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ABOUT PROFEEDBACK

The COST Action PROFEEDBACK - PlatfoRm OF policy Evaluation community for improvED EU policies and Better ACKnowledgement (CA20112, MoU 052/21) 2021-2025 aims to foster the networking of the policy evaluation community at EU-level, raise awareness on the importance of evaluation policy research and improve its impact on policy-making. The Platform, following a bottom-up and open approach, will gather researchers and professionals from various scientific fields and sectors to present and evaluate theories, topics, tools and methods of policy evaluation. Results of the Europe-wide assessment of good practices will provide direct and high-quality inputs for national and EU bodies responsible for policy evaluation.

Policy evaluation is a key tool in understanding, developing and modernising EU policies, thus there is a growing demand for EU-wide and high quality evaluation services. The main challenge is that currently there is no bottom-up platform for European researchers and professionals working in policy evaluation. They have limited possibilities to discuss common problems, assess country specific practices and share their knowledge in a mutually beneficial and effective way.

The PROFEEDBACK Action has three key objectives to achieve during the Action period 18/10/2021 - 17/10/2025 and beyond.

Foster networking and knowledge-exchange of the policy evaluation community at European level

Raise awareness on the importance of policy evaluation research and improve its impact on policy-making

Reinforce state-of-the-art research in the policy evaluation field and contribute to evaluation standards

ABOUT PROFEEDbook4

In the framework of the PROFEEDBACK Action, one conference every half-year is implemented. After each conference thematic deliverables are issued, the so called PROFEEDbooks (D4.1-D4.8). They summarise the main presentations and results of the conferences.

PROFEEDbooks support multidisciplinarity, the systematisation of different methodologies and the exact transfer of know-how for the policy evaluation community. These also serve the interests of European and national policy-makers in developing the frameworks of the next programming periods and of a common European evaluation culture.

In addition, the PROFEEDbooks enrich the literature of public policy, aiming to develop theory, knowledge, method and tool base of European evaluation policy as well as a common understanding of the current problems and challenges. PROFEEDbooks support the Action in reaching audience beyond the Action members.

The 4th PROFEEDBACK Conference focused on **Environmental and Energy Economics: Climate Change Mitigation and Adaptation, Green Transition, Circular Economy.** It provided a conducive environment for a comprehensive exchange of ideas concerning new theoretical and empirical research in environmental, energy, and climate economics and policy analysis. The Conference maintained a balanced interest in both theoretical and applied research, with a particular interest in policy implications, similar to earlier iterations.

The conference has taken place in **Belgrade, Serbia** between **9-10 October 2023.**

The event has been organised by the **Institute of Economic Sciences in Belgrade.**

SUSTAINABLE PRACTICES AND POLICIES: EVALUATIONS, FRAMEWORKS, AND IMPLICATIONS

Daniela Serra Castilhos
Instituto Politecnico de Leiria, Portugal

SUSTAINABILITY AS AN ETHICAL VALUE FOR THE EUROPEAN UNION

ABSTRACT

INTRODUCTION

Gradually, sustainability has been increasingly recognized as an ethical value in the policies and actions of the European Union (EU). As global challenges such as climate change and environmental degradation intensify, the EU has been committed to promoting a balanced development model that preserves natural resources and ensures the well-being of present and future generations. This presentation aims to explore the role of sustainability as an ethical value in the EU, examining the conceptual and theoretical underpinnings that underpin this approach and the policy implications stemming from it.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Sustainability is a multidimensional concept that seeks to integrate environmental, social and economic aspects. It is based on the principle of meeting present needs without compromising the ability of future generations to meet their own needs. This approach recognizes the interconnection and interdependence of these dimensions and highlights the importance of making informed and balanced decisions that consider long-term impacts. In this section, the theoretical foundations of sustainability and its integration into EU treaties will be discussed. The conceptualization of sustainability as an ethical value will be analyzed, as well as its role in promoting balanced and sustainable development in economic, social and environmental dimensions

METHODOLOGY

The present study is based on a comprehensive literature review and desk review of EU policies and treaties related to sustainability. Academic sources, official EU documents and other relevant sources were consulted to examine the theoretical and policy framework for sustainability in the EU. The literature review also attempted to cover case studies and analyzes of specific policies implemented by the EU to promote sustainability in key areas such as energy, transport, agriculture and the environment.

RESULTS

The results highlight the incorporation of sustainability into EU treaties and policies, as well as the initiatives and programs implemented to promote sustainability in various areas. Examples include the implementation of the European Green Deal (Green Deal), which sets out an ambitious vision for the transformation of the EU

into a sustainable economy, with the aim of achieving climate neutrality by 2050. The Green Deal covers a wide range of areas, from agriculture and industry to mobility and infrastructure, and seeks to promote the transition to more sustainable practices across these sectors. Furthermore, the EU has adopted specific policies and measures, such as regulations and directives, to promote energy efficiency, biodiversity conservation, waste management and sustainable agriculture. These actions reflect the EU's commitment to promoting sustainability as an ethical value through concrete policies.

DISCUSSION / POLICY IMPLICATIONS

In this section, the policy implications and challenges associated with promoting sustainability as an ethical value in the EU will be explored. Opportunities and obstacles for the effective implementation of sustainability policies will be discussed, as well as future perspectives in this field. Although the EU has made significant progress in incorporating sustainability into its policies, there are still challenges to be faced. These challenges include the need to harmonize Member States' national policies to ensure consistent implementation of sustainability goals, overcome resistance from economic sectors that may be affected by the necessary changes, and increase citizen awareness and participation in promoting sustainability.

CONCLUSION

The conclusion will summarize the main points discussed in the study, highlighting the importance of sustainability as an ethical value for the EU. The continued need to promote the integration of sustainability into EU policies and actions in order to achieve sustainable development and ensure the well-being of present and future generations will be reiterated.

KEYWORDS

sustainability, European Union, value

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The New European Bauhaus: A new opportunity for evaluators

ABSTRACT

INTRODUCTION

The New European Bauhaus is a relatively new concept of designing and constructing buildings pushed by the European Union. It follows three key principles: sustainability, beauty, and inclusiveness. In the case of sustainability and inclusiveness, the evaluation practice is quite common, using various methods and evaluation criteria. On the other hand, beauty and aesthetics are very subjective, making the evaluations more challenging. Moreover, these three evaluation streams should comply with each other.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Evaluation criteria help the planners to get know whether a project was successful. Among the standard applied criteria belongs the set introduced by the OECD and the Development Assistance Committee (DAC)(OECD/DAC, 2021).

As the New European Bauhaus also applies inclusiveness and aesthetics as core principles, participative evaluation including stakeholders in evaluating targets and effectiveness is important. It is important that stakeholders are involved in the development of objectives and evaluation criteria. The fact that aesthetics in particular is a subjective matter makes their participation necessary, as part of the criteria will be subjective.

METHODOLOGY

On a case study of an open public park in Brno. We show how project implementers can evaluate the effectiveness of a (whatever kind of) building in the three key principles of the New European Bauhaus and their relationships.

RESULTS

Standard evaluation methods can be used to evaluate each of the key aspects of the New European Bauhaus. However, the projects under this concept are always specific and include a strong stakeholder participation component. Thus, it is necessary to apply evaluation criteria that are specific to the project and respect the issues raised by stakeholders.

DISCUSSION / POLICY IMPLICATIONS

While it seems that sustainability criteria and evaluations are already widespread and commonly used, the NEB brings new challenges. The evaluation of sustainability must be carried out in the context of other criteria related also to aesthetics and inclusion. The evaluators must be prepared for the fact that finding a consent on projects´ objectives and definitions of evaluation criteria will be a time-consuming process. Thus, the evaluators should take part in the whole policy cycle to be able to evaluate the New European Bauhaus operations profoundly.

CONCLUSION

A participatory approach must be applied in the preparation of evaluation criteria within the New European Bauhaus construction projects. Not only is inclusiveness one of the key elements, but aesthetics is such a subjective element that evaluation without close collaboration with stakeholders would be meaningless.

KEYWORDS

The New European Bauhaus, Sustainability, Aesthetic, Inclusiveness

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He has experience from several professional associations. He had been actively working in the board of directors of the Czech Evaluation Society for two terms between the years 2012-2015. Among the other associations belong European Evaluation Society (current member of the board), American Evaluation Association. As a member of these organizations, he has always actively participated in the building of evaluation culture and evaluation capacities.

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Sustainability criteria in project evaluations: embedded contradictions

ABSTRACT

INTRODUCTION

The definition of sustainability is often debated in the social sciences and may vary depending on the context and discipline from which the evaluator begins his or her evaluation journey. In mainstream project evaluation, there is a commonly accepted definition of sustainability as "the extent to which the net benefits of an intervention continue or are likely to continue" (OECD, 2021). According to this perspective, sustainability is perceived through the lens of project interests and could produce unwanted spillover effects, especially if the economic and environmental elements of the criteria contradict.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Within development studies, many definitions of sustainability include social, environmental, and economic aspects. For example, WWF's defines sustainable development as an "improvement in the quality of human life within the carrying capacity of supporting ecosystems" (Goodland, 1995:4). Further on, the Brundtland Commission perceives sustainable development as a sort of transgenerational justice: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Ibidem). The OECD definition of sustainability is much narrow and, therefore, more operational. Choosing one definition over another influences the process of evaluation.

METHODOLOGY

The authors will use a framing method in their research. Framing aids the understanding of why choice of one definition of sustainability over another can provoke frustrations or losses for those individuals or groups who perceive a particular event, activity, or phenomenon from a completely different angle. By triangulating data from different sources on sustainability criteria (literature review, analysis of documents, official statements of relevant actors, and reports of non-governmental organizations), the authors aim to offer a critical overview of how it has been defined, operationalised, and applied in project evaluations.

RESULTS

As a result of this critical analysis, we identified that researchers ultimately cherry-pick one of the sustainability concepts when conducting their assessments. Consequently, different concepts generate different framings and results in the evaluation process, which can affect not only the program itself but the broader environment of analysed interventions. Ultimately, the abundance of standards on the sustainability criteria can make it difficult to understand/analyse the whole, leading to the need for cherry-picking.

DISCUSSION / POLICY IMPLICATIONS

Public officers and practitioners have to analyse interventions. Given the absence of complete information, evaluations are the best ways to learn about the outcomes and effects of a particular intervention. Evaluations help to advise on the continuance or cancellation of a programme. Although there is a common standard for conducting programme evaluations, each evaluator ultimately has a degree of freedom when choosing the criteria that outlines the frameworks for guiding their evaluation.

CONCLUSION

In this article, we focus on the sustainability criterion and argue that different conceptual choices might lead to different framings and, consequently, dissimilar assessment results in terms of fulfilling the sustainability criterion. Consequently, the sustainability criterion could be a contradiction in terms – making it difficult to guarantee the political sustainability of a programme by ensuring that it is economically sustainable. This contradiction may end up generating negative externalities (i.e., environmental) which are collectively felt by targeted population. However, this problem affects not only one policy itself but also the set of policies as a whole - in addition to making it impossible to compare evaluations of different programs.

KEYWORDS

sustainability, framing, evaluation, economic, environmental

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SYSTEMIC EVALUATION OF PUBLIC PROCUREMENT APPLYING TRANSDISCIPLINARY LENS

ABSTRACT

INTRODUCTION

Public policies play a vital role in shaping the well-being of societies, economies, and the environment. To ensure positive outcomes, it is essential to adopt a holistic and systems-based perspective during the planning and implementation of these policies. This approach becomes particularly crucial in the complex and dynamic realm of public procurement systems. Decisions and policies within these systems can have far-reaching consequences for communities, nations, and the planet as a whole. Therefore, it is imperative that representatives of public procurement systems serve as exemplary leaders, a plus reason for researchers to focus on systemic evaluation. The study within the Public Procurement System in Romania, specifically at the level of primary and secondary credits coordinators aims to identify opportunities for developing sustainable and environmentally friendly systems and policies, taking into account both intra-systemic (within the Public Procurement System) and inter-systemic (relating to other relevant systems) perspectives and seeks to shed light on the intricacies and challenges that exist within the system. It aims to explore how the decisions and actions of budget coordinators (mostly political decision-makers) impact sustainability and environmental considerations. Additionally, the study aims to uncover potential areas for improvement and propose recommendations for the development of more sustainable and environmentally friendly policies.

The significance of this research lies in its potential to contribute to the advancement of systems evaluation, not only in Romania but also in a broader context. By highlighting the importance of adopting a holistic and systems-based perspective, the study can serve as a valuable resource for policymakers, decision-makers, and practitioners involved in the implementation of the public agenda. Ultimately, the findings of this research endeavor can pave the way for more effective and responsible decision-making, leading to sustainable outcomes that benefit all.

LITERATURE REVIEW / THEORETICAL BACKGROUND

The study conducted a comprehensive literature review using keyword searches in academic databases such as SAGE, Web of Science, and JSTOR where the terms „system" and „evaluation" (Jackson et al., 2020; Patton, 2019)

appears together, using web scraping techniques in economic, political, and social sciences. The analysis revealed a scarcity of research that examines the connections between political science, economics, public administration (including public procurement (Bovis, 2005; Caranta & Gomes, 2021)), systemic evaluation (Atkinson et al., 2021; Barbrook-Johnson & Penn, 2021; Bustamante et al., 2021), and sustainability (Allen et al., 2021; Andhov et al., 2017) when seen through the transdisciplinary (Forbat, 2020; LaVelle & Dighe, 2020; Rigolot, 2020) lens.

Furthermore, the study found a lack of recent studies applying systemic, transdisciplinary evaluation approaches in European and Romanian publications. These gaps highlight the need for further research in this underexplored niche.

METHODOLOGY

The research employed a mixed-methods approach, combining qualitative and quantitative instruments. Data collection spanned from November 2021 to May 2023 and involved various stakeholders such as actors from the Central and Local Public Administration, political decision-makers, Romanian and European evaluators, and representatives of the business environment. Questionnaires, semi-structured interviews, and document analysis were used to gather primary and secondary data. The data were then synthesized, cleaned, and analyzed in comparative analysis, against criteria like systemic sustainability, transparency, resilience, and adaptability, using software applications such as SPSS, Vensim, and ChatGPT 4.

RESULTS

The research outcomes affirmed the formulated research hypotheses. It revealed that public policies and their evaluation in Romania are often conducted in a fragmented manner (Sanchez-Planelles et al., 2022), contrary to the claim of a systemic vision. Public procurement emerged as a pivotal lever (Creamer, 2021) within public systems (Kominis et al., 2022), influencing and being influenced by society, politicians and the natural environment. The study also highlighted the real need to develop the evaluation capacity for the Romanian Public Procurement System, emphasizing the importance of internal evaluators in attributing merit and value (Scriven, 1981) to actions and decisions within the system.

DISCUSSION / POLICY IMPLICATIONS

The findings have significant policy implications. They emphasize the necessity of adopting a transdisciplinary approach in systemic evaluation of public policies, particularly in the context of recent crises

and the need for sustainable solutions. The research proposes recommendations for developing the evaluation system, including the establishment of evaluation and engagement standards for internal evaluators. Furthermore, the study underscores the potential value of systemic evaluation in supporting decision-making processes and the development of efficient policies that promote sustainability, responsible consumption, and production while avoiding being locked-in by our own actions or inactions.

CONCLUSION

The research study on the systemic evaluation of public procurement in Romania sheds light on the fragmented nature of policy implementation and the importance of a transdisciplinary approach in evaluation. It underscores the need to enhance the evaluation capacity for the Romanian Public Procurement System and highlights the potential of systemic evaluation to inform decision-making processes and foster sustainable policies. The study contributes to the existing literature by addressing a research gap and provides valuable insights for policymakers, evaluators, and researchers in the field.

KEYWORDS

complexity, public procurement, systems, systemic sustainability, transdisciplinary evaluation.

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Over the past four years, her research endeavors have been firmly focused on crafting strategies that amplify the internal evaluation capacity within Romania's Public Procurement System. Her insights have been invaluable in refining the efficiency and effectiveness of this critical facet of public administration.

Her professional journey has encompassed several impactful roles:

Management Consultant | Consultancy Firm: her responsibilities span conducting comprehensive studies and evaluations of organizational structures, designing systems and procedures for heightened work efficiency, and setting meaningful Key Performance Indicators (KPIs), adeptness in communication and coordination extends to the highest echelons of the organization, including drafting important documents and facilitating multilingual exchanges.

Policies Consultant | Political Party & Parliamentary Assistant | The Romanian Parliament: she delved into the intricate realm of political analysis, deeply engaging with public policies and governance issues. Her role extended to providing crucial advice in the formulation of public policies and deftly navigating the evolving political landscape.

Consultant | The Romanian Ministry of Tourism: A time marked with legislative intricacies, she represented the Directorate in the Internal Audit Mission, an assignment that required meticulous attention to detail and rigorous documentation research. Her role also involved crafting legal drafts, conducting comparative analyses, and suggesting amendments in alignment with existing legislation and budgetary principles.

General Manager | SME: with a tenure spanning over a decade and a half, as a General Manager of a Small and Medium-sized Enterprise (SME), the responsibilities encompassed orchestrating and managing the full spectrum of SME activities, diligently upholding accounting principles, navigating intricate asset valuations, and ensured the company's compliance

AUTHOR - Ileana-Sabina CHIABURU

with legal provisions, as well as HR management. Her purview extended to market analysis, personnel management, and the maintenance of meticulous accounting records.

Sabina's journey is a testament to her unyielding dedication to effecting meaningful change within the realm of public policy and management. Her capacity for nuanced analysis, strategic thinking, and leadership excellence continues to define her trajectory in these pivotal domains.

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Sustainable Performance Framework Index (SPFI)

ABSTRACT

INTRODUCTION

The aim of our research – commissioned by the Blue Planet Foundation and carried out by Hetfa Research Institute – was to elaborate an indicator system that allows measuring the impact of policy decisions on the state of national resources. Using indicators besides GDP (or combined with GDP) that show the improvement or deterioration of production factors - human, social, economic or natural - is important in order to get a clear picture of social or environmental progress. It is possible only if we observe the outputs of economic activity as well as the quality and quantity of fundamentals which are able to underpin the well-being.

LITERATURE REVIEW / THEORETICAL BACKGROUND

To develop the set of indicators, we reviewed the literature on composite indices and the guidances of major international organisations and the sustainable development strategies of selected countries.

METHODOLOGY

Several experts (economists, environmental engineers, environmentalist, impact assessment experts) were involved in the development of the set of the used indicators through interviews and validating workshops. The methodology of the score calculation is based on the recommendations of OECD.

RESULTS

As a result of our research, we suggest the introduction of a composite index that is capable of functioning as a signalling system. By this mean, areas where there are shortfalls against the objectives can be identified, therefore it enables better targeted policies.

The composite index of Hétfa Research Institute is called “Sustainable Performance Framework Index” (SPFI). It is a flexible, composite macro indicator that can be adapted in various environments. It indicates the improvement or the deterioration of the state of production factors and resources.

SPFI can be aggregated on 3 different levels:

- group composite (e.g. education, biodiversity),
- resource-level composite (human, social, economic, natural)
- overall (total) composite SPFI score.

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Therefore not only the final SPFI score is informative, but the clusters and the groups within them as well. This means that the index can express the overall sustainability level of a society while it enables the assessment of the individual components.

DISCUSSION / POLICY IMPLICATIONS

As a first step, Hétfa calculated the scores of 10 chosen countries. The results in the sub-categories make the trade-offs visible. For instance, in case of Hungary, a substantial progress can be observed between 2010 and 2021 in the area of good governance and infrastructure, while the value of social capital has significantly declined. This results suggests that decision-makers should focus on the improvement of related policies.

CONCLUSION

With necessary care and diligence, SPFI can be used to compare the economic-social performance of countries which are more or less similar in socio-cultural terms. The most important function of this comparison is to make the sustainable performance of a society visible and to underpin the longitudinal examinations.

KEYWORDS

sustainability; sustainable development; composite index; natural resources

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Climate changed laws, but how can laws change the climate?

ABSTRACT

INTRODUCTION

Sustainable development is becoming a building block in European policies and documents. By contrast, there is still a lack of greater and more comprehensive coherence among the various agents in Europe regarding the perception of environmental problems, resulting in inequalities across EU member states as well as regions.

The current state of knowledge suggests that there are crucial differences between countries and their innovative ecosystems (e.g. environmental awareness, availability of funding opportunities and infrastructure, and trust among stakeholders).

In 2021, the EU made climate neutrality, the goal of zero net emissions by 2050, legally binding in the EU. It set an interim target of 55% emission reduction by 2030. This goal of zero net emissions is enshrined in the climate law. The European Green Deal is the roadmap for the EU to become climate-neutral by 2050.

LITERATURE REVIEW / THEORETICAL BACKGROUND

More than 318 climate cases have been identified across Europe since 1993 that relate to Climate litigation

The mid-2000s saw a boom in European climate policy and legislation and, subsequently, in litigation. When the first iteration of the EU ETS Directive came into force in 2005 it had a significant impact on the activities of private parties. Litigation spiked in 2008, as the EU ETS was moving into its second phase, with disputes surrounding the interpretation of Directive 2003/87/EC (EU ETS Directive) and the relative expansion of the competencies of the European Commission and Member States in the regulation of greenhouse gases (see Bogojević, 2013).

Since around 2015, European climate litigation has followed the global trend for increasingly complex climate change litigation, with courts from all over Europe seeing a growing number and diversity of climate cases filed (Setzer et all, 2023).

Prior to the passage of the European Climate Law in July 2021, the core of the EU's legislative response to climate change consisted of a series of 'direct decarbonisation' measures, which are further supported through 'facilitating' and 'integrating' measures.

METHODOLOGY

The research will follow the functional method developed by Zweigert & Kötz , following Michaels' approach.

The methodological approach of the present research proposal will be a combination of doctrinal research, functional wide-scope research, and empirical research.

Qualitative doctrinal research will focus on the relevant cases and decisions of the ECJ originating on preliminary rulings from the EU member states, as well as the established rules of national procedural laws applicable in the different Legal Systems, National Courts and other legal sources.

The chosen methodological research will provide a conceptual understanding of the legal framework case and the efficacy and efficiency of the laws, and procedures.
A quantitative approach will also be used to identify the number of cases, the percentage of infractions/ complaints and the number of sanctions, the applied fines.
Since doctrinal legal research is confined within the boundaries of the law itself, mostly grounded in cabinet research, functional research is put in place in order to compensate for what might be considered an overly theoretical approach.

RESULTS

An outline of the » Fit for 55« proposals will also be presented. Recommendations for the levels of governance will be the major output of this work.

KEYWORDS

European Climate law, Green Deal, Environmental Law, EU, EU integration

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The Reflections of Global Climate Change Policies on Education: A Cross National Comparison of PISA Results

ABSTRACT

INTRODUCTION

Sustainable Development Goals (SDGs) has set forth 17 Goals for a better future for the world population, in which Goal 13 on Climate Action urges the world population to invest in a mutual challenge. In this paper we take Target 13.3 (Improving education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning) as a measure to examine education policies in relation to climate change through using the latest PISA test scores. In particular, we discuss how Target 13.3 is merged into the educational policies through examining PISA data as a standardized test across countries.

LITERATURE REVIEW

Literature on environmental education reveals that there are differences across individuals and countries on students' knowledge and skills on environmental issues. For example, Yılmaz, et.al. (2004) explores Turkish students' attitudes towards environmental issues while Uitto (2011) focuses on Finnish students, among other studies in various countries (Jenkins and Pell, 2006). Scientific literacy and environmental concerns are explored through PISA (2006) data by providing a general overview by Bybee, (2006). Kaya and Elstter (2018) focus on German students' environmental literacy using PISA questionnaire data. In order to contribute to the existing empirical studies, this study will examine 2018 PISA results to explore students' knowledge, skills and attitudes on environmental issues across countries, including climate change and enable a data-driven discussion on investment in sustainable development via education.

DATA AND METHODOLOGY

The latest available PISA database (2018) includes questions on students' and schools' concerns in relation to environmental problems and climate change. The paper uses results from the 2018 PISA student and school questionnaires to make inter country comparisons as to whether the students are subjected to a school curriculum policy that is accepting status quo or has insights to promote sustainability for a greener world. We use cluster analysis to classify countries around the world in groups that are similar to one another and different from other countries with regards to the students' degree of concern in relation to

environmental problems. The resulting groups of countries will be compared using selected macroeconomic variables such as per capita income, economic growth rate, economic development and educational policies.

RESULTS

Preliminary results reveal that there are differences across countries with respect to students' and schools' concerns in relation to environmental problems and climate change. Factors such as per capita income, socioeconomic differences as well as education policies explain such differences.

DISCUSSION AND POLICY IMPLICATIONS

The paper takes Target 13.3 of SDGs as a measure to examine policies in relation to climate change through using figures from education. In particular, we discuss how Target 13.3 is merged into the educational policies through examining PISA results as a standardized test across countries. The PISA results are examined to explore students' knowledge and skills on climate change and sustainable development.

CONCLUSION

This focus of the paper is to understand the differences in relation to students' and schools' concerns on issues related to climate change and environment across countries. We expect to reveal groups of countries that differ with regards to students' environmental concerns with varying levels of socio economic characteristics and education policies. The results are anticipated to shed light to guide teachers and young students for a better and sustainable future through school-level policies to provide benefit for wider communities.

Keywords: Climate Change, Education, PISA 2018 student and school data, cluster analysis.

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Macroeconomic impacts of the “fit for 55” package of proposals

ABSTRACT

INTRODUCTION

The European Commission's "Fit for 55" proposal aims to reduce net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels as an intermediate step towards climate neutrality, as part of the European Green Transition. In this context, the EU will review its climate, energy, and transport legislation to bring it into line with the 2030 and 2050 targets. On behalf of the Ministry of Energy, our research aimed to enumerate the macroeconomic impact of the emission reduction proposals.

LITERATURE REVIEW / THEORETICAL BACKGROUND

We use standard macroeconomic modeling techniques to quantify the macroeconomic effects of demand changes, that come from adapting to the “Fit for 55” package.
The model inputs were supplied by the researchers of the REKK, who used their HU-TIMES model (see Mezősi, A., & Rácz, V. (2023) for example).
For our research, we used our in-house developed HÉTFA-CGE model. It is a standard statical computable general equilibrium (CGE) model, that is based on the Input-Output tables of the Hungarian economy. We used it for numerous studies, like Major et al (2016) and Major & Drucker (2015).

