imperative. The reason for this is the importance of sustainable development and rational use of resources, due to the growing demand for resources, i.e., depletion of resources and use of resources from non-renewable energy sources (Balatsky et al., 2015). This approach to resources' use can have a negative impact on the environmental component of sustainability. But in addition to the growing concerns and interest of scientists to use renewable energy resources (Cerović et al., 2014), there is a need to consider the impact of the excessive consumption on the social and economic components of sustainability (D'Eusanio et al., 2019). The primary reason for this is the global distribution of the supply chain, which brings with it the risk of overexploitation of labor, i.e., inequality of the labor engaged in organizations that are stakeholders in the supply chain. Furthermore, ecological, and social imbalances, i.e., unsustainability of the supply chain, can determine and affect economic unsustainability and vice versa.

In response to the challenges of unsustainability, one of the directions of action is the establishment of a circular economy. A circular economy involves the reuse of resources that have been used once and then recycled. However, the circular economy addresses exclusively the environmental segment of sustainability, which means that the social component remains exposed to potential unsustainability. If we talk about the impact of the circular economy on the economic segment, resources' reuse may result in savings when it comes to the resources' acquisition costs (Murray et al., 2015), or reduction of greenhouse gas emissions from resource production (Mongo et al., 2022). However, the establishment of a circular economy in the supply chain brings with it several challenges related primarily to the need of defining mechanisms that will enable the collection of used resources and the development of mechanisms that will enable or prepare used resources for reuse. This approach



allows for a significant reduction in the waste generated, which can significantly affect the environmental component of sustainability (Ragossnig et al., 2019). But when it comes to adapting resources for reuse, one of the challenges that arises is the release of possible harmful gases resulting from the resources' processing (Wang et al., 2020). On the other hand, the disposal of used resources also affects the production of greenhouse gases, i.e., environmental pollution. Therefore, regardless of the approach to resource management, there is a risk of greenhouse gas emissions, or negative impact on the environmental segment of sustainability, which means that the establishment of a circular economy cannot eliminate the negative impact on the environmental segment but reduce it.

If we talk about the stakeholders involved in the supply chain who are most affected by changes due to the development of the circular economy, it can be said that the circular economy has a significant impact on stakeholders at the beginning of the supply chain. The reason for this is lower demand for raw materials due to recycling. However, in addition to the stakeholders at the beginning of the chain, the establishment of a circular economy in the supply chain may require adjustment of producers, since the production process needs to be adapted to the recycled resources whose characteristics may differ from those of the non-recycled ones. One of the main goals of every organization is foresight needs and requirements that customers have (Buntak et al., 2021). Ultimately, customers or users of supply chain's services should also be prepared to adapt, as the characteristics of the finished products produced with recycled resources may be different from those produced with non-recycled resources. One of the possibilities related to maintaining the satisfactory quality of the final products is the production of finished products with a share of recycled resources to which non-recycled resources are added, as is the case with polymers (Ignatyev et al., 2014). However, in order to increase the quality of the final products, i.e. services that contain recycled materials, it is necessary to develop technological procedures, as is the case with steel, where specially developed technological procedures maintain the quality of the final product based on recycled resources. (Boom & Steffen, 2001). It is especially important to emphasize that the establishment of a circular economy and the reuse of resources in

supply chains is due to global economic disruptions caused by political and other crises, which have slowed or completely disrupted the supply chain (Kovačić et al., 2023). Slowing down the supply chain also leads to a lower ability to supply enough resources needed for the production, which makes recycling imperative. In addition, the shortening of supply chains leads to the development of the need to reuse resources, as some production resources can be procured from distant countries, and due to the shortening of supply chains, the possibility of procuring such resources is diminished.

Therefore, to establish a circular economy in the supply chain, it is necessary to adjust the supply chain, which means to create and implement mechanisms that will enable the collection of used resources, i.e., their recycling and reuse. Organizations involved in the supply chain may face challenges related to the costs of implementing the technology that will enable recycling and reuse of resources, as well as challenges related to ensuring satisfactory quality of the products containing recycled resources.

## Conclusion

The conducted research is based on a systematic review of the literature. The research was founded on a sample from the Scopus database, and the identified trends indicated an increase in the number of researchers, as well as in the number of papers dealing with supply chains, the analysis of the circular economy and its in society. The largest number of researchers come from European countries, i.e., the European Union and China, which are also the countries that have the largest number of produced and cited works.

The research identifies that the circular economy has a significant impact on the functioning of the supply chain in the context of the need to develop mechanisms that will enable the reuse of used resources. The circular economy as such is one of the mechanisms used to increase sustainability, i.e., primarily environmental, and economic sustainability. The main reason for this is the reduction of the costs of procurement of the resources needed for production due to the use of recycled resources, or the impact on the environmental component, primarily due to reducing the negative impact of resources' exploitation and disposal of used resources.

The conducted research has a fundamental limitation of focusing exclusively on the Scopus database, as well as excluding research of entire volumes or book, as it focuses only on professional and scientific papers. The recommendation for future researchers in this field is to conduct a study to examine the extent to which organizations involved in the supply chain use recycled resources, i.e., how willing they are to implement the principles of the circular economy.

## REFERENCES

- Alkier, R., Miložica, V. & Roblek, V. (2023). Complexity of the tourism supply chain in the 21st century: a bibliometric analysis. *Kybernetes*, 52(11), 5480–5502. <https://doi.org/10.1108/k-03-2022-0430>
- Alkier, R., Miložica, V. & Roblek, V. (2023a). Role of Hotel Management Crisis in Covid-19 and Post-Covid-19 Period: A Case Study of Opatija Riviera Micro-Region in Croatia. *Organizacija*, 56(4), 324–341, <https://doi.org/10.2478/orga-2023-0022>
- Apeji, U. D. & Sunmola, F. T. (2022). Principles and Factors Influencing Visibility in Sustainable Supply Chains. *Procedia Computer Science*, 200, 1516–1527. <https://doi.org/10.1016/j.procs.2022.01.353>
- Azzi, R., Chamoun, R. K. & Sokhn, M. (2019). The power of a block-chain-based supply chain. *Computers & Industrial Engineering*, 135, 582–592. <https://doi.org/10.1016/j.cie.2019.06.042>
- Balatsky, A., Balatsky, G. & Borysov, S. (2015). Resource Demand Growth and Sustainability Due to Increased World Consumption. *Sustainability*, 7(3), 3430–3440. <https://doi.org/10.3390/su7033430>
- Bastas, A. & Liyanage, K. (2018). Sustainable supply chain quality management: A systematic review. *Journal of Cleaner Production*, 181, 726–744. <https://doi.org/10.1016/j.jclepro.2018.01.110>
- Batista, L., Bourlakis, M., Liu, Y., Smart, P. & Sohal, A. (2018). Supply chain operations for a circular economy. *Production Planning & Control*, 29(6), 419–424. <https://doi.org/10.1080/09537287.2018.1449267>
- Biermann, F., Kanie, N. & Kim, R. E. (2017). Global governance by goal-setting: the novel approach of the UN Sustainable Development Goals. *Current Opinion in Environmental Sustainability*, 26–27, 26–31. <https://doi.org/10.1016/j.cosust.2017.01.010>
- Birkel, H. & Müller, J. M. (2021). Potentials of industry 4.0 for supply chain management within the triple bottom line of sustainability

- A systematic literature review. *Journal of Cleaner Production*, 289, 125612. <https://doi.org/10.1016/j.jclepro.2020.125612>
- Bocken, N. M. P., de Pauw, I., Bakker, C. & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308–320. <https://doi.org/10.1080/21681015.2016.1172124>
- Boom, R. & Steffen, R. (2001). Recycling of scrap for high quality steel products. *Steel Research*, 72(3), 91–96. <https://doi.org/10.1002/srin.200100090>
- Buntak, K., Kovačić, M., Martinčević, I. & Sesar, V. (2019). *Management*. Koprivnica: North University.
- Buntak, K., Kovačić, M., Mutavdžija, M. (2021). Application of Artificial Intelligence in the Business. *International Journal for Quality Research*, 15 (2), 403–416. <https://doi.org/10.24874/IJQR15.02-03>
- Calisto Friant, M., Vermeulen, W. J. & Salomone, R. (2021). Analysing European Union circular economy policies: words versus actions. *Sustainable Production and Consumption*, 27, 337–353. <https://doi.org/10.1016/j.spc.2020.11.001>
- Cerović, Lj., Drpić, D. & Milojica, V. (2014). Renewable Energy Sources in the Function of Sustainable Business in Tourism and Hospitality Industry. *Turizam*, 18(3), 130–139.
- Chen, C. L., Lin, Y. C., Chen, W. H., Chao, C. F. & Pandia, H. (2021). Role of Government to Enhance Digital Transformation in Small Service Business. *Sustainability*, 13(3), 1028. <https://doi.org/10.3390/su13031028>
- Coderoni, S. & Perito, M. A. (2020). Sustainable consumption in the circular economy. An analysis of consumers' purchase intentions for waste-to-value food. *Journal of Cleaner Production*, 252, 119870. <https://doi.org/10.1016/j.jclepro.2019.119870>
- D'Eusanio, M., Zamagni, A. & Petti, L. (2019). Social sustainability and supply chain management: Methods and tools. *Journal of Cleaner Production*, 235, 178–189. <https://doi.org/10.1016/j.jclepro.2019.06.323>
- De Angelis, R., Howard, M. & Miemczyk, J. (2018). Supply chain management and the circular economy: towards the circular supply chain. *Production Planning & Control*, 181, 425–437. <https://doi.org/10.1080/09537287.2018.1449244>
- de Carvalho, P. R., Naoum-Sawaya, J. & Elhedhli, S. (2022). Blockchain-Enabled supply chains: An application in fresh-cut flowers. *Applied Mathematical Modelling*, 110, 841–858. <https://doi.org/10.1016/j.apm.2022.06.011>

- Del Giudice, M., Chierici, R., Mazzucchelli, A. & Fiano, F. Supply chain management in the era of circular economy: the moderating effect of big data. *The International Journal of Logistics Management*, 32(2), 337–356. <https://doi.org/10.1108/IJLM-03-2020-0119>
- den Hollander, M. C., Bakker, C. A. & Hultink, E. J. (2017). Product Design in a Circular Economy: Development of a Typology of Key Concepts and Terms. *Journal of Industrial Ecology*, 21(3), 517–525. <https://doi.org/10.1111/jiec.12610>
- Despeisse, M., Baumers, M., Brown, P., Charnley, F., Ford, S., Garmulewicz, A., Knowles, S., Minshall, T., Mortara, L., Reed-Tsochas, F. & Rowley, J. (2017). Unlocking value for a circular economy through 3D printing: A research agenda. *Technological Forecasting and Social Change*, 115, 75–84. <https://doi.org/10.1016/j.techfore.2016.09.021>
- Di Foggia, G. & Beccarello, M. (2020). Drivers of municipal solid waste management cost based on cost models inherent to sorted and unsorted waste. *Waste Management*, 114, 202–214. <https://doi.org/10.1016/j.wasman.2020.07.012>
- Di Maio, F., Rem, P. C., Baldé, K. & Polder, M. (2017). Measuring resource efficiency and circular economy: A market value approach. *Resources, Conservation and Recycling*, 122, 163–171. <https://doi.org/10.1016/j.resconrec.2017.02.009>
- Domenech, T. & Bahn-Walkowiak, B. (2019). Transition Towards a Resource Efficient Circular Economy in Europe: Policy Lessons From the EU and the Member States. *Ecological Economics*, 155, 7–19. <https://doi.org/10.1016/j.ecolecon.2017.11.001>
- El Amrani, S., Ibne Hossain, N. U., Karam, S., Jaradat, R., Nur, F., Hamilton, M. A. & Ma, J. (2021). Modelling and assessing sustainability of a supply chain network leveraging multi Echelon Bayesian Network. *Journal of Cleaner Production*, 302, 126855. <https://doi.org/10.1016/j.jclepro.2021.126855>
- Fukumoto, V. & de Vasconcelos, A. M. (2022). The contemporary research on circular economy in industry. In: A. Stefanakis & I. Nikolaou (Eds.), *Circular Economy and Sustainability Volume 1: Management and Policy* (pp. 523–534). Federal University of Mato Grosso do Sul, Brazil. <https://doi.org/10.1016/b978-0-12-819817-9.00023-5>
- García-Cáceres, R. G., Castañeda-Galvis, M. T. & Suárez-Fajardo, J. F. (2019). Towards an efficient and sustainable planning of the drinking water supply chain. *Journal of Cleaner Production*, 230, 394–401. <https://doi.org/10.1016/j.jclepro.2019.05.062>

- Gardner, T., Benzie, M., Börner, J., Dawkins, E., Fick, S., Garrett, R., Gardar, J., Grimard, A., Lake, S., Larsen, R., Mardas, N., McDermott, C., Meyfroidt, P., Osbeck, M., Persson, M., Sembres, T., Suavet, C., Strassburg, B., Trevisan, A., West, C. & Wolvekamp, P. (2019). Transparency and sustainability in global commodity supply chains. *World Development*, 121, 163–177. <https://doi.org/10.1016/j.worlddev.2018.05.025>
- Geissdoerfer, M., Morioka, S. N., de Carvalho, M. M. & Evans, S. (2018a). Business models and supply chains for the circular economy. *Journal of Cleaner Production*, 190, 712–721. <https://doi.org/10.1016/j.jclepro.2018.04.159>
- Geissdoerfer, M., Savaget, P., Bocken, N. M. & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757–768. <https://doi.org/10.1016/j.jclepro.2016.12.048>
- Geissdoerfer, M., Vladimirova, D. & Evans, S. (2018b). Sustainable business model innovation: A review. *Journal of Cleaner Production*, 198, 401–416. <https://doi.org/10.1016/j.jclepro.2018.06.240>
- Genovese, A., Acquaye, A. A., Figueroa, A. & Koh, S. L. (2017). Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications. *Omega*, 66, 344–357. <https://doi.org/10.1016/j.omega.2015.05.015>
- Ghisellini, P., Ripa, M. & Ulgiati, S. (2018). Exploring environmental and economic costs and benefits of a circular economy approach to the construction and demolition sector. A literature review. *Journal of Cleaner Production*, 178, 618–643. <https://doi.org/10.1016/j.jclepro.2017.11.207>
- Ghorbanpour, A., Pooya, A. & Naji Azimi, Z. (2022). Application of green supply chain management in the oil Industries: Modeling and performance analysis. *Materials Today: Proceedings*, 49, 542–553. <https://doi.org/10.1016/j.matpr.2021.03.672>
- Gonçalves, B. D. S. M., Carvalho, F. L. D. & Fiorini, P. D. C. (2022). Circular Economy and Financial Aspects: A Systematic Review of the Literature. *Sustainability*, 14(5), 3023. <https://doi.org/10.3390/su14053023>
- Govindan, K. & Hasanagic, M. (2018). A systematic review on drivers, barriers, and practices towards circular economy: a supply chain perspective. *International Journal of Production Research*, 56(1–2), 278–311. <https://doi.org/10.1080/00207543.2017.1402141>

- Govindan, K., Soleimani, H. & Kannan, D. (2015). Reverse logistics and closed-loop supply chain: A comprehensive review to explore the future. *European Journal of Operational Research*, 240(3), 603–626. <https://doi.org/10.1016/j.ejor.2014.07.012>
- Guandalini, I. (2022). Sustainability through digital transformation: A systematic literature review for research guidance. *Journal of Business Research*, 148, 456–471. <https://doi.org/10.1016/j.jbusres.2022.05.003>
- Guide, V. D. R., Harrison, T. P. & Van Wassenhove, L. N. (2003). The Challenge of Closed-Loop Supply Chains. *Interfaces*, 33(6), 3–6. <https://doi.org/10.1287/inte.33.6.3.25182>
- He, B., Liu, Y., Zeng, L., Wang, S., Zhang, D. & Yu, Q. (2019). Product carbon footprint across sustainable supply chain. *Journal of Cleaner Production*, 241, 118320. <https://doi.org/10.1016/j.jclepro.2019.118320>
- Hong, J., Zhang, Y. & Ding, M. (2018). Sustainable supply chain management practices, supply chain dynamic capabilities, and enterprise performance. *Journal of Cleaner Production*, 172, 3508–3519. <https://doi.org/10.1016/j.jclepro.2017.06.093>
- Howard, M., Hopkinson, P. & Miemczyk, J. (2019). The regenerative supply chain: a framework for developing circular economy indicators. *International Journal of Production Research*, 57(23), 7300–7318. <https://doi.org/10.1080/00207543.2018.1524166>
- Ignatyev, I. A., Thielemans, W., & Vander Beke, B. (2014). Recycling of Polymers: A Review. *ChemSusChem*, 7(6), 1579–1593. <https://doi.org/10.1002/cssc.201300898>
- Iqbal, M. W., Kang, Y. & Jeon, H. W. (2020). Zero waste strategy for green supply chain management with minimization of energy consumption. *Journal of Cleaner Production*, 245, 118827. <https://doi.org/10.1016/j.jclepro.2019.118827>
- Jubinville, D., Esmizadeh, E., Saikrishnan, S., Tzoganakis, C. & Mekonnen, T. (2020). A comprehensive review of global production and recycling methods of polyolefin (PO) based products and their post-recycling applications. *Sustainable materials and technologies*, 25, e00188. <https://doi.org/10.1016/j.susmat.2020.e00188>
- Junaid, M., Zhang, Q. & Syed, M. W. (2022). Effects of sustainable supply chain integration on green innovation and firm performance. *Sustainable Production and Consumption*, 30, 145–157. <https://doi.org/10.1016/j.spc.2021.11.031>
- Junge, A. L. & Straube, F. (2020). Sustainable supply chains – digital transformation technologies' impact on the social and environmental

- dimension. *Procedia Manufacturing*, 43, 736–742. <https://doi.org/10.1016/j.promfg.2020.02.110>
- Kalmykova, Y., Sadagopan, M. & Rosado, L. (2018, August). Circular economy – From review of theories and practices to development of implementation tools. *Resources, Conservation and Recycling*, 135, 190–201. <https://doi.org/10.1016/j.resconrec.2017.10.034>
- Kalyani, N. T., Dhoble, S. J., Vengadaesvaran, B. & Arof, A. K. (2021). Sustainability, recycling, and lifetime issues of energy materials. In: Dhoble, S. J., Thejo Kalyani, N., Vengadaesvaran, B., Arof, A. K. (Eds.), *Energy Materials* (pp. 581–601). Elsevier. <https://doi.org/10.1016/B978-0-12-823710-6.00015-7>
- Khan, I. S., Ahmad, M. O. & Majava, J. (2021). Industry 4.0 and sustainable development: A systematic mapping of triple bottom line, Circular Economy and Sustainable Business Models perspectives. *Journal of Cleaner Production*, 297, 126655. <https://doi.org/10.1016/j.jclepro.2021.126655>
- Khan, M., Schaefer, D. & Milisavljevic-Syed, J. (2022). Supply Chain Management 4.0: Looking Backward, Looking Forward. *Procedia CIRP*, 107, 9–14. <https://doi.org/10.1016/j.procir.2022.04.002>
- Kirchherr, J., Reike, D. & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221–232. <https://doi.org/10.1016/j.resconrec.2017.09.005>
- Kiss, K., Ruzskai, C. & Takács-György, K. (2019). Examination of Short Supply Chains Based on Circular Economy and Sustainability Aspects. *Resources*, 8(4), 1–21. <https://doi.org/10.3390/resources8040161>
- Koberg, E. & Longoni, A. (2019). A systematic review of sustainable supply chain management in global supply chains. *Journal of Cleaner Production*, 207, 1084–1098. <https://doi.org/10.1016/j.jclepro.2018.10.033>
- Korhonen, J., Honkasalo, A. & Seppälä, J. (2018). Circular economy: the concept and its limitations. *Ecological Economics*, 143, 37–46. <https://doi.org/10.1016/j.ecolecon.2017.06.041>
- Kovačić, M., Mutavdžija, M. & Buntak, K. (2022). New Paradigm of Sustainable Urban Mobility: Electric and Autonomous Vehicles – A Review and Bibliometric Analysis. *Sustainability*, 14(15), 9525. <https://doi.org/10.3390/su14159525>
- Kovačić, M., Mutavdžija, M. & Buntak, K. (2022a). E-Health Application, Implementation and Challenges: A Literature Review. *Business Systems Research Journal*, 13(1) 1–18. <https://doi.org/10.2478/bsrj-2022-0001>



- Kovačić, M., Mutavdžija, M., Buntak, K. & Pus, I. (2022b). Using Artificial Intelligence for Creating and Managing Organizational Knowledge. *Tehnički vjesnik*, 29(4), 1413–1418. <https://doi.org/10.17559/TV-20211222120653>
- Kovačić, M., Mutavdžija, M. & Buntak, K. (2023). Conceptual Model of Managing Resilience in Supply Chain. *Tehnički glasnik*, 17(1), 26–31. <https://doi.org/10.31803/tg-20220204110251>
- Kshetri, N. (2021). Blockchain and sustainable supply chain management in developing countries. *International Journal of Information Management*, 60, 102376. <https://doi.org/10.1016/j.ijinfomgt.2021.102376>
- Li, X., Wang, L. & Ding, X. (2021). Textile supply chain waste management in China. *Journal of Cleaner Production*, 289, 125147. <https://doi.org/10.1016/j.jclepro.2020.125147>
- Lopes de Sousa Jabbour, A. B., Jabbour, C. J. C., Godinho Filho, M. & Roubaud, D. (2018). Industry 4.0 and the circular economy: a proposed research agenda and original roadmap for sustainable operations. *Annals of Operations Research*, 270(1–2), 273–286. <https://doi.org/10.1007/s10479-018-2772-8>
- Macedonio, F. & Drioli, E. (2022). Circular economy in selected wastewater treatment techniques. In: A. Iulianelli, A. Cassano, C. Conidi, K. Petrotos (Eds.). *Membrane Engineering in the Circular Economy* (pp. 101–122). Elsevier. <https://doi.org/10.1016/b978-0-323-85253-1.00016-2>
- Mahajan, J. & Vakharia, A. J. (2016). Waste Management: A Reverse Supply Chain Perspective. *Vikalpa: The Journal for Decision Makers*, 41(3), 197–208. <https://doi.org/10.1177/0256090916659029>
- Makholm, J. D. (2022). The renewable energy supply chain problem: A new geography of power supply and new species of electricity transmission. *The Electricity Journal*, 35(2), 107079. <https://doi.org/10.1016/j.tej.2022.107079>
- Manavalan, E. & Jayakrishna, K. (2019). An Analysis on Sustainable Supply Chain for Circular Economy. *Procedia Manufacturing*, 33, 477–484. <https://doi.org/10.1016/j.promfg.2019.04.059>
- Mangla, S. K., Luthra, S., Mishra, N., Singh, A., Rana, N. P., Dora, M. & Dwivedi, Y. (2018). Barriers to effective circular supply chain management in a developing country context. *Production Planning & Control*, 29(6), 551–569. <https://doi.org/10.1080/09537287.2018.1449265>
- Mardani, A., Kannan, D., Hooker, R. E., Ozkul, S., Alrasheedi, M. & Tirkolaee, E. B. (2020). Evaluation of green and sustainable supply chain management using structural equation modelling: A systematic review of the state of the art literature and recommendations for future