METHODOLOGY

During the calculations, we calculated two macroeconomic paths. The first is the baseline, where the exogenous variables are standards, i.e., past real values or the most accurate expectations for the future. We then compute the counterfactual path, in which we change, by term shock, the exogenous variables under investigation. We define the effect of the change as the difference between the two trajectories.

RESULTS

The shocked variables are the increased investment needed by the economic sectors and the reduction of energy consumption. We also count on the households spending on home improvements resulting in a change in energy consumption.
The calculated result variables are the GDP, employment on the sector scale, and government incomes.

DISCUSSION / POLICY IMPLICATIONS

As for policy implications, we identify the sectors that will benefit or not from the proposal. We also pay close attention to the situation of households.

CONCLUSION

Summarizing the sectoral impacts in terms of employment, employment growth is mainly in the construction and logistics sectors, At the same time, gross value added (GVA) growth is also mainly concentrated in these sectors, and the increase in GVA is higher than the decrease in the other sectors. In the case of households, the investment required by them heavily outweighs the decrease in their energy consumption.

KEYWORDS

economic transition, macroeconomic modeling, green economy

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His work at the HÉTFA started with the large-scale development of the in-house built HÉTFA Computable General Equilibrium Model. Since that, for example, he used the model for calculating the macroeconomic impacts of EU subsidies, home energy efficiency upgrade programs, and other macroeconomics-related questions.
He also uses applied econometrics extensively in his everyday work. Using firm-level data he published two research papers, one with a focus on firm debt capacity, and another one on the background factors of firms' export decisions, but also worked on numerous applied research not publicly available.

ADVANCING SUSTAINABLE ENERGY AND POLICY INNOVATIONS ACROSS EUROPEAN CONTEXTS

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Economics and regulation of obtaining energy from biomass in the countries of European Union and Serbia

ABSTRACT

INTRODUCTION

Due to the necessary changes related to climate neutrality, the growth of renewable energy sources is inevitable. Growing concerns about greenhouse gas emissions, climate change and advances in biomass production technology have led to an increase in countries' interest in investing in this type of final energy production. In the period until 2026, it is expected that the share of renewable sources will increase by more than 60% compared to 2020. The growth of their share refers primarily to China, India, Europe and the USA, which account for 80% of renewable sources. overall capacity expansion (IEA 2021).

THEORETICAL BACKGROUND

Bioenergy plays a significant role in three main sectors: electricity generation, thermal energy and transport. Its most important role is in the production of thermal and transportation energy. In Denmark, Finland and Estonia, almost 15% of electricity is produced from biomass. Both solid biomass and biogas are used for the production of electricity. The average annual growth rate of the bioenergy sector, in the period of 18 years, between 2000 and 2018, was 2%. When considered individually, the liquid biofuels sector had the highest growth rate, at 13%, followed by biogas, at 9% (WBA 2020).

METHODOLOGY

Through a systematic review of scientific and professional literature, statistical analysis, comparative method and other scientific methods, the paper aims to provide insight into the economic aspects and regulatory frameworks surrounding energy from biomass in the EU and Serbia. Examining the current state of biomass energy, the aim is to identify key themes, challenges and opportunities associated with this renewable energy source. In addition, it aims to present the existing regulations governing the production of energy from biomass and explore potential areas for improvement.

RESULTS

Since 2005, the European Union has had a set of incentives and measures, economic, financial, regulatory and other, for the development of renewable sources, out of which a quarter is directed towards biomass. Financial measures were the most common and account for about 60% measures related to different types of biomass. Thanks to developed national policies, the need for bioenergy is expected to grow in the coming years. Global demand for biofuels is expected to grow by around 28% by 2026. The largest growth is attributed to the Asian region thanks to the policy adopted in India, related to increasing the use of ethanol (IEA 2021).

POLICY IMPLICATIONS

In the Republic of Serbia, a legal basis has been established when it comes to the recent energy transition, and therefore the greater use of bioenergy. The area of construction of biopower plants is affected by laws from three different areas, such as those related to the area of planning and construction of facilities - the Law on Planning and Construction, the Law on Spatial Planning of the Republic of Serbia, as well as other by-laws. In the field of energy, it is important to mention the Law on Energy, the Law on Renewable Energy Sources, the Law on Energy Efficiency and Rational Use of Energy.

CONCLUSION

Recognizing the potential of biomass energy, Serbia has taken numerous steps to develop its biomass sector. Therefore, Serbia established regulations and incentives to promote the use of biomass for the production of final energy. The goal is to achieve National Action Plans through three-year programs. The programs contain clear plans of activities for the introduction of energy-efficient products, processes and technologies, monitoring of the achieved results as well as the resources for their realization. Steps in this field can also be seen in the construction of a larger number of biogas power plants in Serbia, while the largest amount of biogas power plants in Serbia is concentrated in the area of Vojvodina, 24 out of 28 built, while 73 biogas power plants with a capacity of about 70MW are under construction.

KEYWORDS

Biomass energy, Sustainable energy, Regulations, Bioenergy, Biofuel

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In January 2022, he started the case study section in the secondary economics school "9. Maj" in Sremska Mitrovica. He is currently sales manager in the company EKOTERM, as well as teaching assistant at the Faculty of Management of the Metropolitan University.

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POTENTIAL OF WIND ENERGY IN BOSNIA AND HERZEGOVINA

ABSTRACT

It is globally recognized that the use of renewable energy is of great importance for achieving sustainable development. Nevertheless, considering the reduction of fossil fuel reserves, as well as the environmental impact of using fossil fuels, research into usable renewable energy sources is becoming increasingly important for long-term development (G. Mortensen, L. Landberg, I. Troen, E.L. Petersen, 1993). In Bosnia and Herzegovina, one can find geographical diversity of great importance for the development of wind parks. Bosnia and Herzegovina has natural and geographical potential for the development of wind energy, and some estimates speak of a minimum of 1,000 MW of commercially usable wind power plants (Tešić Miroslav, Elvir Zlomušica i Sabina Sijačić, Elvir Zlomušica i Sabina Sijačić, 2009). Looking at the legislation and energy trends in the European Union, there is a need in Bosnia and Herzegovina for a stronger step forward in the construction and increase of the capacity of renewable energy sources that are integrated into the electric power system (World Wind Energy Association: World Wind Energy Report 2009, 2010).

Although wind power plants are not traditional technologies in Bosnia and Herzegovina, they currently have the greatest potential and are certainly the most acceptable on the market (http://www.bh-news.com/index.php/component/ba/). International, especially European experience indicates that project financing models are mainly used in the research of wind potential, project development, construction and use of wind farms. In this paper, we will show locations in Bosnia and Herzegovina with the highest wind potential, and the way in which wind strength is measured using SODAR and LIDAR. We will explain the principle of operation of large and small (home) wind turbines, as well as the advantages and disadvantages of wind turbines, and provide a conclusion, with the aim of examining the possibility of producing electricity from renewable energy sources,primarily wind energy in Bosnia and Herzegovina (http://www.bh-news.com/index.php/component/ba/. Wind energy potential is currently being measured at 11 strategically located locations throughout Bosnia and Herzegovina using state-of-the-art equipment for wind parks.(Aleksandar Tadić1, Milica Vujadinović,2011)

Keywords: wind power plants, geographical position, development, Bosnia and Herzegovina

Introduction

The sector of renewable energy sources has been given the task of providing reliable power supply for industry, trade and society as a whole. The motivation is not only to replace the dwindling source of fossil fuels, but also to achieve cleaner air and to meet the goals for net zero carbon emissions in globally different time horizons. Both solar and onshore wind energy are limited by geographic factors. In addition, wind energy is generated by airflow, which in turn is influenced by a number of factors, including prevailing climate, weather conditions, underlying surface conditions, topography, and geomorphology,(Wolfgang Platzer,2003). These factors lead to the randomness, intermittentness and uncontrollability of wind power (Nourani Esfetang and Kazemzadeh, 2018). If wind turbines for the production of wind energy are installed in Bosnia and Herzegovina, as the most developed in the field of renewable energy sources (OIE), it could take the leading position, if the appropriate assumptions are made, which is confirmed by the intensity of interest in the construction of wind power plants. Some of the potential investors have been measuring and researching wind energy since 2004/2005 at several locations in Bosnia and Herzegovina, and certain requests for permits, consents and connections to the grid have already been sent to the relevant institutions. (Pedersen, E.; Waye, K.P 2007). The aim of this paper was to present a specific methodology for documenting windmills, to create a graphic representation using computer graphics, as well as to expand the importance of wind potential in Bosnia and Herzegovina.

Methods

This research developed a specific methodology for documenting and displaying the geographic areas where such unique constructions may be found. The techniques used are part of the field of engineering graphics and cartography (Fyhri, A.; Aasvang, G.M 2010). The use of digital photogrammetry is for the purpose of study. Measurements made only using a measuring mast or tower may be classified as banking, and serve in the subsequent phases of the project as a reference for obtaining full or partial financing of the project. A document classified as bankable is also an expertise for wind conditions. This includes the compilation of measurement data from all sensors, the effect and other analyses, such as: relief analysis, measurement uncertainty analysis, air density analysis, wind force distribution analysis, wind turbine set productivity analysis and more (Mc Cullagh, P.; Nelder, J.A,1989). The expertise includes data that enables the assessment of investments in terms of wind, the choice of turbines, Weitbull's distribution and wind roses in Bosnia and Herzegovina. This information may support decision-making in projects of the results of our research for Bosnia and Herzegovina.(Vjetroelektrane.com, http:// www. Vjetroelektrane .com/ energija -vjetra-u-energetici/, (23.03.2015.)

Research results

Wind energy, as a sustainable source of energy, has been considered the fastest growing branch of industry in the world in the last ten years. With its strategic documents, the EU initiated the processes of adopting action plans at the national, regional and local levels in order to use all the potential for energy efficient savings. Wind as a source of energy overtook coal and became the second largest energy capacity in the EU, according to the Eurostat report (CROENERGO.EU, http://www.croenergo.eu/Energija-vjetra-u-2014-godini-porasla-za-cak-44!-25760.aspx/(21.03.20 15.). Bosnia and Herzegovina is recognized as a country with significant energy resources, both conventional and renewable. In the strategy for the development of electric energy until 2030, wind energy occupies a significant place. The basic strategic goal of Bosnia and Herzegovina is the harmonization of legislation, which is a complex task that implies extensive and essential changes and a comprehensive reform of the energy sector. In order to be effective, legal regulation, that is, energy policy, must satisfy three basic criteria: financial, ecological and safety. (Klæboe, R.; Amundsen, A.H.; Madshus, C.; Norén-Cosgriff, K.M,2016)

Conclusion

If the characteristics of wind in Bosnia and Herzegovina are observed, we may conclude that our country has a good wind potential. This does not mean that the entire area of Bosnia and Herzegovina is extremely suitable for the construction of wind power plants. Measurements of certain characteristics of the wind, using LIDAR, SODAR and anemographs, (speed, direction, frequency), have shown that one area is more suitable for the use of wind energy than the rest of Bosnia and Herzegovina (Artar, S. Tolun, 2016). The goal was to obtain the main technical parameters of the windmill, including the obtained power and momentum. These results will be discussed according to Betz's theory. In this paper, we present solutions such as graphic and cartographic representation by integrating computer design, geodetic processing, photogrammetry, cartography and computer graphics.

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(IM)POSSIBILITIES FOR A JUST GREEN TRANSITION IN BULGARIA

ABSTRACT

INTRODUCTION

The energy transition is an enormous global change. The EU aims not only to reduce the greenhouse gas emissions, but also to carry out a fair transition that does not limit development and does not create new social problems. However, the fairness of this process seems to face a risk in regard to the societal capacity to combine demands for justice with economic and technological changes. In the text we will focus on the context in which the green transition is implemented in Bulgaria as it is crucial for the outcomes of the process itself.

LITERATURE REVIEW

In 2015, the ILO adopted Guidelines for a fair transition to environmentally sustainable economies and societies for all (ILO, 2015). Various studies draw attention to the need for interdisciplinary research on the problems of energy transition and the main topics that should address them (McCauley et al., 2019); offer ethical (Jenkins et all, 2018) and theoretical frameworks for conceptualizing the issue of a fair transition; instruments for measuring justice in the energy sector are discussed (Heffron, McCauley & Sovacool, 2015).

METHODOLOGY

The report is based on the research work implemented in the framework of a project "Public Capacity for A Just Green Transition", funded by the National Fund "Scientific Research" (contract KP-06 PN55/13). It presents analysis of data obtained through in-depth interviews with different stakeholders and desk research.

RESULTS

The green transition poses particular difficulties for Bulgaria due to its large share of hydrocarbon energy sources. On the other hand, Bulgaria is among the member states that have high levels of energy poverty and income inequalities. Furthermore, during the 1990s, the country experienced deindustrialization and a distinct economic decline, and fears of a new decline are alive. The result is clearly expressed opposing viewpoints and fears that hardly, if ever, find bridges.

DISCUSSION / POLICY IMPLICATIONS

The text argues for the need of meaningful alignment of social and environmental goals based on public capacity to formulate and implement adequate pro-development policies.

CONCLUSION

Achieving a just green transition is a complex task that requires various aspects to be taken into account. The context in which the process occurs is of significant importance for its quality. The results from our study show that there is a high probability that the problem of maintaining justice in the implementation of the green transition will be underestimated, and conflicts will easily arise between the "green" and social goals (justice) of the transition.

KEYWORDS

fairness, green transition, public capacity, Bulgaria

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Challenges of sustainable development: insights from social innovations case studies in Croatia

ABSTRACT

INTRODUCTION

Social innovations are new ideas (products, services, and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations. In other words, they are innovations that are not only good for society but also enhance society's capacity to act (BEPA 2010)

LITERATURE REVIEW / THEORETICAL BACKGROUND

Croatian experience (Bežovan, et al.,2016.; Baturina, 2019) shows that social innovation is a neglected topic, a concept that is unknown to professionals and policymakers. The social innovation ecosystem is in the initial phase of development, with some identified cases but underdeveloped institutional recognition and support (Baturina, 2019). The goal of the paper is to explore the potential of social innovation in the field of sustainable development in Croatia.

METHODOLOGY

There are two key research questions: firstly, how do social innovations in the field of sustainable development occur in the Croatian context, and secondly, how do social innovations create effects on sustainable development? The research is based on a qualitative research approach since it deals with an under-researched phenomenon (Moulaert and MacCallum, 2019; Wittmayer et al., 2017) through exploratory multiple case studies (N=5). The analysis strategy was by the research design, based on several key dimensions. Analysis of case studies followed the structure established by Yin (2009).

METHODOLOGY

There are two key research questions: firstly, how do social innovations in the field of sustainable development occur in the Croatian context, and secondly, how do social innovations create effects on sustainable development? The research is based on a qualitative research approach since it deals with an under-researched phenomenon (Moulaert and MacCallum, 2019; Wittmayer et al., 2017) through exploratory multiple case studies (N=5). The analysis strategy was by the research design, based on several key dimensions. Analysis of case studies followed the structure established by Yin (2009).

DISCUSSION / POLICY IMPLICATIONS

Backed up with a theoretical framework of transformative social innovation (Haxeltine, et al, 2017) and eco-social innovations (Matthies et al, 2019) and based on the results of the research the paper will discuss the challenges of developing social innovation ecosystem in Croatia and promoting new solutions in fields of energy and environment.

CONCLUSION

Finally, the paper will discuss the implications of the research for the development of supporting policies and reflect on wider aspects such as realizing the goals of the European green deal in Croatia and promoting the sustainable performance of the country

KEYWORDS

social innovations, sustainable development, governance, social impact, transformative social innovations.

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Captured green industrial policy in hybrid regimes: the case of Hungary

ABSTRACT

INTRODUCTION

Climate change has brought environmental protection and green policies to the forefront all over the world. At the same, the political system of certain EU members has shifted towards an autocratic direction. On the example of Hungary we aim to discover whether and how green policies are applied in these newly emerging hybrid regimes. The boundaries of new industrial policies have been considerably extended leading to risks of misuse.

LITERATURE REVIEW / THEORETICAL BACKGROUND

New industrial policies are needed to address sustainable development and transformation towards a low-carbon, resource-efficient economy (Aiginger and Rodrik, 2020; Bulfone, 2022, Altenburg and Assmann, 2017). Bättig and Bernauer (2009) argue that democracies put more effort into climate change mitigation than authoritarian regimes. Povitinka (2018), Bernauer and Koubi (2009) emphasize the importance of low-corruption contexts and other factors.

METHODOLOGY

We support our argument international methodologically with document and literature analysis of and Hungarian sources and interviews with representatives of NGOs, and academic experts. Between November 2022 and February 2023, we prepared seven semi-structured interviews of, 40-80 minutes on Skype, telephone or personally.

RESULTS

We provide evidence on the capture and instrumentalization of green principles and illustrate some mechanisms of that in detail. The green façade is maintained, yet the implementation and economic policy practices show a totally different, anti-climate and anti-environmentalist attitude and reality. This paper adds a further dimension (environmental sustainability) to the analysis of contemporary hybrid regimes and statist experiments.

DISCUSSION / POLICY IMPLICATIONS

The main mechanisms of neglecting green aspects: 1. No social consultation, no transparency 2. Centralization of decision-making 3. Political capture and/or hollowing out of agencies and regulations; 4. Repression of civil initiatives and organizations; 5. Politicization of communication and overwhelming propaganda. It is very difficult to find policy recommendations and to protect the environment in illiberal systems that compromise green growth and development.

CONCLUSION

We do not find any coherent economic policy that would respect sustainability or climate aspects. The strategies aim to fulfil EU requirements and to attract financial resources, whereby the primary motivation is to make private fortunes. The case of Hungary highlights, how green industrial policies are captured in the distorted institutional settings of hybrid regimes more than in established democracies with fully operating checks and balances.

KEYWORDS

industrial policy, hybrid regimes, environmental protection, Hungary

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Procurement of innovation as smart specialization tool enhancing the ce: evidence from Greece

ABSTRACT

INTRODUCTION

The objective of this paper is to investigate how the public sector can effectively intervene to accelerate the adoption of the Circular Economy (CE) while enhancing innovation and growth. It proposes the combination of local development policies, such as the Smart Specialization Strategy (SSS) in the EU, and the utilization of Public Procurement of Innovation (PPI) as an effective policy tool. The paper aims to contribute by intersecting three strands: the circular economy, the smart specialization strategy, and public procurement of innovation. The case of Greece from 2014-2020 is used to support our argument.

LITERATURE REVIEW / THEORETICAL BACKGROUND

The paper discusses the concepts of the CE, SSS and PPI. It explores their potential synergies, highlighting the challenges and resistance to change that each concept faces individually. It argues that the combination of these three concepts can create a conducive framework for mutually reinforcing outcomes, fostering innovation, and driving the transition to a circular economy.

METHODOLOGY

The cornerstone of our analysis is the intersection between the three concepts of interest of this paper. Our approach is that, if we are able to quantify the triple interaction area, we can create a tool that helps generate funding, over and above the CE earmarked resources, thus accelerating the transition to the green economy. In order to assess the magnitude of this intersection we used European Structural and Investment Funds (ESIF) data for Greece from 2014-2020.

RESULTS

The analysis of the Greek case demonstrates that coordination between the Smart Specialization Strategy, the CE, and Public Procurement of Innovation can be mutually reinforcing. The availability

of technical knowledge, the selection of environmental priorities within the SSS, and the significant public sector involvement in relevant activities create favorable conditions for innovation and the transition to a circular model of production and consumption.

DISCUSSION / POLICY IMPLICATIONS

The paper discusses the potential policy implications of the suggested triple synergy. It emphasizes that the public sector's increased demand for products and services supporting the CE will reduce private sector investment risks and stimulate the creation of new markets. The study suggests that development priorities can provide direction and financial resources for unlocking research potential and fostering entrepreneurial discovery in CE-related innovation.

CONCLUSION

It is argued that the combination of the SSS, the CE, and PPI can effectively address societal challenges, foster innovation, and accelerate the transition to a green economy. Coordinated efforts and the utilization of existing public funding can provide the necessary critical mass to trigger PPI and promote the development of CE-related innovative products and services.

KEYWORDS

Sustainability, Resources, Circular Economy, Policy

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Support for congestion pricing among Budapest motorists

ABSTRACT

INTRODUCTION

In recent years, the increase in car traffic has become a significant problem for transportation in Budapest. To reduce car traffic, several public transportation developments have been announced for the coming years, but this alone may not be sufficient to reverse the current traffic trends. In order to change Budapest's car traffic in a favorable direction, it may be necessary to internalize the external costs caused by cars through economic incentives.

LITERATURE REVIEW / THEORETICAL BACKGROUND

To gain a deeper understanding of the topic, this study examines the social and environmental costs related to transportation and draws the conclusion that car transportation generates the highest external costs in modern cities overall. Based on research conducted in this field, on average, less than half of these costs are reflected in the price of driving, making it seem self-evident, according to the principle of polluter pays, that this proportion should be increased. After reviewing tax types and fees, it becomes clear that congestion pricing is the most suitable tool for this purpose.

METHODOLOGY

This survey-based research aims to provide an overview of attitudes towards congestion pricing among Budapest drivers. Comprehensive studies have not been conducted on this topic in Hungary, so this research is exploratory in nature, and its results are limited in interpretation due to the lack of validation, representativeness and small sample size. The main objective of this research is to determine the key obstacles to introducing congestion pricing in Budapest and specify important factors influencing the level of support of individuals.

RESULTS

From analyzing Likert-scale variables and conducting principal component analysis it can be inferred, that openness towards other modes of transport and the support for congestion charges are correlated moderately. Key factors influencing attitudes towards using other modes of transport are the price of public transport, service quality and time of travel. The introduction of congestion pricing was only supported by 25% of respondents, but when proposed with free public transport the support increased by 8,5 percentage points.

DISCUSSION / POLICY IMPLICATIONS

Based on the results, it seems that there is a general openness to using public transportation, and without it, the introduction of congestion pricing, improvements in public transportation quality, worsening personal financial situation, or free fares alone may not have sufficient persuasive power. Territorial factors – mainly the quality of public transportation connections in an area – may also have an effect on the level of support for congestion pricing.

CONCLUSION

While the introduction of congestion pricing proves to be effective in a lot of cities around the world, there still seems to be a lack of understanding about the actual factors determining people's choice of travel. Understanding the factors influencing attitudes towards congestion pricing and other economic tools are crucial for authorities to develop effective regulations and communicate them to the public in a politically acceptable way.

KEYWORDS

congestion, pricing, attitudes, Budapest, externalities

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Influence of socio-economic conditions on climate changes in the Ohrid-Prespa region in the republic north macedonia

ABSTRACT

INTRODUCTION

This research paper is based on the study for the Ohid-Presa region which aim is to determine the socio-economic situation of the region given in consideration the climate change specifications. The study is organized in 7 different parts each containing a specific part of socio-economic analysis. For the purpose of this paper the emphasis is on the forecast part of the study which shows the probable forecast on the industry capacity for the region and GDP growth rate according to two different climate scenarios the RCP2.6 and RCP8.6 for future greenhouse gas concentrations defined by the Fifth Intergovernmental Panel on Climate Change (IPCC) for the period until 2100.

LITERATURE REVIEW / THEORETICAL BACKGROUND

For investigation is consulted too much literature. On one side are publication and data of many international organization, as UN agency (The Intergovernmental Panel on Climate Change /IPCC[1], UNESKO, others), NASA, World Bank, WTO, OECD Key EU laws and policies, as domestic and many others institution. On other side are too many scientists, as Hodder, Martin, Lynas, Mark; Houlton, Benjamin Z.; Perry, Simon, Meinshausen, Malte, Charles Keeling, Weart, Spencer Roy, J.; Tschakert, P.; Waisman, H.; Abdul Halim, but and many others in the world which are member of organization Unitet of Concerned Scientists.

METHODOLOGY

The methodology is based on the forecast according to the historical data and according to these selected presumptions:

- GDP growth rate logarithmic trend line from the period 2010-2021
- Number of enterprises trend logarithmic line from the period 2010-2021
- Projections of number of population in the region according to the UN population data till 2100
- Changes in basic climate variables: daily temperature and daily precipitation according to the RCP2.6 and RCP8.6 scenarios for future greenhouse gas concentrations defined by the Fifth Intergovernmental Panel on Climate Change (IPCC) for the period until 2100.

This forecast does not take into consideration any other variables, and gives the presumption that no other factors will change in the given period, i.e. ceteris paribus. Also another forecast is made taking into consideration the SSP scenarios that respond to the RCP scenarios taken into consideration.

RESULTS

The forecast results show declining trends of the forecasted indicators. This can be expected because of several factors. The fall in population due to changes in the birth rate of the region, migrations, and climate change induced migrations also influence the fall of the two separate indicators. Fall in populations means fewer possible employees and therefore fewer enterprises in the years to come. This also influences the region's GDP growth rate, which will also fall due to the stated reasons. Third and the last reason for the decline of the indicators stated in this forecast is climate change.

DISCUSSION / POLICY IMPLICATIONS

Two different scenarios which were proposed and which show different temperature rises and two different precipitation forecasts, all generally incline towards the downgrade effect on both of the indicators. Rise in temperature and change in climate can really affect the region given that the biggest industry sectors are sensitive to climate changes. Furthermore, the region lacks basic infrastructure to support the existing industries, yet alone support new ones, or build resilience towards climate change perspectives. Lack of sufficient road infrastructure, lack of sustainable energy and touristic capacities are all reasons, which could see the slow but immanent downfall of the region. This will further add pressure to the socio-economic conditions that the resident population is facing currently, leading to more migration and more stagnation for the region in the future.

CONCLUSION

The analysis of the different climate change scenarios for the region show that the average annual temperature will increase by 1.0 ˚ C by 2025 and 1.9 ˚ C by 2050, while the average rainfall is projected to decrease by 3% and 5%. In the same periods, which means a significant increase in dryness. This poses a significant risk for the region particularly in terms of agricultural productivity and as a threat to the two lakes in these municipalities that are of key environmental and socio-economic importance. Particularly because Ohrid has been declared a protected region by UNESCO and the guidelines for the protection of the region must be implemented in order to protect the environment from the upcoming climate changes.

KEYWORDS

Ohid region, climate change, socio economic conditions, GDP, population

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SUSTAINABILITY IN THE MODERN WORLD: ECONOMY, ENVIRONMENT, ENERGY, TECHNOLOGY, AND BANKING PERSPECTIVES

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The nexus between carbon emission and renewable energy in CEE countries: a panel approach

ABSTRACT

INTRODUCTION

While relations between conventional energy sources and carbon emissions in emerging and developing countries have undergone extensive research, the contribution of renewable energy to green development in those groups of countries is still insufficiently explored. The main objective of this paper is to examine and quantify association between carbon emission and electricity production from renewable sources in 15 CEE countries.

LITERATURE REVIEW / THEORETICAL BACKGROUND

The CEE countries are still heavily dependent on energy-intensive industrial production (Fedajev et al., 2019). The dynamics of industrial production is closely linked to the availability and cost of energy (Greenwood et al., 2005; Melick, 2014), and developing economies struggle to ensure a stable and cost-effective energy sources for their industries (Thomas et al., 2010). To this end, it is essential to establish cost-effective energy supply (Andersen & Dalgaard, 2013).

METHODOLOGY

Based on the theoretical discussion and literature review, we formulated the econometric panel model that relates CO2 emission to the electricity production from renewable sources and other relevant variables. To shed light on potential estimation problems, we looked at the properties of the model residuals. Finally, we estimated the empirical model using various panel estimators that align with the specific characteristics of our data, aiming to ensure the accuracy and dependability of our estimates.

RESULTS

The findings from the empirical analysis indicate the presence of robust evidence supporting the association between carbon emission and electricity production from renewable sources. According to the model estimation results, one percentage point increase in renewable electricity production growth in CEE countries reduces carbon emission within the range 0.11 to 0.13 percentage points.

DISCUSSION / POLICY IMPLICATIONS

The results of this research indicate that increasing production of renewable electricity would have a positive impact on green development in CEE countries. To encourage the higher use and production of renewable energy in these countries, it is crucial to implement appropriate policies and institutional frameworks to promote renewable energy development and modernize electricity sector, such as public-private partnerships and provision of tax incentives.

CONCLUSION

Promoting sustainable development based on the renewable energy sources play an important role in decreasing the carbon emission in CEE countries. In spite of the potential to increase use of renewable energy in CEE economies, these countries continue to encounter technical, economic, and social challenges in production of electricity from renewable sources. Subsequently, these countries should prioritize public policies that encourage investments in renewable energy projects.

KEYWORDS

Renewable electricity, carbon emission, CEE countries

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THE DYNAMIC INTERRELATIONSHIP BETWEEN RESEARCH OUTPUT IN THE FIELD OF ENERGY AND CARBON DIOXIDE EMISSION: EMPIRICAL EVIDENCE FROM G7

ABSTRACT

INTRODUCTION

Global average surface temperatures have increased by 1˚C since the 1880s because of rising greenhouse gas emissions (NASA 2020). Experts from relevant organizations estimate that carbon dioxide (CO2) emissions account for 75% of all greenhouse gas emissions, which contribute considerably to the rise in global surface temperature (NASA, 2020). If immediate action is not taken, the global average surface temperature is expected to rise by 1.5˚C between 2030 and 2050 (Petrović and Lobanov, 2020). To halt the process of global warming, CO2 emissions must be reduced. The key challenge for environmentalists, scientists, policymakers, and other stakeholders is to identify the primary causes of CO2 emissions and devise new methods to reduce them. The desire of both advanced and developing economies for increased economic growth and long-term development to improve national well-being raises concerns about its serious consequences for environmental quality, as economic growth is likely the leading driver of CO2 emissions. Given that economic progress includes a wide range of structural changes and consequences (Töbelmann and Wendler, 2020), the major channel via which economic growth affects CO2 emissions is called into question. As economic progress accelerates, so does the demand for output and the need to satisfy varied human aspirations through energy-intensive activities. As a result, increased economic activity demands a larger energy supply (Raghutla and Chittedi, 2020), and increased energy consumption necessitates the use of more fossil fuels to create that energy (Töbelmann and Wendler, 2020). Notably, fossil fuels such as coal, oil, and natural gas account for roughly 60% of global CO2 emissions (Alam et al., 2020), emphasizing their enormous impact to environmental deterioration. One of the most effective mechanisms for mitigating the negative effects of energy on the environment without compromising future economic progress is innovation in the fields of energy and environment. One of the most essential resources for the development of innovations in these areas and for raising awareness among decision-makers about their role in the process of reducing CO2 emissions is scientific knowledge. Accordingly, the main goal of this paper is to analyze the role of research output in reducing CO2 emissions. Additionally, the intention is to determine whether increased CO2 emissions stimulate the productivity of the scientific community in the fields of environmental science and energy.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Energy innovations, particularly in renewable energy sources like biomass, sunlight, wind power, waves, hydro, and geothermal, are transforming fossil fuel-dependent economies into sustainable ones with lower CO2 emissions (Chiu & Chang, 2009; Stern, 2007). Innovations in solar and wind energy production decrease energy consumption-related emissions, while advancements in biofuels and more efficient vehicles contribute to lower mobility-related emissions (Töbelmann and Wendler, 2020). Using renewable energies is a sustainable economic alternative that can limit resource depletion, decrease air pollution, ensure energy security, and create job opportunities (Mongo et al., 2021). Consequently, embracing renewable energy sources is a crucial strategy to combat CO2 emissions (Gessinger, 1997).

A successful strategy for clean energy requires substantial investments in energy-related research and development activities to foster new and improved technologies (Alam et al., 2020). However, over the past few decades, governments have shown reluctance in increasing funding for such endeavors. Energy-related R&D investments have declined since the 1980s in both developed and developing economies, reaching around 17 billion US dollars in 2014, significantly lower than 40 years ago (Alam et al., 2020). The lack of awareness among policymakers about the benefits and consequences of limited investments in this field may explain this negative trend. Considering the potential devastating impact of uncontrolled CO2 emissions on livelihoods and global economic growth, it is crucial for policymakers to thoroughly analyze existing research and develop evidence-based policies to prevent environmental degradation. Scientific publications on pertinent themes in this field can be the most trustworthy source of information for formulating successful evidence-based policy (Đuričin et al., 2022). Furthermore, according to the theory of endogenous growth, R&D sectors generate technical innovation by utilizing human capital and the stock of existing knowledge (Romer, 1986). Essentially, scientific publications provide and disseminate knowledge that can inspire new innovative ideas or technological breakthroughs that researchers and businesses can use to develop new energy-efficient products, services, or processes that boost economic growth.

So far, only de Gouveia and Inglesi-Lot (2021) have conducted a comprehensive analysis of the causality between climate change-related research output and CO2 emissions in developed and developing countries from 1996 to 2019. The results indicate the presence of bidirectional causality between research output and CO2 emissions in developed countries, while there is a one-directional causality running from research output to CO2 emissions in developing countries. When individually examining the world's leading economies (G7), only Germany and Italy exhibited a one-directional causality running from CO2 emissions to research output. In other G7 countries, no causality was found in either direction.

METHODOLOGY

This paper's major objective is to investigate the dynamic interrelationships between CO2 emissions in the G7 group of countries and research output in the field of energy. The number of scientific publications in the domain of energy was employed as a measure of research output. The total yearly CO2 emissions, measured in kilotons, are the CO2 emission indicator. The SCImago electronic database, which is linked to Scopus, was used to retrieve the necessary statistics on the number of scientific publications, while CO2 emission information was taken from the World Bank website. Due to the limited availability of relevant data, the study examines a time frame from 1996 to 2019

By using the Vector Autoregression (VAR) model, we set off on our path to achieve the stated research goal. Instead of using first differences, we calculated VAR models using levels. According to several authors (Ashley and Verbrugge 2009; Gospodinov et al. 2013), a VAR estimation in levels is valid even if the underlying variables have unit roots.

VAR analysis frequently results in the computation of the impulse response function and forecast variance decomposition error in the goal of assessing the dynamic interaction among variables. The impulse response function shows how a variable responds over short and long-time horizons to a one standard deviation disturbance brought on by another variable in the system while maintaining all other variables constant. We employed the cumulative impulse response function to showcase the accumulation of disturbance impact on our variables over time, rather than focusing on the impact at a single moment. The impulse response function's confidence interval is calculated by estimating the standard error of the predicted VAR parameters, which serve as the foundation for the impulse response matrix. We cannot rely on asymptotically based confidence intervals with confidence due to the small sample size, as prior research has demonstrated that they provide acceptable coverage only in sufficiently large samples (Killian and Kim, 2011). A two-stage bias-adjusted approach was used to determine confidence intervals, which, unlike standard bootstrap intervals, explicitly account for the bias and skewness of the impulse response estimator's small-sample distribution.

The impulse response function indicates only the direction of the impact, but not its magnitude. Hence, forecast variance decomposition error was utilized to estimate the proportion of the change in a variable that can be attributed to its own disturbances and the disturbances of other variables in the system.

RESULTS

Scientific output in the field of energy has a negative impact in France, Germany, Italy, the United Kingdom, and the United States. Such findings imply that increased

scientific productivity in this discipline correlates to lower CO2 emissions. France, the United Kingdom, and the United States have seen both short-term and long-term consequences, whereas Germany can only reliably identify the existence of the short-term impact. In Canada's situation, the influence is in the opposite direction and is positive. Increased CO2 emissions boost research production in energy in the short and long run. In Japan, no interrelationships have been discovered.

The reaction of CO2 emissions to changes in scientific production in the field of energy in France, Germany, Italy, the United Kingdom, and the United States accounts for around 49%, 12%, 8%, 38%, and 38%, respectively.

DISCUSSION / POLICY IMPLICATIONS

In most G7 member countries, an increase in scientific productivity in the field of energy contributes to reducing CO2 emissions, which clearly indicates that scientific knowledge is utilized both by those directly involved in the innovation development process and policymakers who use scientific knowledge to create an innovation-supportive environment. These results are contrary to the findings of the study by de Gouveia and Inglesi-Lot (2021).

Increased CO2 emissions have prompted the Canadian scientific community to step up its research in the field of energy, however this has not resulted in a reduction in CO2 emissions. The worst situation is in Japan, where no impact was found in either direction which is in the line with de Gouveia and Inglesi-Lot (2021). In these countries, awareness about the role of scientific knowledge in preventing or addressing issues related to environmental degradation primarily caused by increased CO2 emissions should be expanded. A larger share of financial resources should be directed to energy research and development activities, with an increasing number of scientific publications as one of the outputs.

CONCLUSION

The findings of the research demonstrate that the relationship between scientific production in energy and environmental sciences and CO2 emissions varies throughout the G7 countries. Specifically, in France, Italy, the United Kingdom, the United States, and Germany, the number of scientific publications in the field of environmental science influences a decrease in CO2 emissions, whereas in the same countries, except for Germany, the number of scientific publications in the field of energy influences an increase in CO2 emissions, whereas in Canada, an increase in CO2 emissions influences an increase in the number of

scientific publications. In Japan, no interrelationships were discovered. Energy publications help to address and reduce CO2 emissions through creating knowledge, identifying solutions, analyzing impacts, informing policy and regulation, raising public awareness and engagement, and driving innovation.

Because the relationship between scientific publications and CO2 emissions has not been widely investigated in the literature, this work adds to the body of knowledge in this topic. However, scientific papers alone are insufficient to reduce CO2 emissions. Effective research implementation, stakeholder participation, and strong policy and regulatory frameworks are essential to convert scientific information into tangible actions that reduce emissions.

KEYWORDS
Research output, Environment, Energy, Carbon Dioxide Emission, CO2

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CARBON BORDER ADJUSTMENT MECHANISM EFFECTS ON THE WESTERN BALKAN COUNTRIES

ABSTRACT

INTRODUCTION

Carbon Border Adjustment Mechanism (CBAM) is a new carbon tariff on energy-intensive products (cement, iron and steel, aluminum, electricity, fertilizers and hydrogen) imposed by the EU. In order to be exempt from CBAM tariffs, non-EU countries can introduce carbon pricing systems similar to the EU. As the EU is the main trading partner for Western Balkan (WB), the aim of the paper is to give an overview of CBAM and show exposure of CBAM sectors of WB countries affected by this tariff.

LITERATURE REVIEW / THEORETICAL BACKGROUND

A growing number of studies regarding CBAM have been done. They discuss a wide range of specific issues about CBAM, including legality (Lim et al., 2021; Trachtman, 2016), carbon leakage (Jakob, 2021), effects on the national economy (Acar et al., 2021), non-EU countries' opposition to CBAM (Overland & Sabyrbekov, 2022), etc. Also, special reports from international institutions like World Bank (2023a) and Energy Community (2023) have focused on CBAM effects in WB countries.

METHODOLOGY

In order to conduct these study, several research questions were formulated and attempted to be answered: 1) Will and how will CBAM apllly to WB? 2) How much are CBAM sectors from WB countries exposed to new tariff measured by greenhouse gases (GHG) emission and value of export? A comparative analysis of WB countries by CBAM sectors was done in oredr to answer these questions. Data from the UN (2023), the World Bank (2023b) and Climatewatch (2023) was used for the period of 2018 to 2022.

RESULTS

The majority of CBAM products are exported to the EU. Some sectors, due to high GHG emissions and a greater level of export, may be more exposed, like the iron and steel industry in Serbia. Also, with the exception of Albania, electricity is still dominated by solid fuels and emits much more GHG than in the EU, making this sector vulnerable to CBAM and potential carbon pricing. Although all WB countries are considering carbon pricing, only Montenegro has introduced this system in 2020.

DISCUSSION / POLICY IMPLICATIONS

The findings correspond with research by Eicke et al. (2021), which indicates that Bosnia and Herzegovina and Serbia are quite exposed to CBAM. From a policy perspective, this analysis can provide evidence for the potential implementation of carbon pricing in line with EU regulation in order to be examined from CBAM; however, further analysis is needed regarding the capacity for monitoring GHG emissions and potential effects on inflation, especially during the energy and cost of living crises.

CONCLUSION

The study shows that CBAM will affect WB countries, mostly Bosnia and Herzegovina and Serbia. Individual sectors, such as iron and steel in Serbia, may be particularly affected, which would demand additional policies in order to mitigate the effect of CBAM. The electricity sector is still primarily based on fossil fuels, which makes these sectors exposed to CBAM. Carbon pricing can be a good way of mitigating the effect of CBAM and providing new revenue; however, further research is needed.

KEYWORDS

Carbon Border Adjustment Mechanism, Western Balkans, Carbone Pricing, Green Transition, Carbon Tariffs.

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The MCDM-based assessment of solutions for transition to sustainable industry 4.0

ABSTRACT

INTRODUCTION

Industry 4.0 implies the transformation of organizations into digital entities (Sony & Naik, 2020). It represents a new level of industrial development that has changed demands, competition, industry structure, and sustainability awareness (Dalenogare et al., 2018). The primary objective of this paper is to use Multiple-Criteria Decision Making (MCDM) to identify the principal obstacles and solutions for successfully adopting the technologies that will facilitate a transition of the Serbian industry to sustainable Industry 4.0.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Until now, the authors have used the MCDM approach to analyze different issues regarding Industry 4.0. The topics that gained the researcher's attention are as follows: comparing the Industry 4.0 maturity models (Elibal & Özceylan, 2022), supply chain improvement (Hsu et al., 2022), strategy prioritization (Kumar et al., 2021; Erdogan et al., 2018), technology assessment (Javaid et al., 2022; Chang et al., 2021), cybersecurity evaluation (Torbacki, 2021), and sustainability (Eldrandaly et al., 2022).

METHODOLOGY

The barriers and solutions submitted to the evaluation are borrowed from Javaid et al. (2022). The barriers' significance was defined using the Preference Selection Index – PSI (Maniya & Bhatt, 2010). The assessment of the solutions is performed by three decision-makers and the following MCDM methods: PSI, Compromise Ranking of Alternatives from Distance to Ideal Solution – CRADIS (Puška et al., 2022), and Integrated Simple Weighted Sum Product Method—WISP (Stanujkic et al., 2021).

RESULTS

The results revealed that logistics and reverse logistics management, and technology integration are the most significant barriers. The significance of logistics and warehousing management lies in its role as a crucial facilitator for the sustainable development of industries, ensuring efficient and responsible movement, storage, and distribution of goods. Also, the application and development of new technologies can improve efficiency and reduce environmental impact of Serbian industry.

DISCUSSION / POLICY IMPLICATIONS

The used framework, based on the MCDM methods, enabled the assessment of the barriers and solutions for technology adoption in light of the current business conditions in the Republic of Serbia. The managers and policymakers could easily perceive the main obstacles and optimal actions to fulfill the requirements of Industry 4.0 and to promote sustainable operating. The propositions for future research are directed at introducing the fuzzy MCDM models to better express the decision-maker's opinions.

CONCLUSION

The identification of main barriers and solutions for adopting technologies by application of MCDM-based framework are crucial for the transition to sustainable Industry 4.0. The paper proposed significant methodological framework for barriers and solution identification based on combined application of the PSI, CRADIS, and WISP methods. Its application on the data of three competent decision-makers presented its usability in the decision-making process.

KEYWORDS

Sustainable Industry 4.0, PSI, WISP, CRADIS, technologies

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The Digital Pathway to Sustainable Development: The Role of ICT Skills

ABSTRACT

INTRODUCTION

In the era of digital transformation, Information and Communications Technology (ICT) skills have emerged as a pivotal factor in achieving the United Nations Sustainable Development Goals (SDGs), underpinning progress across multiple dimensions of sustainable development, from economic growth and social inclusion to environmental sustainability. This article examines the critical function that digital literacy plays in achieving sustainable development, with a particular emphasis on Serbia as the case study. We examine the improvement in ICT skills in Serbia over the period of 2007-2021 using data from the Statistical Office of the Republic of Serbia, and we discuss the implications for sustainable development.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Goal 9 of the 17 SDGs emphasizes industry, innovation, and infrastructure, with sub-goal 9c highlighting the importance of universal access to ICTs and the Internet, especially in underdeveloped and developing countries (Hoz-Rosales, et al., 2019; Mhlanga, 2021). Appiah-Otoo & Song (2021) stated that while over 80% of the population in developed countries have Internet access and the necessary ICT skills, less than 35% in developing countries can claim the same. This digital skills gap, a significant aspect of the digital divide, hinders the achievement of universal ICT proficiency, thereby limiting the potential of ICTs for economic growth, social development, and sustainable progress in these countries Bradshaw, Fallon & Viterna, 2005.

METHODOLOGY

Based on data from the Statistical Office of the Republic of Serbia "The Usage of Information and Communication Technology on Individuals/households in the Republic of Serbia", this study employs a methodological framework developed by the EC DG CONNECT group to assess the proficiency of Serbian individuals in ICT skills (EC, 2014). The comprehensive Digital Skills Indicator (DSI) is divided into four sub-sections – Information Skills, Communication Skills, Problem Solving Skills which contains Problem Solving and Familiarity with Online Services, and Skills for Content Manipulation – Basic and Advanced. The analysis focused on the progression of ICT skills across various sub-categories during the time frame spanning from 2007 to 2021. It is important to notice that the utilization of DSI commenced in 2015, necessitating the reconstruction of indices for preceding years, resulting in the acquisition of approximate values. It is posited that, notwithstanding this, a discernible pattern can be observed.

RESULTS

During the observed period, there was a noteworthy enhancement in the level of Information Skills among the population of Serbia, particularly during the period from 2012 to 2014. Nevertheless, there continues to be a discrepancy between Serbia and the EU, specifically regarding advanced skills. The significance of Information skills has garnered increased attention in recent years, especially in light of the Covid-19 pandemic. The enhancement of Communication skills has exhibited a noteworthy progression, as there has been a substantial rise in the population of individuals with advanced proficiency in this domain. However, a concerning percentage of the population in Serbia continues to exhibit deficiencies in fundamental communication abilities. Notwithstanding these advancements, Serbian citizens continue to exhibit a comparative deficiency in problem-solving skills and content manipulation abilities compared to their European Union counterparts.

DISCUSSION / POLICY IMPLICATIONS

Enhancing ICT proficiency in Serbia holds significant implications for the promotion of sustainable development. By addressing one of the subsidiary objectives of sustainable development, which promotes equitable utilization of ICT and unrestricted access to the Internet, a substantial reduction in the digital divide can be achieved. This reduction in disparity plays a crucial role in fostering economic progress, enhancing productivity, and facilitating social integration. In the context of Serbia as a developing country, it is evident that further endeavors are imperative to ensure equitable distribution of ICT, as well as to align the advancement of ICT skills and competencies with the objectives outlined in the SDGs. Policymakers should establish a comprehensive framework that encompasses the enhancement of overall knowledge in this domain. This can be achieved through formal and informal educational channels and lifelong learning initiatives. The ultimate objective of such measures should be to ensure that every individual is adequately equipped, and no one is excluded from benefiting.

CONCLUSION

The stated goals of sustainable development can only be accomplished by developing the framework that supports the use of ICT and the development of skills in all areas of society, which contributes to its overall progress. The present study highlights a favorable trajectory in the enhancement of skills, while also identifying certain deficiencies specific to Serbia. Moreover, it serves as a preliminary investigation that paves the way for future research endeavors exploring the influence of skills on sustainable development.

KEYWORDS
ICT, SDG, ICT skills, Serbia

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Innovation strategies improve environmental aspect of energy efficiency

ABSTRACT

INTRODUCTION

Environmental policies require companies to incorporate environmental protection issues into their business strategies. Although innovation plays a crucial role in decreasing energy consumption and emissions within the industrial sector, its effects on other sectors can vary significantly (Li & Solaymani, 2021).. This study aims to determine and assess the benefits of implementing Energy efficiency Law of Republic of Serbia in the construction sector with the aim to ensure that their interests during the implementation of energy efficiency measures that are obligatory in the designing process.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Buildings exhibit durability, so decisions regarding construction and architecture carry long-term ramifications concerning the environment and energy consumption (Ryghaug & Sørensen, 2009). Defining innovation in the construction industry is challenging because it involves various disciplines and activities. It is a diverse and decentralized field, often characterized by fragmentation, which complicates the understanding of innovation within it (Orstavik et al., 2015).

METHODOLOGY

The survey on environmental protection is conducted as a part of the questionnaire that investigated all aspects of sustainable architecture. Environmental protection was taken as a part of implementing energy efficiency strategies in the construction sector. Since the obligation of issuing energy passports for buildings was required, planners and designers began to take care of the thermal properties of the buildings, materials, type of construction, and structure of all positions and that led, to energy consumption, emission of CO2, environmental contamination, recycling (Table 1).

RESULTS

The respondents assessed the effects of introducing innovations in energy efficiency areas in the construction sector on a Likert scale (1 to 5). The results indicated that the introduction of innovations impacted reducing all indicators of environmental pollution, with the most significant effect being the reduction in energy consumption in construction companies in Serbia.

Table 1. Effects of introducing innovations in the field of energy efficiency

Benefits from innovation introduction	Mean
Reduction in material consumption	2.945
Reduction in energy consumption	3.192
Reduction of emission of CO2	3.055
Replacing existing materials/products with one that less pollutes the environment	3.096
Recycling of wastewater or materials	2.849

Authors calculations

DISCUSSION / POLICY IMPLICATIONS

According to European regulations Serbia has established a legal framework regarding energy efficiency progress and provided the conditions for implementing energy efficiency measures in buildings by introducing methodologies for determining energy performance and calculating heating requirements (Ružičić et al., 2021). This process accelerates the introduction of innovations regarding energy efficiency in the construction industry in Serbia. The conducted research has shown that there are a lot of benefits for environmental protection (Table 1).

CONCLUSION

Innovation focused on enhancing energy efficiency, reducing energy consumption and gas emissions. These advancements hold great potential in fostering sustainable practices and mitigating the environmental impact of energy-intensive industries.

Examples of some parts of the designing process where energy efficiency practices are included:

-Designing buildings to allow for reuse and repurposing.

-Using recycled, recyclable, or biodegradable materials.

-Developing business models that encourage the sharing of resources and materials.

-Implementing waste management systems to reuse and recycling of construction waste.

Implementing all these principles allows the construction industry to reduce its environmental impact, improve resource efficiency, and create new economic opportunities.

KEYWORDS
Environmental protection, energy efficiency, innovation in construction industry

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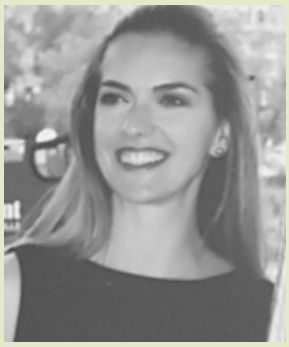

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Energy intensity decrease – still a privilege of developed countries?

ABSTRACT

INTRODUCTION

Energy intensity level is one of main indicators of economy's efficiency. Also, it is one of key metrics when it comes to progress in resolving major 21st century's issues, i.e. global warming and finding the best way for performing a necessary green transition. Energy intensity globally has recorded a significant decrease since beginning of this century, but the extent of this decrease is not the same among countries. The aim of this paper is to address these differences between countries.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Energy intensity (measured as total energy consumption per unit of GDP) is affected by many factors, some of them being GDP per capita, share of renewable energy in total energy consumption, population density, manufacturing share in GDP etc.Some authors identified GDP per capita as the most significant factor with negative impact on energy density. However, decreasing rate slows by more than 30 percent after the level of per capita income reaches $5,000. (Deichmann et al.,2018).

METHODOLOGY

With purpose of identifying significant variables and their impact on energy density, we performed a balanced panel analysis by selecting a sample of 73 countries over period of 15 years (2004-2018, World Bank data). Six independent variables were chosen: GDP per capita, share of renewable energy in total energy consumption, population density, gross fixed capital formation (% of GDP), manufacturing share in GVA and medium and high technologies manufacturing as share in total manufacturing.