- research. *Journal of Cleaner Production*, 249, 119383. <https://doi.org/10.1016/j.jclepro.2019.119383>
- Marôco, A. L., Nogueira, F., Gonçalves, S. P. & Marques, I. C. P. (2022). Work-Family Interface in the Context of Social Responsibility: A Systematic Literature Review. *Sustainability*, 14(5), 3091. <https://doi.org/10.3390/su14053091>
- Meherishi, L., Narayana, S. A. & Ranjani, K. S. (2019). Sustainable packaging for supply chain management in the circular economy: A review. *Journal of Cleaner Production*, 237, 117582. <https://doi.org/10.1016/j.jclepro.2019.07.057>
- Moktadir, M. A., Rahman, T., Rahman, M. H., Ali, S. M. & Paul, S. K. (2018). Drivers to sustainable manufacturing practices and circular economy: A perspective of leather industries in Bangladesh. *Journal of Cleaner Production*, 174, 1366–1380. <https://doi.org/10.1016/j.jclepro.2017.11.063>
- Mongo, M., Laforest, V., Belaïd, F. & Tanguy, A. (2022, August 30). Assessment of the Impact of the Circular Economy on CO2 Emissions in Europe. *Journal of Innovation Economics & Management*, 39(3), 15–43. <https://doi.org/10.3917/jie.pr1.0107>
- Montecchi, M., Plangger, K. & West, D. C. (2021). Supply chain transparency: A bibliometric review and research agenda. *International Journal of Production Economics*, 238, 108152. <https://doi.org/10.1016/j.ijpe.2021.108152>
- Morseletto, P. (2020). Targets for a circular economy. *Resources, Conservation and Recycling*, 153, 1–12. <https://doi.org/10.1016/j.resconrec.2019.104553>
- Murray, A., Skene, K. & Haynes, K. (2015). The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context. *Journal of Business Ethics*, 140(3), 369–380. <https://doi.org/10.1007/s10551-015-2693-2>
- Mutavdžija, M., Kovačić, M. & Buntak, K. (2022). Assessment of Selected Factors Influencing the Purchase of Electric Vehicles—A Case Study of the Republic of Croatia. *Energies*, 15(16), 5987. <https://doi.org/10.3390/en15165987>
- Neves, S. A. & Marques, A. C. (2022). Drivers and barriers in the transition from a linear economy to a circular economy. *Journal of Cleaner Production*, 3, 1–9. <https://doi.org/10.1016/j.jclepro.2022.130865>
- Núñez-Merino, M., Maqueira-Marín, J. M., Moyano-Fuentes, J. & Castaño-Moraga, C. A. (2022). Industry 4.0 and supply chain. A Systematic Science Mapping analysis. *Technological Forecasting*

and *Social Change*, 181, 121788. <https://doi.org/10.1016/j.techfore.2022.121788>

- Oelze, N., Hoejmose, S. U., Habisch, A. & Millington, A. (2014). Sustainable Development in Supply Chain Management: The Role of Organizational Learning for Policy Implementation. *Business Strategy and the Environment*, 25(4), 241–260. <https://doi.org/10.1002/bse.1869>
- Omer, A. M. (2008). Energy, environment and sustainable development. *Renewable and Sustainable Energy Reviews*, 12(9), 2265–2300. <https://doi.org/10.1016/j.rser.2007.05.001>
- Ostojić, I., Jovanović, P. & Matijević, B. (2022). Development Finance Institutions, Environmental Inequalities and Just Green Transition. In G. Ilik & A. Stanojoska (Eds.), *Towards a Better Future: Visions of Justice, Equality, and Politic* (pp. 119–132). Bitola: St. Kliment Ohridski University.
- Ostojić, I. (2023). Green financing in Serbia – challenges and opportunities. In J. Premović (Ed.), *Challenges of modern economy and society through the prism of green economy and sustainable development* (pp. 24–38). Novi Sad: Educational and business center for development of human resources, management and sustainable development.
- Papargyropoulou, E., Lozano, R., K. Steinberger, J., Wright, N. & Ujang, Z. B. (2014, August). The food waste hierarchy as a framework for the management of food surplus and food waste. *Journal of Cleaner Production*, 76, 106–115. <https://doi.org/10.1016/j.jclepro.2014.04.020>
- Payne, J., McKeown, P., & Jones, M. D. (2019). A circular economy approach to plastic waste. *Polymer Degradation and Stability*, 165, 170–181. <https://doi.org/10.1016/j.polymdegradstab.2019.05.014>
- Peng, J., Chen, L. & Zhang, B. (2022). Transportation planning for sustainable supply chain network using big data technology. *Information Sciences*, 609, 781–798. <https://doi.org/10.1016/j.ins.2022.07.112>
- Pieroni, M. P., McAloone, T. C. & Pigosso, D. C. (2019). Business model innovation for circular economy and sustainability: A review of approaches. *Journal of Cleaner Production*, 215, 198–216. <https://doi.org/10.1016/j.jclepro.2019.01.036>
- Prieto-Sandoval, V., Jaca, C. & Ormazabal, M. (2018). Towards a consensus on the circular economy. *Journal of Cleaner Production*, 179, 605–615. <https://doi.org/10.1016/j.jclepro.2017.12.224>
- Qiyong, X. & Jiaojia, G. (2011). Reduction of CO2 Emission Using Bioreactor Technology for Waste Management in China. *Energy Procedia*, 5, 1026–1031. <https://doi.org/10.1016/j.egypro.2011.03.181>

- Ragossnig, A. M. & Schneider, D. R. (2019). Circular economy, recycling and end-of-waste. *Waste Management & Research: The Journal for a Sustainable Circular Economy*, 37(2), 109–111. <https://doi.org/10.1177/0734242x19826776>
- Raian, S., Ali, S. M., Sarker, M. R., Sankaranarayanan, B., Kabir, G., Paul, S. K. & Chakraborty, R. K. (2022). Assessing sustainability risks in the supply chain of the textile industry under uncertainty. *Resources, Conservation and Recycling*, 177. 105975. <https://doi.org/10.1016/j.resconrec.2021.105975>
- Ranjbari, M., Saidani, M., Esfandabadi, Z. S., Peng, W., Lam, S. S., Aghbashlo, M. & Tabatabaei, V. (2021). Two decades of research on waste management in the circular economy: Insights from bibliometric, text mining, and content analyses. *Journal of Cleaner Production*, 314, 128009. <https://doi.org/10.1016/j.jclepro.2021.128009>
- Reno, J. (2015). Waste and Waste Management. *Annual Review of Anthropology*, 44(1), 557–572. <https://doi.org/10.1146/annurev-anthro-102214-014146>
- Rezayat, M. R., Yaghoubi, S. & Fander, A. (2020). A hierarchical revenue-sharing contract in electronic waste closed-loop supply chain. *Waste Management*, 115, 121–135. <https://doi.org/10.1016/j.wasman.2020.07.019>
- Ritzén, S. & Sandström, G. Ö. (2017). Barriers to the Circular Economy—Integration of Perspectives and Domains. *Procedia CIRP*, 143, 7–12. <https://doi.org/10.1016/j.procir.2017.03.005>
- Rizos, V., Tuokko, K. & Bahrens, A. (2017). *The Circular Economy: A review of definitions, processes and impacts*. CEPS Papers. [https://www.ceps.eu/download/publication/?id=9969&pdf=RR2017-08\\_CircularEconomy\\_0.pdf](https://www.ceps.eu/download/publication/?id=9969&pdf=RR2017-08_CircularEconomy_0.pdf)
- Rödl, M. B., Åhlvik, T., Bergeå, H., Hallgren, L. & Böhm, S. (2022). Performing the Circular economy: How an ambiguous discourse is managed and maintained through meetings. *Journal of Cleaner Production*, 360, 1–18. <https://doi.org/10.1016/j.jclepro.2022.132144>
- Ross, M. B. (2019). Carbon dioxide recycling makes waves. *Joule*, 3(8), 1814–1816. <https://doi.org/10.1016/j.joule.2019.07.019>
- Safarzadeh, S., Hafezalkotob, A. & Jafari, H. (2022). Energy supply chain empowerment through tradable green and white certificates: A pathway to sustainable energy generation. *Applied Energy*, 323, 119601. <https://doi.org/10.1016/j.apenergy.2022.119601>
- Samper, M. G., Florez, D. G., Borre, J. R. & Ramirez, J. (2022). Industry 4.0 for sustainable supply chain management: Drivers and barriers.

*Procedia Computer Science*, 203, 644–650. <https://doi.org/10.1016/j.procs.2022.07.094>

- Sarkar, B., Debnath, A., Chiu, A. S. F. & Ahmed, W. (2022). Circular economy-driven two-stage supply chain management for nullifying waste. *Journal of Cleaner Production*, 339, 130513. <https://doi.org/10.1016/j.jclepro.2022.130513>
- Seuring, S., & Müller, M. (2008). Core issues in sustainable supply chain management - a Delphi study. *Business Strategy and the Environment*, 17(8), 455–466. <https://doi.org/10.1002/bse.607>
- Seuring, S., Aman, S., Hettiarachchi, B. D., de Lima, F. A., Schilling, L. & Suddinghe, J. I. (2022). Reflecting on theory development in sustainable supply chain management. *Cleaner Logistics and Supply Chain*, 3, 100016. <https://doi.org/10.1016/j.clscn.2021.100016>
- Sombultawee, K., Lenuwat, P., Aleenajitpong, N. & Boon-itt, S. (2022). COVID-19 and Supply Chain Management: A Review with Bibliometric. *Sustainability*, 14(6), 3538. <https://doi.org/10.3390/su14063538>
- Stranieri, S., Orsi, L., Banterle, A. & Ricci, E. C. (2019). Sustainable development and supply chain coordination: The impact of corporate social responsibility rules in the European Union food industry. *Corporate Social Responsibility and Environmental Management*, 26(2), 481–491. <https://doi.org/10.1002/csr.1698>
- Tomić, T. & Schneider, D. R. (2020). Circular economy in waste management – Socio-economic effect of changes in waste management system structure. *Journal of Environmental Management*, 267, 110564. <https://doi.org/10.1016/j.jenvman.2020.110564>
- Van den Berg, M. R. & Bakker, C. A. (2015). A product design framework for a circular economy. In: *Proceedings of the PLATE Conference*, 17–19 June 2015 (pp. 365–379). Nottingham: Nottingham Trent University: CADBE
- Roblek, V., Drpić, D., Meško, M. & Milojica, V. (2021). Evolution of sustainable tourism concepts. *Sustainability*, 13(22), 12829. <https://doi.org/10.3390/su132212829>
- Velenturf, A. P. & Purnell, P. (2021). Principles for a sustainable circular economy. *Sustainable Production and Consumption*, 27, 1437–1457. <https://doi.org/10.1016/j.spc.2021.02.018>
- Wang, H., Schandl, H., Wang, X., Ma, F., Yue, Q., Wang, G., Wang, Y., Wei, Y., Zhang, Z. & Zheng, R. (2020). Measuring progress of China's circular economy. *Resources, Conservation and Recycling*, 163, 105070. <https://doi.org/10.1016/j.resconrec.2020.105070>

- Yang, M., Fu, M. & Zhang, Z. (2021). The adoption of digital technologies in supply chains: Drivers, process and impact. *Technological Forecasting and Social Change*, 169, 120795. <https://doi.org/10.1016/j.techfore.2021.120795>
- Ying, J. & Li-jun, Z. (2011). Study on Green Supply Chain Management based on Circular Economy. *Physics Procedia*, 25, 1682–1688. Doi: 10.1016/j.phpro.2012.03.295
- Zeng, D., Dong, Y., Cao, H., Li, Y., Wang, J., Li, Z. & Hauschild, M. Z. (2021). Are the electric vehicles more sustainable than the conventional ones? Influences of the assumptions and modeling approaches in the case of typical cars in China. *Resources, Conservation and Recycling*, 167, 105210. <https://doi.org/10.1016/j.resconrec.2020.105210>
- Zeng, X., Ogunseitan, O. A., Nakamura, S., Suh, S., Kral, U., Lim J. & Geng, Y. (2022). Reshaping global policies for circular economy, *Circular Economy*, 1(1), 1–5. <https://doi.org/10.1016/j.cec.2022.100003>
- Zhang, M., Tse, Y. K., Doherty, B., Li, S. & Akhtar, P. (2018). Sustainable supply chain management: Confirmation of a higher-order model. *Resources, Conservation and Recycling*, 128, 206–221. <https://doi.org/10.1016/j.resconrec.2016.06.015>
- Zhang, Z., Malik, M. Z., Khan, A., Ali, N., Malik, S. & Bilal, M. (2022). Environmental impacts of hazardous waste, and management strategies to reconcile circular economy and eco-sustainability. *Science of the Total Environment*, 807, 150856. <https://doi.org/10.1016/j.scitotenv.2021.150856>
- Zhu, Q., Geng, Y. & Lai, K. H. (2010). Circular economy practices among Chinese manufacturers varying in environmental-oriented supply chain cooperation and the performance implications. *Journal of Environmental Management*, 91(6), 1324–1331. <https://doi.org/10.1016/j.jenvman.2010.02.013>
- Zhu, W. & He, Y. (2017). Green product design in supply chains under competition. *European Journal of Operational Research*, 258(1), 165–180. <https://doi.org/10.1016/j.ejor.2016.08.053>
- Zimon, D., Tyan, J. & Sroufe, R. (2020, March 1). Drivers of Sustainable Supply Chain Management: Practices to Alignment with Unsustainable Development Goals. *International Journal for Quality Research*, 14(1), 219–236. <https://doi.org/10.24874/ijqr.14.01-14>



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# Transformative Role of Higher Education in Sustainable Development

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## Abstract

Sustainable education (SDG 4.7) has a key role in enabling the achievement of all other UN Sustainable Development Goals (SDGs) and a power to make a radical shift towards sustainable development. In order to take up this transformative role, it is suggested that education needs to be transformed first. It is because the current educational approach, organization of learning and delivery of education cannot follow the pace and nature of the changes in the society, or contribute to dealing with sustainability challenges. In this paper a unique endeavour of the national coalition of fourteen Dutch universities of applied sciences is presented. This innovative initiative aims to develop and deliver a master profile and a programme in sustainability transition on the national level. Paper provides the discussion and analysis of the motives, process and hurdles of this endeavour with the purpose of sharing the lessons learned and inspiring similar practices in other countries.

*Keywords:* Sustainable education (SDG 4.7), Sustainability transitions, Higher education, Master programme, Dutch Universities of Applied Sciences

## Introduction

■ Slow progress in dealing with major environmental and societal challenges (climate crisis, biodiversity loss, inequality, extreme poverty, etc.) poses a question of the adequacy of the response of businesses, governments, but also of higher education to the unprecedented times of urgency, uncertainty and threat. The UN SDGs articulate the seventeen most important, global ambitions that humanity needs to focus on to be able to deal with the most pressing global challenges, affecting the world and life as we know it. Even though there are many valuable initiatives, regulations and innovations that are setting the development in the promising direction, the progress is still too slow and does not correspond to



the level of the urgency and threat faced with by our planet and society (CGRI, n.d.). It is suggested that only a radically different approach and transformation on the most fundamental levels of society are needed to set us on the right path towards a sustainable future (Sachs et al., 2019). Following up on the 'World in 2050' initiative (TWI250, 2018), UN Sustainable Development Solutions Network (SDSN) suggested six SDG transformations<sup>1</sup> as building-blocks of SDG achievement, the first among them being Education (Sachs et al., 2019).

Current educational system is still characterized by silos, hierarchical structures, fragmentation, departmentalization and conventional ways of delivering the programmes, with a limited view of what the role and impact of education, and specifically universities and their graduates, can and should be. Some authors suggest that there is an astonishing disconnection between the pressing signs of a global change, and the relatively closed world of higher education (Sterling, 2021).

The main purpose of this study is to inspire higher education to take up a transformative role, as envisaged by SDG 4.7, by sharing the lessons learned from the Dutch higher educational system, as one of the possible ways in which higher educational systems could provide more considerable contribution to the achievement of the UN SDGs and provide meaningful response to the environmental and societal challenges.

In line with this purpose, we set the research objectives. The first objective is to analyse adequacy of the current educational system from the perspective of pressing societal and environmental challenges. The second objective is to examine what the educational approach (purpose, curriculum, learning environment, delivery) needs to be like, so that the graduates can truly become agents of change and transition leaders. Finally, the third objective is to present, discuss and learn from the Dutch example of fourteen universities of applied sciences working together to ensure transformative role of higher education.

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<sup>1</sup> Six SDG transformations according to the SDSN are: 1. Education, Gender, and Inequality; 2. Health, Wellbeing, and Demography; 3. Energy Decarbonisation and Sustainable Industry; 4. Sustainable Food, Land, Water, and Oceans; 5. Sustainable Cities and Communities; and 6. Digital Revolution for Sustainable Development

In line with the main aim of the study, the research question we start from in this paper is: What does it take for a higher educational system to contribute to sustainability transitions and educate professionals at the forefront of transformations towards a more sustainable world?

In order to answer the question, we will use single in-depth case study as the most adequate research method to provide in-depth analysis of the phenomenon (Yin, 2014). The context we choose for the case study is the higher educational system in the Netherlands, and more specifically, the master level education in the domain of sustainability. The Netherlands is one of the most developed countries in Europe with rich, open, international, and consequently highly competitive and diversified offer of bachelor and master programmes, with many of its universities occupying very high positions in the Academic Ranking of World Universities (Shanghai Ranking).

The paper will discuss and analyse one particular example and an initiative of setting up a new master programme in the Netherlands in the domain of sustainability. To the best of our knowledge, this is a unique example of a national coalition of universities setting up an innovative form of working together on designing a new master profile and programme and proposing radically novel way of delivering the master programme, so that its graduates can be at the forefront of societal transformation, which is necessary in the unprecedented conditions of urgency.

The remaining part of the paper has the following structure. In the next section, we provide a short literature overview that presents concepts and frameworks necessary for determining the basis of the study and useful for structuring the presentation of our empirical findings. We will shortly present the UN SDGs and in particular SDG 4 that concerns education. We will also introduce the literature that evaluates the current system of higher education from the perspective of its adequacy in the conditions of urgency. Lastly, using literature on the educational science and analysis of reported practical requirements, we will discuss the features of higher education needed to provide adequate response to environmental and societal challenges. Literature review section will be concluded by summarizing the main findings that will be used as a

conceptual framework to analyse and discuss the results of our empirical research.

Research methodology section will provide more specific details on the research design, research context and case selection, as well as a description of the data collection and data analysis methods. In the Discussion section we will present data analysis and findings. Final section of the study contains the conclusions that will be derived from the findings and analysis and contrasted with previous research. In this final section, researcher also offers possible lines for future research.

## Literature Overview

### *Education for Sustainable Development*

Our economy and society are faced with serious environmental challenges requesting urgent response and action on all the levels of our society. The population is growing, and together with the growing needs and the economic growth, this has a detrimental effect on natural resources and the environment. To ensure there's enough food, water and prosperity for the future generations, national economies need to switch from a linear<sup>2</sup> to a circular and more sustainable economy. Increasing number of companies embrace social and environmental responsibility and perceive it as a source of the competitive advantage (Pesalj et al., 2012). Also, the most proactive and dynamic companies are willing to adapt and improve by introducing new management tools to improve performance (Pesalj, 2014). However, instead of ensuring more circularity of materials, it appears that the world almost exclusively relies on new (virgin) materials. Material extraction is increasing, leading to an increase in the circularity gap and shrinking of global circularity: from 9.1% in 2018, to 8.6% 2020, and now 7.2% in 2023 (Circularity Gap Report, 2023).

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<sup>2</sup> Linear economy rely on the sequence "Take – make – dispose", meaning that raw materials are collected, then transformed into products that are used, until they are finally discarded as waste.

The quantity and diversity of products increase at such a pace that the existing natural resources and their capacity to regenerate cannot keep up with it, leading to an increasing gap between the demand and availability of resources. We are overusing our planet's resources. Currently the world is using 1.75 planets to support humanity's demand. If the current pace continues, by 2050 we'll consume three planets (Global Footprint Network, 2023). Obviously this scenario is unsustainable. The Earth Overshoot Day is another measurement calculated to make this transparent. It marks the date when humanity's demand for ecological resources and services in a given year exceed what Earth can regenerate in that year. The earlier the date is in the year, the less sustainable we are. The Earth Overshoot Day fell on 28 July 2018; 29 July 2019, then during the pandemic it was on 22 August 2020, then on 30 July 2021, and once again on 28 July 2022.

Obviously, the economic growth and the use of natural resources are on a collision courses and it is suggested that they need to be decoupled from each other in order to avoid detrimental effects on the society and the environment. Not only that natural resources become depleted, but human activities "[...] are leading to transgression of nine key planetary boundaries" (Accenture, 2014, p.8). We've passed some planetary boundaries already – rate of biodiversity loss, climate change, human interference with the nitrogen cycle (biogeochemical flows); chemical pollution and the release of novel entities and land-system change, threatening abrupt or irreversible environmental changes that can have far-reaching social and economic consequences.

Looking at the progress so far, it becomes obvious that transition to a more sustainable future requires a *radical* shift in the way we think, produce, live and consume (Mitrović & Pesalj, 2021). The amount of that shift is best described by Kirchherr et al. (2017) as "a fundamental *systemic [innovation]* instead of a bit of twisting the status quo." (p. 229).

The United Nations developed the 2030 Agenda for Sustainable Development with the 17 specific Sustainable Development Goals (SDGs) to provide guidance to all participants and stakeholders in the transition process (SDG, n.d.). One of the seventeen goals is SDG4 Quality Education: Ensure inclusive and equitable quality

education and promote lifelong learning opportunities for all (SDG, n.d.). SDG4 has seven targets and the seventh one is the most relevant for our study. SDG 4.7 is formulated as follows: “By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development.” (SDG, n.d.)

Education for Sustainable Development (ESD), as described in SDG 4.7 is an enabler for all 17 SDGs, and is the foundation for the required transformation – a radical shift, providing everyone with the knowledge, skills, attitude and values to become change agents for sustainable development (UNESCO, 2021). ESD is the education that enables learners to develop knowledge, skills, attitudes, values and ethics to cope with the complexity and risk of today’s world, to build resilience, to think systemically and creatively, and to empower them to take responsible action as citizens.

Having in mind the urgency and the threat that our society is faced with, while also having in mind what the ambition for sustainable education is, as defined by SDG 4.7, in the following section we will examine the features of the current educational system, specifically that of higher education, from the perspective of its ability to take up the roles as defined by SDG 4.7.

Despite Brazil having the middle income country status, it does have a public health system with universal access, meaning that everyone is covered by it. However, the level of healthcare in the public healthcare system (named ‘public unified health system’, in Portuguese, ‘Sistema Único de Saúde – SUS’) is as a general rule rather low, and most people that can afford it, subscribe to private health insurance in order to have access to private health services. During COVID-19, the good news was that everyone in principle had access to public healthcare services, though due to the system’s mostly poor state, it soon practically collapsed when confronted with the magnitude of the task of handling the pandemic, combined with the chaotic response to the pandemic orchestrated

by the federal government, under the leadership of the former president Jair Bolsonaro (Di Giulio et al., 2023).

The situation in Brazil during COVID-19 has been described as 'catastrophic' (Ortega & Orsini, 2020), especially in the first months of handling the crisis. A sad example regards the city of Manaus, which experienced two peak crises connected to the COVID-19 pandemic – the first took place in early January 2021, regarding the failure of the funerary services to deal with the number of COVID-19 deaths, which led to the collective burial of many deceased in mass graves (Reeves, 2021). The second crisis took place in late January 2021, when hospitals were faced with acute shortage of oxygen supplies and many intensive care patients who were hospitalized due to COVID-19 died. At that point intensive care units in the city of Manaus were overwhelmed with COVID-19 patients and were referred to as "asphyxiation chambers" (Bergamo, Mônica, n.d.).

The severe losses the country experienced during the pandemic can be linked partially to the federal government's initial denial of the seriousness of the virus and of its effects on humans (Smith, 2020). The then president Bolsonaro openly dismissed the virus, calling it a 'little flu', and denied the severity of the disease, contributing to the spread of disinformation. The bottom line was that he argued that the economic impact of the pandemic was more dangerous than the virus itself, and he therefore vehemently opposed lockdowns and any other restrictions on economic activity (Reverdosa et al., 2021). Furthermore, the president advocated for the intake of medically unproven substances to prevent and combat the virus, namely chloroquine and hydroxychloroquine (CNN et al., 2021). He also appealed to religious beliefs, saying that he had been diagnosed with COVID; but that his body was protected by god, and that therefore he had just mild symptoms.