RESULTS

The results of analysis have shown that the largest negative impact on energy intensity has GDP per capita, confirming previous researches findings. The second highest negative impact comes from renewable energy share in total energy consumption. On the other side, positive impact expectedly have gross fixed capital investments and manufacturing share in GVA. However, these positive contributions are much smaller compared to the negative impact of GDP per capita.

DISCUSSION / POLICY IMPLICATIONS

Analysis findings show that the key driver of decrease in energy intensity is the level of country economic development, meaning that developing countries with highest share in World population and industry (China, India, Indonesia etc.) still have limited possibilities for decrease in energy intensity. Less developed countries are unable for large investments in new green technologies. The second important result is the importance of renewable energy as a factor of energy efficiency increase.

CONCLUSION

Energy intensity is one of key metrics for overall economy efficiency. It is of great importance for green transition goals. Over last 20 years, World energy intensity has significantly decreased. However, the speed of decrease defers between countries. We performed a panel analysis, identifying GDP per capita as the main factor of energy intensity decrease. Developed countries have more possibilities for reducing energy intensity, as they can provide higher investments in green technologies.

KEYWORDS

energy intensity, renewable energy, global warming, green transition

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SUSTAINABILITY INTERSECTIONS: POLICY, EDUCATION, AND SOCIO-ECONOMIC IMPACTS

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Education for Sustainability – the missing link in policy making for the Green Transition

ABSTRACT

The main argument of the paper

Most of policy making is stuck in a dominant paradigm way of thinking that struggles with solutions since such proposals are often framed within the same thinking or mindset that created them. However we do not need to stay stuck in such a mindset and a new alternative paradigm is already emerging. Thus one can argue that policy making is the root cause of the current climate change challenges as well as the potential main solution to lead us to the required Green Transition. Education for Sustainability is the missing link.

Literature review/theoretical background

David Orr (1992) has argued that the endangerment of the things on which our future depends on, such as climate stability, is not the result of the work of ignorant people but rather that of people with MBAs, and PhDs. His provoking comment was done in order to stimulate a debate about the quality and relevance of education rather than the level attained. In spite of the importance of such debates on the types of education that best serve us, there is a huge gap in knowledge regarding the critical pedagogies needed for policy makers. There have been a few recent endeavours to fill in such a gap. Hili & Pace (2022) have attempted to "personally involve policymakers in their critical education through dialogical encounters aimed at perspective transformational change (p.36|)". Caruana (2014) has demonstrated the need to invest in leadership, social learning and in the enhancement of the capacity of institutions to be and become innovative cocreators of a new emerging paradigm, arguing that this is a challenge for educators to embrace with passion and urgency. Hopkins (2009) has demonstrated that the required Green Transition is not a utopic endeavour but a spreading emerging undertaking at a local level that gives a news sense of possibility.

Methodology

This research is theoretical research to help answer the following questions:

1. To what extent is our education system preparing policy makers to be ecologically literate?
2. What kind of education will lead us to the required Green Transition?
3. Is Education for Sustainable Development (ESD) – as foreseen in SDG 4.7 – a suitable vehicle to scale up efforts towards the Green Deal and the Green Transition?

It is based on as review of relevant secondary documents and research, using Malta as a case study where necessary, to shed light on the above-mentioned questions.

Findings/Discussion/Policy implications

ESD has gained traction – in particular since the United Nations Decade on Education for Sustainable Development (2005 - 2014) sought to integrate the values of sustainable development into all learning processes to encourage positive behaviour for sustainability (International Implementation Scheme, 2005). In spite of this, the approach to ESD has remained fragmented, and still privileges the formal system of education, regardless of the constraints that often emanate from rigid syllabi. The non formal and informal sectors – particularly as pertaining to policy makers as a target group – have remained at the fringe, under researched, and with no co-ordinated efforts to ensure quality, relevance and accessibility. This jars with the ever-growing understanding that education is central to sustainability. New approaches to reach policy makers are needed, as are models and values hierarchies' systems to infuse sustainability across all steps of policy making, including monitoring and evaluation. This needs to be done within an innovation context that understands how government, civil society, academia and industry interact. Indeed active change requires both a top-down approach and a bottom-up approach that seeks to involve different stakeholders, not least civil society, in authentic participatory exercises. The experiments taking place within the Transition Towns framework are indicative of what can be done at a larger scale. The Rapid Transition Alliance (2019) is showcasing what can be done through new thinking outside of the dominant paradigm mindset. Community involvement and motivation is high. In spite of their success and their bottom-up approach, they still argue for this to be done with top-down support, asking for changes at the national and macro level to remove obstacles and on the need to bring about change in the wider policy framework.

The pedagogic processes taking place at adult, youth and community level - within examples such as the Transition Towns - need to be further researched, understood and systematically captured.

Conclusion

This paper argues for an increased role of ESD in the Green Transition. However, the type of ESD required needs to disassociate itself from the dominant paradigm that is at the root cause of the climate challenge and embrace an emerging paradigm that privileges both empowering policy makers to be change makers as well as the genuine participation of civil society. More research is needed to better capture the pedagogic process that take place within already positive examples of good practice, in order to be able to scale up and scale deep.

Keywords
Education for Sustainable Development, Green Transition, Policy Makers.

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ENVIRONMENTAL CITIZENSHIP – An instrument to enhance sustained environment policy through community gardens

ABSTRACT

The paper examines and analyzes an instrument of environment policy by describing the idea of community garden (CG) phenomenon. The case study we choose are CGs located among sites included in the Israeli National Project Renewal for Disadvantaged Neighborhoods (PR) where Ethiopian immigrants settled. It describes them as both social practice and spatial expression including environmental citizenship implications. They became one of additional national policy to cope with climate changes and its environmental impacts.

The case study relates to the Ethiopian population arrived to Israel during the big migration waves in the early 1990's. People who came from traditional agricultural society, surrounded by natural landscapes and who have no knowledge about what urban environmental life looks like, found themselves with no suitable employment while housed in urban neighborhoods.

CGs became the most suitable solution for them to "return back to the land". It composed all comprehensive human and social structures and personal needs they lacked that accompanying their migration. The main outcome of CGs experiment spread among other communities in Israel supported by local governments, NGOs, Government Offices, and Private sector. The locations are in open places where no present plans relates to them. It solves many social, community, physical, environmental, economical, educational, citizen and civic behavior, conflicts among groups.

Keywords: Community garden; Ethiopian population; Traditional VS modern agriculture; patriarchic VS modernized society; Environmental citizenship values; Environmental instrument that create policy

1.Introduction

I would like to start with a citation which to my view presents the most compliance way to representing emerging minority groups of society who express their environmental citizenship in their neighborhoods and city at large and posted it as an environmental instrument:

"Our bodies and narratives have been primarily excluded from mainstream imagery of outdoors recreation and engagement; however, we have such deep cultural ties to land and the outdoors. Our experiences and tradition are intimately interwoven into our relationship with nature. Reconciling that relationship, and reaffirming our place and position in these spaces, is critical to our collective healing journey" (Bey, July 10th, 2019).

Expanded urbanization developments of the industry and consumption enhance the research occupation in the existence of open green spaces. Human behavior has cardinal influence on the design of natural environment resources, on their management and their preservation. At the same time, there are significant impacts on human beings and its culture (Zimrony, 2017).

Therefore, the discourse of environmental researchers focuses on the importance of natural environments for the benefit of humanity. It practiced through conceptualizing of ecosystem services that define four different goods and services natural spaces provide human beings: provisioning (e.g. food); regulating (e.g. climate control and air quality); cultural services (e.g. enjoyable possibilities); recreation and ecotourism.

The approaches that examine the feature perceived by human beings assume that nature connects to the social world where he/she lives in. These approaches are related to the natural surrounding and they are the product of cultural understanding where people interpreted the physical characteristics of the environment according to the cultural categories exist in their own society (Zimrony, 2017:128).

The life in the city and the urban environment place are in front of a challenge: How can we live in a modern society without losing the values the human society has acquire along the history in the open spatial space? Will we be enlightened enough to find the balance between the modern life and the intimate contact with the environment?

Community garden enables all of us to connect between the environment, its values and advantages and modernity. It is not so surprisingly at all, that thousands of citizens in Israel are attracted to become active in CGs. We find them among down towns and city centers, in disadvantaged neighborhoods, in open lots and public institutions (Ministry of Agriculture and Rural development [MARD], 2013)

CG is a cooperative framework of people, who adopt a plot of land and cultivate it in a way that invite the establishment of relationships between citizens and encourages community activity around a common goal. Gardening, whether for agriculture or aesthetic purposes is executed by the community members in open spaces both in private and public ones.

The common activity in the CG creates social significant community processes such as: citizen participation; taking responsibility and accountability of the citizens for their dwelling surrounding; community empowering; a multi-cultural dialogue between different populations;

In addition, CG enhances environmental quality.Many local authorities in Israel invest huge efforts in order to encourage citizens to take active actions to protect the environment through waste cycling, reusing solid waste, food resources, developing local leadership, strengthening sense of belonging, reducing alienation and contact bonding with inter-generation and inter-cultural.

Our paper puts forwards the following questions:

1. What are the impacts of the creation of CGs on the Ethiopian population living in disadvantaged neighborhoods?
2. What are the framework aspects involved in CGs?
3. What are the criteria and measures to evaluate environmental citizenship among the CGs population?
4. To what extent CGs have help to build community cohesion?
5. What are the inter- and intra-generations relationship?
6. Which criteria of the environmental citizenship definition by the ENEC 2018 have definite expressions among the neighborhoods included in the sample?
7. Are there any new criteria of environmental citizenship not included in the official definition?
8. How the impacts of CGs cause the creation of an environmental instrument that establishes policy?

2. Methodology

This study examines 8 community gardens located in neighborhoods that are part of the Israeli Project Renewal (Weinstein, 2010; Carmon, 1989; Alterman, 1991) and composed of Ethiopian population. The focus of the study is on community gardens cultivated by local residents of Ethiopian origin settled in urban disadvantaged neighborhoods who migrated to Israel during the mid-1980s and the beginning of the 1990s.

The research and fieldwork held during the period of March to December 2019. The data collected included: local history of the neighborhoods under investigation; socio-economic information such as the city and neighborhood cluster rank according to the Israeli Central Bureau of Statistics (CBS); public Vs. ownership housing; education; municipality services and community institutions.

The interviews were executed with the community garden coordinators who manage the whole operation and responsibilities of the gardening especially the direct contacts with the local municipality departments, NGOs, and external organizations who became important partners in developing the community gardens. More interviews have been done with social workers who were part of the organizational staff, Ethiopians who worked in the CGs and Project Renewal managers of the neighborhoods under research.

An open questionnaire was prepared for the interviews. It covers variety of sub-topics in community garden such as: physical and social attributes; patterns of CGs; social and community events; social interactions; social impacts; garden's components; impacts of CGs on the Ethiopian population; and stakeholders involved.

Since the literature on community garden is huge, we have chosen those researches and articles that used keywords as follow: community garden, environmental education, environmental citizenship, disadvantaged neighborhoods, urban community garden, migrant's garden, social aspects of community gardens, community gardens benefits, community garden and local government.

We present here the operational definitions and terms used in this study to clarify their meanings. The terms relate to environment issues with an emphasize to local resident citizenship, education, ecology and ecosystems.

- **Community garden:** The term has two sets of meanings: one is the community garden and the second is the community relates to people. Nada (el al., 2018) refers to community garden as a variety of land types uses. It can range from plots of flowers on vacant lots to collections of individual plots on private property, among others. Community gardens have been described broadly as "... tangible arenas in which urban residents can establish and sustain relations with one another, with elements of nature, and with their neighborhood" (Kurtz, 2001:651).

- In a broader definition CGs are open spaces designed, cultivated and maintained by citizens' locality (Pudup, 2008). Eizenberg (2008, p.32) defines CG as follow: "Urban community gardens are open plots in the city, designed and maintained by the neighborhood's residents... the gardeners are employed on a voluntary base". Other definitions emphasize the physical aspects and the social-community sides (Gibson, 2010; Kurtz, 2001).
- There are different models, management and development of gardens in the urban space. Gardens can be located on land under the responsibility of institutions, whether public or private. Some are growing flowers, vegetables or plant with cultural significance. In Europe we find the Allotment Gardens where individuals separately are growing plants with limited community activity (Bell et.al., 2016).

- Environmental citizenship: is defined as the responsible pro-environmental of citizens who act and participate in society as agent of change in the private and public spheres, on a local, national and global scale, through individual and collective actions, in the direction of solving contemporary environmental problems, preventing the creation of new environmental problems, achieving sustainability as well as developing a healthy relationship with nature (ENEC, 2018).
- Environmental citizenship includes the exercise of environmental rights and duties, as well as the identification of the underlying structural causes of environmental degradation and environmental problems, the development of the willingness and the competences for critical and active engagement and civic participation to address these structural causes, acting individually and collectively within democratic means, and taking onto account inter- and intra-generation justice (ENEC, 2018).
- Berkowitz (2004:232) adds, that environmental citizenship is the intendancy to develop our values and act them as we choose. It is a process that continues and evolves as our relationship with and understanding of the environment, societies evolve, and as the world around changes.

In addition, Berkowitz et al., (2004:230) present their five overlapping components required for the development of environmental citizenship as shown in Figure 1.

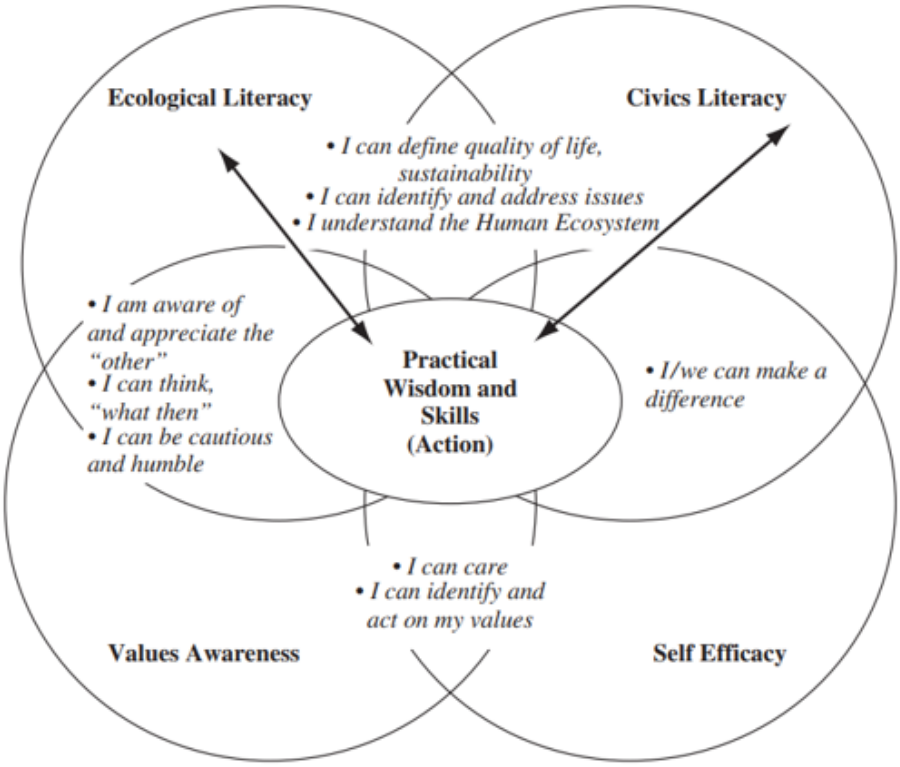

Figure 1: The five overlapping components of environmental citizenship. For each area of two-way overlap, illustrative statements of an environmental citizen are included. The prominent arrows emphasize the dynamic pathways by which literacy, awareness and self-efficacy contribute to and also benefit from acquisition of practical wisdom and skills through action.

The components are described and explained as follow:

- Ecological Literacy: Understanding the key ecological systems using sound ecological
- understanding, thinking, and habits of mind for living in, enjoying and/or studying the environment while also understanding the nature of ecological science and its interface with society.
- Civic Literacy: Understanding the key social, economic, cultural and political systems using the requisite critical thinking skills. It is also the ability to participate in society responsibility. Environmental issues and problems should be seen as essential topics for civic and ecological literacy, rather than as a separate dimension of environmental citizenship.
- Values Awareness: Awareness of personal values with respect to the environment, and ability to connect these values with knowledge and practical wisdom in order to make decisions and act. These values are fostering environmental citizenship. They are built on the socially accepted value that environment is crucial when making decisions and acting. People recognize that humanity wellbeing and health is connected to the quality of life and the physical world around.

- Self-efficacy: Having the capacity to learn and act with respect to personal values and interests in the environment. The two way interactions among components of the environmental citizenship framework are presented once with self-efficacy growing from taking acting and building practical wisdom and insight and once again, when low levels of self-efficacy or disempowerment limit action.
- Practical Wisdom: Possessing practical wisdom and skills for decision-making and acting with respect to the environment. Practical skills include problem-solving, issues clarification, communication and persuasion. Besides, the arenas in which people choose to act through community organizations, or political process, the legal system, policy and management, or individual behavior, leave open a broad range of practical skills needed, with each individual choosing his/her own path in his regard.

Active Citizenship: Buijs et al. (2017) add this significant perspective factor which we connect and integrate it as an important issue of environmental citizenship. Active citizenship is understood as 'Citizens' ability to organize themselves in a multiform manner, to mobilize resources and to act in the public [...] in order to protect rights and take care of common goods' (Cited from Moro G. 2012 p.11). Active citizenship does not start from government intervention but refers to a self-organization or bottom-up governance. The engagement of citizens with local green spaces can be motivated by a combination of social and environmental objectives, rooted in a type of environmental stewardship that goes beyond immediate personal benefit and incorporates wider cultural values (Krasny & Tidball, 2012).

Long-Term Ecological Research Network (LTER) has proposed the Integrated Science for Society and the Environment (ISSE) framework. Active citizenship critically depends on cultural capital that is the capacity and capability of people to take part in actions around spaces they value. Active citizens often focus on maintenance of urban green. As such, they continue to the on-going challenge for municipalities of place-keeping. This challenge is important to ensure the long term continuity of stewardship that is required to preserve the social, environmental and economic values of a place.

Social Resilience: An aspect of active citizenship (Weinstein, 2013). Adger (2000) defines it as 'The ability of groups or communities to cope with external stresses and disturbances as a result of social, political and environmental change' (p. 347). He argues that a clear link exists between social and ecological resilience. By bringing people together and formulating shared goals, citizen groups are known to contribute to social cohesion. Improving self-organization through activities such as urban food growing can help citizens build resilience to declining economic conditions, and the promotion of environmental awareness and education (Weinstein,2010).

Active citizenship and social resilience receive support from Agustina and Beilin (2012) research on the links between immigrants and community gardens in Melbourne, Australia. As part of attempt by the organization of Cultivating Community Works with the Department of Human Services and Office of Housing to engage migrants who live in public housing in activities relating to plants and food that share skills and knowledge and to increase their sense of community and connectedness with those around them. This demonstrates as awareness of the process of adaptation experienced by migrants in their new country of residence. Considering migrants' displacement from their country of origin and culture, as well as their experience of new and unfamiliar cultures, the adaptation process is critical to their experience of everyday life in their new surroundings.

Dobson (2003:88-95) argues that environmental citizenship (EC) should be defined with respect to the relationship between the state and the citizen. Environmental citizenship focuses on contractual rights and entitlement within the public sphere and entails the extension of rights-based discourse to cover environmental rights. Where Dobson speaks about the rights between the state and the citizen, in our case study by contractual rights we mean the relationships between the local citizens in the neighborhood territory and the local municipality. Local community groups claim certain rights to use their resources in line with customary norms and traditional lifestyles.

Dobson (2010) defined the essence of environmental citizenship as "pro-environmental behavior in public and private, driven by belief in fairness of distribution of environmental goods, participation, and co-creation of sustainability". This concept is becoming increasingly pervasive in the discourse on sustainability and is connected with environmental education as part of ecological citizenship (Gan, 2016) and environmental education (Goldman et al., 2015).

- **Civic Ecology (including education):** It describes an urban environmental education programs that engage youth in community-based stewardship to restore vacant lots, brownfields, stream sides and other degraded habitats. Civic ecology education considers urban areas as linked social-ecological systems to learn from the practical and diverse knowledge of urban stewards (e.g. community gardens) and focuses on restoration of urban social-ecological systems (Tidball & Krasny, 2010:5).
- **Urban Environmental Education:** the term described and cited by Tidball and Krasny (2010) based on Frank et al. (1994) defined it as having "the same objectives as traditional environmental education: to encourage awareness, knowledge, attitude formation, skill development, and participation in solving environmental problems," while also being "unique because it happens in urban areas, with urban people and deal with urban environmental systems and issues" (Tidball & Krasny, 2010:4).

- **Ecological Citizenship:** Is based on the concept of ecological footprint. The ecological footprint refers to the environmental impact of human on ecological systems. Different lifestyles and standards of living will have different ecological footprint than those in poorer and less developed countries. Ecological citizenship reinforcing when legal rights and principles are evoked to legitimize the claims of individuals and communities to a fair share of ecological space (Humphreys, 2009:174).

3. Literature review on community garden

The international literature on community gardens is very broad and spans several disciplines. It is usually focuses social sciences, on life aspects related to human beings and the social groups characteristics. The literature divides into groups of food systems producing, social dimensions, culture, community interrelationships, leadership, governance, social benefits, ecosystems and ecology. The short description given below of the historical background aims to complete the general ideas and origin of CG concepts.

3.1. Historical background

Community gardens in Britain began in the 19th century with the tradition called Allotments. Poverty in the industrial revolution on one hand and the beginning of gardening advantages of open spaces aimed at the workers' welfare on the other hand, let the authorities to divide public lands to smaller plots for food growing (Irving et al., 1999). In the USA community gardens have been develop by social and educational reformers and the need that came up from the immigration waves and the transformation from rural to urban areas following the industrial revolution (Glover et al., 2005; Lawson, 2005).

Pudup (2008) indicates several stages in the developing of community gardens initiatives in the USA, representing the variety of needs along the years since the beginning on the 20th century. School garden (1900-1920), urban gardens (1905-1920), freedom and leisure gardens (1930-1939), victorious gardens (1941-1945) and then community gardens from the 1970s to date. CGs enjoyed blooming in between the two World Wars. As a compensation of recruiting of people working in agriculture to the army – millions American grew food plants in their yards and CGs called 'victory gardens' in order to fill the food stock and the supply to the war front.

According to Schmelzkopf (1995) part of the extended activity of CGs in the USA were due to the economic crises. He argues that the initiative to develop CGs came from the local Federal government aiming for self-supplying of food. The gardens were established on low land values and at the end of the crisis these plots were marketed for construction developers and

real estate targets. Another stage of gardening by residents on land without permission of the owners. They were called Guerilla Gardening. This phenomenon began in New York in the early 1970s with the popular movement "Green-guerilla" which spread seeds of flowers and plants in neglected urban areas aiming to cultivate them. Nowadays, part of these guerilla gardening aims are political and other are acting without a fixed agenda (Hardman, 2010).

Residents of deprived neighborhoods in the States have changed deteriorating and violent areas to clean, green and food processing and places of community events, nutrition security in era of inflation. These gardens expressed a new approach and contributed to strengthening social ties among neighbors in periods of social unrest (Lawson, 2005).

Community gardening in American cities have been practiced in most periods of crisis since the late nineteenth century. It has been often subsidized by local and federal governments, so the residents can produce foodstuffs for themselves. The typical scenario has been for gardens to be established on land that is considered to have little market value. At the end of the crisis, although the problems of urban poor persist, governments usually withdraw their support and focus instead on profitable real estate development on the former garden plots. With the emergence of the environmental movement in the 1970s and with the availability of open space as a result of unsuccessful urban renewal, community gardens have resurged in many American cities. Many of the gardens are in low-income areas and have been hailed as safe places that provide residents with a sense of nature, community, rootedness and power (Schmelzkopf, 1995).

CG forms and organization depend on city specific context. In New York City for example contemporary CG were developed in the late 1960s and early 1970s in the context of fiscal crisis and urban deindustrialization; they were first meant to resolve local problems of sanitation, violence, crime and lack of recreational amenities in neighborhoods without public and private investment (Eizenberg, 2013; Lawson, 2005). In France, the first CG were developed in the late 1990s in the recent historical context of global enthusiasm about environment and sustainable development.

3.2. Benefits and advantages of community gardens

Many studies and researches have analyzed and examined the positive benefits for individuals as well as to society at large and the contributions of many other aspects due to the establishment of CGs (Kingsley et al., 2006; Wakefield et al., 2007). A group of researcher have suggested to enhance CGs in cities including them in their official policies and community development planning (Armstrong, 2000; Jamison, 2003; Holland, 2004; Glover, 2005; Eizenberg, 2008; Kranzler, 2010; Weinstein, 2013). We have divided the benefits and advantages into several sub-groups as follow:

- 1. Food production and supply
    - Many studies focus on the role that CGs play in food production and provision. Different findings report about more consumption among those who evolve gardens (Kingsley, Townsend & Henderson-Wilson, 2007) and others reported that vegetables consumption is lacking in low income neighborhoods (McCormack, Laska, Larson & Story, 2010).
    - The benefits of food production in CGs are food security and diet improvement. CGs have played an important role for the supply of food and food security in many historical periods when economic and political crises appeared (Barthel and Isendhal, 2013). Studies indicates that CGs may also help to improve citizens' daily diet consuming fruit and vegetables (Bell et. al., 2016:124).
- 2. Social benefits
- As mentioned by MARD (2013), CGs can provide many social benefits to members, such as fostering feelings of self-worth and self-confidence, providing a sense of security and cultivating empowerment by providing opportunities to collaborate towards collective goals. Kingsely et al., (2006) found that participants described social support, connections and social networking as positive elements of participating in a CG. The physical action of cultivating CG is contributing a great deal to achieve contact among the resident, the neighborhood and the community. In return it assists the building of a "common narrative" expressed groups advantages such as gathering, recognition and identity feeling of all neighborhood residents. In this way the CGs serve two functions of bonding and bridging (Weinstein, 2010).
- A special social benefits are gained by excluded populations. Schmelzkopf (1995) pointed out in his research on the gender aspect involved in the CG activity. He found that there is a majority of women engaged in CGs in New York. Women from low socio-economic background feel much more protected and secure in CGs and enjoyed spending their time with their own children.