Furthermore, under Bolsonaro, and especially at the beginning of the pandemic, there was a series of changes in key positions in the country's Ministry of Health, which negatively affected the handling of the crisis. Although at the beginning of his term the Ministry of Health had been led by a medical doctor, after the minister dismissed the 'treatment' advocated by the president on medical grounds, Bolsonaro viewed this as defying his authority and the

Minister was fired. During a short time no less than three health ministers were nominated to handle the pandemic in the country. Later on, a military person with no medical knowledge was appointed to occupy the post (Paes & Kavanami, 2020); (Di Giulio et al., 2023). Meanwhile, the number of deaths was steadily mounting.

According to the WHO, between January 2020 and March 2023, Brazil had over 35 million cases of COVID-19 reported, and about 700,000 deaths (WHO, n.d.). The worst of the pandemic in the country took place between late 2020 and early 2021.

Although Brazil has a universal healthcare system, to which in principle everyone has access, the service is quite underfunded, meaning that the facilities and quality of the public healthcare system is often low, and the people who can afford that, pay for private healthcare services in order to receive better healthcare treatment. With the COVID-19 pandemic, both public and private hospitals were soon full, and there was a lack of beds and oxygen for patients. There were also issues of the lack of protective equipment for healthcare personnel, beside excessive levels of stress and burnout among healthcare workers. As mentioned earlier, the capital of the state of Amazon, Manaus, faced an extreme situation, with lots of COVID-19-related deaths due to, among other reasons, a combination of the lack of medical oxygen reaching public hospitals, the new Delta variant, and poor isolation policies (Di Giulio et al., 2023). Pictures of hundreds of graves in Manaus (including collective graves) linked to COVID-19 deaths in the beginning of 2021 were broadcasted all over the world.

Beside the health crisis, a political crisis severely affected the country, with other actors trying to counteract the lack of effective measures by the federal government. In other municipalities, those that followed Bolsonaro's position (namely, the denial of the virus and disregard for protective measures) had proportionally higher numbers of coronavirus cases; this has been referred to as the 'Bolsonaro effect' (Di Giulio et al., 2023). Some sub-national authorities tried to act according to medical advice and scientific expertise and thus adopted more strict measures (such as social distancing, and the wearing of face masks) and sought to purchase and set up COVID-19 vaccination initiatives, as has been the case of the government of the state of São Paulo. Although the federal government

of Bolsonaro was initially strongly against such measures, it later started changing its strategy, beginning with vaccination campaigns and acting more in line with medical advice practiced in other countries (thus favoring the use of face masks, hand washing measures, etc.). But overall, the handling of COVID-19 by Brazilian authorities, especially the federal government in the early stages of the pandemic, was very problematic.

Moreover, criticism was being raised due to the fact that public policies had a particular negative impact on certain societal groups, especially poor urban communities, many of them composed of Brazilians of African descent, and indigenous peoples located in remote (often forest) areas. Critics have blamed the Bolsonaro administration and President himself for promoting genocidal policies targeting indigenous peoples, or at least facilitating the commission of crimes against humanity in relation to them, and the matter was sent to the International Criminal Court for consideration (Paes & Kavanami, 2020; Di Giulio et al., 2023). Although this chapter does not envisage going deeper into this discussion, these series of events do suggest severe disregard by the federal government for both human rights and ethical principles in its management of the pandemic. Foucault's ideas about biopower provide a theoretical way to reflect on these developments, namely where the state exercises authority over human bodies, by enacting or abstaining from adopting laws and policies (Zaidi et al., 2021). In this case, this may ultimately amount to deciding on who is to be healthy and who not, by offering (or not) health service to groups of the population. Furthermore, another theory that has been referred to in relation to the Brazilian handling of the pandemic is Mbembe's necropolitics (Mbembe, 2003). Although it originally mostly drew upon the colonial experience of African peoples, it ultimately does refer to the power over the life and death of the colonized body and people (Bastos Lima et al., in press).

In the Brazilian case, this could similarly inform how the country dealt with particular sections of its population that suffered the most with the COVID-19 pandemic (Lopes & Bastos Lima, 2020). Beyond the urban poor, and mostly Black communities, the indigenous communities were hit particularly hard. As put by the UN Committee on the Elimination of Racial Discrimination:



“Indigenous peoples in voluntary isolation or initial contact require specific measures of protection, as they are extremely vulnerable to new or external diseases” (UN Committee on the Elimination of Racial Discrimination, 2017; UN Committee on the Elimination of Racial Discrimination, 2018). In the Brazil case, care towards the indigenous population was blatantly lacking, with authorities been accused of having overtly neglected this community (Newey, 2020).

The management of the pandemic by the federal government in Brazil raises questions pertaining to international human rights legal standards, especially the two international covenants, on civil and political rights (ICCPR)(UN General Assembly, 1966a), and on economic, social and cultural rights (ICESCR)(UN General Assembly, 1966b). Brazil is a state party to the two treaties, and therefore it is internationally legally bound to act in accordance with them.

Examples of the rights affected in the country during the pandemic include the right to life (article 6 ICCPR), especially due to the failure to effectively take action to avoid deaths linked to COVID-19, including timely starting of vaccination campaigns. Also the right to health (article 12 ICESCR) was violated, for example due to misinformation and obstruction by the federal government of the efforts towards protection of this right by other actors, especially regional authorities. Similarly, the prohibition of discrimination (article 2, paragraph 1 ICCPR and article 2, paragraph 2 ICESCR) was also disregarded, especially through policies (or the lack thereof) that badly affected those who had found themselves in a position of vulnerability prior to the pandemic, due to, among other factors, long-lasting socio-economic disparities that have affected the country. Both the urban poor Black community and indigenous peoples experienced higher mortality rates than the rest of the population. Another right that was considerably disregarded during the pandemic was the right of citizens to take part in the conduct of public affairs (article 25 ICCPR), namely through participation in deciding on the public health measures adopted during the pandemic. At least some form of popular consultation and risk assessment needed to be conducted, in particular since the proposed measures were expected to disproportionately impact parts of the population. Under Bolsonaro, several important issues were

debated and decided on by a selected 'parallel cabinet' that was neither publicly elected, nor qualified in medical issues, but that nevertheless decided or had a say during the management of the pandemic (Di Giulio et al., 2023).

Regarding ethical conduct, one especially worrying issue is the misinformation and the promotion of early (alleged) treatments for COVID-19, which were largely considered ineffective by the medical and scientific community, and international organizations such as the World Health Organization. This raises questions in relation to good faith by the federal government and the violation of principles of beneficence and nonmaleficence regarding patients who received unapproved and even ineffective interventions without the approval of an official scientific review board statement on their safety and efficacy. In addition, autonomy of patients was not respected as informed consent was not obtained from them prior to provision of such care. That said, it is important to note that in Israel, as well as in other places, the same management of provision of unapproved and unregistered interventions was common in the early stages of the disease (Zuckerman et al., 2022).

Another issue that has raised concern was the lack of transparency in relation to the reporting of COVID-19 deaths by the federal government. It prioritized publishing data on recovered cases rather than reported cases and deaths in an attempt to protect the economy. This raised concerns in relation to transparency, accountability and ultimately public trust in federal authorities. Regarding this particular example, thanks to the initiative of six Brazilian communication companies, a media consortium was created to fill this important information gap and provide the latest information on the number of cases, obtained directly from states rather than through the federal government (Di Giulio et al., 2023).

### *The Paradox of Changing 'Business as usual' while Keeping Education as usual*

As discussed in the previous section, environmental and societal challenges (climate crisis, biodiversity loss, pollution, extreme poverty and inequality), all exacerbated by the pandemic,

pose the question of the adequacy of the response of businesses, governments and education to the unprecedented times of urgency, uncertainty and threat. It is known that knowledge and learning are the bases of renewal and transformation. As our planet is at risk and our lives with it, this means that education is not yet fulfilling its responsibility to help people shape a sustainable future (ICFE, 2021). It has been suggested that it is only a transformative (radical) change that can set us on a path to sustainable development, starting from a transformation of education.

Focusing on higher education, it is suggested that current educational system is still characterized by silos, hierarchical structures, fragmentation, departmentalization and conventional ways of delivering the programmes, with a limited view of what the role and impact of a university, and of its graduates, can and should be (Sterling, 2021). There is an astonishing disconnection between the pressing signs of global change, and the relatively closed world of higher education. It has long ago been suggested that there is a widening developmental gap between the current state of education and the rapidly changing society (Banathy, 1991).

Critically important questions concerning education are: Can our current educational system support the transitions and educate professionals at the forefront of the transformations towards a more sustainable world? Or do we first need to “transform” the education, so that it can be transformative in its effect?

Banathy (1991) argues that the dominant educational paradigm cannot, “possibly cope with the complexity, mutual causality, purpose, uncertainty, ambiguity, and ever accelerating dynamic changes that characterize our systems and larger society environment.” According to this author, education needs to be transformed and self-transcending so that there is a major shift in the way we think about the education and we approach educational inquiry. There have been some steps taken in that direction.

The ‘World in 2050’ initiative (TWI250, 2018) has suggested and the UN Sustainable Development Solutions Network (SDSN) has followed up on six transformations as building-blocks of the SDGs achievement. The first one of them and the one that can enable all the others is the transformation of Education, Gender and Inequality, followed by: Health, Wellbeing, and Demography; Energy

Decarbonisation and Sustainable Industry; Sustainable Food, Land, Water, and Oceans; Sustainable Cities and Communities; and Digital Revolution for Sustainable Development (Sachs et al., 2019).

The UNESCO Berlin Declaration on Education for Sustainable Development suggests that the urgency of societal and environmental challenges, “requires a fundamental transformation that sets us on the path of sustainable development based on more just, inclusive, caring and peaceful relationships with each other and with nature” (UNESCO, 2021). Education is seen as a powerful enabler of a positive change of mind-sets and world-views, enabling all other changes and transitions towards a more sustainable future.

Acquisition of knowledge, its productive application, continuous renewal and expansion represent the sources of competitive advantage (Ostojčić, 2012). The UNESCO International Commission on the Futures of Education (ICFE) endeavours to “rethink education in a world of increasing complexity, uncertainty, inequalities, risks and possibilities” (ICFE, 2021) in terms of the purpose of education and the role of education, learning and knowledge in the future. Education is seen as capable of making a profound change and transformation of the future, but to that end, a new social contract for education seems to be needed.

### *Scientific and Practical Considerations of Higher Education Features to Support Sustainability Transitions*

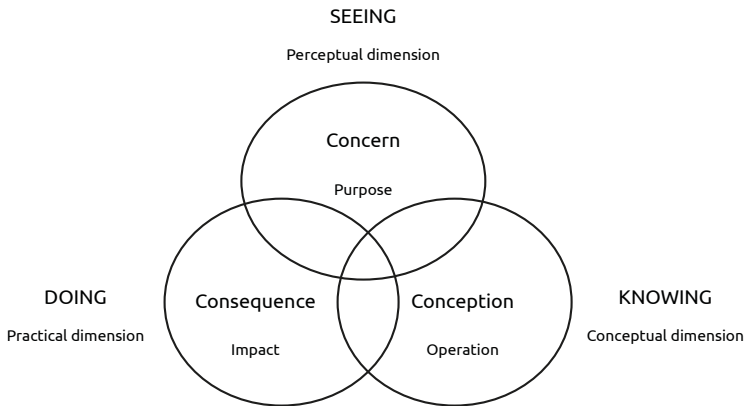
Translating the top down directionality of a global and national SDGs orientated policy approach into the knowledge and skills needed for cross-disciplinary, cross-sectoral and cross-actor innovation, requires sustainability educators to work with the full range of actors: businesses large and small, public authorities, scientists, social enterprises and civil society and stimulate bottom-up experimentation by bringing together diverse coalitions (European Commission, 2018). A nexus of *education, research, government and practice* is critically important for achieving SDGs and improving the quality of (applied) research and education (Vereniging Hogescho- len, 2019; Roadmap Next Economy, 2016) and the role of Higher Education for the Sustainability Agenda. It is also important for the

betterment of the profession and its contribution to dealing with societal and environmental challenges (SDG, n.d.).

Challenges of the long-term development involve fundamental transformation of its own dynamics and workings, and imply a new paradigm of economic and technology development, including a redefinition of education and governance. The required innovation in education pose some important questions, from the optimal educational approach and format for teaching sustainability, to the question of the optimal organization and delivery of sustainability education, that would be in line with the principles of sustainability transitions.

Sterling (2021) uses a Triad model to assess the current education system and suggest a framework to rethink higher educations. The triad model is a framework of three broad and complementary components of the paradigm: Concern (Purpose), Conception (Operation) and Consequence (Impact).

Figure 1. The Triad Model

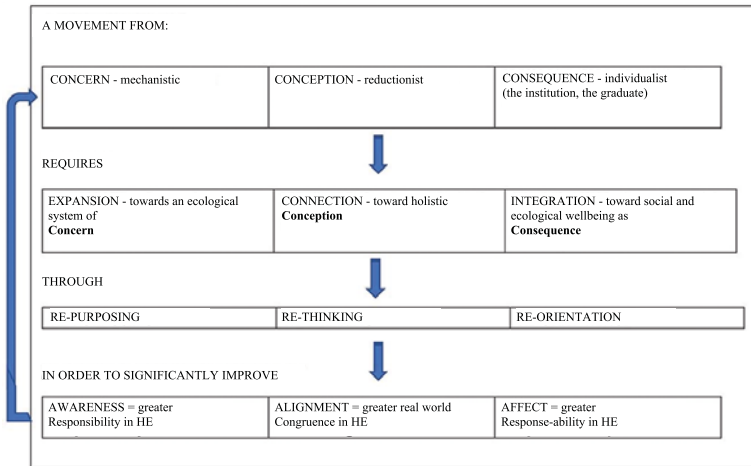


Source: Sterling (2021)

Using the Triad model, Sterling (2021) evaluates the currently dominant educational paradigm, as characterized by mechanistic control-oriented thinking, reductionism, instrumentalism, managerialism, standardization, and submissive to the global testing culture and neo-liberal in its conception and purpose. He proposes the following framework toward an ecological (relational) framework,

through the conscious practice of institutional critical reflexivity and organizational learning:

Figure 2. Paradigm shift in higher education



Source: Sterling (2021)

Using this triadic model, it is suggested that university needs to be purpose driven while that purpose needs to be determined in a dialogue with all stakeholders (including nature). The ultimate purpose of higher education is social and ecological wellbeing. It is important to ensure the alignment of activities on all levels with this ultimate purpose

The conception element of the paradigm needs to follow the principles of a holistic, integrative and collaborative approach in setting up and executing all educational activities. Engagement with the society, local community and the environment should lead to the desired impact of education via societal and environmental activism (peaceful, non-violent engagement, contribution to solving sustainability challenges).

The alignment between concern, conception and consequence very often cannot be achieved in a simple linear process, but is envisaged as iterative and cyclical. All three fundamental academic missions – education, research, and societal engagement – form the basis of how universities are expected to respond to the

global sustainability challenges (Hurth & Steward, 2021), and are seen as equally important and working together.

Each field of study requires the most suitable educational approach, organization and format, that would engage relevant stakeholders, apply most effective pedagogical and didactical approaches and align it with the choice of assessment types. Format of the *Living Lab* and didactical approach relying on *Enquiry, problem-based and experiential learning* are considered the most suitable for teaching sustainability topics (Thomas, 2010; Bessant et al., 2013) and best suited to the needs of the professional field (Roadmap Next Economy, 2016). In order to educate change agents and transition managers, master programme would need to allow students to develop their (cognitive and professional) skills, attitude, values and ethics, in order to confidently engage with a range of stakeholder groups (policy makers, corporate, NGOs, general public, consumers) and lead the action to make systemic change. Educational programme would need to facilitate a powerful personal transformation process that would be continued within the (learning) community.

Sustainability is about *engagement (civil responsibility)* and development of a sustainable mind-set (SDG, n.d.). Therefore education of sustainability transition managers, requires development of engaged global citizens through active citizenship competence (European Commission, 2019) and agency in solving global societal and environmental challenges. Education has to produce intellectual takeaway for students, but also an emotional experience that makes the learning “stick” and internalize. Proposed educational format needs to result in strong social fibres within the learning community, keeping its members together, even as they change their professional roles and positions.

As the field of sustainability is changing rapidly and produces tension between the supply and demand for sustainability talents, the innovative educational format has to enable continuous close interaction between the teaching agenda, research agenda and the professional field, and to enable it on the long term basis.

In order to summarize what has been presented from the literature and seems to be needed to transform the education so that it can become transformative, we can point out the following:

- Paradigm shift in higher education (Banathy, 1991).
- Educational system based on: context, holism, circularity, participation, appreciation, collaboration, planetary boundaries, equity, peace and social and ecological justice.
- Adaptive, innovating institutions engaged in a continual co-evolutionary learning process with community and society, shifting from a “delivery” role to one of engagement (Martin and Sterling, 2019).
- Courage to re-think and transform the way that higher education develops and delivers its programmes so that they are purposeful.

We will employ the conclusions of our literature review as the conceptual framework in assessing and evaluating the nature of the phenomenon explored in our empirical research.

## Research

### *Research Design and Methods*

Qualitative research strategy is used in this study. The case study method is used and corresponding data collection methods. The case study method is considered to be the most adequate research method for this study, to provide in-depth analysis of the phenomenon that is the object of this research (Yin, 2014).

The study was conducted using the action research method (Westbrook, 1995) and the researcher collected data using various sources and methods, such as survey, semi-structured interviews, interventions, workshops, conferences, participant observations and co-design in small teams, over an extended period of time (22 months). During this time the researcher had the opportunity to actively take up a variety of different roles in the various phases of the development of the phenomenon: leading and coordinating the collaborative process; leading the design teams; being a part of the design and organizational teams and being a part of decision bodies. This participation in the collaborative teams has led to designing a range of important documents that constitute the nature and characteristics of the phenomenon presented in this study.



Due to the deep immersion into the phenomenon and its culture, this study can also be described as ethnographic in its nature (LeCompte & Schensul, 2010).

The intensity of the researcher's involvement and in-depth understanding of the phenomenon ensure richness of data and depth of insights in this single case study. This approach is justified by the literature, that suggests that reliance on single-case studies is necessary for maximizing learning about the complex phenomena where prior knowledge was limited (e.g. Naor et al., 2015; Pellinen et al., 2016; Beer & Micheli, 2017; Pesalj et al., 2018).

### *Research Context and Case Selection*

The context chosen for the case study is the higher educational system of the Netherlands, which the researcher is familiar with. The Netherlands is one of the most developed countries in Europe, with an international, open, rich, competitive and diversified offer of bachelor and master programmes, and many universities occupying very high positions in the Academic Ranking of World Universities (Shanghai Ranking).

The Dutch higher education system is known to be dichotomous (binary), differentiating between research universities and universities of applied sciences (Van Houten, 2018). Research universities focus on a closely interwoven mix of academic education and research, as well as on the knowledge creation. Universities of applied sciences focus on higher professional education and applied research (Vereniging Hogescholen, 2019) with a clear orientation towards professional practice. Universities of applied sciences offer high-quality four-year bachelor's programmes and one year master's degree programmes, which are strongly oriented towards practical training of future graduates, by including internships, or work placements that provide students with practical work experience. Universities of applied sciences also offer an increasing number of programmes that lead to a master's degree.

The object of the study (phenomenon explored) is the initiative to conduct a radically innovative collaborative process of designing, developing and delivering the new master profile and programme in sustainability transitions, on a national level. The master

profile and programme is entitled Master Sustainability Transitions (MST) and the initiative has been started by the Association of Universities of Applied Sciences. At the beginning of the process (July 2021) eighteen universities of applied sciences expressed their interest to participate in the collaborative process of designing and delivering the MST together.

At present (April 2023) fourteen universities of applied sciences still work together in the MST coalition. To the best of author's knowledge, this is a unique endeavour in the direction of ensuring the transformative role of education and taking up the responsibility for sustainable development by higher education. Sharing the details about the process, organization, hurdles and learnings, as well as systematically analysing against the conceptual framework, are expected to inspire similar endeavours in other countries and enable further learnings that could be useful to guide similar initiatives elsewhere.

### *Data Collection*

The research involved an in-depth participative immersion in the phenomenon studied, which at the moment of writing the article has lasted for 22 months already, from July 2021 till present (April 2023). The researcher spent approximately 640 hours per year in the process, very often taking a dual role. During the whole process, the researcher actively represented her own university in the coalition of universities but also performed other different roles taken up in different phases of the development of the phenomenon and used different research methods to collect data. The process of the MST development within the coalition was conducted in three phases.

The first phase was the Quartermaster phase that lasted for 6 months (July 2021 – December 2021). In that phase the researcher had a role of the quartermaster, shared with an educational advisor. The main purpose of this phase was to make an inventory within the coalition of the existing master programmes in the area of sustainability, but also an inventory of expectations and ideas with respect to the MST (initial ideas about the need, master profile, possible roles of future graduates in the

professional field and possible forms of delivering the programme together). During this phase, a survey and a set of semi-structured interviews were used to collect data from the eighteen coalition universities. The outcome of this phase was the report that was shared and presented, and which led to the next step – deciding whether the universities are interested to further work together. Since the report provided promising opportunities, the next step was to employ a director (coordinator) that would be responsible for leading the cooperation and taking the actions that were agreed by the MST coalition members. Coordination phase started in January 2022, and with respect to the purpose and outcomes, it can be divided into two stages.

The second phase was the Coordination 1 phase which lasted for 8 months (January 2022 – August 2022). The main objective of the director (coordinator) in this phase was to reach the agreement of the MST coalition universities on the main elements of the new master. The outcome of this phase was a report – the Business Case. It described the following elements: 1) characteristics of the master profile; 2) needs and opportunities at the labour market; 3) students' enrolment and dispersion of the programme on the national level and 4) possible forms of working together in delivering the programmes. The MST Business Case was needed as the basis for formal decision making on the highest level of the participating universities - the Board of Directors (Executive Board). In order to deliver the Business Case, all the representatives of the participating universities were working together in four work groups, corresponding to the elements of the Business Case. In this phase the researcher was leading the work group that was responsible to deliver on the main features of the new master profile (description of the master profile; learning outcomes; key knowledge, skills, attitudes, values and ethics; and main characteristics of the learning environment). Furthermore, the researcher was also a part of the integration team, responsible for the alignment, integration and making decisions on the final outlook of the Business Case. In this phase next to the secondary research, main methods of primary data collection were: co-design in small teams, interventions, workshops and conferences (to verify the design worked in smaller work groups).

The third phase has been the Coordination 2 phase that is still ongoing, and that has lasted for 8 months already, by the time of this article's finalisation, (September 2022 – April 2023). This phase has also been managed by the director (coordinator) and is aimed at preparing a file to be submitted to the Ministry of Education, Culture and Science (Commission for the Aptitude of Higher Education) for the approval of the master profile and the publicly funded MST programme. The work of the coalition has been organized in such a way that, besides the design work (on preparing the submission file), coalition representatives have been included in the organizational structure designed to ensure efficient decision making. Organizational structure includes: work groups (continuing the design work on the four topics as in the Business Case and representing sections of the submission file), project team (involving representatives of all participating universities and preparing the proposals for the decision making body), and MST Board (involving representatives of all participating universities and responsible for making decisions). The researcher has been involved in all three layers in this organizational structure. The methods of data collection in this phase have included: co-design in small teams, interventions, workshops and conferences (to verify the design work in smaller work groups).

## Discussion

### *Coalitions of Dutch Universities of Applied Sciences in the Sector Plan*

The Netherlands has international, open, rich, competitive and diversified offer of bachelor and master programmes delivered within the dichotomous (binary) system, differentiating between research universities and universities of applied sciences (van Houten, 2018). Recently this division has seen some decrease, especially because both types of universities realize the values of all three missions (education, research and social engagement) within the design and delivery of the Education for Sustainable Development. While research universities have made a step towards working more with the professional field and society, universities of

applied sciences (UAS) have embraced the importance of applied research and put more effort to capture and deliver new insights and create new knowledge.

Universities of applied sciences (UAS) traditionally develop their programmes in a strong collaboration with the professional field and multiple stakeholders, and deliver highly educated professionals that are equipped with the knowledge and skills needed in practice. More importantly, fresh graduates have the know-how to connect the knowledge with the needs of the society and the economy (Verhofstad, 2022). Fast changes and developments in the society and in the professional field (energy transition, autonomous vehicles, healthcare, to name but a few examples) have opened opportunities for further development of practice-based new master programmes at the universities of applied sciences (also known as professional masters). Furthermore, reports indicate that there has been a tension in the labour market due to the mismatch between the supply and demand (Ernst & Young, 2020; Vereniging Hogeschoolen, 2020). Embracing these developments is recognized as an opportunity for stronger positioning of the UAS in the Netherlands, under the condition that adequate funding is also following this growth opportunity.

For all major transition issues (for example energy transition, sustainability issues in healthcare, mobility etc.), it can be perceived that they are cross-sectoral and multidisciplinary in nature (Verhofstad, 2022). To be able to respond to future needs in the society and economy, the UAS have looked ahead and anticipated most important social trends. In order to respond to the labour market needs and offer broader portfolio of master programmes, Dutch UAS set to organize cross-institutional masters around major transition issues and societal challenges. The Association of UAS and National Platform of Professional Masters took forward the initiative of UAS in 2019 to set up a national 'Sector Plan professional master' and started a dialogue with the Ministry of Education, Culture and Science to consider the process of its accreditation. The Sector Plan was supposed to include masters that "contribute to the training of professionals who have high-quality, practice-based knowledge in the areas where the major social challenges of the future lie" (Vereniging Hogeschoolen, 2021). The sector plan focuses on

innovative cross-sectoral programs, where an increasing demand from the labour market and society is expected.

The themes included in the Sector Plan have been distilled from various reports, such as Horizon Europe, but also some specific for the Netherlands, and some performed at the request of the Association of UAS. Also UAS provided input about major themes that should be addressed in the Sector Plan. This has led to the six broad, future-oriented topics:

1. Managing (navigating) sustainability transitions
2. Artificial Intelligence
3. Data driven innovation
4. Human capital innovation
5. Quality of life in the 21<sup>st</sup> century
6. Quality of the living environment

The Sector Plan also envisaged the phases of organizing the work around these topics to be the Quartermaster and Coordination phase. UAS were invited to express their interest in working collaboratively on the topics offered, and within the framework proposed. Each one of the UAS ensured their representatives were given appropriate time to work on this. The UAS representatives were experts in the relevant field at the positions of researchers, senior lectures, professors, but also programme managers. The main principle of working together in a coalition was consensus required to make decisions and progress further. UAS shared the costs incurred by employing professionals to lead the coalition (quartermaster and/or coordinator/director), or performing market research needed for working on the profile.

The idea behind the Sector Plan was to join forces of UAS to develop new national master profiles and novel cross-sectoral master programmes that would be accredited by the Ministry of Education, Culture and Science (Ministry) following a somewhat lighter procedure. The standard procedure of the Ministry contains some of the elements that could be difficult to apply to the novel cross-sectoral nature of the master programmes. UAS started working on the selected topics in July 2021 within their coalitions. The interest was considerable and many of the UAS started working on multiple programmes simultaneously.

In this research, we will describe and analyse only one of the six topics of the Sector Plan – Managing (Navigating) Sustainability Transitions. There are multiple reasons for that. First reason is that the researcher has been actively and continuously involved in the topic from its very start to the present moment, having complete and in-depth understanding of the phenomenon. Additionally, the researcher has also been involved in the alignment process for all six topics on the national level – the entire Sector Plan, so can also provide the comparison of the topics, where needed. The third reason is that the selected topic has engaged the largest number of UAS interested in working together on it. The fourth reason is that the process and development of the content have very often been more ambitious and innovative here, than in other five topics.

Over the period of 22 months (till present), design and development work has been performed on two levels: 1) the process of collaboration and working together in a coalition of 18 UAS and 2) the features of the new master profile and programme and possible ways of delivering the programme (content). Keeping the main purpose of the paper in mind, we will, first of all, present the process of creation (the how) and devote less attention to the content created (the what) – features of the master profile and possible forms of delivering the programme.

We will focus on describing and analysing the process within the coalition. However it is important to indicate that besides the fact that each UAS representative took part (and also designed) the process of working together in a coalition, each representative also had to participate in a number of parallel processes needed to ensure the alignment and coordination on several different levels.

Firstly, each UAS representative was responsible to gather and coordinate an internal team within his/hers/their UAS. This is because each UAS participates in developing the content of the profile and the programme. These programmes are all envisaged as transdisciplinary and cross-sectoral, requiring expertise from multiple programmes and research areas, and thus an internal team coming from different faculties, centres of expertise and research centres was needed. Each UAS representative also needed to ensure very good communication line with the programme manager in charge of the development of the new master portfolio,

Dean of the Faculty or the domain in charge, all the way to the Board of Directors of the University, which was the body to approve the proposal and make formal decisions in the name of the UAS. This part of communication was very different in each UAS, as different formal procedures were in place.

The second level of coordination and alignment was also on the level of individual UAS. Namely, most of the UAS registered for multiple topics of the Sector Plan. Therefore, there was a need to establish a setting where representatives for all different topics would sit together to exchange the information about working in different coalitions, share experiences and avoid duplications on the level of their UAS. Board of Directors would often want to receive updates, or information to make decisions concerning the whole package of new master programmes. For that reason, it was important to coordinate and align the timelines and activities. Furthermore, form and structure of some documents were the same, and the market research would address the same population, so it made sense to share and cooperate on that level too.

The third level of alignment was, as it was mentioned, involved the entire Sector Plan, and therefore with the representatives of the coalition for all six topics, on the national level. These regular gatherings and discussions were also very valuable, as coalitions often faced similar challenges or dilemmas when important decisions needed to be made. One of the most valuable contributions of this setting was to enable the comparison of the master profiles, once they were ready, for all six topics. Master profiles were developed in each coalition (including description of the profile; key learning outcomes; key knowledge, skills, attitudes, values and ethics; admission criteria, possible jobs). Opportunities to discuss similarities and differences between the master profiles helped each coalition to fine tune the profiles and recognize “unique selling points” of each one of them. In these meetings, representatives of the UAS Association and National Platform for Professional Masters were also present, so they were able to take important questions and dilemmas to be discussed with the Ministry and its relevant agencies.

During this 22 months, researcher participated in all three described levels of coordination and alignment outside the MST coalition, as well as in the process within the MST coalition that is to



be described in the next section. Entirety of these processes asked for a considerable amount of time that was invested in the process and can explain approximately 640 hours per year devoted to it. Researcher is the only participant of the MST coalition that has been in the process from the very beginning and that has been involved in all three levels of coordination and alignment outside of the coalition, as well as in all levels of varying organizational structure in different phases. This enabled the researcher to gain a unique insight into the phenomenon.

After describing the context of the case study, researcher will present the process within the coalition.

### *The Coalition for the Master in Sustainability Transitions (MST)*

As described, work within the coalition was organized in three phases with their different purposes, methods of work and achieved outcomes.

The purpose of the first phase - Quartermaster phase (July 2021 – December 2021) was to explore the scope and prepare the grounds for the next phase. Together with the external educational advisor, the researcher had the leading role in this phase within the MST coalition. In some other coalitions, professional, external advisors took up the role. This was a liberal and democratic process in which each coalition, based on their own specific circumstances, made the decision on who could take up this role. In any case, what proved to be important for the leading role in this phase was a combination of knowledge and skills: specific content expertise and project management skills.

By using the methods of desk research, survey and semi structured interviews, quartermasters collected the data on: previous availability of similar master programmes and relevant research infrastructure and topics within the coalition of UAS; preliminary overview of the labour market needs in the area of sustainability; opinions about possible features of the master profile (key characteristics, key learning outcomes, possible future jobs/sectors/employers; language of instruction; part time or full time master; number of ECTS; potential topics for the programme); initial ideas

on the possible forms of working together in delivering the programme; and initial ideas on the resources needed for developing the programme. This was an exploratory phase the most important objective of which was to stay open, make space for variety of perspectives and embrace opinions of all the UAS representatives.

As the main principle of the coalition was to work in consensus, it was important that everyone felt heard and involved, and that their most important suggestions were reflected in the report. The outcome of this phase was a report including all the elements mentioned before, that contained the outline of what the coalition could already agree upon and what needed to be further explored and specified. As the outline of the future master profile and the joint endeavour seemed promising and innovative and it was presented as such in the report, the coalition agreed to proceed to the next phase. Representatives of the coalition agreed to employ the coordinator/director with the main assignment to lead the coalition towards the preparation of the file for the new master profile and accreditation of the new master programme – MST. The costs of the salary of the coordinator/director were shared among all coalition members.

Coordination phase 1 (January 2022 – August 2022) was characterized by establishing more formal organizational structure to work within the coalition. The purpose of this phase was to work on the document intended for the Board of Directors of the participating UAS as a basis for a yes/no decision on moving forward.

The document (named the Business Case) was based on the Quartermaster report and elaborated further along its main elements. In order to work on those elements, four work groups were established: 1) Master profile; 2) Needs and opportunities at the labour market; 3) Students' enrolment and dispersion of the programme on the national level, and 4) Possible forms of working together in delivering the programme.

Besides the work groups, there was also an Integration Team in place, which was in charge of the alignment of the work groups' output, as well as in charge of making decisions. During this phase, there was a feeling of enthusiasm, motivation and pride shared by all members of the coalition. This was observed and shared during the process and the explanation could be found in the following elements:

- Members of the coalition all felt that they were working on something purposeful, meaningful and radically innovative. Development of the MST profile and programme was seen as an opportunity to design a truly novel approach to education that would be more in line with the nature of sustainability (complex, transdisciplinary, fast changing). The novel approach to education was supposed to accept that outcomes of the learning process were not known in advance, learning was collective, took place in a real context and practically contributed to dealing with sustainability challenges. In designing the MST profile and programme, the coalition members felt they had the opportunity to ‘practice what they preached’ and put their teaching of sustainability into practice, while designing the education for sustainable development.
- All coalition members were experts in different areas and sectors of sustainability (behaviour, social work, healthcare, energy transition, circular economy, etc.). Co-creation in work groups was jointly-regulated in a creative, democratic process in a safe, friendly, encouraging and inspiring environment. The process gave a lot of space for every member to be heard, to contrast opinions in an open dialogue with the others, construct shared meaning and content, as well as to contribute and complement each other in a variety of ways in line with one’s interests, talents and time available.
- All of the relationships within the coalition were completely informal (no one received any job or task description) and based on a mutually agreed social contract. Actually, participants themselves initiated and proposed the tasks, then agreed on the method of working on them and then divided the tasks. No formal control was executed. The agreements were respected, tasks were performed on time, with a lot of agency and individual and team responsibility.
- The role of the coordinator/director was very important. The director was first among equals, demonstrating similar type of leadership with a lot of humility, encouragement, positive attitude, taking genuine care of everyone’s wellbeing and providing space and support for individual growth. The director, first of all, took care of the work atmosphere (to be

friendly, positive and encouraging), ensured that the structure and method of work were agreed upon, and followed up on the agreements. An ambition to take up certain role by any member of the coalition, was always accepted. Any issues or suggestions were discussed in multiple direct conversations with the involved members. Members were credited and praised for their individual and team contributions and achievements, while milestones were celebrated.

- All of the presented led to the creation of a unique MST culture and active engagement, to broaden the group of supporters of the MST initiative (the MST community).

The outcome of this phase was a document – The Business Case, sent to the Board of Directors of the participating UAS for a yes/no decision on progressing towards the final phase – preparation of the file (submission) for the Ministry, as a very formal document with predefined structure.

During this phase, two work conferences were organized. The purpose of these work conferences was to: present the output of research and co-creation by the work groups, to verify the findings and align the research and design among the work groups. Finally, the purpose of the work conferences was also to present the work of the coalition to a broader audience, extend the community and get support for the endeavour. In order to reach a broader audience and get more traction for the work of the MST coalition, the coalition members looked for ways to actively engage in promoting and disseminate the work of the MST coalition. LinkedIn posts, podcasts and introduction of the MST to the other established networks via personal connections, were identified as forms of activism (non-violent engagement) to support (act) for the success of the MST initiative.

The third phase – Coordination phase 2 (August 2022 – April 2023) is at the moment of writing this paper, still ongoing. The purpose of it, as said before, has been writing up of the submission file for the Ministry. Currently there are fourteen UAS that are still on board and participate in the coalition. The second phase was very intense and after the submission of the Business Case to the Board of Directors of the participating UAS, the coalition has seen a change in the representatives of the participating UAS.

After 14 months in the coalition, many UAS representatives (70-80%) asked to be replaced, in order to be able to devote more time to other tasks, or for personal reasons. This shift did make an impact on the work within the coalition. It took several months for new members to catch up with the previous outcomes, to fully understand and embrace the developments, and become immersed into the culture. The culture itself saw some adjustments under the influence of the new, fresh perspectives and with some more focus on additional transparency in articulating the relationships within the coalition. In this phase the Manifest of the MST was produced to describe the nature and characteristics of the work within the coalition. Presence of the 'old' members, and especially coordinator/director, allowed meanings and the created content to be explained, and continuity ensured, while new members brought new insight, new perspectives and enabled a new, richer meaning and content to be constructed.

The organizational structure has been even more elaborate in this phase. On the level of development of the content, the method of work groups has been kept, this time more geared towards the sections of the submission file for the Ministry. In order to ensure coordination and decision making in this phase, Project Team and MST Board were introduced. The Project Team is similar to the Integration Team of the previous phase. Its role has been to align the research of the work groups and prepare the basis for the decisions needed to be made. The MST Board has included representatives of all participating UAS and it has been in charge of making all of the decisions. In this phase too, work conferences were organized, with the same purpose as in the previous phase.

### *MST Coalition's Achievements and Challenges*

It is interesting to mention that in both co-creation phases (Coordination phase 1&2), coalition members had to accept certain level of uncertainty and ambiguity, and to work with it. For example, every member of the coalition wanted to know in advance what kind of profile and programme MST would be. That would make it easier for the coalition members to decide whether it was worthwhile to be part of it or not. It had to be discussed multiple

times that it was still not known and that it was actually up to the coalition members to agree on it. Still, this dependency on so many other participants produced some discomfort.

Over time, the work of the coalition provided some clarification and certainty, especially when it comes to the master profile and a rough outline of the programme. Enormous progress was made in articulating the mission and the vision of the MST. On one side, the coalition was free to imagine the way that the profile and programme should ideally look like, but on the other, the creative process was still limited by thinking about what was possible in the existing conditions.

The realization of a transdisciplinary programme in a field so broad, complex and fast changing as sustainability within a single year (60 ECTS) was seen as very ambitious. However, focusing on the purpose of the programme – to educate true change agents and transition leaders, helped with making some important decisions in specifying the profile.

Personal transformation of learners is seen as the key aspect of the programme running throughout the year. As the admission is open - students with any bachelor background are accepted – it is believed that the first part of the programme needs to ensure that everyone is on the same page with some main concepts in the area of sustainability (such as SDGs, multiple value creation, circular business models, etc.). It is proposed that all participating UAS join forces in building and sharing this part of the programme, so that the best experts on the topic can create and deliver (using hybrid model) the topics for all students.

In the middle part of the programme, learning would take place within specific context and on the research topics that could be of regional, local or international character, organized by a smaller group of participating UAS, involving all relevant stakeholders (municipality, local community, companies, etc.) around common social and/or environmental issues. Learning would take place in the formats suggested as the most adequate for the domain of sustainability – living labs and enquiry and problem-oriented educational approach and collaborative learning communities, where all members (students, lecturers, researchers, companies, policy makers) would explore and learn together. Students would choose the

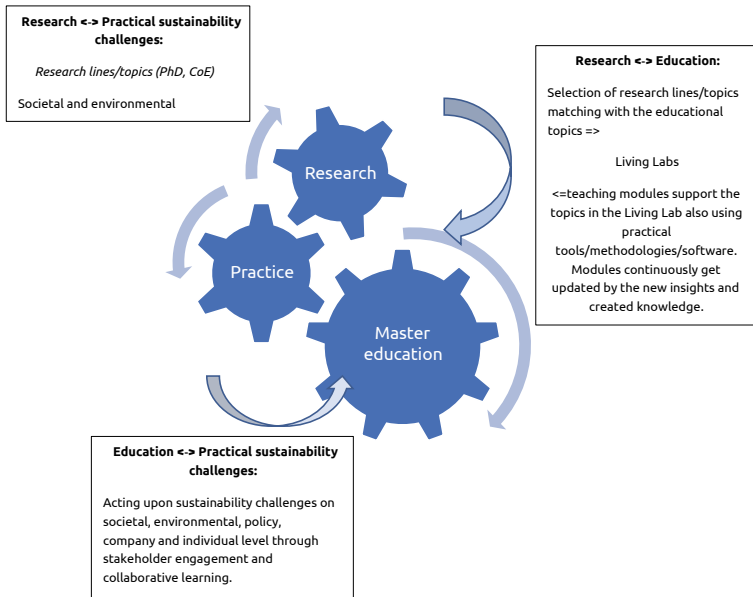
participating UAS, or their regional constellations for this middle part of their study, and conduct 2 to 3 practical research projects in this specific context offered (sustainability issues in health care, energy sector, food and agriculture, mobility, etc.). Supporting content and workshops by experts would be designed and delivered to ensure optimal results in the Living Lab projects. A strong connection between research and education is of the critical importance in this phase.

The final part of the programme is the graduation assignment, that would contain a self-guided research project that the student wants to specialize in, and a portfolio where student will gather and demonstrate all the evidence that he/she/they has made progress in the personal transformation and in acquiring knowledge, skills, attitude, values and ethics at the master level. Civil engagement (non-violent activism) is recognized as an important characteristic and requirement for all students, lecturers and other members of the learning communities, leading to a real impact of education.

One possible way of visually presenting the interaction of education, research and practical sustainability challenges for the purpose of creating impact and making progress to a more sustainable future, can be presented in Figure 3.

Uncertainty and ambiguity, as said before, has been, to a certain extent, decreased over the period of 22 months, when it comes to the master profile and the programme. The coalition has embraced its freedom to imagine the profile and programme outside of what already existed and recognized this approach as a unique selling point of the profile and the programme. On the other hand, the final element that the coalition needs to develop and propose is the organizational set up of UAS in the delivery of the programme. This part is still very unclear. This is also an element that UAS representatives in the MST coalition cannot make the decisions on that would be in line with what is best suited to the nature of the programme. For the MST coalition, collaboration in the development and delivery of the programme would be an optimal solution for the MST programme. However, this is the aspect where existing institutional practices (legal, operational and financial) appear as the limiting factor.

Figure 3. Interaction between the science (research), education and practical sustainability challenges



Source: Author's presentation

UAS in the Netherlands are organized as independent entities and funded based on the number of students that graduate in a certain year. Submission file for the new profile and programme can be submitted to the Ministry only by an existing educational entity. The existing legal framework does not envisage a situation in which there would be multiple UAS accredited for a single programme, jointly delivering the programme and being equally responsible for its quality. While searching for the answers, it is unfortunate that the Sector Plan was abandoned at the beginning of 2023. Namely, after years of dialogue between the work group of the UAS Association and the National Platform of Professional Masters on one side and the Ministry and its relevant agencies on the other, no agreement has been made, unfortunately. This means that the approval of the master profiles, as well as accreditation of the master programmes developed within the six topics will need to follow the standard procedure of the Ministry and its agencies.



This poses a challenge in finding a way within the existing legal and institutional framework to further continue with the MST initiative, in the way it has been envisaged.

At this point, it remains to be seen if the emerging approach to sustainability education can be embraced by the *existing* institutional system. Will the existing institutional system show enough of flexibility and openness for radical educational innovation?

## Conclusion

In this section we will derive some key conclusions from the description and discussion presented in the previous section with the help of the conceptual framework established in our literature review.

Using in-depth, longitudinal single case study method, in this paper we discuss and analyse the initiative of developing a new master profile and programme in the Netherlands in the domain of sustainability. To the best of our knowledge, this is a unique example of a national coalition of universities setting up an innovative form of working together on designing the new master profile and programme on the national level, and proposing a radically novel way of delivering the master programme, so that it can truly lead the societal transformation necessary in the unprecedented conditions of urgency and threat.

In the presented literature review, we have found evidence that, based on the progress so far, it becomes obvious that transition to a more sustainable future requires a radical shift, a fundamental systemic change. There have been six transformations identified that can set the humanity on a path to sustainable development (Sachs et al., 2019). Education is estimated to have the power to enable deep systemic change (UNESCO, 2021; ICEF, 2021).

Unfortunately, literature also suggests that education first needs to be transformed, so that it could take up the transformative role (Banathy, 1991; Sterling, 2021).

Based on the literature review, we offer conceptual framework to analyse and discuss a unique and innovative undertaking of fourteen Dutch UAS to collaboratively design, develop and deliver a new master profile and programme in sustainability transitions, on

the national level. The ambition of the participating UAS was to educate change agents and transition leaders so as to ensure systemic change on all levels of society.

The manner of collaboration on the design, development and delivery of the programme was organized to be in line with the requirements of education for sustainability development. Based on the discussion presented in the previous section, some of the main characteristic of the collaboration on the MST can be summarized as follows: accepting complexity, uncertainty and ambiguity and working with it; working collaboratively and ensuing coordination and alignment across and within UAS; following principles of transparency and consensus in working together; embracing and having open dialogue about differences in perspectives; allowing novel approach to education to emerge even though the existing institutional context is still not welcoming; developing of a strong MST culture based on enthusiasm, positive encouragement, well-being, engagement, (non-violent) activism, agency, democratically regulated processes and organization of tasks.

Using the conceptual framework derived from the literature review, we can assess if the presented MST initiative can be considered as an endeavour in the direction of educational transformation. Banathy (1991) suggested that a paradigm shift is needed so that education can take up a transformative role. Using the Triad model (Sterling, 2021) and its elements: Concern, Conception and Consequence, we can conclude that the MST initiative has intentionally moved away from the conventional way of designing and delivering of the master programme, and has attempted during the process so far, to work towards a different purpose, innovative organization and operations all leading to a very different impact. The MST profile and programme are based on the main principles of sustainability (context, holism, participation, appreciation, collaboration, etc.) that are deeply ingrained into the way the whole design and development processes were undertaken. These ideas to a certain extent correlate with the suggestion of Meta University proposed by Constanza et al. (2021), and are in that sense an attempt of realization on a national level.

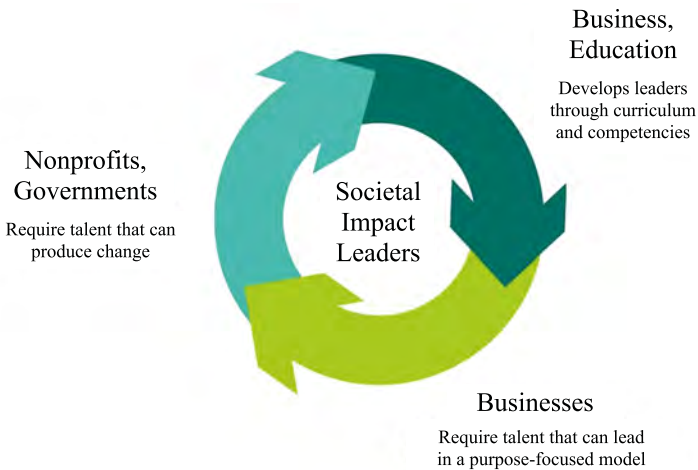
The MST programme *delivery* is also envisaged (the same as MST profile and programme were *developed*) to be taking place in

an adaptive, continual co-evolutionary learning process with participating innovating UAS, engaged with community and society and shifting from the “delivery” role to the role of engagement (Martin and Sterling, 2019), thus contributing to dealing with pressing societal and environmental challenges.