- 3. Civic engagement and empowerment
  - Studies have also found evidence that CGs provide opportunities to build civic engagement and a sense of collective efficacy to take action for the common good of the neighborhood. The framework of CGs enables developing social networking with great potential to conflict solutions and enhancing democratic decision making processes (Teig et al., 2009). As we pointed out before, CG is a two joined words – physical site and community. An activity in CG especially among disadvantaged neighborhoods with high concentration of minorities, helps in building social networking, trust creation, ability to organize community leadership.
  - CGs require the active participation and engagement of gardeners. This can increase civic empowerment, stakeholder involvement and community participation (Bell et. al., 2016:135).
- 4. The right to the city
  - Community gardens have also been framed as spaces of citizenship practice in marginalized urban context (Petrovic et al., 2008:37). The common practice of claiming vacant land to establish CGs, as well as engaging in political activism in an effort to preserve them in the face of development pressures, can be seen through the lens of the right to the city (Fenster, 2016) and as a challenge to neoliberal governing practices and capitalistic relations (Schmelzkopf, 2002) expand upon the realm of Leferbvre's right to the city with the right in places approach, which recognize that place making occurs through a "plurality of experiences and meaning" (ibid, p. 87). And seek to account for competing and overlapping rights claims, both inside the gardens themselves and across the larger spatial and political contexts within which they are situated.
- 5. Governance structure
  - According to Glover el al. (2005) CGs shows a multitude of governance structures and generally take on an "internal democratic approach structure, characterized by direct participation in decision making, high turnover leadership and low hierarchy" (p. 80). Strong leadership can provide stability to garden operations but might lead to tension among the members who may not feel adequately represented in decision making processes. According to Fox-Kamper (2018) cited by Petrovic (2018), CG governance structure is characterized on continuum of top-down to bottom-up structures with regard to the role of professional and community driven management, respectively. However, many community gardens operate as a mixture of both, and considerably changes commonly occur throughout the various developmental stages of individual gardens.

- 6. Wellbeing, health and quality of life
  - International studies report many benefits of CGs for well-being of urban dwellers. Among such benefits are relaxation, improved physiological well-being (Maller et al., 2006), healthy nutrition and physical activity (Wakefield et al., 2007). According to Filkobski et al., (2016 p.150) urban gardens provide particularly effective arenas and tools for combating the extension of experience as well as retaining and disseminating social-ecological memory, described as 'combined means by which knowledge, experience and practice of ecosystem management are captured' revived and used' (Barthel et al., 2013:6).
  - Some of the negative impacts of urbanization include individual isolation, lack of social support, interracial conflict and increased incidence of crime and violence (Nature and Health, 2004). According to Keniger et al. (2013) provision and access to green space within urban areas may ameliorate of even reverse some of these social challenges and ultimately increase social cohesion (Aldous, 2007; Kingsley, 2006). Interaction with nature can facilitate social interaction in adults and children, foster social empowerment (Westphal, 2003), enhance interracial relationships (Shinew et al, 2004). The activity in CGs advances health in several ways. A positive correlation was found between the closeness to parks and the level of body activity of residents at large and children in particular (Mota et al., 2005). CGs contribute to the mental wellbeing through social and community empowering connections (Wakefield, 2007). A study in Cleveland, Ohio, found that growing vegetables was reflected in dietary habits (Blain et al., 2010).
  - The concept of ecosystem services is being used to highlight the links between urban ecosystem and human well-being (MA, 2005). They have been defined as a flow of benefits from an ecosystem, sustained by its structure and processes, to humans obtain from CGs and result from human interactions with and within CGs.
  - Human engagement with CGs and green spaces has shown to provide recreational benefits through reduction of stress, providing possibilities for relaxation and reflections (Bell et. al, 2016:132).
  - Another benefit regarding health is the physical activity which is very important especially to elderly people, who are the main group to attend CGs. Therefore, they have excellent motivation to spend time outside and undertake physical activity through digging, body movements and balancing provide health benefits of lowering blood pressure, cholesterol level and obesity (Bell et. al., 2016:132).

- 7. Strengthening migrants' cultural identity
  - Studies show that community gardens play an important role in providing land to preserve migrants' cultural identity (Teig et al., 2009) made possible through gardening and food production practices, or through the sharing of preparation of food that they produce. These practices create a sense of belonging for migrants. The Melbourne's research confirms that the reality of practices in the community gardens may have similar characteristics to the historical gardening practices or culture of the migrants' places where traditional agriculture skills remain essential to daily life. CGs where migrants are involved play significant role in strengthening their low self-value and their traditional cultural values, provide them with access to employment in agriculture as was their way of life before they immigrated to the new place.
- 8. Environmental and Sustainability Education
  - CGs in the city enable space to re-connect with nature. The rich vegetation attracts biodiversity that create ecological networks in the urban spaces (Hanna and Oh, 2000). The activity in the CGs is a place of learning and teaching sustainability, environment preservation, cycling, re-division of resources and collaboration. The guidance activities are given by professional (Eizenberg, 2008; Kranzler, 2010).
- 9. Local Municipalities Benefits of Community Gardens
  - In most urban places local municipalities became an integral partner to the idea of CGs together with other organizations, NGOs, and even ministries. Usually, the local municipality supply water, fences and furniture. Allocation of pieces of land, no matter how big are they, the immediate benefit is that local residents cultivate the unused urban areas and thus cause less maintenance expenses to the local municipality and keep the areas cleaned (Saldivar-Tanaka and Kransky, 2004). According to Eizenberg (2008, p.28) 'the process of institutionalization of community gardens shows on the long run implications to the status and abilities to influence urban policy. There are campaigns where local residents fight against changing the purpose of the allotment from 'green' to brown or blue as well.
- 10. Biodiversity
  - CGs provide many habitats for plant and animal species and may be crucial for the maintenance of biodiversity. They also promote the conservation of soil-water-plant systems (Bell et. al., 2016).
  - Figure 2 shows the "tree of wellbeing" and the benefits of community garden when implemented by the citizens.

Figure 2: Model of community gardens and wellbeing.

Source: Victoria Egli, Melody Oliver, El-Shadan Tauolo (2016). The Development of a model of community garden benefits to wellbeing. Elsevier (P. 350).

The sections above including the introduction, methodology, historical background and CGs benefits summarize the first part of our article with strong base to continue for the second part concentrated at the CGs situation in Israel.

4. Background to the Ethiopian Community in Israel

AS mentioned above a decision was made up to focus this research paper on those cases where Ethiopian populations are located in Project Renewal towns and neighborhoods and where CGs were established. Their backgrounds - origin, tradition, culture, individual and family relationships, sticking to the earth and nature – give us the complete framework impact of their history and enable us to understand their situation, reasons, outcomes and solutions to their unique mode of life, their organization structure and activities in their community gardens in the settlements throughout Israel.

As an introduction and acquaintance with the Ethiopian society, the following sections will introduce deep insights and understanding the process the Ethiopian community has been witnessed and being absorbed in the Israeli society. The section is based on a lecture given by the author at the RC21 Conference in Berlin on the topic of: Social Resilience – The Case of Diversity and Inclusion in Israel Project Renewal (Weinstein, 2013).

The theoretical introduction gives fundamentally background of the Ethiopian population describing their immigration and absorption processes, aspects of resilience, social and human capitals; These have special importance to understand the uniqueness of the Ethiopian community and its choice to establish community garden as the ideal solution for their social, personal, inter-generational and economic problems.

The process of immigrants into host society has been studies for many years, from many perspectives, and with relation to multiplicity of factors and characteristics that influence the process. In addition to immigration characteristics (such as number of years since migration) and the demographic characteristics of the immigrant (such as gender and age), economic, social and psychological characteristics have also been found to be linked to the process. Language plays a critical role in the integration of the immigrant in the new labour market and his/her ability to narrow economic gaps vis-a-vis the natives (Chiswick 1998; 2002). The relevant skill applicable to the new country, together with appropriate level of education and local language proficiency, all comprise the human capital of the immigrant. In this paper we argue that human capital and social capital when being integrated together create community resilience. Besides, the outcome of a continuous process of resilient ends with sustained community. The connection among these terms will be described and analysed.

Therefore, the definition we proposed is as follow: **Resilience is a process that builds capacities and skills for the individual, the community and the society as a whole. It integrates in a comprehensive way cultural, human, social, economic, community and institutional resources. These resources are aiming to cope with external disasters that influence deeply human being lives. Resilience has two sides of the same coin: on one hand, it equipped them with abilities to achieve former framework of state by keeping** the urban areas are growing fast due to internal migration from rural to urban places that offer more opportunities for employment, education and culture. The human needs for food is therefore growing in the cities and new directions of food security and production are in need. Fast solutions are born among them: developing of urban agriculture outside the dense city; growing food on building roofs; home self-growing organic food. Besides, we witness processes of technologies that reach the food sector such as food-tech which becomes a leading factor. Therefore, the next challenge will be to connect traditional agriculture among Ethiopians with the new technological innovations.

Conclusion

The developments regarded the evolution of CGs, its wide perspectives elements and the strong benefits supported by the analysis of wide literature and references and especially the ENEC (2018) definition of environmental citizenship. It presents an excellent example of establishing a bottom-up environmental instrument policy that originally grows in this direction and impacts decision makers to post it as a national policy.

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ENVIRONMENTAL AND ENERGY POLICIES IN SERBIA IN THE CONTEXT OF CHILD'S RIGHTS PROTECTION

ABSTRACT

INTRODUCTION

Child's rights protection is closely interrelated with environmental conservation. Several aspects of child's rights depend on environment quality. The violation of environmental protection provisions may result in the violation of child's rights. Violation of child's rights through the violation of environmental provisions may occur not only through criminal offences against environment, but also through long-term application of environmental policies that are harmful for child's rights or do not take into consideration the needs and best interest of children.

LITERATURE REVIEW / THEORETICAL BACKGROUND

In this paper, child's rights and environmental protection are defined in accordance with relevant international legal documents ratified by the Republic of Serbia, Constitution of the Republic of Serbia and national legislation regulating the protection of child's rights on the one hand and environmental protection, on the other. Strategic documents from which the conclusions about public policies in the field of child's rights protection and environmental conservation are draws, are also analyzed in this paper, along with reports of relevant international and state bodies.

METHODOLOGY

Two methodological approaches are applied in this paper. Normative method is applied for the purpose of interpretation of relevant national and international legislation pertinent to child's rights protection and environmental conservation as well as on strategic documents setting directions and goals for future normative and practical steps in these areas. Qualitative study is applied on relevant reports with the aim to obtain the information about current courses in policies regarding these two areas in the Republic of Serbia as well as to identify key challenges in these fields.

RESULTS

The analysis of the aforementioned material is aimed at estimating whether child's rights are sufficiently taken into consideration in relevant legislative, strategic and policy documents dedicated to environmental protection in the Republic of Serbia. These findings are also compared with the data obtained from relevant reports describing current state of both – environmental and child's rights protection in Serbia.

DISCUSSION / POLICY IMPLICATIONS

The results of these analysis indicate that there are some serious concerns regarding the respects of child's rights in the context of environmental protection in Serbia. Based upon these findings, it may be assumed that child's rights are not given the sufficient amount of attention in documents regulating environmental protection and sustainable development in the Republic of Serbia. This particularly refers to children from marginalized groups living in substandard settlements.

CONCLUSION

Normative framework of the Republic of Serbia regulating the issue of environmental protection is harmonized with international standards, but actual policies and practice should be more adjusted to specific needs of children, as particularly vulnerable group. Similar to the concept of "child friendly justice" there seems to be the need for something that the authors of this paper would refer to as "child friendly ecology".

KEYWORDS

Child's rights, environmental protection, international standards, human rights, ecology

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Ana currently participates in Prison LIFE project, conducting the research of different segments of the characteristics of the quality of prison life. She is also involved in project promotion activities, primarily on social networks and in charge of producing documentary and artistic photographs depicting various aspects of prison life and bringing the key problems, challenges and changes in this area closer to the public.
Ana is the author of more than 120 publications (either as a single author or as a co-author), including several articles published in relevant national and international scientific journals, conference presentations, book chapters and 9 books.

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PROFESSIONAL EXPERIENCE

·More than 30 years in project environment.

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·Proven experience in developing methodology, drafting, monitoring and evaluation of policy documents, policy analyses and recommendations, especially in the context of the alignment with relevant international (especially UN, CoE, EU) child rights standards in the context of the EU accession processes.

·Strong experience in analysing Child Rights standards and measuring the level of compatibility of Serbia's normative and institutional framework with international standards such as "Child Rights in Serbia" - CRIS project.

·Vast experience carrying out project activities in donor-funded reform and development programs.

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The Islamic Economy: Promoting Sustainable Development Goals through Justice, Sustainability, Transparency, and Solidarity

ABSTRACT

INTRODUCTION

This study explores the relationship between the Islamic Economy and the Sustainable Development Goals (SDGs) set by the United Nations. It highlights how the Islamic Economy aligns with the principles of sustainable development and contributes to the construction of a sustainable future. The Islamic Economy supports the SDGs through its emphasis on justice, promoting social equality and fair resource distribution. Additionally, it encourages sustainable resource management, taking into account the temporary nature of human existence and the importance of protecting the environment. The Islamic Economy also promotes transparency and accountability in economic decision-making, preventing corruption and ensuring efficient resource utilization. Lastly, it fosters solidarity and cooperation through practices such as zakat and alms, supporting the poor and reducing poverty. This study sheds light on how the Islamic Economy can play a significant role in achieving the SDGs and advancing sustainable development worldwide.

The Islamic Economy is an economic system formed based on Islamic faith and principles and naturally supports the goals of sustainable development. In this study, the relationship between the Islamic Economy and the Sustainable Development Goals (SDGs) will be discussed. It will be discussed how the Islamic Economy supports the SDGs and contributes to the construction of a sustainable future.

The Sustainable Development Goals (SDGs) are an initiative set by the United Nations consisting of 17 main goals aimed at ending poverty, ending hunger, reducing inequality, combating climate change, and building a sustainable future around the world. The Islamic Economy supports these goals and offers various principles to improve the well-being of society. One of the basic principles of the Islamic Economy that promotes sustainable development is justice. Justice is a principle that promotes social equality and equality of opportunity. The principle of justice in the Islamic Economy advocates for the fair distribution of resources and the availability of economic opportunities for everyone. This contributes to the fight against poverty,

reducing income inequalities, and solving many problems in society. The Islamic Economy also encourages the use of sustainable resources. The religion of Islam emphasizes that people are temporary guests in the world and the importance of protecting nature sustainably. According to the Islamic Economy, people should adopt environmentally friendly practices and not waste natural resources while putting nature at the service of humanity. This supports the fight against climate change and ensures that future generations can also benefit from these resources.

Another important element of sustainable development is transparency. The Islamic Economy promotes transparency and accountability. To achieve the goals of sustainable development, economic decisions must be made openly and transparently presented to society. This helps in the effective and efficient use of resources, preventing corruption and malpractice. The Islamic Economy promotes solidarity and cooperation in society. The religion of Islam, while adopting systems such as zakat and alms, cares about supporting the poor in society and helping those in need. This helps to increase social solidarity in society and reduce poverty.

LITERATURE REVIEW / THEORETICAL BACKGROUND

The relationship between the Islamic Economy and the Sustainable Development Goals (SDGs) has garnered significant attention in recent years due to the shared values and principles they embody. This literature review explores the existing scholarship on how the Islamic Economy aligns with the principles of sustainable development and contributes to the construction of a sustainable future.

The Islamic Economy, as an economic system rooted in Islamic faith and principles, naturally supports the goals of sustainable development. Central to the Islamic Economy is the principle of justice, which promotes social equality and equal opportunity. Scholars have highlighted that this principle plays a pivotal role in achieving sustainable development by advocating for the fair distribution of resources and ensuring economic opportunities are accessible to all members of society (El-Gari, 2018; Ahmed, 2020). By addressing poverty and reducing income inequalities, the Islamic Economy directly contributes to SDG 1, which aims to end poverty in all its dimensions.

Sustainable resource management is another area where the Islamic Economy aligns with the SDGs. Islam recognizes the temporary nature of human existence and emphasizes the importance of protecting the environment for future generations. The concept of stewardship (khalifa) in Islam encourages

the sustainable use of resources and discourages wasteful practices (Hamouda et al., 2018). Scholars argue that this principle supports SDG 12, which focuses on responsible consumption and production, as well as SDG 13, which aims to combat climate change by promoting sustainable resource utilization and reducing environmental degradation (El-Ashker & Wilson, 2018; El-Gari, 2020).

Transparency and accountability are fundamental aspects of the Islamic Economy, as emphasized by Islamic teachings. Islamic finance, for instance, promotes ethical financial practices and prohibits activities that lack transparency and involve excessive risk-taking (Belouafi & Ariff, 2019). These principles align with SDG 16, which calls for the promotion of peaceful and inclusive societies, access to justice, and accountable institutions. By advocating for transparency in economic decision-making, the Islamic Economy helps prevent corruption and malpractice, thus ensuring efficient resource utilization and supporting SDG 16 (El-Ashker & Wilson, 2018).

Solidarity and cooperation are central tenets of Islamic teachings, reflected in practices such as zakat and alms-giving. These mechanisms play a vital role in supporting the poor and reducing poverty in society (Saeed et al., 2021). Such practices align with SDG 1 and SDG 10, which aim to reduce inequalities and ensure social inclusion. The Islamic Economy fosters social solidarity by promoting the well-being of individuals and emphasizing the responsibility of businesses and individuals to fulfil their social obligations (Rahman et al., 2020).

In conclusion, the literature review highlights the significant role of the Islamic Economy in contributing to the Sustainable Development Goals. Scholars have shown that the principles of justice, sustainable resource management, transparency, and solidarity in the Islamic Economy align with various SDGs. By emphasizing social equality, responsible resource utilization, accountability, and support for the poor, the Islamic Economy can play a crucial role in achieving the SDGs and advancing sustainable development worldwide.

METHODOLOGY

This study employs a qualitative research approach to explore the relationship between the Islamic Economy and the Sustainable Development Goals (SDGs). The research methodology involves a comprehensive review and analysis of existing literature, including academic articles, reports, and relevant publications from reputable sources.

The study begins with a systematic literature review to gather information on the Islamic Economy and its alignment with the principles

of sustainable development. Various databases, such as academic journals and online libraries, will be searched using relevant keywords. The literature review will help establish a theoretical background and provide insights into the connections between the Islamic Economy and the SDGs.

RESULTS

There are various relationships and connections between Islamic economics and sustainability goals. Islamic economics encompasses a set of principles and values that support sustainability goals. For example, Islamic economics emphasizes the protection of natural resources. According to Islam, people should use resources without wasting them and should not disturb the balance of nature. Sustainability goals also aim at the sustainable management of natural resources. The Islamic economy offers an approach that is compatible with sustainability goals by encouraging the sustainable use of resources. In addition, Islamic economics promotes the equitable distribution of wealth. Sustainability goals also aim to reduce income inequality and end poverty. The Islamic economy emphasizes the equitable sharing of resources and the achievement of social justice to support sustainability efforts. In the context of social responsibility, Islamic economics encourages businesses and individuals to fulfil their social responsibilities. According to Islam, economic activities should be carried out not only to make a profit but also to contribute to the well-being of society. This coincides with the goals of sustainability because sustainability requires the fulfilment of social and environmental responsibilities. In terms of a human-centred approach, Islamic economics encourages a human-centred approach. Sustainability goals also aim to meet people's needs and improve their quality of life. The Islamic economy encourages the prioritization of human welfare and the realization of sustainability goals in a way that is compatible with human needs. Islamic economics, in the care of environmental protection, emphasizes the protection of the environment and the sustainable use of natural resources. This is in line with the sustainability goals. Sustainability aims to protect the environment and ensure the balance of ecosystems.

DISCUSSION

It shows that there are similarities and common goals between the Islamic economy and sustainability goals. The principles of Islamic economics can contribute to the realization of sustainability goals and help societies move towards a more sustainable future from a social, environmental, and economic point of view.

The Sustainable Development Goals (SDGs) are a framework of 17 main goals set by the United Nations aimed at supporting sustainable development globally by 2030. The Islamic economy offers basic principles

and values that are compatible with many of the goals of the SDGs. Ending poverty: SDG 1 aims to end poverty in all its dimensions. The Islamic economy promotes the fight against poverty through mechanisms such as zakat (a kind of obligatory charity) and sadaqah (voluntary donation). The Islamic economy can contribute to the reduction of poverty through the equitable distribution of income and increasing social welfare. Ensuring human rights: SDG 16 encourages the creation of fair, rule-of-law-based, and transparent institutions. The Islamic economy is based on the principles of justice, transparency, and accountability.

The Islamic economy can contribute to the goals of SDG 16 by promoting human rights and a just legal system. Reducing inequalities: SDG 10 aims to reduce income inequalities and ensure equality of opportunity. The Islamic economy promotes fair distribution of wealth and supports equality and justice in society. The Islamic economy can contribute to reducing inequalities through the equitable sharing of resources and increasing social welfare. Ensuring clean water and sanitation: SDG 6 aims to ensure that everyone has access to sustainable sources of clean water and hygienic living conditions. Islamic economics emphasizes the conservation of water resources and promotes equitable distribution of water. Islamic economics can contribute to the sustainable use of water resources and the development of clean water and sanitation services. Climate action: SDG 13 aims to combat climate change and adapt to climate impacts. Islamic economics emphasizes environmental protection and sustainable resource management. The Islamic economy can contribute to climate action goals by promoting sustainable energy use and energy efficiency and reducing dependence on fossil fuels.

CONCLUSION

In conclusion, there are some similarities and compatible aspects between the Islamic economy and the Sustainable Development Goals (SDGs). In the context of ending poverty, Islamic economics promotes poverty alleviation and assistance to the poor through mechanisms such as zakat (obligatory charity) and sadaqah (voluntary donation). SDG 1 also aims to end poverty in all its dimensions and aims to create an egalitarian economic structure. To end hunger, the Islamic economy attaches importance to halal food production and fair food distribution, as well as mechanisms such as zakat and charity. SDG 2 aims to ensure that everyone has access to safe, nutritious, and adequate food. In the context of health and good living conditions, the Islamic economy promotes human health and good living conditions. People's access to health services, the rights of patients, and ethical values are part of the

Islamic economy. SDG 3 has the purpose of maintaining a healthy lifestyle and promoting good well-being. In terms of qualified education, the Islamic economy attaches great importance to education and encourages the provision of egalitarian, accessible, and qualified educational opportunities. SDG 4 aims to provide egalitarian and qualified educational opportunities. Finally, in terms of gender equality, the Islamic economy supports gender equality and rejects gender-based discrimination. It promotes women's access to egalitarian opportunities in the economic, social, and political spheres. SDG 5 aims to achieve gender equality and women's empowerment. In this way, there are some parallels between the Islamic economy and the SDGs. The Islamic economy provides a framework compatible with SDGs to contribute to sustainable development goals and improve people's well-being. The Islamic economy has an approach that attaches importance to sustainability goals such as social justice, fair distribution of resources, protection of the environment, and meeting human needs.

KEYWORDS: Islamic Economy, Sustainable Development Goals (SDGs), Sustainability, Transparency, Solidarity

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The Impact of Climate Change on Nonprofits Themselves: A Review of Literature

ABSTRACT

INTRODUCTION

It is clear that NGOs are dealing with the effects of climate change. A significant number of NGOs work in geographical regions and areas where drought and heat waves, floods and vector-borne diseases are most felt as a consequence of climate change. Climate policy is fragmented at the local level, even though climate change is experienced mostly at the local level, in some regions more than others (Maibach et. al., 2008). Therefore, climate protection at the local level is a policy issue where different actors and groups seek to understand the problem and its solution and take measures (Orderud, 2011). Naturally, many NGOs may lack the internal capacity and expertise to address the challenges of climate change.

LITERATURE REVIEW / THEORETICAL BACKGROUND

The studies conducted generally do not identify the impact of climate change on NGOs. However, researchers (Chandrasekhar et. al., 2022) have focused on certain aspects that are the result of the effects of climate change. Chandrasekhar et al. al., (2022) examined the importance of NGO involvement in disaster recovery planning. According to the researchers, natural disasters affect the capacity of organizations because the scale of NGO activity increases dramatically in such disasters. Studies have found that competition between large and small environmental NGOs is growing, as the small ones are being pushed out, the influence of the larger ones is increasing due to the lack of capacity, knowledge and experience of the smaller ones (Maibach et. al., 2008; Allan, 2018). During the previous research, it was found that organizations that experienced at least some impact of natural disasters changed their service provision. Continuing, it is possible to note the research on climate migrants, with which NGOs find themselves on the front line, and as research indicates that doing nothing in this area also has its price (Baldwin et. al., 2014).

Climate change directly and indirectly affects human health. Health care NGOs can be drivers and sources of information on climate change (Chadwick, 2017). Like public sector hospitals, healthcare NGOs are likely to be forced to save energy due to the impact of climate change, although it is also important for them to provide services 24 hours 365 days a year (Nematchoua et. al., 2019). NGOs that operate globally and have better funding can locate in green equipped buildings. Therefore, naturally climate change acts to be environmentally friendly (Nematchoua et. al., 2019).

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METHODOLOGY

For methodological justification, we will use the theory of structural integration formulated by Galtung (1968). The researcher distinguished that one part of the theory consists of such a condition for integration as integration of actor-integration. This condition is based on two models: (i) a similarity model in which we assume that similarities between NGOs increase. Since climate change is a global problem, it can be said that there is a harmonization of legal acts regulating the activities of NGOs taking into account the prevailing climate change mitigation measures; (ii) the interdependence model shows that the dependence between NGOs is growing and NGOs are integrated to the extent that they are related to each other, this means that what negatively affects one NGO negatively affects another and what is beneficial to one is also beneficial to others.

The overall research question guiding this project can be formulated as follows: How and to what extent do non-governmental organizations identify the impacts of climate change on their activities, what kind of impacts are these and how do they affect participatory governance?

DISCUSSION / POLICY IMPLICATIONS

The research will reveal new ways to identify and implement practical, local, adaptive responses that are contextually relevant to climate change impact assessments for NGOs. The analysis of scientific literature and documents of international organizations and non-governmental organizations will be applied.

CONCLUSION

1. NGOs feel direct and indirect impact from the Climate change
2. They react resiliently
3. Adaptation vs mitigation
4. Increased networking, governance and inclusion of indigenous and vulnerable community members

KEYWORDS
Non-governmental organizations, climate change, adaptation, impact, participatory governance

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Urban travel behaviour and sustainability: a new culture for long-term solutions

ABSTRACT

Overview

Sustainable transport is crucial for a higher quality of life in European urban areas and enables the reduction of congestion, pollution and accidents. First, a greater awareness of all travelers about the impact of their mobility choices is an essential element towards the new culture of urban mobility. Second, in order to promote fair behaviours of road users, the availability of efficient collective transport services and routes and of cycle and pedestrian paths are very important.

Methods

The use of push and pull measures is a priority and it could be successfully applied if coordinated and introduced at the same time as a mixed policy. Experience in European Member States show that pull measures are tools for making public transport more attractive, while push measures use deterring or punishing tools to promote modal shift. The combination of these two different tools is the winning solution.Empirical findings are that notwithstanding the existence of a weak transport urban service, people would be in favour of using buses in the future. Nevertheless, this shift towards public transport needs to be encouraged through appropriate policies, which could culminate in the achievement of greater sustainability; otherwise, we will most certainly have a difficult future.
In this paper a Random Utility Model (RUM) is used to measure and evaluate the willingness to use public transport. Results provide useful policy indications.

Data

Data have been collected through a survey in Italy. They are microdata very helpful to profile transport users.

Preliminary results

A new culture for urban mobility is needed. In the light of new exigencies, decision-makers should support sustainable mobility-related measures to meet people's expectations.
In the long term, mobility patterns can change if there is a change in urban locations and in land-use patterns. An effort is required to include these aspects in regional and urban development planning. The planning should

aim at maximizing the urban transport system efficiency by considering the environmental and the city resource constrains.
Sustainable transportation systems require a dynamic balance between all the components of sustainable development, that is environmental protection, social equity and economic efficiency for current and future generations.

Keywords: Mobility, Sustainability, R.U.M., Travel Behaviour, Urban Development Planning.

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Crowdfunding for Climate Change: A systematic literature review of the crowdfunding practices to finance climate change mitigation

ABSTRACT

INTRODUCTION

The escalating global awareness of climate change has ignited a discourse on alternative methods of financing climate mitigation initiatives. Among various options, crowdfunding has emerged as a particularly convenient alternative. Crowdfunding entails acquiring funds from a potentially extensive network of interested backers, each contributing a relatively modest sum of money, often bypassing traditional financial intermediaries. This approach presents a compelling opportunity for financing climate mitigation projects (Maehle et al., 2021a).

LITERATURE REVIEW / THEORETICAL BACKGROUND

Crowdfunding campaigns have successfully facilitated the implementation of diverse projects aimed at combating climate change, such as solar panels, community energy initiatives, biogas facilities, and community-supported micro dams. These campaigns have garnered support from citizens across the globe. Beyond providing financial returns to crowdfunding investors, these endeavors have actively contributed to the pursuit of environmental sustainability (Hörisch, 2019; Lam & Law, 2016; Kragt et al., 2021; Maehle et al., 2020; Maehle et al., 2021b; Testa et al., 2019).

METHODOLOGY

Numerous questions persist regarding the appropriate design, implementation, and feasibility of crowdfunding platforms, as well as the motivations and willingness of crowdfunding campaigns specifically focused on climate change.

Additionally, it remains important to ascertain the extent to which public policies can bolster the success of such crowdfunding campaigns (Chervyakov & Rocholl, 2019). To address these inquiries, this review adopts the "Systematic Literature Review" (SLR) approach originally introduced by Tranfield et al. (2003), employing objective and replicable procedures for literature synthesis.

RESULTS and POLICY IMPLICATIONS

This study endeavors to analyze the extent to which existing research literature addresses the challenges encountered by

community-supported crowdfunding campaigns for climate change. It aims to identify factors that contribute to the success or failure of these campaigns and identify best practices. By doing so, we aim to unlock the potential of crowdfunding as a catalyst for green transition. Furthermore, this study aims to identify research gaps within the context of crowdfunding for climate change.

CONCLUSION

This study aims to conduct a systematic review of the literature at the intersection of crowdfunding and climate change. It intends to explore various aspects, including the types of crowdfunding campaigns (donation, equity, lending, or reward-based), the nature of the projects, and the factors that influence the success or failure of these campaigns.

KEYWORDS

Climate Change, Green Transition, Crowdfunding, Entrepreneurship

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ADVANCING SUSTAINABLE FINANCE, ENERGY, AND RISK ASSESSMENT: INSIGHTS AND PERSPECTIVES

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GREEN BOND PREDICTIONS: A WAVELET-NEURAL-NETWORK APPROACH

ABSTRACT

INTRODUCTION

Despite efforts to prevent climate change, drastic consequences of human actions are becoming increasingly apparent (Sueyoshi et al., 2017). Fatal consequences e.g. are droughts, floods or natural disasters (Osberghaus, 2015). Green bonds as debt instruments aim to finance, e.g. green projects and to cope with the effects of climate change by incentivizing investors to 'go green' (Jiang et al., 2022). This paper predicts green bonds with wavelet neural networks (WNNs) (Doucoure et al., 2016).

LITERATURE REVIEW / THEORETICAL BACKGROUND

Studies, which apply wavelet conceptions to green bonds, mostly focus on dynamical interrelations (e.g. with carbon markets, see Ren et al., 2022), spillover effects and connectedness (see Khalfaoui et al., 2022) or on time-frequency co-movements (see Huang et al., 2023). Moreover, green bonds have shown to be chaotic and complex systems recently (see Vogl et al., 2023). In addition, the prediction of green bonds in themselves is scarce and considered a gap.

METHODOLOGY

The study implements a biorthogonal 'bior2.8' WNN with a deep learning multilayer perceptron (DL-MLP) network topology. WNNs replace the activation function with a wavelet, which is localized in time and can cope with complex system's data (see Alexandridis & Zapranis, 2014). Further, the root mean square error (RMSE), tracking signal (TS), mean absolute deviation (MAD) and the Akaike information criterion (AIC) are calculated. The predictions are conducted by an out-of-sample backtest.

RESULTS

The data of the logarithmic returns of the S&P Green Bond Index (2014-2023) has been deployed into the WNN with a 20-80 train-test split, resulting in ~ 350 out-ofsample predictions as given in Figure 1. Regarding performance, the RMSE (0.0052), the TS (0.7871) and the MAD (0.0026) are rather low, indicating a good predictive result. The AIC (-4871.6891) indicates a good model fit owing to a large negative value. In total, the predictions seem reasonable.

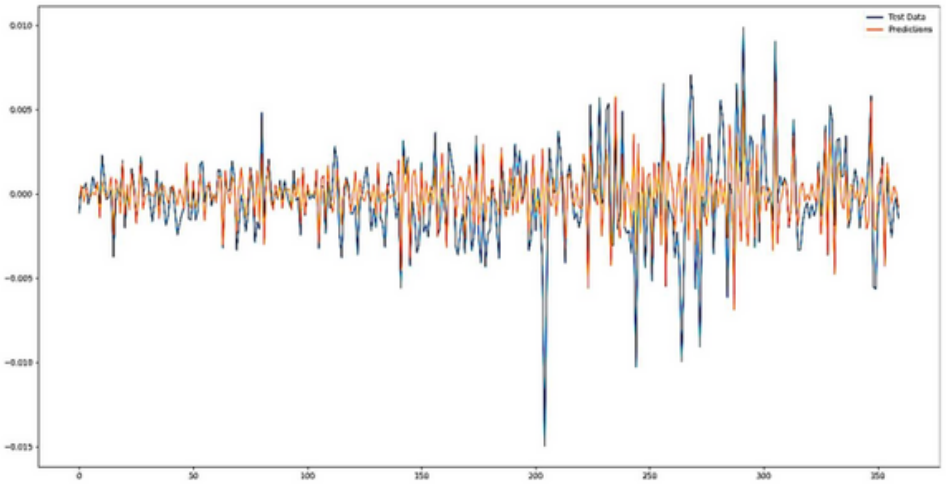

***Figure 1**: Out-of-sample backtest with ~350 steps. Orange line is the WNN prediction, while the blue line indicates the test data.*

DISCUSSION / POLICY IMPLICATIONS

Following Beenstock et al. (2016) as an example, state that (climate) models, which are underlying policy decisions have not been "subjected to rigorous empirical testing". Furthermore, the selected models are not capable of handling complex or nonlinear interrelations. By applying a state-of-the-art, AI based time-frequency algorithm, i.e. a DL-MLP WNN, a functional method for green bond predictions can be used to better predict green project investments.

CONCLUSION

Within the study, a DL-MLP WNN based on a biorthogonal 'bior2.8" wavelet is calculated to predict the S&P Green Bond Index (2014-2023) out-of-sample. The predictive results are deemed as acceptable and can help enforce hedging or investing optimizations of green bond portfolio exposures.

The model is capable of handling the arising complex dynamics of the green bond series. With better predictions, a more granular policy or investment exposure creation strategy is assumed to be possible.

KEYWORDS
Green bonds, wavelet neural networks, climate change, time-series predictions, out-of-sample backtest

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GREEN Municipal Bonds Issuance: An Insight into the Future Prospects of Serbia and Romania

ABSTRACT

INTRODUCTION

Unlocking novel channels for municipal borrowing holds importance for municipalities combating with immense financial challenges. Since green-labelled municipal bonds have begun to emerge as a preferable innovative funding option for municipalities in developed countries, the research aimed to investigate whether two adjacent Balkan states with distinct development levels – Serbia and Romania – have the potential for entering "greener" financial regimes and achieving municipal debt diversity of this kind.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Knowledge on Serbia's and Romania's (green) municipal bonds markets' features was gleaned from the modest literature foundation (Zipovski & Benković, 2014; Pop & Georgescu, 2015; Jolović & Jolović, 2021; Tiron-Tudor et al., 2021; Šoja & Grujić, 2022). Based on the theoretical evidence (Elmer, 2012; Saha & d'Almeida, 2017; Brand & Steinbrecher, 2019; Caporale & Spagnolo, 2023), green municipal bonds represent fixed-income financial instruments slated for raising capital for sustainability-focused projects with positive environmental/climate benefits for local communities (pollution prevention, renewable energy, low-carbon transportation, sustainable land use, biodiversity conservation, responsible waste management projects, etc.).

METHODOLOGY

The research methodology mainly relied on a quantitative approach, whilst the data on the inspected phenomena were gathered through desk research. Namely, the empirical study was built on the secondary data on borrowing arrangements of Serbia's and Romania's local governments, available in the official records of the relevant counties/municipalities/cities/communes. The empirical analysis covered a 2001-2023 interval, i.e., included Serbian and Romanian municipalities' initial and current endeavours to attain indebtedness through municipal bonds' issuances.

RESULTS

The obtained research results unveiled that in the 2001-2023 interval several Serbian and Romanian counties/municipalities/cities/communes augmented their legal/administrative infrastructure and technical capacity

for issuing green-labelled municipal bonds. Namely, municipal bonds issuance by private placement/public offering has been carried out by 4 Serbian municipalities/cities (the municipality of Stara Pazova and the cities of Novi Sad, Pančevo, and Šabac), videlicet, by 33 Romanian counties/municipalities/cities/communes (4 counties; 24 municipalities: from which Timișoara, Bucharest, and Alba Iulia issued the greatest total grand of bonds (7, 7, and 6 bonds tranches, respectively); 4 cities; and 1 commune) so far. Adding a green label to the aforementioned municipal bonds and tying them as such into municipalities' borrowing plans is acknowledged as feasible and desired in both states, since Serbia's and Romania's strategic/legal frameworks provide the elementary ambience required for this kind of emissions and acknowledge the critical role that green municipal bonds can play in financing local development.

DISCUSSION / POLICY IMPLICATIONS

Green municipal bonds are considered a superior mechanism for financing local development. Municipal issuers' motives for these innovative securities' release include generating significant capital at lower interest rates and with improved debt management control. In exchange, to investors, who tend to make profitable social and environmental investments, issuers offer a "guarantee" that the collected funds will be used exclusively for investments in projects certified as sustainable. Albeit without the green label, municipal bonds have already been successfully used as economical financing avenues in both Serbia and Romania - for example, the city of Novi Sad, as the first Serbian city that issued municipal bonds (the tranche, which had RSD 3.5 billion value, a 12-year maturity, a nominal interest rate of 6.20% and an effective interest rate of 6.25%, was issued via private placement in May 2011), generated funds which were used for the purpose of finalisation of the construction project of the city's largest boulevard and the sewerage network in certain suburban settlements (Pavlović et al., 2012); simultaneously, the municipalities Predeal and Mangalia, as the first Romanian municipalities that issued municipal bonds (the tranches, which had RON 5 billion value and RON 10 billion value, a 2-year maturities, a interest rate of 36% and 37% per year, respectively, were issued via public offering in October 2001), generated funds which were used for the purpose of constructing novel tourist entertainment facilities (Bercu & Onofrei, 2007; Bucharest Stock Exchange, 2023). Thus, these examples perfectly demonstrate that the aforementioned funding method works great in practice, and that incorporating a "green component" to emissions of this kind should be perceived and used as a major local development opportunity.

CONCLUSION

Green municipal bonds are acknowledged as an essential vehicle for funding local development in Serbia's

Sustainable Urban Development Strategy until 2030, i.e., Romania's Sustainable Development Strategy 2030 and Government Public Debt Management Strategy 2022-2024. Although all the necessary legal conditions are being progressively created, this financing mechanism has not yet been utilised in Serbia and Romania. However, Serbia is one step ahead of Romania in this regard, since it already gave impetus to the green market development in 2021 (by issuing the first green bond, which had EUR 1 billion value, 7-year maturity, and a fixed interest rate of 1.95%) – Romania is expected to carry out the first green bond's issuance by the end of 2023 (Public Debt Administration of Serbia, 2023; Ministry of Finance of Romania, 2023). Finally, prospects for the green municipal bonds markets' development in Serbia and Romania could be labelled as promising, since both states have certain municipal bonds' issuance histories and basic strategic/legal frameworks necessary for successful green bonds' emissions.

KEYWORDS
Green finance, Green bonds, Municipal bonds, Serbia, Romania

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Long waves in energy behaviour-some global evidence

ABSTRACT

INTRODUCTION

A long-wave hypothesis, due to Kondratieff (1935), stipulates that time series, such as commodity prices, interest rates, wages and energy aggregates, exhibit cycles lasting 45-60 years (through to through). Numerous studies tested Kondratieff's long-wave hypothesis, mainly focusing on commodity prices. The main research objective of this study is to question the existence of long waves in various energy production and consumption time series.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Cuddington & Jerrett (2008) test the presence of supercycles in the prices of six metals traded on the London Metal Exchange in the past 150 years, while Jerrett & Cuddington (2008) broaden this search to three additional metals: steel, iron, and molybdenum. By focusing on the same period, Erten & Ocampo (2013) analyzed supercycles in the prices of non-oil products. Finally, Férnandez et al. (2020) propose a common stochastic trend representation of supercycles for various commodity prices.

METHODOLOGY

This research applies Christiano-Fitzgerald's (2003) band-pass filter in extracting Kondratieff's long waves in global energy consumption data in the last 200 years. The "ideal" band-pass filter uses an infinite number of leads and lags, while one must use a finite number of leads and lags when dealing with finite samples. Christiano and Fitzgerald (2003) develop alternative finite sample approximations to the “ideal” band-pass filter, both symmetric and asymmetric, which this study utilizes.

RESULTS

Some preliminary econometric results identify a long wave in the behaviour of global energy consumption in the last 200 years. The results are, to a certain extent, robust concerning different detrending methods (mean removal vs linear detrending), stationarity assumption of shocks (I(0) vs I(1)), and fixed length symmetric vs full sample asymmetric band-pass filter type.

DISCUSSION / POLICY IMPLICATIONS

The preliminary empirical results of this research might be relevant for constructing a small mineral market model along the lines of Cuddington and Zellou (2013), which policymakers could use for running simulation exercises and scenario analyses for conducting macroeconomic and energy policies.

CONCLUSION

This study tested the presence of the long-wave hypothesis in the case of global energy dynamics in the last 200 years. Potential avenues for further research include broadening the analyses for different countries and energy products to generalize the preliminary findings of this research.

KEYWORDS

long waves, supercycles, Christiano-Fitzgerald band pass filter

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MACROECONOMIC EFFECTS OF HEAT-RELATED LABOR PRODUCTIVITY LOSSES IN AUSTRIA

ABSTRACT

INTRODUCTION

The summer of 2022 with an estimated 60,000 heat-related deaths in Europe (Ballester et al. 2023) was a clear signal that rising temperatures caused by the climate crisis have enormous consequences on human health. All The latest climate mode predictions indicate a future increase in the number and extent of heat waves in Europe. These heat waves cause adverse health effects which also have economic costs, ranging from the costs of treatment and therapy to losses in productivity. We apply an agent-based macroeconomic model for Austria to quantify the economic consequences of heat-related reductions in labor productivity.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Based on greenhouse gas emissions and related temperature scenarios published by the Intergovernmental Panel on Climate Change (IPCC), Hübler and Klepper (2007) develop scenarios on the development of human heat stress in Germany. Then, based on a study by Bux (2006), they estimate resulting losses of labor productivity. According to studies cited there, the reduction in productivity in the temperature range of 26 to 36˚C varies between 3 and 12 percent, depending on the type of job. These labor productivity reductions lead to GDP losses in the range of 0.12 to 0.48 percent.

METHODOLOGY

We apply an agent-based model (ABM) of the small open economy of Austria. The model is described in detail in Poledna et at. (2023). The ABM considers the following sectors: firms, private households, the general government, banks including the central bank, and the rest of the world. Each sector consists of heterogeneous agents representing either natural persons or legal entities. The firm sector is made up of 64 industries, each producing a perfectly substitutable good with labor, capital, and intermediate inputs from other sectors with a fixedcoefficients (Leontief) technology. The model has been applied to assess the medium-run macroeconomic effects of lockdown measures taken in Austria to combat the COVID-19 pandemic (Poledna et at., 2023), and to estimate the economic impacts of flood events in Austria (Bachner et al., 2023).

RESULTS

We apply (higher) sector-specific reductions in labor productivity for the most vulnerable sectors, the largest in the construction sector, and additionally assume that heat waves result in lower productivity in the remaining sectors. The ABM simulations will show the consequences for gross value added and employment in each sector as well as the total economy. The sectoral impacts will depend on the initial shock(s), but also on the sectoral linkages.

DISCUSSION / POLICY IMPLICATIONS

The climate crisis and the resulting increase in the number and extent of heat waves has various economic implications. In this paper we focus on labor productivity losses, but the rising number of deaths, more sick leave days, crop failures in agriculture, negative impacts on electricity production, higher electricity demand, air conditioning supply and demand as well as changes in international tourism are also to be expected. Hence, sectoral and macroeconomic effects of labor productivity reductions most likely underestimate the true economic costs of increasing heat waves.

CONCLUSION

Based on our model simulation results, we estimate the magnitude of the macroeconomic effects of heat-related labor productivity losses, although the exact numbers of GDP and employment reductions have to be interpreted with caution. At least the results will identify those sectors where, based the direct effects and on the production linkages, the largest economic consequences can be expected.

KEYWORDS

Agent-based modeling, macroeconomic modeling, Austria, climate crisis, heat waves

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A COUNTRY RISK ASSESSMENT FRAMEWORK WITH INTERDEPENDENCIES BETWEEN DIFFERENT RISK DIMENSIONS

ABSTRACT

INTRODUCTION

The assessment of a country's risk is considered a significant instrument in decision-making processes about investments, risk management and the allocation of resources. Considerations of a country's risk profile are necessary when entering foreign markets, due to certain unpredictable factors associated with conducting business in a specific country (for instance, civil unrest, political stability or economic conditions).

LITERATURE REVIEW / THEORETICAL BACKGROUND

Among the first to consider the necessity of defining the concept of country risk was Robock (1971). Negative events, such as crises, bubbles and panics, lead to changes in the measurement methods of risk. Scholars gave various definitions to country risk (Robock, 1971; Haendel et al., 1975; Meldrum, 2000; Deceanu et al., 2010). Gautrieaud (2002), Yao et al. (2006), and Martin (2010) argued that country risk represents a set of political decisions, sovereign actions and economic and financial risks.

METHODOLOGY

To describe the connections between the risk dimensions, such as social, labour, legal and environmental risks, we employ the generalized structure component analysis (GSCA) on a set of 120 developed, emerging and frontier countries. The robustness of the results was tested in two manners. First, we involve a partial least squares multi-group analysis (PLS-MGA), and then we assessed the effects of variable changes by replacing the legal risks latent variable with a broader one.

RESULTS

Our findings reveal that risk dimensions are interconnected at the country level and that such mutual dependencies should be taken into account for country risk assessment.

There is a two-fold contribution to the current literature: 1. our model assesses the potential connections and causality between the risk dimensions for a set of 120 developed, emerging and frontier countries; and 2. we involved in our study the environmental risks which represent a topic of emerging interest nowadays.

DISCUSSION / POLICY IMPLICATIONS

The study has implications for the design of public policies meant to ensure macroeconomic and social stability. Therefore, there should be implemented a proper strategy of communication and explanation of public policy measures. Moreover, a unified public policies' framework should be considered in tackling the country's risk issues.

CONCLUSION

Country risk assessment is a complex topic that caught and grabbed the attention of researchers, especially after the past financial crises. Due to its inherent complexity, it is quite difficult to build an assessment indicator system and to set index weights to measure country risk. However, the literature recommends certain methods, including the Generalized Structure Component Analysis (GSCA) that we employ to describe the relationships between four different country risk dimensions.

KEYWORDS

country risk assessment, risk dimensions, generalized structure component analysis, latent variables, PLS-MGA

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The rebound effect of resource efficiency for the eu and its major trading partners: a stochastic frontier analysis

ABSTRACT

INTRODUCTION

In recent decades, material consumption has significantly increased. According to some recent estimates, the need for materials will also continue to rise in the years to come (OECD, 2019). From the standpoint of climate mitigation, this is crucial because a significant percentage of GHG emissions are caused by the energy embodied in materials, mostly due to their extraction, processing, manufacture, or assembly. In this context, increasing material efficiency is seen to be extremely crucial for lowering emissions (Aidt et al. 2017; Hertwich et al. 2019; Boldoczki et al. 2021; Skelton & Allwood, 2017). However, strategies for increasing material efficiency have not received much attention up to now, and a greater focus has been placed on the energy-based climate solutions, such as reducing the use of fossil fuels through improved energy efficiency or raising the share of renewable energy in the overall energy mix (Pauliuk & Heeren, 2021).

Improvements in energy and material efficiency are equally important for reducing climate change, but they may also have a rebound effect. The rebound effect of material efficiency, contrary to the substantial literature on the rebound effect of energy efficiency, has received less attention (Meyer et al. 2007; Skelton et al. 2020). Using the Stochastic Frontier Analysis (SFA) approach, this study comparatively investigates the material and energy efficiency performances, as well as their rebound effects, for the European Union (EU) member countries and their main trading partners. As the EU is the main economic bloc to significantly address resource efficiency (both in the case of energy and material) through a number of earlier projects and its most recent European Green Deal (EGD) proposes the implementation of the Carbon Border Adjustment Mechanism (CBAM) (to make sure that imports from countries with less strict climate policies do not undermine the EU's climate ambitions), we work on the EU member countries and its major trading partners. This study will help us determine which trading partners may be more exposed to and affected by the CBAM by comparing the material and energy efficiency performances of EU member states and their trading partners.

We believe that our paper will significantly contribute to the literature in a number of ways: This is the first study to use the SFA approach to assess the material and energy efficiency performances for the EU member countries and their main trading partners. This study will also be able to analyze and discuss the potential rebound impacts of these efficiency gains, which are frequently ignored by many studies, especially for material efficiency improvements.

LITERATURE REVIEW / THEORETICAL BACKGROUND

The rebound effect of material efficiency, in contrast to the substantial literature on the rebound effect of energy efficiency, has received less attention (Meyer et al., 2007, 2012; Pfaff & Sartorius, 2015; Saunders, 2014; Skelton et al., 2020). A theoretical framework for the raw material rebound effect is developed by Saunders (2014), who also underlines the crucial importance of material efficiency. In an earlier study, Meyer et al. (2007) examine the macroeconomic rebound effect of material efficiency in Germany and find that increasing material efficiency have a significant rebound effect. Germany's raw material rebound effect, according to Pfaff & Sartorius (2015), is roughly 3.8 percent, which suggests that material efficiency rebound values are often lower than those estimated for energy efficiency. Vivanco et al. (2018) contend that focusing solely on one resource could be misleading when it comes to choosing an effective policy. Therefore, they argue that cross-resource rebound analysis and comparisons (such as energy and material rebound effects) are necessary for a better understanding of resource interlinkages. These findings in the literature for the rebound effects of both energy and material efficiency strongly imply the need for additional research because it will become more and more important to measure rebound effects. Skelton et al. (2020) consider both energy and material rebound effects across a range of efficiency scenarios in the automotive sector supply chain by employing a macroeconomic computable general equilibrium (CGE) model for the UK. The findings reveal that material rebound effects—rather than energy rebound effects—are more likely to offset the UK's emissions reductions. These outcomes in the literature for the rebound effects of both energy and material efficiency clearly suggest that more studies are needed as measuring rebound effects will increasingly become more crucial.

In terms of its scope, methodology, and country sample covered, our study differs greatly from Skelton et al. (2020). Besides, our paper also assesses how the CBAM may impact the EU's key trading partners. In doing so, we will compare and analyze not only the material and energy performances but also any potential rebound effects of these efficiency improvements, which are frequently ignored by many research.

METHODOLOGY

In this study, we employ the direct measurement of the rebound effect provided by the SFA approach developed by Orea et al. (2015). The key benefit of this model is that it can estimate efficiency and the rebound effect simultaneously as it incorporates the rebound effect into the stochastic frontier model. Besides, as it quantifies the rebound effect in terms of its determinants, it also makes it possible for us to identify the primary rebound effect determinants.