The MST endeavour also took a lot of courage to accept and work with complexity (on the process, content and institutional levels), uncertainty and ambiguity, as well as to re-think and move away from the conventional approach to developing a new master programme. The MST coalition chose to collaborate on developing and delivering the MST programme in such a way that it would be purposeful and empowering.

The MST initiative as presented, focused on the three pillars (levers) working together to deliver quality education with impact: research, practical sustainability challenges and education. This is very much in line with the suggestions of the AACSB, international global non-profit association that connects educators, students, and business in achieving a common goal: to create the next generation of great leaders.

Figure 4. The next generation of great leaders



Source: AACSB Conference: Societal Impact Conference: Leaders Accelerating Change

Based on these conclusions we could assess the initiative of the MST coalition as an attempt to organize a higher educational programme in a way that it can take up a transformative role, so much needed in the times of urgency and threat. After 22 months, this initiative is still ongoing, and facing yet another challenge: institutional educational system that now needs to have a breadth and flexibility to embrace this extraordinary proposal. On the basis of the MST example, we can articulate the dilemma to provide the direction for future research. Sustainable education needs to bring about the radical, systemic change. However, existing institutional systems, that education is a part of, might represent an insurmountable obstacle for the transformed education to be even given 'a license to operate'.

Addressing this dilemma, among other questions mentioned in the literature, and further exploring the ways in which higher education can embrace a paradigm shift and become transformative, has a critical importance for ensuring sustainable development.

The paper adds to the academic literature on the role of higher education for sustainable development. Furthermore, the paper aspires to also have a practical value. By sharing the experiences and the lessons learned from the presented initiative of the MST coalition which, that according to our analysis, qualifies as transformative educational approach, we hope to inspire and provide useful insight to similar endeavours elsewhere.

## REFERENCES

- Accenture (2014). Circular Advantage Innovative Business Models and Technologies to Create Value without Limits to Growth, available at: [https://www.accenture.com/t20150523t053139\\_w\\_us-en/\\_acnmedia/accenture/conversion-assets/dotcom/documents/global/pdf/strategy\\_6/accenture-circular-advantage-innovative-business-models-technologies-value-growth.pdf](https://www.accenture.com/t20150523t053139_w_us-en/_acnmedia/accenture/conversion-assets/dotcom/documents/global/pdf/strategy_6/accenture-circular-advantage-innovative-business-models-technologies-value-growth.pdf) (September 22, 2020)
- Banathy, B. (1991). Systems Design of Education: A Journey to Create the Future, *Educational Technology Publications*. New Jersey: Englewood Cliffs.
- Beer, H. & Micheli, P. (2017). How performance measurement influences stakeholders in not-for-profit organizations, *International Journal of Operations and Production Management*, 37(9), pp. 1164–1184.

- Bessant, S., Bailey, P., Robinson, Z., Tomkinson, B., Tomkinson, R., Ormerod, M. & Boast, R. (2013). Problem-Based Learning: A Case Study of Sustainability Education", available at: [https://www.researchgate.net/publication/264082416\\_Problem-Based\\_Learning\\_A\\_Case\\_Study\\_of\\_Sustainability\\_Education](https://www.researchgate.net/publication/264082416_Problem-Based_Learning_A_Case_Study_of_Sustainability_Education) (September 16, 2021).
- CGRi, n.d. available at: <https://www.circularity-gap.world/about> (April, 26, 2023).
- Circle Economy (2023). The Circularity Gap Report 2023. Amsterdam: Circle Economy.
- Costanza, R., Kubiszewski, I., Kompas, T. & Sutton, P. C. (2021). A Global MetaUniversity to Lead by Design to a Sustainable Well-Being Future, *Frontiers in Sustainability*, 2.
- Ernst & Young (EY) (2020). *Megatrends 2020 and beyond*. EYQ 3rd edition.
- European Commission (2018). Council Recommendation of 22 May 2018 on key competences for lifelong learning, available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C\\_2018.189.01.0001.01.ENG&toc=OJ:C:2018:189:TOC](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_2018.189.01.0001.01.ENG&toc=OJ:C:2018:189:TOC) (August 18, 2021).
- Hurth V. & Stewart I. (2021). Re-purposing Universities: The Path to Purpose. *Frontiers in Sustainability*, 2.
- ICFE (2021). Reimagining our futures together: a new social contract for education, UNESCO, Paris.
- Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Tuijens, A., Hekkert, M. (2018). Barriers to the Circular Economy: Evidence from the European Union (EU), *Ecological Economics* 150, pp. 264 – 272.
- LeCompte M. & Schensul J. (2010). Designing and conducting ethnographic research, An Introduction. UK: AltaMira Press.
- Martin, S. and Sterling, S. (2019) On track for a sustainable future? International Association of Universities, 24 (2), available at: [https://www.iau-aiu.net/IMG/pdf/iau\\_horizons\\_vol.24.2\\_light.pdf](https://www.iau-aiu.net/IMG/pdf/iau_horizons_vol.24.2_light.pdf)
- Mitrović, Đ. & Pesalj B. (2021). *Circularna ekonomija: principi, merenje i implementacija* [Circular Economy: principles, measurement and implementation]. Belgrade: Faculty of Economics.
- Naor, M., Bernardes, E., Druehl, C. & Shiftan, Y. (2015). Overcoming barriers to adoption of environmentally-friendly innovations through design and strategy: learning from the failure of an electric vehicle infrastructure firm. *International Journal of Operations & Production Management*, 35(1), pp. 26–59.

- Ostojić, I. (2012). Znanje kao faktor ljudskog kapitala i ekonomskog razvoja. In V. Vukotić, S. Maksimović, V. Goati, D. Šuković & V. Radovanović (Eds.). *Stanovništvo i razvoj* (pp. 348–355). Belgrade: Institute of Social Sciences.
- Pellinen, J., Teittinen, H. & Järvenpää, M. (2016). Performance measurement system in the situation of simultaneous vertical and horizontal integration, *International Journal of Operations and Production Management*, 36(10), pp. 1182–1200.
- Pesalj, B., Pavlov, A. & Micheli, P. (2018). The use of management control and performance measurement systems in SMEs: A levers of control perspective. *International Journal of Operations and Production Management*, 38, 11, pp. 2169–2191.
- Pesalj, B. (2014). Performance effects of performance measurement systems—Evidence from a transition economy. *Studies in Managerial and Financial Accounting*, 28, 127–151. <https://doi.org/10.1108/S1479-351220140000028012>
- Pesalj, B., Buivys, S. & Ainsbury, R. (2012). Corporate Sustainability and Responsibility as a source of competitive advantage – case of Van Houtum company, *Economic ideas and practice*, 6, pp. 45-59.
- Roadmap Next Economy (2016). Metropoolregio Rotterdam Den Haag, available at: <https://agendastad.nl/content/uploads/2016/12/Roadmap-Next-Economy-NL-versie2.pdf> (December 10, 2021).
- Sachs, J. D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N. & Rockström, J. (2019). Six Transformations to Achieve the Sustainable Development Goals, *Nature Sustainability*. DOI: 10.1038/s41893-019-0352-9.
- SDG (n.d.), (November 7, 2021). Available at: <https://SDG's.un.org/goals>
- Smith, W. (2016). *The Global Testing Culture – Shaping Education Policy, Perceptions, and Perceptions, and Practice*, Oxford: Symposium Books, doi: 10.15730.
- Sterling S. (2021). Concern, Conception, and Consequence: Re-thinking the Paradigm of Higher Education in Dangerous Times. *Frontiers in Sustainability*, 2.
- Thomas, I. (2010). Critical Thinking, Transformative Learning, Sustainable Education, and Problem-Based Learning in Universities. *Journal of Transformative Education*, 7(3), pp. 245–264.
- TWI2050 – The World in 2050 (2018). Transformations to Achieve the Sustainable Development Goals, Report prepared by The World in 2050 initiative, International Institute for Applied Systems Analysis

(IIASA), Laxenburg, Austria, available at: [www.twi2050.org](http://www.twi2050.org) (April, 27, 2023).

UNESCO (2021). Berlin Declaration on Education for Sustainable Development, available at: <https://en.unesco.org/events/ESDfor2030> (February, 24, 2023).

Van Houten, M. M. (2018). Vocational education and the binary higher education system in the Netherlands: higher education symbiosis or vocational education dichotomy?, *Journal of Vocational Education & Training*, 70(1), pp.130–147, DOI: 10.1080/13636820.2017.1394359.

Vereniging Hogescholen (2020). Meta-analyse maatschappelijke opgaven relevant voor het hbo, Berenschot by Zwart de S., Broeks L. and Berg van den T.

Verhofstad, R. (2022). Professional master kan groeibriljant zijn voor hbo, interview by Bakker M., Science Direct, available at: <https://www.scienceguide.nl/2022/09/professional-master-kan-groeibriljant-voor-hbo-zijn> (March 10, 2023).

Westbrook, R. (1995). Action research: a new paradigm for research in production and operations management, *International Journal of Operations and Production Management*, 15(12) pp. 6–20.

World Business Council for Sustainable Development (WBCSD) (2021). Macrotrends and Disruptions shaping 2020–2030, *Vision 2050*, issue brief.

Yin, R. K. (2014). *Case Study Research Design and Methods* (5th ed.), Thousand Oaks, CA: Sage.







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## Sustainable Tourist Destination in a Strategic Marketing Context (Montenegro)

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### Abstract

Contemporary understanding of tourism marketing is grounded in a holistic approach to marketing management aimed at fostering sustainable tourism. This involves embracing the principles of holistic marketing, with a focus on sustainable or “green marketing,” which entails the organizational commitment to develop, promote, price, and distribute products that do not harm the environment. Examination of a sample profile indicates that highly educated younger women are particularly interested in the environmental aspects of tourism. Considerable variations in the assessment of nearly all (85.71%), or a significant portion (57.14% to 71.43%) of selected elements of tourist offerings were observed based on independent variables such as educational background, country of origin, and the method of travel organization. However, no significant differences were noted in the higher evaluation rate (57.14% to 71.43%) of specific elements in the offerings among independent variables like age, gender, and overall travel cost per person. Montenegrin tourists from Russia and Serbia displayed a positive stance in terms of environmental preservation compared to other European countries and Greece. In contrast, tourists from Bosnia and Herzegovina and Croatia, as well as Germany, demonstrated a less favorable position compared to Croatian and other European counterparts. British tourists held a neutral perspective on environmental preservation compared to other European countries and Italy. The results imply that Montenegro lacks recognition as a destination with a unique emphasis on sustainable tourism in the expected formats and desired locations. This underscores the necessity for further initiatives in developing and promoting cohesive environmental messages through the selected promotional strategies.

*Keywords:* Ecotourism promotion, Travel locale, Strategic marketing

## Introduction

The sustainable development outlook for tourist destinations, particularly in the realm of strategic marketing, is a significant concern in both theoretical and practical aspects of destination management. Various research endeavors focus on exploring the potential and constraints related to the growth of tourist activities within a destination, guided by marketing concepts (Raspor & Macuh, 2021).

It is crucial to address specific concerns pertaining to the sustainable growth of tourism and the challenges involved in managing tourist destinations in this context (Raspor & Divjak, 2017). The subject of the research of this paper is the determination of the existence of important influences of strategic marketing on the sustainability of tourist destinations in the case of the destination of Montenegro.

The primary objective of this paper is to offer an understanding of the outcomes achieved by applying strategic marketing principles in the development and promotion of sustainable tourism products in Montenegro. The central research inquiry revolves around the prioritization between marketing products that are appealing to tourist and marketing those that are sustainable. The methodology employed involves utilizing secondary sources through a literature review, along with the primary data collected by the National Tourism Organization of Montenegro.

The described method employing primary data incorporates diverse statistical methods to analyze tourists' perceptions of sustainable products and the image of tourist destinations, including Montenegro, within the context of strategic marketing. The assessment of tourist attitudes utilizes SPSS, drawing on original data sourced from the National Tourism Organization of Montenegro. The findings presented are the outcome of a unique procedure and have not been previously disclosed in the organization's report. Statistical techniques such as descriptive statistics, cross-tabulations, single-factor analysis (ANOVA), and t-tests for independent samples are among the analytical approaches applied.

The document is divided into an introductory section and three subsequent parts. The introduction outlines the theme and

objective of the paper, providing an overview of the methodological framework and structure. The first segment delves into the theoretical foundation of the research topic. The second section covers methodological details and presents the research findings. The third part comprises a discussion and concluding remarks, emphasizing the key implications of the research results and offering insights into the future prospects for the advancement of marketing initiatives in Montenegro as a sustainable tourist destination.

## Literature Overview

Strategic planning of Special Interest tourism is necessary for all tourist destinations wishing to sustain for a longer period, as is the case with Montenegro (Bulatović et al., 2017). Eco-friendly tourism can be described as “a form of nature-based tourism that tends to be ecologically, socioculturally and economically sustainable, and provides opportunities for learning and appreciating the natural environment or its specific elements” (Weaver, 2001; cited in Lacmanović, 2016). As the paradigm of sustainable development gained prominence, particularly in the late 1980s and early 1990s, there has been a heightened awareness of the potential for the coexistence of tourism development and environmental quality. This is particularly evident in the concept of community-based tourism, which seeks to generate income and alleviate poverty by engaging local population and leveraging their own resources (Job & Paesler, 2013).

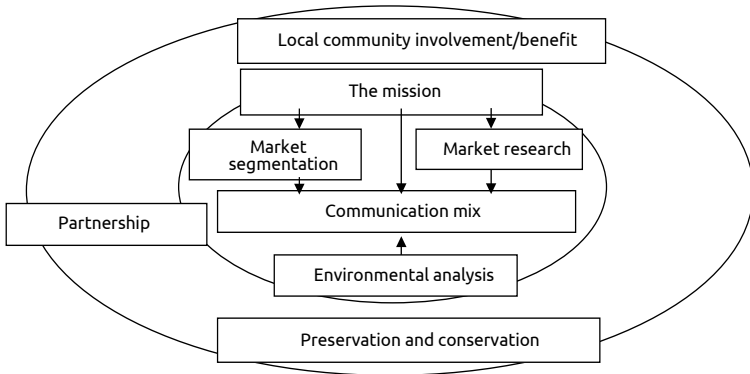
Forging the connection between marketing and eco-friendly tourism O. Bakić claims that “marketing in tourism can no longer be directed away from the environment (natural, cultural-historical, etc.) and society, but on the contrary, it must be directed toward both the environment and the socially responsible development” (Bakić, 2010).

The global tourism sector is undergoing significant transformations. The consistent increase in the number of travelers contributes to rising a turnover and income. There is a multitude of destinations attracting tourists, while newcomers are also exploring specific destinations for the first time (Raspor et al., 2020).

D. Chhabra clarifies that tourism as a subject of ongoing technological, economic and political changes is inseparable from the concepts of sustainable marketing that tend to enhance the well-being of both tourists and local inhabitants (Chhabra, 2009).

The following figure shows the marketing model of sustainable tourism as a framework for the application of basic marketing techniques, such as market segmentation, market research, environmental analysis, etc.

Figure 1. Marketing model of sustainable tourism



Source: Adapted to Chhabra, D. (2009, May). Proposing a sustainable marketing framework for heritage tourism. *Journal of Sustainable Tourism*, 17(3), 303–320.

L. Roberts and D. Hall believe that it is necessary, beyond the classical marketing theory, to comprehend the utilization of sustainable tourism offerings and to assess the existence of market niches in the tourism market. The development of new marketing ideas and theories creates a framework for the application of sustainable tourism marketing (e.g. rural tourism), which should not be a copy of either product marketing or service marketing. Focused on creating an experience, the marketing of, say, rural tourism should establish its own marketing characteristics (Roberts & Hall, 2004).

The concept of eco-friendly marketing emerged in the late 1980s. (Peattie, Crane, 2005; cited in Chan, 2014). Eco-friendly marketing involves the organizational initiatives in developing, promoting, pricing, and distributing products that have no detrimental impact on the environment (Pride, Ferrell, 1993; Chan, 2014). Tourist

destinations are evidently moving in their development from mass tourism to responsible tourism strategies, especially in terms of sustainable tourism and social corporate responsibility (Camilleri, 2014).

Lacmanović emphasizes that “The creation of a ‘new tourist awareness’ will represent the next challenge in the management of the tourist destination, which will require additional financial efforts to improve the existing personnel and technical-technological structure. Special attention will be directed to the quality of life of the resident population; protection of tourist consumers in all aspects; proper information and prepared programs in case of incidents and crisis situations since the COVID-19 pandemic has caused irreparable and long-term damage to many industries (Ljubotina & Raspor, 2023); special programs for guests with disabilities; the aspect of racial, religious, national, political and gender tolerance; and strict adherence to standards in the provision of services in accordance with the adopted categorization” (Lacmanović, 2014).

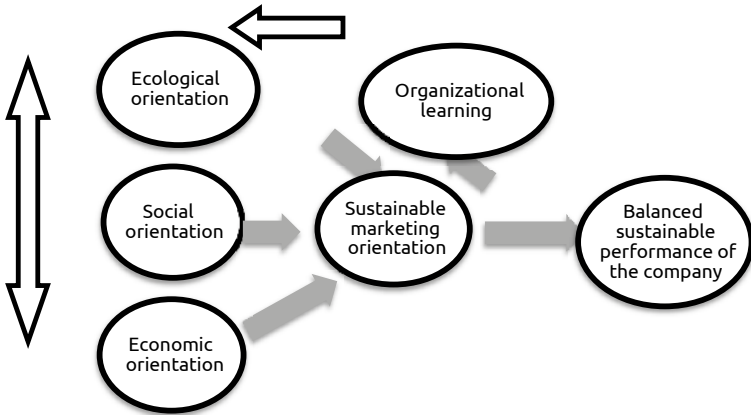
Lacmanović and Bulatović note that “Carefully chosen locations already and spatially harmonized accommodation and other tourist facilities in function of the realization of a wider range of tourism offers to a number of spending groups of tourists. A supportive social environment for the development of new tourist products is of greatest interest to the local population” (Lacmanović & Bulatović, 2014).

Using the analysis of the importance of performance in the business of hotel-tourism companies that apply the concept of sustainable tourism, Lj. Cvelbar Knežević and L. Dwyer investigated the key factors of strategic planning and determined that the need to measure performance in the tourism industry according to the indicators contained in the key provisions of sustainable tourism is emphasized, along with the necessity for each hotel-tourist company to develop its own set of indicators in the broader context of cooperation with the social community (Cvelbar Knežević & Dwyer, 2013).

A company’s sustainable marketing orientation refers to a strategic method encompassing the equitable management of ecological, social, and economic resources spanning multiple generations. This managerial model incorporates both macro-level sustainability principles and micro-level practices, such as gathering structured information and integrating knowledge. The ultimate

goal is to develop and promote profitable products and services, as outlined by Mitchell, Wooliscroft, and Higham (Mitchell, Wooliscroft & Higham, 2010; Mitchell, Wooliscroft, & Higham, 2013). The conceptual model of the orientation of sustainable marketing is given in the following figure.

Figure 2. A conceptual model of the orientation in the realm of sustainable marketing for the company



Source: Adapted to Mitchell, R., Wooliscroft, B. & Higham, J., Sustainable market orientation: A new approach to managing market strategy, *Journal of Macromarketing (Special Issue on Sustainability)*, Vol. 30, No. 2, 2010, pp. 160–170; in: Mitchell R., Wooliscroft, B. & Higham, J., Applying sustainability in national park management: balancing public and private interests using a sustainable market orientation model, *Journal of Sustainable Tourism*, Vol. 21, No. 5, 2013, pp. 695–715.

Tourism is responsible for generating five percent of worldwide CO<sub>2</sub> emissions and contributes to 14% of the overall greenhouse gas emissions globally, mentioned by E. Juvan and S. Dolnicar (Juvan & Dolnicar, 2014), who studied the question of how tourists could choose a vacation with a low carbon footprint, and noticed that tourists who are truly interested in this type of vacation could not simply find a suitable arrangement. The problem is how to compare the arrangements with the smallest carbon footprint and choose the adequate one.

S. Gössling, D. Scott and M. Hall examined the variation in CO<sub>2</sub> emission intensity between selected emitting tourism markets

and discovered various consequences for destination promotion and carbon control (Gössling, Scott, & Hall, 2015). The distinction between the degree of environmental consciousness and the practical environmental conduct while on a tourist excursion indicates that (Doran & Larsen, 2014):

- (1) Travelers typically hold a favorable self-assessment regarding ecology and environmentally friendly progress.
- (2) Their ecological position reflects commonly acknowledged standards.

Derived from the exploration of the cause-and-effect connection between cognitive perception, emotional perception, perceived worth, and environmentally conscious conduct, following conclusions were drawn (Chiu, Lee, & Chen, 2014):

Initially, the cognitive image influences the emotional perception of an eco-destination.

Secondly, the perceived value functions as an intermediary element that forms the connection between the perception of an eco-destination and environmentally responsible behavior.

Eco-destinations should be perceived as an intrinsic component of the societal community in which they exist, with the eco-destination and social community being interdependent.

The importance of the ECO certificate for forming the perception of visitors regarding the destination of sustainable tourism and operators in the tourism business (hotels, carriers, tour operators, restaurants, etc.) is continuously examined to create adequate marketing strategies (Esparon, Gyuris & Stoeckl, 2014).

E. Chan's research (Chan, 2014) concerning the implementation of eco-friendly marketing in the hotel sector indicates several significant implications.

Demographic profile shows that female guests attach significantly more importance to eco strategies, and they act as pioneers in accepting green hotel products.

The participation of hotel guests in green activities depends on a communication strategy and a complete understanding of their wishes, which ultimately leads to the design of more efficient and effective hotel green programs (Baker, Davis & Weaver, 2014).



The motivation to visit and the intention to revisit a certain destination by eco-tourists is continuously investigated in terms of various attributes of ecological products and profiles of eco-tourists.

Very important point of view in discussing the image of sustainable destination is potential terrorism threat, which is subject of Berce, Raspor and Lacmanović's research, as each country has its own characteristics and image in the eyes of a tourist. Research results show that ongoing terrorist or violent incidents in a non-European country have a more negative effect on the number of tourists visiting than occasional such events in a European country, which agrees with the research findings on sporadic and persistent terrorism and the regularity and organization of terrorist acts. It could be stated that the quicker they recover, the more politically and economically stable they are, as confirmed by previous studies (Berce, Lacmanović, & Raspor, 2022).

A research study that was carried out in the eco-parks of South Korea implied that eco-tourists were mostly highly educated women between the ages of 20 and 40, they mostly travelled individually, or in small groups, which resulted in a small impact on the destination and a greater ability of the destination to recover faster (S. Lee, Lee & Lee, 2014).

Through analyzing the influence of the destination's perception and self-assurance in forecasting the intention to visit a wine tourism destination, M. Pratt and B. Sparks demonstrated that destination image, encompassing both functional aspects (tangible and intangible destination attributes) and affective elements (feelings and emotions associated with the destination), typically exerted a significant impact on attitudes toward wine tourism. This influence extended indirectly to the intention of visiting a wine region, which meant that the affective image was having a stronger impact on attitudes towards wine tourism (Pratt & Sparks, 2014).

M. Bravi and E. Gasca, (Bravi & Gasca, 2014), through the evaluation of preferences for cultural heritage tourism offerings, unequivocally recognize that the experience of getting to know cultural heritage represents a distinctive form of consumption that is challenging to integrate seamlessly into the consumption patterns of other products and services. Establishing a brand and attaining

the designation of a World Heritage Site (WHS) under protective measures of UNESCO are parts of this process. UNESCO is understood as a critical factor in the competitiveness of many tourist destinations. Research indicates that in many countries with a weaker business environment; however, there has been a substantial rise in the volume of visitors submitting nominations for the inclusion in the UNESCO World Cultural Heritage List as a component of a more extensive strategy aimed at transforming the destination's perception. (81% of applications are from developing and rapidly growing countries economy/BRIC countries), the case of Cambodia's success as a cultural heritage tourism destination is particularly illustrative (Ryan & Silvanto, 2014).

The significance of creative industries in the promotion of sustainable tourism destinations is growing, and represents an additional instrument in the application of marketing activities (Lee, Wall, & Kovacs, 2015; Remoaldo et al., 2020; Baixinho et al., 2020; Wei, 2020; Sarantou, Kugapi & Huhmarniemi, 2021).

## **Research Results in Marketing Montenegro as a Sustainable Tourism Destination<sup>1</sup>**

Exploring possibilities for implementing sustainable tourism marketing in Montenegro involves presenting and statistically analyzing tourists' perspectives on specific aspects of the sustainable tourism product.

### *Methodology Notes*

Examining tourist sentiments involves utilizing SPSS, drawing on the primary data sourced from the National Tourism Organization of Montenegro. The displayed findings originate from a distinct procedure and are not included in the organization's official report. The statistical techniques utilized comprise descriptive statistics, cross-tabulations, single-factor analysis (ANOVA), and independent samples' t-tests. The investigation centers on attitudes pertaining to distinct components of the tourist product and the

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<sup>1</sup> Adapted from: (Lacmanović, 2016).

positioning of destinations within the framework of sustainable tourism. The dependent variable comprises selected elements such as the natural and scenic allure, the charming layout of the location, ecological conservation, effectiveness in promoting tourist attractions, variety of cultural activities, excursions, and overall satisfaction during the stay (Lacmanović, 2016).

The independent variables (factors) include age, gender, educational background, country of origin, mode of travel arrangements, and the total travel cost per individual. The aim is to identify significant differences in satisfaction levels, measured through the Likert scale (ranging from 1-excellent to 5-very bad, with 9-do not know), among the categories within the independent variables (analysis involving three or more groups, using factor ANOVA; for two groups, t-test for independent samples). The intensity of the association between the dependent and independent variables within a group showing notable distinctions, is assessed through Cohen's eta squared (Cohen, 1988) to ascertain the magnitude of influence (minimal impact, moderate impact, substantial impact).

Positioning Montenegro as a destination entails cross-tabulating the comparative aspect of the tourist product (environmental preservation) across various destinations, including Serbia, Croatia, Italy, Turkey, Greece, Spain, other European countries, and non-European countries. This is conducted according to the respondents' country of origin, encompassing Russia, Serbia, Bosnia, Croatia, Germany, and Great Britain. The assessment scale evaluates destinations using the Likert scale (1-Better in Montenegro; 2-Similarly; 3-Worse in Montenegro) (Lacmanović, 2016).

### *Findings from the Study*

This section includes the presentation of certain outcomes, such as the profile characteristics of the sample, the age and gender distribution in relation to specific aspects of the tourist product, and the placement of Montenegro as a destination in the source markets of Russia and Germany.

The key attributes of the sample's profile are depicted in the table below.

Table 1. Attributes of the sample's profile

Variable		N	%	Variable		N	%
<b>Age</b>	<= 25	489	19.7	<b>Country of origin</b>	Russia	603	24.3
	26–35	852	34.3		Serbia	609	24.5
	36–45	573	23.1		Montenegro	213	8.6
	46–55	341	13.8		Germany	102	4.1
	56+	225	9.1		Italy	49	2.0
	Total	2,480	100.0		France	77	3.1
<b>Gender</b>	Male	1,161	46.8		Other countries	143	5.8
	Female	1,319	53.2		Kosovo, Macedonia, Albania and Romania	124	5.0
	Total	2,480	100.0		Bosnia-Herzegovina and Croatia	153	6.2
<b>Education</b>	Primary school education or lower	31	1.2		Ukraine and Belarus	137	5.5
	High School	567	22.9	Poland, the Czech Republic and Hungary	116	4.7	
	College	649	26.2	Scandinavia	69	2.8	
	Faculty and senior levels	1,205	48.6	United Kingdom	87	3.5	
	No answer	29	1.2	Total	2,480	100.0	
	Total	2,480	100.0	<b>The method of travel arrangements</b>	Through a travel agency, tour operators	652	31.5
<b>The total cost of travel per person in €</b>	<= 500	1,125	63.7		Directly with the accommodation facility in	1,132	54.7
	501–1000	423	24.0		Through local tourism organizations (in Montenegro)	25	1.2
	1001–1500	126	7.1		Other ways	230	11.1
	1501+	91	5.2		No answer	32	1.5
	Total	1,765	100.0		Total	2,070	100.0
<b>Lack of data</b>		715		<b>Lack of data</b>		410	
<b>Total</b>		2,480		<b>Total</b>		2,480	

Source: Lacmanović, 2016

Table 2. The correlation between age and contentment with specific aspects of Montenegro's tourist offerings

		ANOVA				
Selected elements of the tourist product (the dependent variable)		Sum of Squares	df	Mean Square	F	Sig.
<b>The beauty of nature and the landscape</b>	Between Groups	21,777	4	5,444	1,824	,121
	Within Groups	7385,583	2475	2,984		
	Total	7407,359	2479			
<b>The picturesqueness and arrangement of the destination</b>	Between Groups	27,384	4	6,846	1,454	,214
	Within Groups	11651,118	2475	4,708		
	Total	11678,502	2479			
<b>Environmental preservation</b>	Between Groups	32,509	4	8,127	1,568	,180
	Within Groups	12827,093	2475	5,183		
	Total	12859,603	2479			
<b>Quality of marking tourist attractions</b>	Between Groups	123,917	4	30,979	4,095	,003
	Within Groups	18723,449	2475	7,565		
	Total	18847,366	2479			
<b>Diversity of cultural events</b>	Between Groups	144,622	4	36,156	4,349	,002
	Within Groups	20574,497	2475	8,313		
	Total	20719,120	2479			
<b>Excursions</b>	Between Groups	67,873	4	16,968	1,803	,126
	Within Groups	23295,754	2475	9,412		
	Total	23363,627	2479			
<b>Overall stay satisfaction</b>	Between Groups	43,591	4	10,898	1,920	,104
	Within Groups	14045,003	2475	5,675		
	Total	14088,594	2479			

Source: Lacmanović, 2016

Table 3. Gender to the satisfaction with selected elements of the tourist product of Montenegro

Selected elements of the tourist product (the dependent variable)	Independent Samples Test									
	Levene's Test for Equality of Variances			t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
The beauty of nature and the landscape	Equal variances assumed	10,507	,001	2,700	2478	,007	,188	,069	,051	,324
	Equal variances not assumed			2,665	2238,65	,008	,188	,070	,050	,326
The pictur- esqueness and arrangement of the destination	Equal variances assumed	9,472	,002	1,726	2478	,085	,151	,087	-,021	,322
	Equal variances not assumed			1,713	2340,58	,087	,151	,088	-,022	,323
Environmental preservation	Equal variances assumed	,010	,919	1,342	2478	,180	,123	,092	-,057	,303
	Equal variances not assumed			1,341	2424,78	,180	,123	,092	-,057	,303

		Independent Samples Test								
<b>Quality of marking tourist attractions</b>	Equal variances assumed	3,364	,067	1,625	2478	,104	,180	,111	-,037	,398
	Equal variances not assumed			1,622	2420,26	,105	,180	,111	-,038	,398
<b>Diversity of cultural events</b>	Equal variances assumed	6,802	,009	1,847	2478	,065	,215	,116	-,013	,443
	Equal variances not assumed			1,843	2413,07	,065	,215	,117	-,014	,443
<b>Excursions</b>	Equal variances assumed	16,120	,000	2,071	2478	,038	,256	,123	,014	,498
	Equal variances not assumed			2,065	2402,16	,039	,256	,124	,013	,499
<b>Overall stay satisfaction</b>	Equal variances assumed	6,430	,011	1,937	2478	,053	,186	,096	-,002	,374
	Equal variances not assumed			1,929	2384,93	,054	,186	,096	-,003	,375

Source: Lacmanović, 2016a

The typical participant in the sample is predominantly (almost or more than 50%) female, under the age of 35, possesses a college or university education, originates from Russia and Serbia, reserves lodging directly with the accommodation provider, and incurs a travel expense per person of up to 500 €.

Significant statistical differences were noted across diverse age brackets regarding facets of the tourist product, particularly in terms of the effectiveness in promoting tourist attractions and the variety of cultural events. The impact magnitude, gauged through eta square, was 0.007 for both variables, denoting a minor influence. Nevertheless, no notable variances were detected for the other components of the tourist product. The satisfaction level with statistically significant facets of the tourist product varied from 2.46 to 3.24.

Concerning gender distinctions, statistically significant differences were pinpointed in the attractiveness of nature and landscape, as well as excursions, with corresponding eta square values of 0.003 and 0.002, respectively, indicating a small impact. No statistically significant distinctions were observed among groups for the remaining elements of the tourist products. Women exhibit greater contentment with the attractiveness of nature and scenery, whereas men exhibit a heightened degree of discontentment with excursions.

Table 4. Educational status concerning contentment with specific aspects of Montenegro's tourist offer

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
<b>The beauty of nature and the landscape</b>	Between Groups	9,226	4	2,306	,772	,544
	Within Groups	7398,134	2475	2,989		
	Total	7407,359	2479			
<b>The picturesqueness and arrangement of the destination</b>	Between Groups	68,121	4	17,030	3,630	,006
	Within Groups	11610,381	2475	4,691		
	Total	11678,502	2479			



ANOVA						
<b>Environmental preservation</b>	Between Groups	68,417	4	17,104	3,310	,010
	Within Groups	12791,186	2475	5,168		
	Total	12859,603	2479			
<b>Quality of marking tourist attractions</b>	Between Groups	178,512	4	44,628	5,916	,000
	Within Groups	18668,854	2475	7,543		
	Total	18847,366	2479			
<b>Diversity of cultural events</b>	Between Groups	144,007	4	36,002	4,331	,002
	Within Groups	20575,113	2475	8,313		
	Total	20719,120	2479			
<b>Excursions</b>	Between Groups	140,945	4	35,236	3,755	,005
	Within Groups	23222,682	2475	9,383		
	Total	23363,627	2479			
<b>Overall stay satisfaction</b>	Between Groups	94,018	4	23,505	4,157	,002
	Within Groups	13994,576	2475	5,654		
	Total	14088,594	2479			

Source: Lacmanović, 2016

In terms of educational status, significant differences were identified across all selected elements of the tourist offer, except for the beauty of nature and the region, with eta squared values ranging from 0.006 to 0.009, indicating a small impact. The subsequent noteworthy differences were noted in the evaluation of elements within the tourist offer among groups categorized by educational status:

Picturesqueness and arrangement of the place: Primary school or junior and secondary education.

Environmental conservation: Secondary school and high school; secondary school and college and advanced education levels.

Landmark marking quality: Primary school or below and secondary school, college, and advanced levels; intermediate school and secondary school.

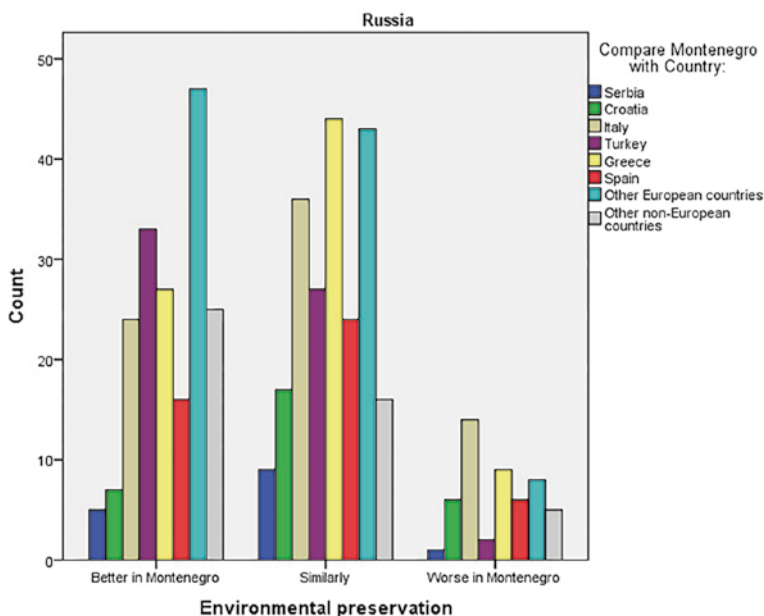
Diversity of cultural manifestations: Elementary school or lower and higher school, college and higher levels.

Offer of organized excursions in the area: Primary school or below and upper school; secondary school and secondary school; secondary school and college and advanced levels.

Total grade of stay: Elementary school or lower and upper school.

The degree of contentment with statistically distinct components of the tourist offering varied between 2.25 to 5.38. Graphical representations of the outcomes of cross-tabulation concerning the placement of Montenegro as a destination are presented below.

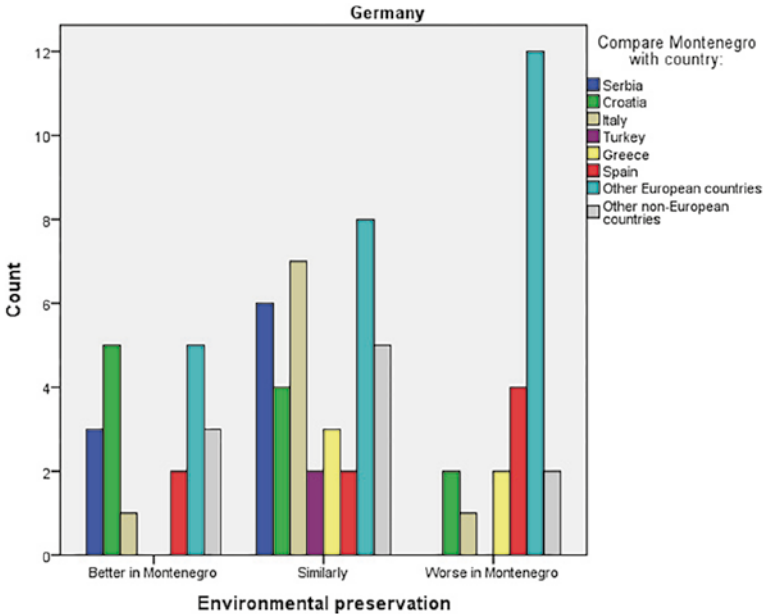
Figure 3. Montenegro's placement in the Russian source market



Source: Lacmanović, 2016

Montenegro received the most favorable positioning from Russian tourists when compared to other European countries, displaying a similarity, albeit with a slightly lower intensity, in comparison to Greece.

Figure 4. Montenegro's placement in the German source market



Source: Lacmanović, 2016

Tourists from Germany assessed Montenegro as inferior compared to other nations, and their perception was similarly less favorable in contrast to other European countries, albeit with a notably lower degree of intensity. The positive positioning is minimal.

## Discussion and Conclusion

Examining the outcomes of the investigation into opportunities for implementing the sustainable tourism marketing approach in Montenegro reveals a higher degree of inconsistency than consistency when compared to similar previous findings. This variability, as explained in the literature (Boley & Nickerson, 2013);

Lacmanović, 2016), is not uncommon in sustainable tourism studies, where contradictory information regarding socio-demographic variables is often identified.

In terms of the impact of independent variables on the contentment level with specific aspects of the tourist offer in Montenegro, certain observations can be made. The sample profile indicates that environmentally conscious preferences in the tourist offerings are more pronounced among young, highly educated women. This observation aligns with findings in other studies (Chan, 2014; Lee et al., 2014; Boley & Nickerson, 2013; Lacmanović, 2016).

Considerable variations were observed in nearly all (85.71%), or a substantial portion (falling within the range of 57.14% to 71.43%) of the selected components of the tourist offering regarding independent variables such as educational background, country of origin, and travel arrangement method. This finding probably aligns with the research on geo-traveler segmentation by Boley and Nickerson (Boley & Nickerson, 2013; Lacmanović, 2016) regarding the consistency of differences in terms of country of origin.

However, no noteworthy differences were identified in a significant proportion (ranging from 57.14% to 71.43%) of the chosen aspects of the tourism product in relation to independent variables like age, gender, and the overall travel expenditure per person. This alignment could be consistent only with gender-related findings in the research on wine tourist segmentation by Nella and Christou (Nella & Christou, 2014; cited in Lacmanović, 2016) and with age-related findings in the segmentation research on geo-travelers by Boley and Nickerson (Boley & Nickerson, 2013; cited in Lacmanović, 2016).

In contrast to previous studies, no consistency was observed across all other independent variables. On the contrary, the results contradicted earlier findings that revealed significant differences in terms of age, income (total travel cost per person), and no disparities in variables such as country of origin and educational background (Nella & Christou, 2014; Lacmanović, 2016). Furthermore, differences were found in gender and income (total travel cost per person) variables, contrary to previous studies that found no differences in education variables (Boley & Nickerson, 2013; Lacmanović, 2016).

The evaluation of the beauty of nature and the region exhibited variations only based on the gender variable, while no significant differences were noted in the other independent variables. This discrepancy can be attributed to the existing perception of women having a higher level of environmental commitment compared to men, highlighting the inadequacy of gender differentiation or adaptability in other selected elements of the tourist offer. Similarly, the scenic and orderly aspects of a place were appraised differently only by the groups categorized by educational status and country of origin, indicating insufficient profiling of this element in promotional activities.

The assessment of environmental preservation varies among groups based concerning educational background, country of origin, and travel arrangement method. This indicates a favorable market position for the mentioned groups, but also highlights an insufficient level of profiling among other demographic segments.

Distinct evaluations for the quality of landmark marking and the diversity of cultural manifestations are observed across age groups, educational status, country of origin, travel organization methods, and total travel costs. This implies that these aspects of the tourist offer are more finely tuned than other elements, contributing significantly to the general perception of the location

Regarding the destination's placement, respondents from different countries perceive Montenegro differently. Concerning environmental preservation, tourists from Russia and Serbia express a favorable perspective in contrast to other European nations and Greece. Conversely, visitors from Bosnia and Herzegovina, Croatia, and Germany convey an unfavorable viewpoint in comparison to Croatia and other European nations. Tourists from the United Kingdom adopt a neutral stance on environmental preservation in contrast to other European countries and Italy.

Negative and neutral perceptions may suggest either heightened environmental awareness among respondents and a realistically lower level of environmental preservation compared to competitors, or a weaker ecological profile of the destination. This raises questions for future research to explore.

Considering these consequences, one can deduce that Montenegro is not recognized as a destination with a unique

sustainable tourism offering in the anticipated formats and locales. This underscores the necessity for further endeavors in crafting and executing comprehensive environmental messages via the selected promotional channels. A need could be noted for a more detailed categorization of tourists with distinct inclinations for sustainable tourism offerings, such as eco, rural, and geo-tourism. Particular interest groups such as birdwatchers, hiking and biking enthusiasts, adventure seekers (rafting, paragliding, climbing, diving, etc.), and those seeking distinctive cultural and historical experiences (revival of historical events and sites, dark tourism, etc.) should be more accurately identified (Lacmanović, 2014).

To implement a product differentiation strategy, adjustments or significant innovations in the components of the tourist product, particularly in the locations conspicuous for sustainable tourism, are necessary. These adjustments should align with the heightened sensitivity expressed by tourists in these areas.

The creation of a competitive offer of various forms of sustainable tourism at the destination level of Montenegro should be based on the consideration of several important requirements from the aspect of marketing management (Kompula, 2014):

1. The success of companies and organizations in a competitive environment is determined by factors such as good management of the local community, backing and involvement of municipal authorities, sufficient financial resources for the advancement of tourism, quality tourist offices and the widest support of the local community
2. The strategies of companies and organizations must include strategic planning of integral tourist arrangements, alignment and collaboration between the community and local governance, and alignment and collaboration among entrepreneurs as purveyors of sustainable tourism offerings.
3. Competence of destination companies and organizations, which is understood as a success factor and emphasizes the role of entrepreneurship in destination development, as well as the provision of information and technical support for the advancement and marketing of tourism, where the involvement of DMO and local authorities plays a crucial role.

By using an adequate promotional mix, destination management organizations could provide a more realistic picture of destination Montenegro to the potential visitor, reducing the gap between the expectations and the experiences of responsible tourist products (Lacmanović, 2011).

A sustainable tourism destination can secure a lasting presence in the market, provided there is an effective marketing strategy that adeptly meets the wants and requirements of tourism clientele, secures profitability within the tourism industry, and enhances the welfare of the local community more proficiently and competently than competing approaches. The societal marketing, or socially responsible marketing approach (Kotler, Bowen, & Makens, 2010; Lacmanović, 2016) is in harmony with the endeavors of tourism operators within the domain of sustainable tourism, and serves as a suitable framework for marketing management. Crafting a marketing strategy within the broader context of tourism development is crucial to revitalization of the tourism sector. A pivotal aspect in this regard is the formulation of a sales policy. To ensure high hotel occupancy rates and substantial tourism revenues, hotels need to collaborate with niche tourist agencies and travel coordinators overseas. The establishment of a comprehensive tourism system is imperative. The further development of current tourism cannot be anticipated without the support of state departments (Ljubotina & Raspor, 2022).

In the times ahead, tourism marketing will be approached from various perspectives: tourists are viewed as contributors to value creation, competitors are seen as possible collaborators, and marketers play a role as facilitators in the process of understanding ourselves (Li & Petrick, 2008; Lacmanović, 2016). Society is aging, and with that, the tourists are also getting older. Individuals and society alike must be prepared for ageing (Džajić Uršič et al., 2022). It will also be necessary to prepare special tourist programs for the elderly.