The SFA's fundamental theoretical premise is that there is an ideal frontier that no country can beyond in terms of efficiency. Once this ideal frontier has been established, the individual input inefficiency of the countries that deviate from it can be calculated. Inefficiency rises when countries leave this frontier. To put it another way, the frontier is where the relatively efficient countries are found, while those that are farther from it are more inefficient (Filippini and Hunt, 2015; Kumbhakar et al. 2015).

The empirical analysis of the study is based on a balanced panel dataset, which contains data from the 26 EU members and the top 10 trading partners of the EU. The dataset covers the years from 1995 to 2019. We compile our dataset from various sources: The World Bank Development Indicators (WDI, 2022), United Nations Environment Programme International Resource Panel Global Material Flows Database (UNEP-IRP, 2022), International Monetary Fund Primary Commodity Prices database (IMF, 2022), and the British Petroleum Statistical Review of World Energy (BP, 2022). We specify two different models: stochastic material demand model and stochastic energy demand model.

RESULTS, DISCUSSION AND POLICY IMPLICATIONS

Our preliminary findings are as follows: We start by estimating the stochastic material and energy demand models. The estimation coefficients for both material and energy consumption are consistent with our expectations and primarily exhibit similarities in terms of their sign. However, the results of the two models, taken together, demonstrate that, in contrast to energy demand, material demand seems to be more elastic and, hence, more sensitive to changes in its determinants. Therefore, concentrating on these key determining factors may have a greater impact on attempts to reduce material demand.

Second, we measure energy and material efficiency performance of countries in the sample and estimate the rebound effects associated with these efficiency measurements. Based on our empirical findings, we suggest that while less developed EU members and trading partners generally ranked lower in material and energy efficiency ratings, more developed EU countries and their

rich trading partners generally ranked higher. This is an expected outcome given that developed countries often have more time and money to devote to enhancing their production methods and technology than emerging economies. These increases in efficiency performances may also be linked to developed countries' earlier commitments to climate mitigation efforts. Within industrialized and developing nations, there are, however, also considerable variances, particularly in material efficiency scores. Due to the higher variation in material efficiency among countries, we could also argue that when the correct policies are put in place, low-scoring countries have a great deal of room to improve their material efficiency.

Third, compared to their trading partners, the EU member countries score higher on average for material and energy efficiency, with the exception of the UK, the US, and Switzerland. So, based on our research, it is possible that the EU's CBAM will have an important impact on trading partners with poor efficiency scores in terms of energy and material and less strict climate policies, like Turkey, China, India, and Russia. These countries may have some difficulty adopting new regulations and will be forced to take serious actions to increase their material and energy efficiency performances.

Fourth, our analysis shows that implementation of resource efficiency may have rebound effects. As shown in Figures 1 and 2, we find a positive correlation between efficiency improvements and rebound effects for both material and energy consumption, meaning that increased efficiency results in higher rebound effects. More importantly, the rebound effect is stronger in resource-efficient countries. This suggests that rebound effects, especially in high-income countries, can cancel out some of the benefits of resource efficiency increases.

Figure 1. Material efficiency and the rebound effect

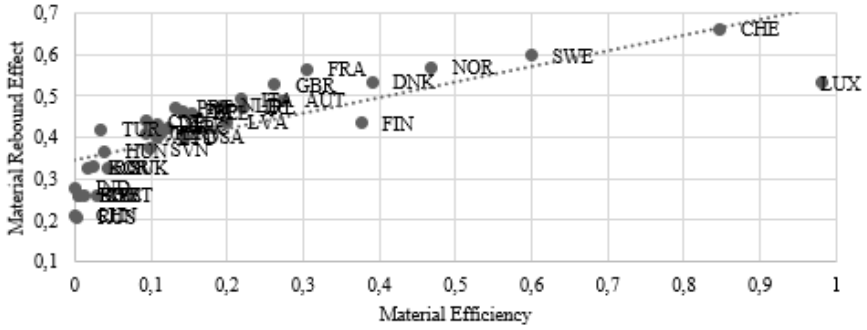
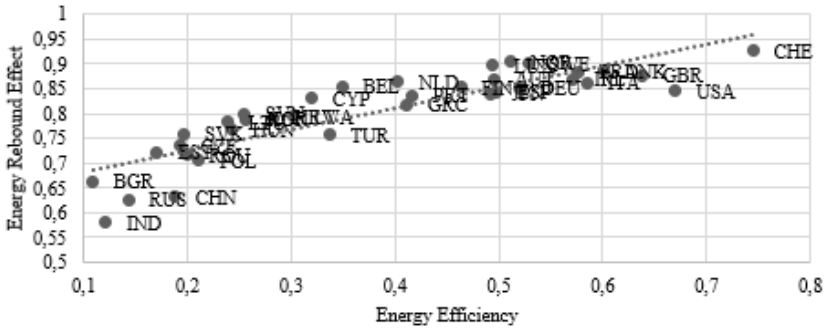


Figure 2. Energy efficiency and the rebound effect



Lastly, while energy efficiency scores are relatively higher, material efficiency performances are lower, but improving over the years. The rebound effects of energy efficiency exceed those of material efficiency, implying that energy reduction potentials are largely offset. Overall, these findings suggest that targeting material consumption to improve environmental sustainability could be an important policy option as there is still significant potential to improve material efficiency due to the relatively low rebound effects and increasing material efficiency trend.

CONCLUSION

Improving energy and material efficiency is essential for achieving sustainable development, energy security, and climate goals. These improvements could, however, have a rebound effect that would cancel out any potential resource savings mainly driven by the increased resource efficiency. In this study, in order to simultaneously measure resource efficiency and the rebound effect based on their potential determinants, we estimate and analyze material and energy efficiency scores as well as rebound effects for the EU member countries and their trading partners in the context of sustainability and climate change using the SFA. This study contributes to the literature by highlighting the complex relationships between material and energy efficiency and by revealing potential rebound effects that may result from their implementation.

The empirical outcomes of the paper are presented in a comparative manner using energy and material models to help policymakers determine the best action plans for lowering energy and material use while minimizing any rebound effects.

To avoid or lessen the rebound effects linked to resource efficiency programs, policymakers might take a variety of steps. For example, they can increase the effectiveness of resource efficiency policies and encourage a more sustainable and effective use of resources by setting appropriate targets, implementing complementary policies, using pricing mechanisms to fund resource efficiency measures, ensuring policy coherence, and monitoring and evaluating policies. Policymakers can also seek to change social norms and values to promote sustainable consumption. In order to promote the benefits of resource efficiency and sustainability and to promote more sustainable and equitable lifestyles, this can involve awareness campaigns, educational efforts, or social marketing campaigns. Last but not least, by encouraging more sustainable patterns of production and consumption, circular economy strategies—which emphasize reducing, reusing, and recycling materials—can assist to reduce the rebound effects of resource efficiency.

KEYWORDS
Material efficiency, energy efficiency, rebound effects, stochastic frontier analysis, the EU member countries

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CRITICAL SUCCESS FACTORS, SUSTAINABILITY AND CLIMATE CHANGE: HYBRID FLOOD PROTECTION AND DRINKING WATER SUPPLY IN A GERMAN WATER ASSOCIATION

ABSTRACT

INTRODUCTION

Owing to climate change, water scarcity and water stress are an imminent threat to the global society (Debele et al., 2019). Natural hazards get more severe and frequent (Hake et al., 2016). Hence, avoiding critical system failures by provision of safe drinking water supply and functional flood protection are crucial tasks (Scheffler, 2020). This study presents the use of critical success factors (CSF) to build an autarkic surface water plant with ~ 65 Mio. €, thereby addressing climate change.

LITERATURE REVIEW / THEORETICAL BACKGROUND

A systematic review of the tension field is proposed in Scheffler and Vogl (2022) providing a bibliometric content and citation network analysis. The literature agrees on the existence of increasingly severe natural disasters, occurring more frequently and, thus, threatening the human existence (Kareiva & Carranza, 2018). Further, the water sector is in the fourth revolution, i.e. transforming towards a “human-water-data-nexus” (Poch et al., 2020). CSFs are unclear (Scheffler, 2020)

METHODOLOGY

The paper is based on the results of a larger research study, which started 2010 as a case study and encompasses over eight research papers, whose insights are directly implemented. Derived CSFs for mega-project realizations have been used to enable the water plant. The policy application and implementation of an according knowledge management system is given in Scheffler and Vogl (2022) and the planning of an AI-based decision support system in Vogl and Scheffler (2023).

RESULTS

Core result of the study is the deviation of water sector relevant CSFs (see Figure 1) (Scheffler, 2020). However, the dimensions of digitalisation and sustainability are to be seen as CSF as well (Vogl & Scheffler, 2023). By applying the CSFs, the planning of the surface water plant has been shortened to several months, instead of 20 years as seen in previously failed mega-projects. Therefore, a template for future projects in Europe has been derived, thus, enhancing sustainable climate solutions.

DISCUSSION / POLICY IMPLICATIONS

The implementation of the CSFs on a policy level can be stated as success. The practical operational implementation is demonstrated in Vogl and Scheffler (2023), proposing IT project taxonomy solutions. In general, mega-project speed-ups would enable sustainable and fast reactions to climate change on a policy level as well as an exploitation of "windows of opportunities" as given in the Kingdon's streams model (Vogl & Scheffler, 2023; Herweg, 2015). Thus, hybrid solutions are future avenues.

CONCLUSION

By integrating knowledge management, sustainability principles and CSFs, this study illustrates a functioning mechanism against climate change. CSFs can be utilized at a policy level to enable mega-projects, which in a hybrid setting allow to reduce the strain on ground-water levels and to cope with climate change effectively. Paired with the notation of sustainability and digitalisation, a practical implementation is derived, which serves as a holistic template for future European projects.

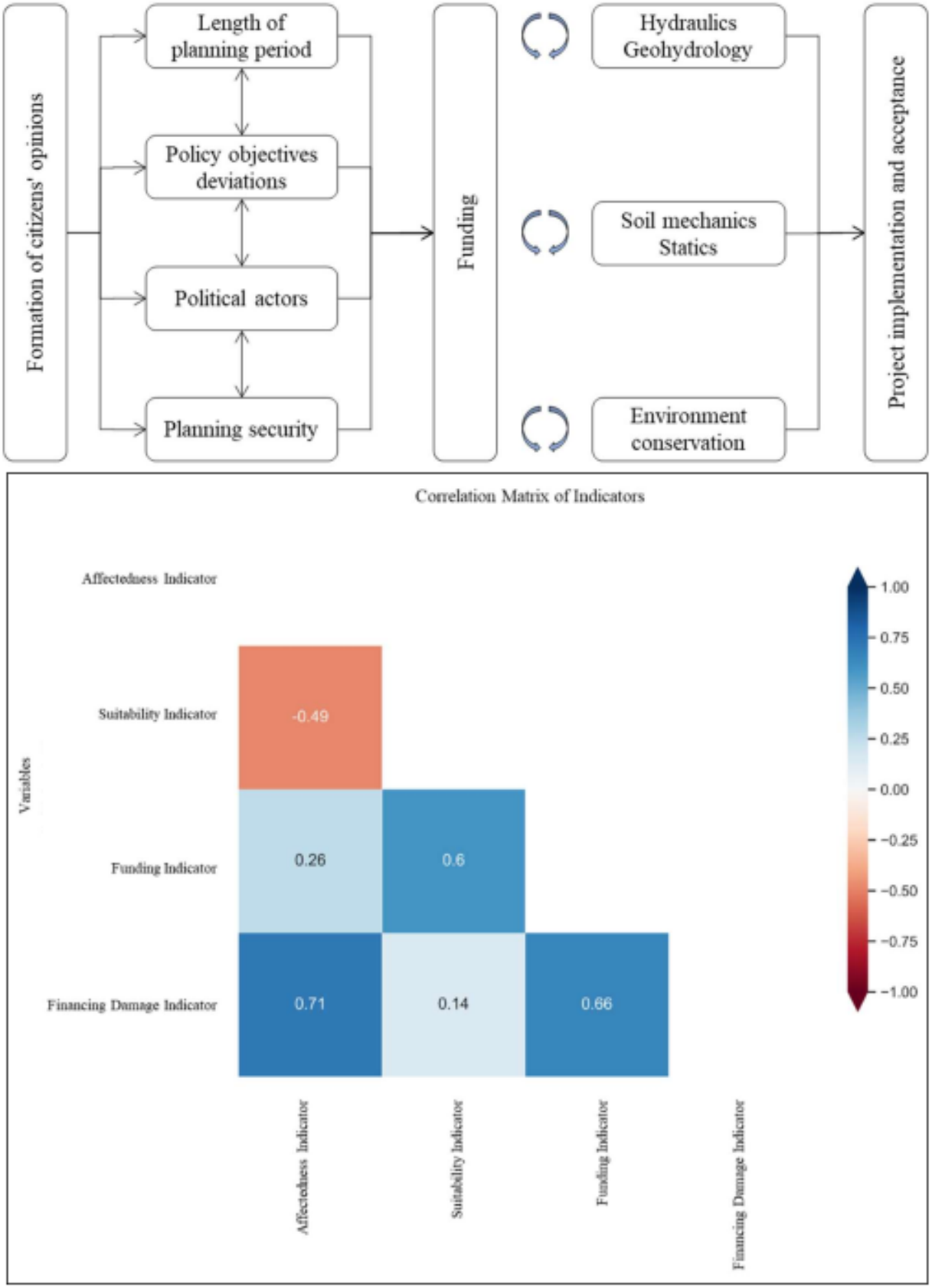

Figure 1: (Top): Model of the overall process of CSFs and their interdependence within the knowledge- management process implementation (Scheffler & Rietze, 2017). (Bottom): Representation of the correlation matrix of the indicators formed as proposed in Scheffler (2020).

KEYWORDS

Hybrid flood protection and drinking water supply, climate change, digitalisation, sustainability, critical success factors

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MULTIFACETED APPROACHES TO SUSTAINABILITY AND ESG

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SUSTAINABILITY REPORTING AND ESG PERFORMANCE OF THE SERBIAN REAL SECTOR

ABSTRACT

INTRODUCTION

The aim of the paper is to analyze the complexity of national corporate reporting in accordance with sustainable development goals. Due to the growing awareness of the importance of environmental and social business dimensions, the paper investigates the transparency and the quality of disclosed ESG information in the most successful large-sized companies in Serbia. The paper's specific objective refers to the state analysis in the creation of unique globally accepted sustainability standards.

LITERATURE REVIEW / THEORETICAL BACKGROUND

The paper provides a review of domestic and foreign literature related to the sustainability reporting and qualitative and quantitative ESG information (Adams et al., 2022; Darnall et al., 2022, Berber et al., 2018). Besides, it is interesting to follow the activities of standardization and quality improvements in the area of sustainability (Malinić and Vučković Milutinović, 2023; Global Report Initiative; International Sustainability Standard Board; Sustainability Accounting Standards Board).

METHODOLOGY

Considering the defined goals, the paper includes desk research focused on the reporting of economic, environmental and social aspects of the Serbian real sector. The subject of the research is the management reports and sustainability reports of the companies that are included in the top 100 enterprises with the highest realized net profit. The analysis covers the reports for 2022 and was determined using data from the Register of Financial Statements of the Serbian Business Registers Agency.

RESULTS

The results of the analysis indicate that a responsible attitude towards the environmental and society is an indispensable part of the business of analyzed companies. The majority of companies disclose information about sustainability (as a part of annual business report, separate publication or within group sustainability report). For most of the analyzed companies, it is characteristic that the sustainable reporting was not based on the unique internationally recognized methodology.

DISCUSSION / POLICY IMPLICATIONS

This paper contributes to the literature in the area of corporate sustainability reporting and ESG performance. Sustainability reporting has become one of the top priorities due to growing environmental, governance and social problems. The research results can be interest to readers in academic areas, but also to management of companies, financial analysts, policymakers and stakeholders.

CONCLUSION

There are significant differences between companies' sustainability reporting due to lack of clear regulations and unique standards regarding methodology, content and form of reports. In order to unify and improve non-financial reporting in Serbia, it is necessary to promote sustainability reporting as a desirable business practice, as well as harmonize the national legislative framework with international legislation and leading trends in this area.

KEYWORDS

Sustainability reporting, ESG information, performance, methodology, Serbia

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What role does board composition play in ESG disclosure? Evidence from v4 countries

ABSTRACT

INTRODUCTION

With climate change and environmental issues getting severe, environmental, social and governance (ESG) has received a great attention in recent years, it effectively assesses a company's capacity to operate sustainably and socially. The purpose of this study is to investigate the relationship between board composition, including gender diversity, board size, non-executive directors on the board and CEO duality, and ESG disclosure by public listed companies in the Visegrád Group (V4) countries.

LITERATURE REVIEW / THEORETICAL BACKGROUND

A company's ESG practices and disclosures benefit from effective corporate governance. (Albitar et al., 2020). ESG are considered as a corporate governance issue (Ying et al. 2021), the board of directors acts as a management oversight body, providing direct and indirect information to all stakeholders, and monitors management choices pertaining to sustainable development of internal management and the of society (Akisik & Gal, 2017; Chebbi & Ammer, 2022).

METHODOLOGY

To achieve the objective, Bloomberg's database was employed to collect ESG disclosure scores and financial data for publicly listed companies in the V4 countries, with a sample of 642 firm-year observations. Two-way random effect regression model is utilized to control for unobserved heterogeneity across the individuals, firms, and countries in the panel data, ESG disclosure served as the dependent variable, the four proxies of board composition were adopted as explanatory variables.

RESULTS

The regression analysis demonstrates a statistically significant and positive association between percentage of women on board and ESG disclosure, with a coefficient estimate of 0.258 (p-value < 0.01). It reveals a significant and positive relationship between board size and ESG disclosure, with a coefficient estimate of 1.407 (p-value < 0.01). However, it did not find a significant relationship between the percentage of non-executive directors on the board and CEO duality with ESG disclosure.

DISCUSSION / POLICY IMPLICATIONS

The results suggest that the presence of gender diversity on corporate boards can serve as a catalyst for greater transparency and disclosure regarding ESG issues. A greater representation of women on their boards views ESG disclosure as a critical component of broader sustainability strategy, and may be more willing to publicly report on their ESG practices. However, non-executive directors and CEO duality do not play a significant role in shaping companies' decisions to disclose ESG practices.

CONCLUSION

This study reveals a positive association between gender diversity and board size with ESG disclosure in the public listed companies in the V4 countries, provided valuable into sustainable business practices. While there is no significant association between non-executive directors, CEO duality, and ESG disclosure. From the perspective of corporate governance, focusing on gender diversity and board size more helps to enhance corporate's sustainability and align with global ESG standards.

KEYWORDS

Board composition, ESG disclosure, Visegrád Group, Gender diversity, Board size

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'GREEN' ENERGY IN 'RED' YUGOSLAVIA: THE FAILURE OF RENEWABLE ENERGY IN YUGOSLAVIA BETWEEN THE 1960s AND 1980s

ABSTRACT

INTRODUCTION

This research focuses on the positive and negative experiences with renewable energy in socialist Yugoslavia. The fact that the country produced at times up to 70 percent of its electricity for industry and households in the hydroelectric power plants is an admirable achievement from the perspective of the contemporary push for Green Transition in the energy sector. However, the experiences were catastrophic at times, ranging from blackouts in the cities to production stoppages in industry.

LITERATURE REVIEW / THEORETICAL BACKGROUND

The existing Serbian or regional scholarship has not yet analyzed this topic except from technological or engineering perspectives. Starting from that point, this research aims to provide an overarching analysis from a historical perspective of the gradual evolution and ultimate failure of the Yugoslav energy policies based on hydroelectric power, focusing on continuous problems in the supply of electricity and solutions found to navigate them.

METHODOLOGY

This research employs a critique of the sources as a standard historical method. It is based on a combination of primary and secondary sources, stretching from official Yugoslav policies and statistics, expert analyses, newspaper articles, and interviews with former engineers and other agents involved in the process.

RESULTS

The expected results will provide a deep understanding of the Yugoslav experiences with hydroelectric power plants as the dominant source of electric energy that are important in regional and global contexts. These will include the overview and historical reconstruction of the entire process and a critical investigation of the problems and adaptations of official Yugoslav public policies that could be used as a starting point in the formulation of contemporary public policies in the field.

DISCUSSION / POLICY IMPLICATIONS

Previous experiences with electricity production in hydroelectric power plants or other renewable sources of energy are crucial in adequately approaching the Green Transition process that includes the expansion of hydroelectric power plant networks as renewable energy sources, which is and will most certainly be one of the pressing agendas in the future.

CONCLUSION

Transition to renewable energy, whether from hydro, solar, wind, or geothermal sources, faces a challenge in providing a continuous flow of energy to industry and households at the current level of technological capabilities. Lacking capacities for storage of vast amounts of electric energy, the solutions to this challenge will have to be found in conventional sources, among which nuclear power currently seems to be the best option, despite other environmental and safety concerns it raises.

KEYWORDS

Yugoslavia, hydroelectric power, renewable energy

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JUST TRANSITION FROM THE LOCAL SOCIO-ECONOMIC DEVELOPMENT PERSPECTIVE – THE CASE OF 10 MUNICIPALITIES IN THE REPUBLIC OF SERBIA

ABSTRACT

INTRODUCTION

As a full signatory of the Energy Community Treaty and Sofia Declaration on the Green Agenda for the Western Balkans, Serbia is committed to engage in phasing out coal-fired energy and reduce dependency on fossil fuels. The National Energy and Climate Plan (NECP) provides a legal basis for sustainable transition including financial resources and governance mechanisms. However, not all economic sectors, population groups and geographical regions are equally exposed. This research aims to assess to what extent ten selected municipalities, with a high mining sector dependance, prepared for the just transition process taking into account characteristics of the local economy.

LITERATURE REVIEW / THEORETICAL BACKGROUND

We particularly rely on empirical research contributions aimed at identifying critical factors of the local energy transition in the European context. Reviewed literature includes papers focusing on mitigation risks immanent to labour market transformation (Voicu-Dorobantu, 2021), socio-economic impact and governance (Pavloudakis et al. 2023;Moodie, 2021; Galgóczi, 2020), as well as experiences of the Central and Eastern Europe economies (Young and Macura, 2023; Nowakowska et al. 2021).

METHODOLOGY

The research approach is mainly based on assessment of the economic, social and governance capacities of the selected ten municipalities selected with respect to the share of mining sector in the local gross value added and employment. Such empirical analyses were performed using available local statistics provided by the national statistics. The analysis was amended by the analysis of local economic potentials that could be used to minimize negative effects of the decarbonization.

RESULTS

Research results indicate severe exposure of the targeted municipalities to the negative consequences of decarbonization. The main risks refer to potential job losses in mining and energy sectors including sectors directly

related to decarbonization, with potential adverse effects to the whole local economy. Municipalities with underdeveloped sectors of small and medium enterprises and ones with poor infrastructure could be seriously affected in terms of depopulation and brain drain.

DISCUSSION / POLICY IMPLICATIONS

Obtained results provide evidence for developing targeted interventions aimed at minimizing negative effects of the just transition process on local economies and vulnerable population. The focus of the policy measures should be on supporting upskilling and reskilling of the population employed in affected sectors, compensation policies as well as providing market-based mechanisms (eg. “Polluter pays principle”) and incentives to change their behavioral patterns such as switching to renewable energy sources.

CONCLUSION

Just transition process reflects Government’s strategic direction towards sustainable development. Serbia has already started paying the price of non-acting and further costs including unhealthy living environment and temporary imports of electricity are projected to rise in the future. The social component of just transition should not be neglected since development of the renewable energy sector might produce significant spillovers to other economic sectors and regions already facing issues such as lack of well-educated workforce.

KEYWORDS

Just Transition, Local Development, Sustainable Development, Governance, Serbia

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China's green finance development: Perspectives and challenges

ABSTRACT

INTRODUCTION

China's green finance has grown rapidly in recent years, while Chinese financial market decision-makers have taken the lead in expanding their responsibilities in developing a green financial system. Despite recent advancements, there are still many challenges China's green development faces. Moreover, green development is additionally challenged nowadays by the current global geopolitical changes. Considering that, the research is aimed to analyze the recent trends in green finance in China and investigate the main barriers, including their overcoming solutions.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Green development and green finance have become highly discussed topics in recent years, while a framework and definition for green finance have been established by certain scholars like Lindenberg (2014), Wang and Zhi (2016), Qin and Wang (2019), Hafner et al. (2020), Zhang et al. (2020), and others. According to Wang et al. (2021), China has become a major player in the fields of green finance and development, and its research output is only second after the US. Most scholars discovered that green financing has a positive impact on the environment in China (Li et al., 2022; Zhou et al., 2020; Sun et al., 2023; Lee & Lee, 2022; Muganyi et al., 2021) and aids in the shift from conventional to renewable energy use (Song et al., 2021; Wang et al., 2021). However, some main obstacles to the development of green financing in China continuously persist (Zhao et al., 2022; Ren et al., 2020).

METHODOLOGY

This research focuses on the analysis of the recent trends in green finance in China, i.e., mapping out green finance policies that have been recently applied, green instruments that have been used, and challenges that China's green development faces. In addition, this research seeks to offer some perspectives on the following issues: 1) How might green finance contribute to sustainable development? 2) What are the policy recommendations for China's advancement of green finance? 3) How can the public and private sectors contribute to the promotion of green finance?

RESULTS

After initiating the green finance reform and launching the innovation pilot zone (GFPZ) policy (Zhang, 2023) in 2017, China has made tremendous strides in developing green finance. According to the Climate Bonds Initiative report (2023), the Chinese green bond market hit a record high of a total of USD 155 billion (RMB 1.0 trillion) in onshore and offshore labelled green bonds in 2022. An RMB 200 billion (USD 31 billion) re-lending program for clean coal was implemented by the People's Bank of China in November 2021, while a new re-lending scheme worth RMB 100 billion (around USD 15 billion) was announced in May 2022 with the aim "to support the clean and efficient use of coal" (Xinhua, 2022).