## REFERENCES

- Baixinho, A., Santos, C., Couto, G., Albergaria, I. S. de, Silva, L. S. da, Meireiros, P. D. & Simas, R. M. N. (2020). Creative tourism on islands: A review of the literature. *Sustainability (Switzerland)*, 12(24), 1–25. <https://doi.org/10.3390/su122410313>
- Baker, A. M., Davis, A. E. & Weaver, A. P. (2014). Eco-friendly Attitudes, Barriers to Participation, and Differences in Behavior at Green Hotels. *Cornell Hospitality Quarterly*, 55(1), 89–99.
- Bakić, O. (2010). *Marketing u turizmu* (Vol. 9). <https://doi.org/10.1017/CBO9781107415324.004>
- Berce, J., Lacmanović, D. & Raspor, A. (2022). Impact of terrorism on tourism demand in the EU and in the Mediterranean. In V. Bevanda & S. Štetić (Eds.), *Modern management tools and economy of tourism sector in present era: 6th international thematic monograph* (pp. 73–92). <https://doi.org/https://doi.org/10.31410/tmt.2021>
- Boley, B. B. & Nickerson, P. N. (2013). Profiling geotravellers: an a priori segmentation identifying and defining sustainable travelers using the Geotraveler Tendency Scale (GTS). *Journal of Sustainable Tourism*, 21(2), 314–330.
- Bravi, M. & Gasca, E. (2014). Preferences Evaluation With a Choice Experiment on Cultural Heritage Tourism. *Journal of Hospitality Marketing & Management*, 23(4), 406–423.
- Bulatović, I., Stranjančević, A., Lacmanović, D. & Raspor, A. (2017). Casino Business in the Context of Tourism Development (Case: Montenegro). *Social Sciences*. 6(4):146. <https://doi.org/10.3390/socsci6040146>
- Camilleri, M. (2014). Advancing the Sustainable Tourism Agenda Through Strategic CSR Perspectives. *Tourism Planning & Development*, 11(1), 42–56. <https://doi.org/10.1080/21568316.2013.839470>
- Chan, E. S. (2014). Green Marketing: Hotel Customers' Perspective. *Journal of Travel & Tourism Marketing*, 31(8), 915–936.
- Chhabra, D. (2009). Proposing a sustainable marketing framework for heritage tourism. *Journal of Sustainable Tourism*, 17(3), 303–320. <https://doi.org/10.1080/09669580802495758>
- Chiu, Y.-T. H., Lee, W.-I. & Chen, T.-H. (2014). Environmentally Responsible Behavior in Ecotourism: Exploring the Role of Destination Image and Value Perception. *Asia Pacific Journal of Tourism Research*, 19(8), 876–889. [https://doi.org/10.1007/978-94-007-0753-5\\_101202](https://doi.org/10.1007/978-94-007-0753-5_101202)



- Cohen, W. J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cvelbar Knežević, L. & Dwyer, L. (2013). An importance–performance analysis of sustainability factors for long-term strategy planning in Slovenian hotels. *Journal of Sustainable Tourism*, 21(3), 487–504.
- Doran, R. & Larsen, S. (2014). Are We All Environmental Tourist Now. *Journal of Sustainable Tourism*, 22(7), 1023–1036.
- Džajić Uršič, E., Macuh, B., Ljubotina, P. & Raspor, A. (2022). Social challenges and social gerontology competencies: the case of Slovenia. *Collegium Antropologicum*, Vol. 46(4), 311–320. <https://doi.org/10.5671/ca.46.4.7>
- Esparon, M., Gyuris, E. & Stoeckl, N. (2014). Does ECO certification deliver benefits? An empirical investigation of visitors' perceptions of the importance of ECO certification's attributes and of operators' performance. *Journal of Sustainable Tourism*, 22(1), 148–169. Retrieved from <http://eds.b.ebscohost.com/eds/pdfviewer/pdfviewer?sid=997d2595-4855-4f08-b2dd-f02e35e12bc1%40sessionmgr112&vid=12&hid=114>
- Gössling, S., Scott, D. & Hall, C. M. (2015). Inter-market variability in CO2 emission-intensities in tourism: Implications for destination marketing and carbon management. *Tourism Management*, 46, 203–212. <https://doi.org/10.1016/j.tourman.2014.06.021>
- Job, H. & Paesler, F. (2013). Links between nature-based tourism, protected areas, poverty alleviation and crises-The example of Wasini Island (Kenya). *Journal of Outdoor Recreation and Tourism*, 1–2, 18–28. <https://doi.org/10.1016/j.jort.2013.04.004>
- Juvan, E. & Dolnicar, S. (2014). Can tourists easily choose a low carbon footprint vacation? *Journal of Sustainable Tourism*, 22(2), 175–194.
- Komppula, R. (2014). The role of individual entrepreneurs in the development of competitiveness for a rural tourism destination - A case study. *Tourism Management*, 40, 361–371. <https://doi.org/10.1016/j.tourman.2013.07.007>
- Kotler, P., Bowen, T. J. & Makens, C. J. (2010). *Marketing for hospitality and tourism* (5th ed.). New Jersey: Pearson Education.
- Lacmanović, D. (2011). Positioning of Montenegro as responsible tourist destination. "Responsible Tourism – Responsible Tourist", 149–167. Budapest, Hungary: Budapest Business School, College of Commerce, Catering and Tourism.

- Lacmanović, D. (2014). *Marketing planiranje održivog turizma* (1st ed.). Podgorica, Montenegro: Univerzitet Mediteran.
- Lacmanović, D. (2016). Marketing perspectives in sustainable tourism Montenegro. *Journal of Innovative Business and Management*, 8(2), 1-9.
- Lacmanović, D. & Bulatović, I. (2014). The Role of Local Community in the Marketing Planning for Sustainable Tourism National Park Skadar Lake (Montenegro). *Turizam*, 18(3), 113–129.
- Lee, A. H. J., Wall, G. & Kovacs, J. F. (2015). Creative food clusters and rural development through place branding: Culinary tourism initiatives in Stratford and Muskoka, Ontario, Canada. *Journal of Rural Studies*, 39, 133–144. <https://doi.org/10.1016/j.jrurstud.2015.05.001>
- Lee, S., Lee, S. & Lee, G. (2014). Ecotourists' Motivation and Revisit Intention: A Case Study of Restored Ecological Parks in South Korea. *Asia Pacific Journal of Tourism Research*, 19(11), 1327–1344.
- Li, X. & Petrick, J. F. (2008). Tourism Marketing in an Era of Paradigm Shift. *Journal of Travel Research*, 46(3), 235–244. <https://doi.org/10.1177/0047287507303976>
- Ljubotina, P. & Raspor, A. (2022). Recovery of Slovenian Tourism After COVID-19 and Ukraine Crisis. *Economics*, 10(1), 55–72.
- Ljubotinja, P. & Raspor, A. (2023). Deležniki Slovenske Glasbene Industrije v Kriznih Razmerah, *Teorija in praksa*, 60(3), 441–459. <https://doi.org/10.51936/tip.60.3.441>
- Mitchell, R., Wooliscroft, B. & Higham, E. S. J. (2013). Applying sustainability in national park management: balancing public and private interests using a sustainable market orientation model. *Journal of Sustainable Tourism*, 21(5), 695–715.
- Nella, A. & Christou, E. (2014). Segmenting Wine Tourists on the Basis of Involvement with Wine. *Journal of Travel & Tourism Marketing*, 31(7), 783–798.
- Pratt, A. M. & Sparks, B. (2014). Predicting Wine Tourism Intention: Destination Image and Self-congruity. *Journal of Travel & Tourism Marketing*, 31(4), 443–460.
- Raspor, A., Kleindienst, P., Peršič, T., Mastilo, Z., Borojević, D. & Miletić, V. (2020). A case study of ethno village in Slovenia and Bosnia and Herzegovina. *Economics*, 8(2), 89–102. <https://doi.org/10.2478/eoik-2020-0015>
- Raspor, A., Divjak, M. (2017). What is tipping in post-communist countries? A Case study from Slovenia. *Teorija in Praksa*, 54(6), 1023–1039.

- Raspor, A. & Macuh, B. (2021). *Trajnostno naravnani dostopni turizem* (1.st). Dolga Poljana: Perfectus, Svetovanje in izobraževanje.
- Remoaldo, P., Matos, O., Freitas, I., Gôja, R., Araújo Alves, J., Ribeiro, V., ... Xavier, C. (2020). An International Overview of Certified Practices in Creative Tourism in Rural and Urban Territories. *Journal of Hospitality and Tourism Research*, 1–29. <https://doi.org/10.1177/1096348020950792>
- Roberts, L. & Hall, D. (2004). Consuming the countryside: Marketing for "rural tourism." *Journal of Vacation Marketing*, 10(3), 253–263. <https://doi.org/10.1177/135676670401000305>
- Ryan, J. & Silvano, S. (2014). A Study of the Key Strategic Drivers of the Use of the World Heritage Site Designation as a Destination Brand. *Journal of Travel & Tourism Marketing*, 31(3), 327–343.
- Sarantou, M., Kugapi, O. & Huhmarniemi, M. (2021). Context mapping for creative tourism. *Annals of Tourism Research*, 86. <https://doi.org/10.1016/j.annals.2020.103064>
- Weaver, D. (2001). Ecotourism as Mass Tourism: Contradiction or Reality? *Cornell Hotel And Restaurant Administration Quarterly*, 42(2), 101–127.
- Wei, X. (2020). Research on the Integration of Rural Tourism and Cultural and Creative Industries in the Context of Global Tourism. *2020 5th International Conference on Economics Development, Business & Management*, EDBM 2020, 907–911. <https://doi.org/10.25236/edbm.2020.177>





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# Ecological Marketing and Environmental Taxes in the Function of Energy Systems

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## Abstract

The production, transport and use of energy greatly affect the environment and ecosystems. In the case of energy, the impact on the environment is almost always negative, from direct environmental disasters such as oil spills, acid rains and radioactive radiation, to indirect consequences such as global warming. Since the energy needs of humanity will continue to grow, and the number of people on Earth and their standards are increasing, it is necessary to implement measures that would minimise the impact of energy exploitation on the environment and ecosystems. There are many measures and ways, and this paper deals with the actions in the sphere of people's ecological awareness, that is, how marketing can strengthen human responsibility towards energy consumption and the environment in which the population, flora and fauna should exist in harmony. The length of our stay here, in our only habitat, i.e. ecosystem, depends on this harmony. Economic instruments have become extremely popular around the world as a strategy to achieve environmental protection goals and a way to eliminate the consequences of production and consumption. In modern day societies, taxes and other fiscal fees play a particularly important role in environmental protection. They are called ecological, eco or green taxes because of their purpose and the goals they want to achieve. In the Republic of Srpska, as well as in the whole of Bosnia and Herzegovina, the problems of environmental protection are not given their proper place, neither in economic instruments, nor in theories of sustainability, humanity, nor in management and marketing, and they are actual instruments of change: first of all, human attitude towards the environment, and then the activism to prevent environmental damage, so that the Republic of Srpska (and Bosnia and Herzegovina) do not become a garbage dump for the wider region.

*Keywords:* marketing, energy system, ecological protection, environmental taxes, the Republic of Srpska

## Introduction

“Man, no matter how much he exalts himself, eventually realizes that he still depends on nature. No matter how hard he tries, he cannot destroy it. That is not possible, because nature will be a part of him until the doomsday.”

*Ramo Kolar*

█ The main role of the green economy is to improve people's well-being and promote a healthy natural environment. Therefore, the green economy and green industry do not harm people's health and do not damage natural ecosystems, and the essence of the green economy is to achieve a higher level of human well-being, and the green industry is responsible for the efficiency of sustainable development through the smart use of raw materials (Ostojić, Maksimović & Stojković-Zlatanović, 2022: 264). The biggest source of energy at the moment are fossil fuels, i.e. coal, oil, natural gas and nuclear energy. These are also the most dangerous energy sources, because fossil fuels emit a huge amount of carbon dioxide when burned, and nuclear power plants leave highly radioactive waste. Therefore, most of the world's energy is still obtained from environmentally unacceptable energy sources, especially from fossil fuels, which are still the dominant source of energy. Since the basis of fossil fuels is carbon, the normal combustion of that fuel produces carbon dioxide (CO<sub>2</sub>), which is the main greenhouse gas. That carbon dioxide mostly ends up in the atmosphere and causes global warming with its greenhouse effect. Even more dangerous is the gas that is released during incomplete combustion of fuel (burning without sufficient oxygen), namely carbon monoxide (CO), which is an extremely poisonous gas without colour, taste or smell, and a concentration of only 0.6% causes death in humans after 15 minutes of breathing.

At the moment, not a single fossil fuel is completely purified, so some harmful gases such as sulphur dioxide or nitrogen oxides are released during combustion. These gases later react with water vapor in the clouds and form droplets that fall to the ground as weak sulfuric and nitric acids - acid rains, and these rains have an extremely harmful effect on the entire ecosystems they

affect. During the combustion of some energy sources, small mineral particles are also formed, which later create ash, but a part of these particles rises into the atmosphere carried by the smoke vortex. These particles are also very dangerous for health and ecosystems.

Despite the fact that significant progress has been made in some fields in attempts to, if not prevent, then at least mitigate global climate change, the overall progress is still not satisfactory, so there is still a lot of uncertainty and ambiguity in that field that needs to be resolved in order to stop global warming. Namely, emissions of greenhouse gases into the atmosphere have not decreased significantly, and the opponents of the Kyoto Protocol<sup>1</sup> point out that the reduction of emissions in accordance with the requirements of the Kyoto Protocol would impose a heavy burden on the economy. Therefore, some countries signed the protocol, but did not ratify it, because studies have shown that, when viewed against the costs, it does not achieve the desired effects. In any case, humanity must urgently search for more ecologically acceptable sources of energy, which would meet its energy needs. In recent decades, renewable energy sources have been the most talked about and switched to, but it is still not realistic to expect that these energy sources will be sufficiently developed and commercialized to satisfy the growing energy needs of humanity to a greater extent. This orientation is in line with the shift in the economy from a linear to a circular economy model, which is being advocated by humanely oriented economists, who use marketing to influence people in order to strengthen their environmental awareness: first, to accept the fact that humanity is in a major environmental problem, and then to direct their intellectual and material energy towards the search for solutions.<sup>2</sup>

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<sup>1</sup> The Kyoto Protocol (named after the Japanese city, adopted in 1997) is an addition to the international agreement on climate change, signed with the aim of reducing the emission of carbon dioxide and other greenhouse gases. By 2010, it had been signed by 195 countries and governmental organizations, which account for over 60% of polluters.

<sup>2</sup> Knežević, M. Lugođa, A. (2022), „Turizam BiH“, UPS, Banjaluka.



## New Energy Sources

The world is changing faster and faster in every way. In recent decades, the same thing is happening to Earth, our only habitat, and the cause of such rapid changes is man, "the most perfect being on earth," as we humans like to think. In the last decades of the last century, it became very evident and clear to the people of science, that our consumer mentality and, in close connection with it, the mass industrial production of goods with the shortest possible shelf life, would quickly lead our planet to becoming the planet of our waste, which we would have nowhere to dispose of and would thus endanger the survival of, if not our children, then certainly our grandchildren and great-grandchildren.<sup>3</sup>

The results are also visible in the increase in consumption of "renewable energy sources" such as solar, wind, water, geothermal energy, bioenergy and the like. However, solar energy is not sufficiently usable and is expensive, wind energy is not available everywhere in sufficient quantities, the energy potential of water has already been used to a large extent. Geothermal energy can be optimally used only on tectonic faults, i.e. in places on Earth where thermal energy from the Earth's interior comes very close to the surface. Tidal energy and wave energy represent a great potential, but due to low availability, extremely little energy is currently generated from these sources (Stiff, 2006). Bioenergy, or more precisely, biofuels, is imposed as a substitute for classic fossil fuels, but these fuels also release greenhouse gases into the atmosphere, and therefore are not completely environmentally acceptable. Additionally, there is an interesting ethical problem associated with biofuels. Namely, biofuels are produced from sugar cane, corn, soybeans, rapeseed and other plants that can be used as food. Thus, richer countries produce biofuels in a way that turns food into fuel, while on the other hand, an extremely large number of people on Earth are dying of hunger and that same food could save their lives.

"Clean" energy in large quantities can currently only be produced in nuclear power plants. Nuclear power plants have almost no

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<sup>3</sup> Education and sustainable development, Proceedings of Prometej College, Banja Luka, June 2022, issue 8, p. 15.

impact on the environment if all rules are followed during exploitation. Apart from Chernobyl, there were no major problems with nuclear power plants, and Chernobyl itself cannot be repeated because all modern nuclear power plants have extremely well-solved active and passive safety systems. Ecological marketing is necessary here, because the public is afraid of this area, as we had a case in Serbia, where citizens protested and stopped the construction of a nuclear power plant, which would be a great solution to the country's pollution problem, and especially beneficial for the local community, which would be primarily oriented towards energy consumption from the nuclear power plant, thus significantly reducing other forms of pollution, as well as the consumption of non-renewable fuels. It is necessary to promote their safety and the results of research in the field of nuclear fission safety, because today an extremely large number of technologies are being developed that could be used for energy production in the future (Aleksić, Rakić & Biočanin, 2009). A lot of expectations are placed on the ITER<sup>4</sup> project, an international project focused on developing the technology to harness nuclear fusion. Nuclear fusion is the joining of two light atoms into one heavier one, with the release of energy, and this procedure should be completely environmentally acceptable, because there is no strong radiation, no greenhouse gases. The EU, China, Japan, South Korea, India, Russia and the USA are working on this scientific project, united in the common intention to create a "mini Sun" on Earth, that is, to solve the energy problems of our planet by producing energy using fusion. The machine for the production of this energy costs about 22 billion euros and represents the most complex machine in the history of civilization, and it is being built in the French nuclear research centre Cadarache in Provence. The construction of ITER began in 2006, and completion is expected at the end of 2025.<sup>5</sup>

The modern lifestyle implies an increasing use of energy in order to achieve greater efficiency and comfort, so the use of energy is increasing every day. Currently, most of humanity's energy needs are met by the use of very harmful fossil fuels, and in the

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<sup>4</sup> ITER is an international thermonuclear experimental reactor.

<sup>5</sup> <https://www.jutarnji.hr/life/znanost/najveci-znanstveni-projekt-za-covjecanstvo-ima-novog-sefa-svjestan-sam-goleme-odgovornosti-koju-preuzimam-15251>

future these fuels will have to be replaced by cleaner energy sources in the form of renewable energy sources or nuclear energy. As can be seen from the text above, the available energy is more than enough to cover all possible future energy needs; it is only necessary to find ways for clean and safe utilization of various energy sources, of course, gradually reducing the influence of the oil lobbies, which use every opportunity to undermine all sources of energy that they do not financially control.

## **Ecological Marketing – The New Paradigm of the Energy Sector**

Due to its increasing influence on everyday life and quality of life, energy has become the main strategic resource for all, especially developed, countries. In order to maintain a stable supply of energy, more and more wars have been started recently, with an attempt to conquer areas rich in energy resources, so energy wealth actually causes a lot of harm to some countries (Berber, 2006). The transition to alternative energy sources would reduce dependence on energy-rich countries, if marketing manages to change people's awareness in the direction that "more, faster and more profitable must be replaced by less, slower and less profitable, but sustainable." Such an orientation requires a new philosophy and paradigm of life and economy, where ecological ethics are a key actor in changing people's consciousness, from ordinary citizens who can do a lot in their homes to large global state and world policies, which can be more responsible in their race for wealth and weapons, with which they intend to steal the energy sources of other countries. Here, underdevelopment is a competitive advantage, because underdeveloped countries are abundant in energy wealth, of course, because they have not exhausted it, but this should in no way justify the aspirations of large and powerful countries for occupation or neo-colonialism. Apart from the war in Ukraine, a clear example is the occupation of the oil-rich Iraq by the USA for the purpose of oil control. That occupation brought about a significant increase in the prices of all oil products, which later had an indirect effect on the prices of almost all products. There are countless similar examples in the "global village", how we call the world because

of the lack of ethical behaviour towards man, flora, fauna and the Earth itself, our only habitat (Živanović & Đokić, 2020).

For now, humanity relies on energy and energy sources, the exploitation of which damages the structure of soil, air and water, that is, our habitat. The negative impact that energy exploitation has on ecosystems is, unfortunately, huge and unavoidable for now. Holistic philosophy will only increase the consumption of energy sources, and action is needed in the sphere of consciousness - ethics and humanism.

The holistic management ideology must have built-in responsibility towards: the environment, people, their ethnical, cultural, as well as historical values, regardless of the country's economic purposes.

*Not everything can be subject to marketing!*

Preserving, supporting, encouraging local customs, culture, art, music and education, which is carried out by the corporation as a member of the community, should be a way of conducting good and responsible business in every sector (Bijelić & Đokić, 2019; Đokić, 2003). That's why incorporating the integrity of the environment into holistic development strategies is considered mandatory management at all levels, because in addition to the environment, energy is a factor without which no serious development strategy can be built.

In addition to ways of saving energy, managers must work on promoting greater use of the aforementioned alternative sources of energy, but also on other sources, such as: using natural and mechanical ventilation instead of electricity. Many forms of energy use can fit into the environment and form a whole with it, so that they appear much more attractive than when constructing is done without considering the location, climate, ambience and surroundings. If we take a look at the management of the world's major hotel systems, we can see that the concern for ecology and energy is already incorporated into their holistic business philosophy: Du Pont, Marriott International hotels, IBM, Levi Strauss, Johnson&Johnson, McDonalds, 3M, General Foods, can be examples of this (Vojvodić & Đokić, 2020; Đokić & Vilić, 2019).

The process of Europeanization and expansion of the European Union has led to the fact that 27 countries jointly decide on environmental protection (Šobot & Lukšič, 2016, 2017, 2019, 2020a, 2020b, 2023). In recent decades, the European Union has taken a leading role in saving the planet. It devotes almost one third of its legislation to the problem of environmental protection and the struggle to eliminate the consequences of using and disrespecting the planet. In order to regulate the economy and transition to a resource sustainable economy, it primarily uses state regulations, various market mechanisms of management and marketing. The introduction of environmental taxes and other duties or punitive measures for non-compliance with environmental regulations is only one of the ways to solve the problem.

However, a lot of work is still needed on the fund allocation system, harmonization of tax rates in relation to pollution levels, setting up a far-reaching system of control and collection, as well as the abolition of incentives for goods and services that have a direct negative impact on the ecosystem. What is most important, in addition to the continuous and dedicated work on improving the existing protection system from an economic, normative or political aspect, we must also act to raise awareness of the humanistic aspect, that is, the aspect of human rights and the survival of future generations (Knežević & Đokić, 2016).

The rapid growth and development of industry, companies, thermal power plants, and nuclear plants as a prerequisite for a good life led to the solution for the population's existential needs for employment and family support, but on the other hand, it led to a disruption of the balance with nature. The economy, as an indispensable factor for the prosperity and progress of a country, neglects the protection and safety of the environment. The negative impacts of pollution cause ecological problems on a wider scale.<sup>6</sup>

In recent years, the application of economic instruments in environmental protection policy in the countries of Central and Eastern Europe has been monitored by the Environmental Policy Committee of the UN Economic Commission for Europe (UNECE).

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<sup>6</sup> The role of marketing and ethics in environmental security in Bosnia and Herzegovina, Proceedings of Prometej University, Banja Luka, April 2023, number 10, p. 15.

The instruments used in these countries are: compensation for emissions (which includes compensation for air pollution, waste management and emissions into surface waters), payment of deposits and using means of coercion, which should be a last resort and not a marketing measure, because environmental management involves marketing that educates and binds up individuals in the spirit that we are part of nature and that without it there is no us (Vojvodić & Đokić, 2020a).

## Term and Types of Environmental Taxes

Today's global daily life is characterised by a crisis on all levels. Apart from the disrupted flows of money and goods, what is perhaps even more alarming and important for the survival of a country is the endangered environment. Natural resources are rapidly decreasing, there is an increasing shortage of drinking water and fertile land (Milanović, 2009).

Tax and financial law form the basis for the introduction and application of economic instruments for environmental protection. Environmental protection policy is a long-term activity that requires special financial resources. The success of implementing and conducting environmental policy is based on ensuring stable sources of financing. The goal of economic-ecological instruments is to stimulate the prevention of environmental pollution and to become a permanent source of environmental protection. On the other hand, taxes are the most important public revenues. Taxes represent a type of public revenue that the state collects on the basis of its fiscal sovereignty, without direct compensation, and is used to finance public expenditures. In addition to its basic function - covering public expenditures, some types of taxes have also received other functions: social, health, environmental, developmental, etc. There are numerous taxes that are classified as environmental, where the environmental function is more important than their fiscal function. The introduction of environmental taxes as a model, method or way of reducing environmental problems, i.e. the consequences of accelerated, inhumane development of industry and services, is a way to prevent many consequences, both for humans and for flora, fauna and the entire ecosystem. Are they effective in the Republic

of Srpska or could more be achieved through marketing activities promoting humane and sustainable development, promoting a return to nature and promoting care for our only habitat – the Earth? The contradiction with this issue is in the perception of the problem in the minds of ordinary people, who are the biggest polluters, but also the bearers of governmental and non-governmental policies, which deal with this issue in the Republic of Srpska. Their “business” is reduced to “putting on global uniforms”, which reveal the specific characteristics and particularities of countries, regions, people and their mentality, and from which their attitude towards the environment and everything in it: people, animals, things, plants, earth, air, etc. is derived (Kovačević & Knežević, 2009).

The European Commission, Eurostat and OECD define environmental taxes from the aspect of the tax base, and therefore: an environmental tax is a form of tax where the tax base is expressed in physical units of matter whose negative impact on the environment is proven.

We distinguish environmental taxes in the narrower and broader sense. Environmental taxes in the narrower sense are those taxes that include duties on goods that contribute to environmental pollution. This group includes taxes on goods that are not in sufficient quantity precisely because of their level of pollution, such as, for example, drinking water. In a broader sense, environmental taxes include various environmental and similar duties, and in theory the opinion that fees for non-compliance with environmental standards and environmental regulations should be added to this group has also been expressed. Applying environmental taxes can affect legal and natural persons. Legal entities that are polluters are taxed in order to reduce the level of harmful emissions during the production process, and natural persons (households) in order to influence them into reducing consumption of the goods and services that are not acceptable from an environmental point of view. By using environmental taxes, funds are collected to finance expenditures for public environmental protection programs.

By analysing the given definitions, it can be concluded that environmental taxes represent a set of tax forms whose goal is to protect and improve the environment. It is difficult to make a clear distinction between environmental taxes and fees, so a distinction

is made in theory between environmental taxes in the broad and narrow sense. In domestic and foreign literature, synonyms are often used in addition to the term environmental taxes, such as: eco taxes, green taxes, polluter taxes, etc.

There are numerous theoretical positions on how important environmental taxes are and they certainly have an impact on the implementation of environmental taxes and the environmental tax reform itself.<sup>7</sup> Environmental taxes are intended to achieve environmental goals that:

- aim to ensure environmental protection,
- ensure the internalization of externalities,
- have a stimulating role,
- have a fiscal role,
- it is necessary that they be coordinated with other environmental instruments in order to bring about the appropriate effects.

Each state aims to achieve these stated goals of environmental taxes, because based on them, additional revenue is provided to the budget for the state, constant incentives are created to ensure dynamic efficiency in the human-environment relationship, and pollutants are controlled, especially at large. In many countries, these taxes have been reduced only to collecting revenue for the state and filling the budget, and employers perceive them as a hateful burden and an unnecessary imposition on their business. In order for this tax to be more collectable, it is necessary to change the perception of environmental taxes among citizens and employers. The perception that environmental remediation costs are an integral part of the product must also be presented in marketing, in order to change attitudes and behaviour according to Šobot and Lukšič (2020a). Ecological marketing should be implemented in all sectors of the economy and life, because only through positive marketing actions will people understand and accept these taxes – levies, as something they pay for future generations, who also have the right to the environment.

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<sup>7</sup> We list the following as the most important: the Baumol-Oates theory, the polluter pays principle, the argument of the lowest costs of reducing negative externalities, the argument of the double dividend and the theory of Arthur Pigou.



*"We don't inherit the Earth from our ancestors, we borrow it from our successors."*

In the countries that implemented the environmental tax reform, the perception of environmental taxes is somewhat more favourable, which is the product of a longer impact on people's awareness of the real threat to our habitat and the very urgent need to act to prevent an ecological disaster, which we can still avoid because we are a backward and underdeveloped country, and that means relatively clean and unpolluted.<sup>8</sup> The most important energy products for transportation purposes are gasoline and diesel, and for stationary use they are: fuel oil, natural gas, coal and electricity. The tax on energy products also includes the tax on the emission of carbon dioxide (CO<sub>2</sub>) from economic entities and individuals. Transport tax includes taxes related to the ownership and use of motor vehicles and other means of transport (air transport). These taxes can be one-off (if paid when importing or selling equipment and assets) or periodic (e.g. annual road use tax).

Pollution taxes include taxes on measured or estimated emissions of harmful gases into the air, wastewater discharged into rivers, solid waste management and noise. Taxes on resources include those taxes that solve problems with the consumption of water, mineral resources and forests. Regardless of the fact that there are conflicting opinions on whether the exploitation of resources means their degradation, there is definitely an agreement that their excessive use can lead to environmental problems (pollution, soil erosion, etc.).

## **Ecological Taxes in the Republic of Srpska**

A well-coordinated institutional framework is necessary to achieve sustainable development goals. Institutions that control the rationality of use and the degree of depletion of resources constitute the necessary framework for achieving sustainability

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<sup>8</sup> This claim is supported by the fact that Bosnia and Herzegovina is one of the few countries in Europe that has drinking water.  
<https://www.google.com/search?q=koje+zemlje+u+Evropi+imaju+pitku+vodu&oq=koje+zemlje+u+Evropi+imaju+pitku+vodu+&aqs=chrome..69i57j0i546l4.2262>

(Ostojić, Petrović & Kelić, 2023: 312). In order for environmental taxes to be ecologically effective, that is, to be an instrument of environmental policy, they must be viewed in the context of broader economic and non-economic measures undertaken to protect the natural environment, i.e. we must refer to the legal and institutional framework that serves as a basis for the introduction public revenues. In addition to the framework, that is, the background, it is very important to harmonize culture, ethics, mentality of people, residents, public opinion, position and opposition.

There are 3 ministries responsible for environmental protection in the Republic of Srpska: Ministry of Agriculture, Forestry and Water Management (Water Agency, etc.), Ministry of Education and Culture (Republic Institute for Cultural, Historical and Natural Heritage), Ministry of Spatial Planning, Construction and Ecology (Šobot & Lukšić, 2019). The Fund for the Protection of the Natural Environment of the Republic of Srpska is also under the jurisdiction of the latter. This division of competences has affected that very few issues in this area are regulated at the state level, where only a few umbrella laws have been passed. This includes laws on concessions, veterinary medicine, plant health protection, genetically modified organisms, animal protection and welfare, agriculture, nutrition and rural development, radiation and nuclear safety, and phytopharmaceuticals.

Environmental protection from the point of view of public finances represents expenditure and budget balance, while very little can be said about the application of public revenues in the function of environmental protection, i.e. reduction of pollution and internalisation of external effects. In the RS, there are very few public revenues whose existence can be linked exclusively or mostly to environmental goals (Popov, 2000).

Indirect taxes are state taxes, that is, they are regulated at the level of the Indirect Taxation Administration and the Parliamentary Assembly of BiH. The environmental component in the domain of indirect taxes can be incorporated in higher VAT rates on products that pollute the environment or in the form of prescribing a higher excise duty. In the domain of indirect taxes, and in connection with environmental protection, a procedure was developed for the exemption from VAT and customs duties on

goods imported as part of the support for projects that implement ratified environmental conventions. Then, there is also a fee related to the issuance of permits for the import and export of substances that have a harmful effect on the ozone layer (Jović & Maksimović, 2014).

The analysis of laws and regulations in this area at the entity level of the Republic of Srpska shows that environmental taxes can only be talked about in a broader sense. That is, ecological components have only certain fees and charges. Fees for the use of natural and other goods of general interest, water management fees, fees or funds for environmental protection, and fees for the use of other goods of general interest are prescribed within the fees. The Law on Chemicals and the Law on Biocides, as well as the accompanying rules, prescribe the compensation to be paid by persons who produce, sell and store chemicals and biocides. Here we are talking about the fees paid for the decision to carry out activities and the registration of chemicals in the register of chemicals, that is, the fees for permits for placing such products on the market. The amount of the fee is different and ranges from 50 to 500 BAM (Government of the Republic of Srpska, 2002 and 2007: 114).

According to the current laws of the RS, there are 2 types of concession fees:

- Fees that are paid once for concession approval,
- Fees paid according to the scope of exploitation of the natural asset that is the subject of the concession.

There is also a Fund, which has the task of collecting funds and financing projects in the field of environmental protection and improvement, and energy efficiency. The law stipulates that the Fund, among other things, is financed from fees that have an ecological character (Government of the Republic of Srpska, 2011). The following environmental charges are listed:

- Fees paid by environmental polluters,
- Fees for burdening the environment with waste,
- Fees for water protection paid by owners of means of transport that use oil or oil derivatives in accordance with the Law on Water.

Also, it is clarified who is liable and under which conditions do they pay compensation:

- Legal and natural persons whose actions directly or indirectly cause environmental pollution in the sense of the Environmental Protection Act, other laws and international regulations,
- Legal and natural persons that produce or import products/goods, which are harmful substances or contain them, in accordance with the Law on Environmental Protection, other regulations and international regulations, i.e. products/goods that can burden the environment,
- Legal and natural persons that produce or import products/goods that become specialty waste streams after use,
- Energy entities that emit carbon dioxide (CO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and solid particles into the atmosphere by performing energy activities,
- Legal and physical entities that burden the environment by discarding waste.

Based on this, we see that these fees have the character of Pigovian taxes and that we could compare them with pollution taxes that exist in the EU.

In addition to the mentioned fees, some fees also have the characteristics of environmental taxes. In the Law on Administrative Fees and the Associated Tariff, environmental fees are specified in tariff number 68, where the highest fee for issuing a decision for the approval of an impact study is: 1000.00 BAM, while e.g. the fee for issuing a decision for the transit of hazardous waste through the territory of the RS is 700.00 BAM. These fees do not have purposeful characteristics, but represent revenues that are paid into the budget of the Republic, and the funds collected from them also belong to the Republic.

The above-mentioned revenues represent the only forms of public revenues that we could identify as having a purely ecological character. In addition to these, it is possible to find elements of greening of existing taxes in the tax system of the RS. Thus, when real estate is taxed, the land on which dams and embankments were built for flood protection is not taxed. In the case of profit

tax, we have reductions in the tax base for investments, in the case of indirect taxes, we have the excise tax on gasoline, etc. However, these instruments have more fiscal and less or no ecological characteristics. Namely, the purpose of their introduction is not primarily of an ecological nature, which reduces their effectiveness and creates in the minds of taxpayers the feeling of unnecessary taxation, or taxation that does not go in the right direction, because the revenues are not used for environmental protection (Poting, 2009).

## Conclusion

As part of looking at the future of energy in the world, one should be ready to act quickly in order to improve the circumstances that are essential for the survival of Man and Earth. These are, above all, global warming<sup>9</sup> and climate change, geopolitical relations and conflicts, mainly in areas rich in oil and gas deposits. The data show that today more than 2.5 billion people do not have the opportunity or access to modern forms of energy; a significant increase in the world's population (9–11 billion is expected by 2050), a constant trend of increasing energy consumption (by 2030 an increase of over 40% is expected), and a constant increase in carbon dioxide emissions into the air (by 2030, an increase of over 55% is expected), will cause even more environmental changes.

Energy needs are increasing every day, while the amount of easily available, cheap and “clean” energy is decreasing day by day. Rational use of conventional energy sources, as well as investing in systems for more efficient and cleaner exploitation of these sources, would reduce the harmful effects that occur during exploitation, that can be harmful for both the environment and humans. Proper disposal of the waste that remains after the use of conventional energy sources is a way to provide a healthier and less polluted environment for current and future generations. Activities should focus on the modernisation of fossil fuel exploitation

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<sup>9</sup> Each element has its own positive effects, and one should be careful in analyzes and conclusions, because it is unknown how each measure would further affect our ecosystem. For example, global warming is changing the climate on earth, for many parts of the country in a positive sense, that is, in terms of less energy consumption.

methods, which would reduce the degradation of the habitats for many species of plants and animals, including humans. In addition, modern promotion and marketing of the development of alternative energy sources would lead to lightening the burden on the environment, and preservation of non-renewable natural resources. Sustainable use of energy allows for the possibility for providing healthy development of the population that is environmentally aware and that clearly plans, rationally uses and respects its energy sources with use of its management and ecological marketing. By investing in the reduction of energy loss, non-renewable sources are saved and preserved, which will ensure smooth development and progress for current and future generations, as it will reduce the environmental crisis that has arisen on the ground.

Numerous environmental debates show that the problem of environmental degradation must be viewed through a comprehensive treatment of the moral, legal, economic-political and technical-technological levels. Ecological awareness and ecological marketing will reduce the current pessimistic-apocalyptic vision of modern civilization, but also unwarranted optimism, because the solution to the problem must include a fundamental transformation of values, ethics and the spirit of contemporary work culture. Successful application of eco-management and humane marketing will enable unhindered industrial growth, improve quality of the environment, safety and health at work, as well as provide a harmonious life for present and future generations. The hundred-year period of accelerated development of the now highly developed countries of the world proceeded without taking appropriate measures to protect the environment. The most effective way to reduce pollution is possible through increasing energy efficiency: by choosing the right energy sources, using the right tools for production, transformation and transport of final energy and choosing new technologies. This is in line with the strategy of moving from linear to circular economy, which must energetically and rigorously deal with further polluters of the environment at all levels. This type of marketing requires professional staff and material resources, and then the harmonisation with EU regulations, which would lead to the harmonisation of regulations from the local and national to the regional level. This way, the basis for quality eco-communication

between all participants is built, within the framework of the assessment and implementation of energy efficiency measures in the international economic constellation, which is the only correct approach that can adequately respond to the rapid development of the world. The great burden of this development falls on developing countries, which carry the burden of transition and the desire to reach the level of development of other countries. But it also represents an advantage, because they still have a relatively clean environment, so according to the principle "prevention is better (and cheaper) than treatment", they can avoid many traps of rapid economic growth, at the expense of the habitat in which they develop. Here, the problem must be dealt with globally, because without the global management and marketing of those who have gone through those stages of development, greater success cannot be expected.

Therefore, the basic goals of future environmental and energy marketing must be general and unique:

- Affordability – energy must be available at prices that are acceptable to poor people and countries, in order to enable their development,
- Availability – continuous supply of energy over a long period of time and with satisfactory quality of services,
- Acceptability – compliance of social goals with environmental protection goals.

Therefore, new and renewable sources of energy must become primary sources of energy in the future, and thus wars for energy would become a thing of the past, and the world could become a more peaceful place for human life, flora and fauna.

In the last decade, the European Union has taken a leading role in environmental protection at the global level. It devotes almost one third of its legislation to the problem of environmental protection and the struggle to eliminate the consequences of using and disobeying ecological principles. To regulate the economy and transition to resource-sustainable EU, it primarily uses state regulation and market mechanisms.

Bosnia and Herzegovina (and the RS) are far from this legal regulation. It is mentioned that Bosnia and Herzegovina is a

signatory to over 80 EU-based acts related to this issue, but when it comes to implementation, nothing can be found, not even the state obligating the subjects to these acts. They only serve for the European integration of BiH, which is disastrous, given that BiH - RS are developing rapidly, and every development step is a burden on the environment. The problem must be solved in management processes as well as marketing activities that need to be redesigned in a new spirit, not because of the need to approach the EU (formally), but actually by building environmental awareness among people - residents – citizens – polluters, and then among economic entities, ministry departments and authorities. The opening of the Faculty of Ecology and the modernization of programs and syllabuses in them leads to a change in the consciousness of young people, who will soon become businesspeople and bearers of politics and government. That is why the role of marketing through the education of personnel for the needs of environmental protection is extremely important, i.e. crucial to prevent the fate of countries and regions, to which nature has responded adequately: with droughts, floods, hurricanes, tsunamis, earthquakes, ozone holes, acid rain and similar sorrows and warnings. This type of marketing and management can raise generations who will logically, sensibly, with love, and under force and sanctions, respect the domestic tax system, which, in the Republic of Srpska, has relatively recently started with the introduction of environmental taxes, determined, in the author's opinion, for the gradual implementation of these duties in order to leave enough space for the adjustment of business entities and the market. However, the fact is that environmental protection, as our burning problem, does not have as much time as the conditions of our society would require. Much more work is needed on the system of allocation of resources, harmonization of tax rates in relation to pollution, installation of a more serious system of control and collection, as well as the abolition of incentives for those goods and services that have a direct negative impact on the ecosystem. What is most important, in addition to continuous and dedicated work on improving the existing protection system from an economic, normative or political aspect, we must also act to raise awareness of the humanistic aspect, that is, the aspect of human rights and the survival of future generations, in these areas.



## REFERENCES

- Air Protection Law, *Official Gazette of the Republic of Srpska*, no. 53/02.
- Aleksić S., Rakić R., Biočanin R. (2009). Energetska efikasnost u funkciji očuvanja kvaliteta životne sredine, VIII Symposium "SAVREMENE TEHNOLOGIJE I PRIVREDNI RAZVOJ", October 23–24, 2009, Leskovac.
- Berber S. (2006). *Ekologija*. University of Novi Sad.
- Bijelić, B. & Đokić, S. (2019). Preduzetnički menadžment kao pretpostavka razvoja poslovnog sistema, In: *Zbornik radova Visoke škole ITEP Banja Luka*, No. 1, (pp. 83–102), Banja Luka, ISBN 978-99976-31-13-8
- Group of Authors (2007). *Energetska efikasnost i obnovljivi izvori energije, prioriteti energetske strategije u BiH*. Sarajevo: Fondation Heinrich Boll.
- Đokić S. & Vilić S. (2019). *Marketing i internet marketing*, College of Information Technologies, Economics and Entrepreneurship, Trn.
- Đokić, S. (2003). *Cause-related Marketing*. Banja Luka: SSC.
- Government of the Republic of Srpska (2007). Republic air protection strategy with air quality management action plan, Banja Luka.
- Jović, Lj. & Maksimović, Lj. (2014.) Ekološko oporezivanje u Republici Srpskoj – stanje i perspektiva. *Annals of business economics*.
- Knežević, M. & Lugonja, A. (2022). *Turizam Bosne i Hercegovine*. Banja Luka: UPS.
- Knežević, M. & Đokić, A. (2016). *Menadžment ljudskih resursa*. Banja Luka: ITEP.
- Knežević, M. (2012). *Mogućnosti komplementarnog i održivog razvoja turizma i ekologije u BiH*, (zbornik radova). I Congres of Ecologists titled "Ekološki spektar" Banjaluka: UPS.
- Kovačević B. & Knežević, M. (2009). *Ekologija i ekološka kriza*. Banja Luka: NUB.
- Kostić A. (2007). *Inženjering zaštite životne sredine*. Belgrade: University in Belgrade.
- Law on the Fund for Environmental Protection, *Official Gazette of the Brčko District of Bosnia and Herzegovina*, [www.mvteo.gov.ba/org\\_struktura](http://www.mvteo.gov.ba/org_struktura)
- Law on the Environmental Protection Fund, *Official Gazette of the Republic of Srpska*, no. 51/02.
- Law on Amendments to the Law on Spatial Planning, *Official Gazette of the Republic of Srpska*, no. 53/07.
- Law on Forests, *Official Gazette of the RS*, no. 75/08.
- Law on Spatial Planning and Construction of the RS, *Official Gazette of the Republic of Srpska*, no. 84/02.
- Law on the Protection and Use of Cultural-Historical and Natural Heritage in BiH, *Official Gazette of SR BiH*, 4/65, 3/78 and 20/85.

- Law on Environmental Protection, *Official Gazette of the Federation of BiH*, [www.mvteo.gov.ba/org\\_struktura](http://www.mvteo.gov.ba/org_struktura)
- Law on Nature Protection, *Official Gazette of the Brčko District of BiH*, [www.mvteo.gov.ba/org\\_struktura](http://www.mvteo.gov.ba/org_struktura)
- Law on Nature Protection, *Official Gazette of the Republic of Srpska*, no. 50/02.
- Law on Nature Protection, *Official Gazette of the People's Republic of BiH*, No. 45/61 and 4/65.
- Law on Environmental Protection of the RS, *Official Gazette of the Republic of Srpska*, no. 53/02 and 109/05.
- Law on Air Protection in FBiH, *Official Gazette of the Federation of BiH*, [www.mvteo.gov.ba/org\\_struktura](http://www.mvteo.gov.ba/org_struktura)
- Law on Air Protection in FBiH, *Official Gazette of Brčko District of BiH*, [www.mvteo.gov.ba/org\\_struktura](http://www.mvteo.gov.ba/org_struktura)
- Law on Local Self-Government of the RS, *Official Gazette*, no. 101/04.
- Milanović, M. (2009). *Ekonomija prirodnih resursa*. Belgrade: Megatrend university.
- Official Gazette of the Republic of Srpska*. Numbers: 100/11, 117/11, 51/02, 53/07, 60/06, 92/09.
- Ostojčić, I., Maksimović, M. & Stojković-Zlatanović, S. (2022). Nejednakost i neravnopravnost žena na tržištu rada u kontekstu zelene ekonomije. *Temida*, 25(3), 251–281. <https://doi.org/10.2298/TEM2203251O>
- Ostojčić, I., Petrović, P. & Kelić, V. (2023). Institutional Framework and International Environmental Organizations for Sustainable Development. In: M. Reljanović (Ed.), *Regional Law Review* (311–325). DOI: 10.56461/iup\_rlc.2023.4
- Paić, M. (1994). *Toplina, termodinamika, energija*. Zagreb: Školska knjiga.
- Pavlović, T. & Čabrić, D. (2007). *Fizika i tehnologija solarne energetike*. Beograd: GRAĐEVINSKA KNJIGA.
- Perović, M. (1998). *Menadžment – informatika – kvalitet*. Kragujevac: CIM Centar.
- Popov, G. (2000). Ekološki porezi. Savet projekata Konstituisanje Srbije kao pravne države.
- Poting, K. (2009). *Ekološka istorija svijeta*. Beograd: LIBRA.
- Stiff, G. (2006). *Energetska evolucija*. Tuzla: Centre for ecology and energy.
- Šobot, A. & Lukšić, A. (2016). The impact of europeanisation on the nature protection system of Croatia: example of the establishment of multi-level governance system of protected areas Natura 2000. *Journal of Social Ecology*, 25(3), 235–270.

- Šobot, A. & Lukšič, A. (2017). The impact of europeanisation on the nature protection system of Slovenia: example of the establishment of multi-level governance system of protected areas Natura 503, 2000. In: A. Lukšič (Ed.), *Exploration of Political Ecology in Slovenia* (pp. 113–147). Ljubljana: Centre of Political Theory, University of Ljubljana.
- Šobot, A. & Lukšič, A. (2019). The impact of europeanisation on the nature protection system Bosnia and Herzegovina: example of the establishment of multi-level governance of Natura 2000 protected areas. *Journal of Social Ecology*, 28(1), 28–48.
- Šobot, A. & Lukšič, A. (2020a). Natura 2000 experiences in southeast Europe: Comparisons from Slovenia, Croatia and Bosnia and Herzegovina. *Journal of Comparative Politics*, 13(1), 46–57.
- Šobot, A. & Lukšič, A. (2020b). Ensuring the sustainable development of Natura 2000: challenges and solutions. *Teorija in praksa: revija za družbena vprašanja*. Year. 57, No. 1, pag. 368–388.
- Šobot, A. (2023). The role of the European Union in the implementation of the natura 2000 programme: differences between Slovenia and Bosnia and Herzegovina. *Poslovne studije*. Vol. 15, No. 29/30, pag. 159–167.
- Uremović D., Jovanović N. & Bočanin R. (2009). Ekspertsko ocjenjivanje naučnih projekata i programa razvoja u oblasti zaštite životne sredine. I Scientific conference “Ekološka bezbjednost u postmodernom ambijentu”, ICAMA-2009, Banja Luka, June 26–27.
- Valić, F. et al. (2001). *Zdravstvena ekologija*. Zagreb: Medicinska naklada.
- Vojvodić, N. & Đokić, S. (2020). Korporativno brendiranje. In: *Zbornik radova Visoke škole ITEP Banja Luka*, No. 2, (pp. 12–25). Banja Luka, ISBN 978-99976-31-14-5
- Vojvodić, N. & Đokić, S. (2020a). Direktni marketing. In: *Zbornik radova Visoke škole ITEP Banja Luka*, No.3, (pp. 12–21), Banja Luka, ISBN: 978-99976-31-15-2
- Waste Management Law, *Official Gazette of the Republic of Srpska*, no. 53/02.
- Water Law, *Official Gazette of the Federation of Bosnia and Herzegovina*, [www.mvteo.gov.ba/org\\_struktura](http://www.mvteo.gov.ba/org_struktura)
- Water Law, *Official Gazette of the Brčko District of Bosnia and Herzegovina*, [www.mvteo.gov.ba/org\\_struktura](http://www.mvteo.gov.ba/org_struktura)
- Water Law, *Official Gazette of the Republic of Srpska*, no. 50/06
- Živanović, C. & Đokić, S. (2020). Neuromarketing i neurokultura u funkciji psihološke spoznaje o percepciji i ponašanju potrošača. In: *Zbornik radova Visoke škole ITEP Banja Luka*, No. 3, (pp. 95–105). Banja Luka, ISBN 978-99976-31-15-2

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