DISCUSSION / POLICY IMPLICATIONS

Despite recent advancements, there are still many challenges China's green development faces and much work to be done in order to establish a greener financial sector. Particularly, one of the key problems is that economic growth precedes environmental compliance, or, in other words, while insufficient environmental regulation implementation creates incentives for investing in polluting companies, the beneficial effects of green projects and the negative consequences of pollution have not yet been sufficiently capitalized to give an impetus for green investment. Furthermore, although the absolute growth of green finance appears to be significant, the share of green finance for green loans and bonds in the overall system shows slow progress.

CONCLUSION

To facilitate green finance and overcome the main barriers, the promotion of green insurance and other green financial products, as well as the strengthening of consistent regulation, is necessary. The establishment of a unified green bond disclosure system, along with encouraging green consumption incentive mechanisms, could also contribute to the more pronounced development of the Chinese green financial system.

KEYWORDS

China, green finance, green development, green policy

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Local powers and cadastral method for the implementation of the sustainable development goals in the state of Bahia - Brazil

ABSTRACT

INTRODUCTION

Decentralization in large countries, as in Brazil, brought a new method of more efficient management of local affairs concerning its population in their territories from the point of view of cogovernance and participatory and deliberative democracy. Due to the scenario, the United Nations has promoted the Sustainable Development Goals (SDGs) initiative, which demands its implementation focus on the local level.

LITERATURE REVIEW / THEORETICAL BACKGROUND

The involvement of local authorities in cadastral services would help legitimize and enhance the process. However, the theoretical model that suggests adding variables does not guarantee demographic inclusion, equal deliberation, or procedural transparency (Gastil, 2021). Meanwhile, digital platforms offer a solution by continuously updating participatory processes but face hurdles due to their usage by local authorities and the community (Bobbio, 2019).

METHODOLOGY

Participation, deliberation, and their effects on public policies indicate that Information and Communication Technologies (ICTs) contribute to legitimacy based on participatory processes (Przybylska, 2021). Local powers to non-governmental organizations, civil society, international agencies, and all kinds of expressions of organized society from the point of view of co-governance and participatory and deliberative democracy (Pateman, 2012). As a multipurpose cadastre model (Velasco, 2008)

RESULTS

The participation of citizens or local authorities in coordinating cadastral policies would positively affect the results of the SDGs. Local organizations are involved in processes carried out in an area they know much better than the government authorities themselves. The cadastre requires continuous updating, and this could be a form of participation that is not limited in time, in which local authorities are involved permanently.

DISCUSSION / POLICY IMPLICATIONS

Considering that Bahia is composed of 417 municipalities, it is critical to develop a pedagogical process of accompaniment to build "communities" understanding at the local level of coordination, encompassing standard metadata. For that, to create instruments of policy based on governance to promote citizenship and evidence to offer support from data to implement realist measures able to attend to the demands of the population and redress the territorial and socioeconomic inequality (Grin, 2019).

CONCLUSION

To analyze this context and enhance the tools to provide more consistency for policy-makers is essential to implement cadastral methods that organize the municipalities by the census to obtain the necessary data that form a source of information for new public policies in the cities, thus establishing a space for participatory deliberation that involves local authorities both in the cadastral organization and in the application support of the SDGs in the municipal territory.

KEYWORDS

Public policies; municipalities; local development; Latin America; SDGs.

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CIRCULAR ECONOMY STRATEGIES AND INNOVATIONS

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CONTRIBUTION OF BIODEGRADABLE WASTE TREATMENT TO CIRCULAR ECONOMY POLICY

ABSTRACT

INTRODUCTION

As a pre requirement for joining the European Union (EU), Republic of Serbia has to comply with the goals of the EU landfill directive and introduce sustainable solutions for diversion of biodegradable waste from landfills. The aim of this paper is to evaluate the contribution of the processes for biodegradable waste in order to fulfill the goals of sustainable waste management.

LITERATURE REVIEW / THEORETICAL BACKGROUND

There is a long way in a waste management of Serbia from open dumping to being a vital part of a circular economy concept. Adopting EU policy into the national legal system is only the first step in the process of adapting to EU standards. The adequate application and enforcement of regulations at the national and local levels is a component of the EU's environmental protection policy.

METHODOLOGY

In order to implement sustainable waste management and meet the objectives of the landfill directive, it is necessary to introduce the diversion of biodegradable waste from landfills (Stanisavljevic, Levis, & Barlaz, 2018). All results in the material flow analysis (MFA) can be controlled because their basic principle is based on the material balance comparing all inputs, stocks and outputs of a process (Brunner & Rechberger, 2004). The software STAN has been applied for modeled scenario (Stanisavljevic & Brunner, 2014).

RESULTS

In this paper, the scenario for the year 2030 is modeled and MFA was used to evaluate the extent of combining anaerobic digestion and home composting contribution to diversion of biodegradable waste from landfills. Functional unit for the scenario is 3,119,000 tons per year. In the scenario (Figure 1), 10% of biodegradable waste is going to home composting and other biodegradable waste is treated in anaerobic digestion plant. It is calculated that 508,000 tons of compost will be produced annually.

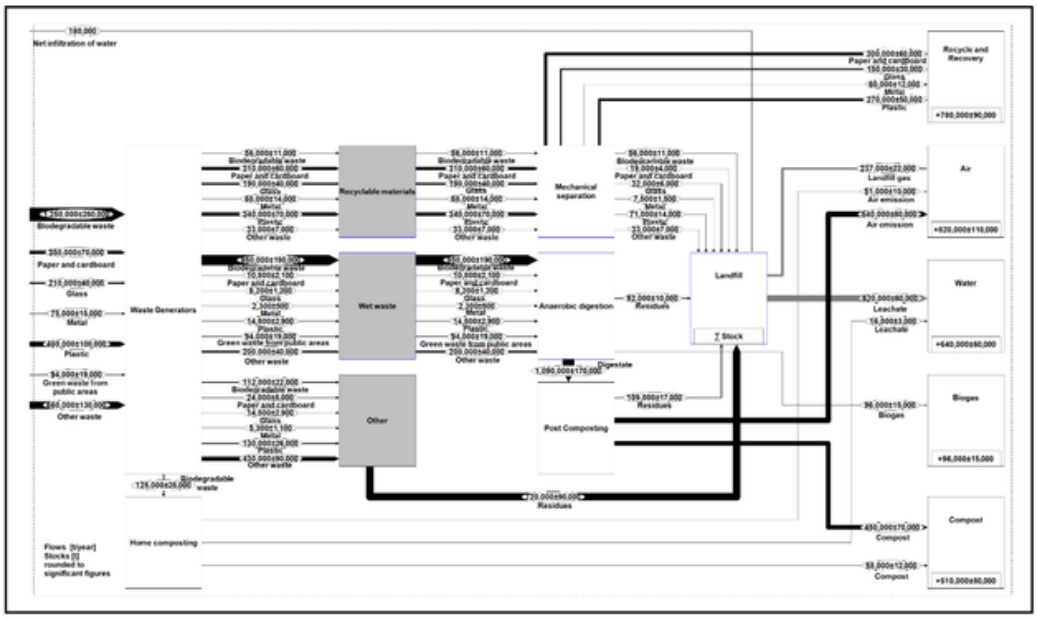

Figure 1: Material flow analysis of modeled scenario

DISCUSSION / POLICY IMPLICATIONS

The modeled scenarios could be used in order to evaluate to what extent different waste management systems can comply with the existing circular economy policies, quantitative goals of the EU directives and in the same time contributes the most waste management goals (protection of human health and resource conservation),. Therefore, it could contribute to the development of standards for the design and implementation of technologies for waste treatment.

CONCLUSION

MFA indicates that (1) home composting has the potential to minimize biodegradable waste entering the collection stream, and therefore it reduces the cost of collection and transportation and the use of landfills, and (2) anaerobic digestion greatly reduces the amount of waste that goes to landfills and contributes to biogas and compost production as well as high recycling goals implemented by circular economy requirements.

KEYWORDS

European Union, landfill directive, circular economy, composting, material flow analysis

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Bibliometric analysis on digitalization and circular economy

ABSTRACT

INTRODUCTION

Globally, communities and economies have gone through a significant change following the digital revolution, which has also revolutionized how information is accessed, shared, and used. Simultaneously, the circular economy has emerged as a key concept in relation to discussions about sustainable development due to growing worries about resource depletion and environmental damage. The purpose of this extended abstract is to explore the complex interactions between the circular economy and digitalization, as well as the resulting policy implications by performing a bibliometric assessment of “digitalization” and “circular economy” literature using the Web of Science database will be performed utilizing with the R programming language. This study intends to contribute to the creation of efficient policies for utilizing the advantages of digitalization to promote the use of circular economies by examining potential synergies and difficulties.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Earlier literature provides insights into the role of digitalization in promoting circular economy practices and underline the potential opportunities for sustainability and remanufacturing (Ghobakhloo, 2020; Kerin and Pham, 2020). Most of these studies suggest that digitalization can play a vital role in advancing the circular economy agenda set by the policy makers (Antikainen et al., 2018). In accordance, this paper will provide an extensive review on this topic and will look at the intersection of digitalization and circular economy to answer the questions such as; what are the main research topics studied by the earlier literature and what kind of policies can be implemented following the current research outcomes.

METHODOLOGY

Bibliometric assessment on “digitalization” and “circular economy” literature using the Web of Science database will be performed by utilizing bibliometrix package in R studio. Descriptive statistics including annual scientific production, and average citation per year will be provided. Top journals where the “digitalization” and “circular economy” research was published and their impact, together with publication progress over time will be examined. Data patterns will be visualized and notable research trends in the above field will be detected showing most reproductive authors, institutions, and countries, as well as existing networks. Collaboration network analyses will be performed to project collaboration networks between authors, institutions, and countries.

RESULTS

We will perform a bibliometric analysis on scientific documents that focus on the interactions between digitalization and circular economy. The literature will be extracted ftom Web of Science (Wos) database. Only peer-reviewed scholarly (original research) journal articles that are in the English language are included in the search results following the inclusion/exclusion criteria (review articles are excluded). The search strategy used the keywords of ("circular economy" or "recycling economy") and ("digit*") and by using Boolean (AND, OR) operators. Original search strategy yields 836 results. After applying inclusion/exclusion criteria to include only original research articles in the English language, the results reduce to 575 results (review articles, proceeding papers and book chapters are excluded).

DISCUSSION / POLICY IMPLICATIONS

The findings of this research will have several policy implications for both national and international stakeholders engaged in promoting sustainable development:

1. Legislative Frameworks: Policymakers should establish comprehensive legislative frameworks that support the integration of digital technologies into circular economy strategies. This includes developing regulations that encourage the adoption of digital solutions for resource tracking, waste management, and supply chain optimization.
2. Innovation and Collaboration: Policymakers should promote cross-sectoral collaboration between technology providers, businesses, research institutions, and civil society organizations. This collaboration can drive innovation in digital tools and platforms, as well as facilitate knowledge-sharing and capacity-building initiatives.
3. Education and Awareness: Policy interventions should prioritize educational programs and awareness campaigns to enhance digital literacy and promote understanding of the circular economy principles. This will ensure that individuals and businesses can effectively leverage digital technologies to support sustainable production and consumption patterns.
4. Public-Private Partnerships: Governments should foster public-private partnerships to encourage investment in digitalization projects aligned with circular economy objectives. This collaboration can provide financial and technical support for the development and implementation of innovative digital solutions.

- In conclusion, the research on the intersection of digitalization and the circular economy presents significant opportunities for policymakers to harness the transformative potential of digital technologies for sustainable development. With this study, we aim to provide a roadmap for governments and other stakeholders to design effective strategies that can accelerate the transition towards a circular economy, leading to improved resource efficiency, reduced environmental impact, and enhanced economic resilience.

CONCLUSION

This study will provide a detailed bibliometric analysis of the literature on the intersection of circular economy and digitalization to find out the most popular research trends and results that will yield important policy implications. We will be able to determine the main research themes, important keywords, the most productive authors in the field and the research collaborations existing between countries and institutions.

KEYWORDS

Digitalization; circular economy; bibliometric analysis; biblioshiny; R

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The role of waste in the linear and/or circular economy model

ABSTRACT

INTRODUCTION

The basic hypothesis on which the author based the paper is that the linear model of the economy has caused a lot of damage to the living environment and that it is high time to move from theory to practice with more intensive forms of the circular economy. The derived hypothesis is that the "life cycle" of waste is much shorter in the linear economic model than in the circular economic model.

LITERATURE REVIEW

The increase in the world's population, accompanied by an increase in the volume of production, results in an increase in waste and negative externalities for the environment (Russel, 2009). However, waste that is used appropriately, as a raw material in a new production process, reduces raw material consumption and reduces externalities (Lacy & Rutqvist, 2015), directly affecting GDP growth, especially in transition economies (Mitić, Munitlak Ivanović & Zdravković, 2017). The optimal answer for the mentioned problems is to replace the linear economic model with a circular economic model (Munitlak Ivanović, 2019).

METHODOLOGY

The work was mainly done using the desk-search method, analysing of available modern literature, the comparison of previously obtained results, the method of description, analysis and synthesis with the use of schematic representations.

RESULTS

The possibility of replacing the linear model with a circular one will evaluate the waste management system and management. The circular model is "circular" in shape because there is a feedback loop between the output and the input. This production model supports the circular movements characteristic of processes in nature (Munitlak Ivanović, 2019).

DISCUSSION

The linear model of production was in mass use during the 20th century. The possibility of replacing this form of economy with a circular one is not always suitable, because if the waste is dangerous, there is no possibility of applying the circular model of production. The duration of "waste" has a shorter lifetime in the linear model than in the circular model.

CONCLUSION

The analysis of case studies showed that economic entities practicing circular economy achieve savings in costs in the form of a reduced amount of waste (garbage, energy residuals, clean air). On the other hand, starting a new production process requires less input and energy because part of the output from the previous production cycle is the input for the new production cycle. This means that in the circular economy, fewer inputs are consumed and less undesirable residues remain after production.

KEYWORDS

Circular production model, linear production model, waste, input, output

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–Olja Munitlak Ivanović is a professor at the Faculty of Sciences, University of Novi Sad.
–She completed basic and graduate studies at the Subotica Faculty of Economics, University of Novi Sad.In the courseof her studies,she was awardeda Diploma foroutstanding performance at the Faculty by the University of Novi Sad. Olja Munitlak graduated from the Faculty at International Commerce study programme with grade 10, whereas her average grade during studies is 8.94. She was a recipient of scholarship from the Ministry of Education and Railway Transport Company (Železni čko transportno preduzeće). On 11 November 2002 she defended a M. Sc. thesis under the title «Chall enges of Poverty in the 21st Century » at Subotica Faculty of Economics and was conferred an academic degree of M. Sc. in Economic Sciences. On 28 December 2006 she defended a doctoral dissertation under the title "Ecological Aspect of a Sustainable Development – International and Regional Comparison" at Subotica Faculty of Economics, University of Novi Sad and was conferred a doctoral degree, PhD in Economic Sciences.
–After graduation she worked as an independent economic associate with an international forwarding company «KDS» and Railway Transport Ente rprise (Železni čko transportno preduzeće,ŽTP) in Novi Sad.
–In the school year of 1998/99, Olja Munitlak got a job at Svetozar Miletić Secondary School of Economics in Novi Sad. In December 2000 she passed a state licence exam at Subotica Faculty of Economics.
–In the academic year of 2000/01 she started to work as a part-time associate-assistant at the Faculty of Mathematics of the University of Novi Sad, Department of Geography.
–She started to work as a part-time associate at "Braća Karić" Faculty of Entrepreneurial Management in Novi Sad in the academic year of 2001/02 and in the academic year of 2003/04 she got a full-time job there.
–In December 2000 she passed an exam at the Ministry of Finance of the FR Yugoslavia and was conferred the title of auditor and in March 2001 she got a licence of certified auditor.
–In March 2007, she was conferred the title of assistant professor at "Braća Karić" Faculty of Entrepreneurial Management in the field of economics. In February 2008 she got a job at the Faculty of Business in Service Industry, Sremska Kamenica.
–She was conferred the title of associate professor at the Faculty of Business in Service Industry on 28 June 2009 in the field of economic sciences, narrow scientific field: management and marketing.

AUTHOR - Olja Munitlak Ivanović

–The Academic Council of the Faculty of Business in Service Industry made a decision on 27 Jan. 2010 to appoint Olja Munitlak Ivanović Head of Department of Economic Sciences.
–In the period 2 Dec. 2010 through 21 Feb. 2012 she was discharging the post of Vice-Dean for Science, following which she got a job at the Faculty of Business Economy at Edukons University.
–Publishing activities in the sphere of scientific journals: editing Godišnjak Univerziteta Edukons journal, published by Edukons University since May 2011; a member of the editorial board of Ecologica scientific journal published by the Scientific Association for the Protection of Living Environment, ECOLOGICA, since April 2011; a member of the editorial board of scientific journal Poslovna ekonomija – časopis za poslovnu ekonomiju, preduzetništvo i fina nsije, published by the Faculty of Business in Service Indusrty; since 2012 she has been a member of the local reviewing committee of Ekonomski pogledi journal, published by the Faculty of Economics, University of Priština; since 2013 she has been a member of the local editorial board of Economic Analysis journal, published by the Institute of Economic Sciences, Belgrade; since 2012 she has reviewed several scientific papers for journals from the list of Ministry of Education, Science and Technological Development. (Poslovna ekonomija, Ekonomski pogledi, Economic Analysis).
–She has been intensively collaborating and doing reviews for the Commission for Accreditation and Quality Assurance (CAQA). So far she mentored two doctoral dissertations, 28 master and 4 M. Sc. thesis, as well as over 50 basic studies and graduation papers.
–On the basis of a decision made by the Senate of Edukons University, she was appointed Principal of the Research Centre of Edukons University on 30 May 2011.

AUTHOR - Olja Munitlak Ivanović

Professional Training

Through exchange of professors and doctoral students, Dr. Olja Munitlak Ivanović participated in the summer International School on Energy Systems (ISES 2012) – Training Course on Energy Systems for Young Researchers and Professionals" in Kloster Seeon, Germany in October 2012.

She successfully completed the International Course: "Green Growth: Policy Measures and Implementation Tools" in Rehovot, Israel. Course was organized by Israel's Agency for International Development Cooperation, Ministry of Foreign Affairs (MASHAW) and Weitz Center for Development Studies (CURUR).

International Activities

While at Edukons University, Dr. Olja Munitlak Ivanović actively participated in the activities of the Alliance of Central Eastern European Universities - ACEU). That way, she established contacts and cooperation with professors from private and state universities from Romania, Hungary, Slovakia, Slovenia, Macedonia, Bosnia and Herzegovina, Montenegro, Ukraine and Albania. The cooperation of Dr. Olja Munitlak Ivanović with professors from these institutions was conducted through: exchange of information on researches and study programmes, exchange of information on lectures, teaching tools, publications and literature of importance for education and research, joint organization of seminars, conferences, congresses and other events in Serbia and in countries of other members of the Alliance, joint publishing activities, joint application for projects with funds of European institutions, regional organizations, as well as funds of governments of Central Eastern European countries.

As a co-mentor on doctoral studies at Universita degli Stude della Tuscia, Viterbo, Rome, she visited the University in June 2006 and held an invited lecture to doctoral students under the title **Perspectives and Indicators of Sustainable Development in the Countries of South-Eastern Europe**. Dr. Olja Munitlak Ivanović participated in 9 international conferences with 20 papers, the form of participation being their organization, making announcements or giving invited lectures which were published in conference proceedings, either whole or in abstracts

AUTHOR - Olja Munitlak Ivanović

As participant on Round table with topic: “SMEs and Green Economy” she was in Kyiv, Ukraine,during the period 13-16. April 2016,organized by: Organization of the Black sea Economic Cooperation (BSEC) i Konrad-Adenauer-Stiftung (KAS).

Dr. Zvi Weinstein
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IMPLEMENTING CIRCULAR ECONOMY AND "CYCLE" ENTREPRISE

ABSTRACT

The paper describes a case study policy to cope with construction and demolition waste (CDW). It is explained through stages of recycling process which creates new green materials and products on one hand and limit the environmental, health, pollution, economical costs of illegal landfill impacts and keeping public spaces clean and attractive for the citizens on the other hand (Eco Finance, 2020; European Commission, 2008; Ellen MacArthure, 2015).

The "Cycle" enterprise aims at answering those problems caused by CDW and prevent future impacts on our environment and make it sustained way through high standards, regulation, partnerships with stakeholders who have the same interest to keep our globe out of nature disasters and to mitigate failures.

INTRODUCTION / AN OVERVIEW

The paper examines and analysis aspects of CDW, their economically and environmental impacts as well as the idea development to establish an enterprise which will use unique locally and globally guidelines emphasizing the means to achieve sustainability and much less greenhouse gas (GHG) emission in the production, less urban heath islands, mobility and marketing processes. The Cycle enterprise is an Israeli innovation. The framework and concepts relate to Cycle are written by the author.

In order to describe and explain the topic we will discuss here the situational picture of CDW in Israel its consequences and costs.

In 2023, the State of Israel is celebrating its 75th anniversary with a population of 9.8 million inhabitants. According to a fundamental research by 100 experts covered most aspects of life, the population is expected to double itself in 2048 (one hundred years after its establishment) to 17-20 million inhabitants (Hasson, 2016). However, the construction needs in Israel indicates that the demand is growing dramatically: Until the year 2030 demand of additional 400,000 housing units needed; while in 2035, it will be necessary to build 1,120,000 of additional new housing units due to population grow.

The expected building momentum in urban regeneration and roads infrastructure, will generate huge amount of CDW quantities. About 85% of it will undergo full recycling processes for that purposes. Furthermore, the 2020 data for master plan TAMA 14 and TAMA 14a (an outline plans for minerals and mining) indicates a critical shortage of basic construction materials such as clay, chalk, cement and sand (Ministry of the Interior, 2012).

These facts must be at the top of the priorities of the decision makers at the level of central government ministries in their consideration dealing with the number one problem in the field of construction waste from its various sources and preventing serious damages to the environment, society, the economy and the residents' health (Weinstein 2020).

The Cycle enterprise devotes multidisciplinary strategic thinking to all possible aspects in which society, economy and environment are comprehensively integrated. It represents a unique, innovative, best technological equipment, powerful and versatile for CDW treatment in large volumes at a national level.

The uniqueness of Cycle base is its capacities to coping with multi-problems caused by climate changes and CDW. For example, the environmental effects of the construction industry depend not only on the construction and planning methods but also on the products used. Implementing the reduction of environmental impacts as a way of thinking in the management and development of green products from recycled materials will create a competitive advantage for companies in Israel and the world and promote the local and global green construction market.

Cycle uses another innovative item that does not found in similar factories and it is a full Life Cycle Assessment (LCA). Starting from the stage of collecting construction waste from all sources, arriving to the plant through its mineral change becoming a new green material, using it in the building process, measuring its impact on the environment, and the loop return once again when the building ends existence and destroyed. In other words, this is the process of the circular economy theoretical and practical way.

Using the LCA system generates the saving of natural resources in the process of circular economy. Israel is poor of them. Therefore, the urgent need to save on the utilization of quarrying and mining resources and to make broad use of the building waste accumulated from various sources. In addition the by-product is reduces environmental pollution and resulted of using less landfills in open spaces.

The clear advantages of CDW recycling processes are agreed and many countries have adopted it using variety of policies, technical and technological means.We briefly summarized them here: saving natural minerals and raw materials; reduction huge volumes of landfill; reducing pollution in open spaces; decreasing cost of transporting waste to landfill locations; types of CDW materials are used to produce energy;

METHODOLOGY

Cycle enterprise is using three main theoretical directions that became its main policies establishing the firm on sustained principles:

1. Circular Economy (CE): Circular economy is acquainted to many industries using natural raw materials for production. Global economies have reached to the conclusion that used raw materials cannot renew themselves and therefore, new ideas and technologies must take initiate to create and establish a balance between demand and supply of industries and create new ways to exchange materials among themselves. In Cycle, the circular method creates more outcomes such as producing completely new raw materials for the building construction industry with new characteristics for variety of uses.
2. UN Sustainable Development Goals (SDG's, 2015): Cycle has adopted the following goals related to its vision, ideas and practical products:
    - Goal 6: ensuring the availability of water resources and sanitary infrastructure and managing them properly
    - Goal 9: Developing future quality infrastructure and encouragement of innovation and entrepreneurship.
    - Goal 11: Promoting the urban environment so that cities and town are safe, resilient for all groups of the large society.
    - Goal 13: Taking immediate steps to combat climate changes and its effects.
    - Goal 15: Life on Earth: Protection of terrestrial habitats and their use.

- The SDG's have three principles: promoting social capitals and values; protection environmental ecosystems through resilience and economic requirements' maintaining growth values according to economic principles and economic stability.

3. Doughnut Economy: Kate Raworth is the creator of that method since 2017. Raworht's model strives to balance both elements: the need of humans and the ecosystem that were destroyed due to incessant quest for growth. The crisis facing the world's population (climate change, famine, desertification, floods, migration waves, fires, dried water resources) originates from the system we have created and it disrupt human beings. Her three circle of sustainability include an outer circle which indicates the limits of the planetarium describes the global ecological problems; An intermediate circle consists of the safe space for humanity and renewable divided economy; and the inner circle consists of twelve basic values that should be provided to every person.

COCNLUSION

The paper analysis a case study of coping with issues of construction demolition waste and its direct impacts on society, environment, economy, human health, urban planning and energy.

These effects are examines through three principles of Circular Economy, the Doughnut Economy developed by Kate Raworth (2017) and the UN Sustainable Development Goals (2015).

An enterprise established in Israel succeeded to integrate among these three principles adding new innovative ways to cope with one of the most influential issues of quarrying and mining essential raw materials that are decreasing in nature. The "CYCLE" firm is the most modern technological plant that is able to cope with 85% of CDW.

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Dr. Zvi Weinstein is a multidisciplinary academic. He holds 8 (eight) academic degrees among them: Urban Regeneration (PhD.), Town and Regional Planning (MSc.), Environment and Urban Sustainability (MA), Public Policy (MA), and Law (MA).

He was a former National Coordinator for Project Renewal of Disadvantaged Neighborhoods at the Ministry of Construction & Housing in the State of Israel during the years 1977-2015. He is the co-founder of the Israeli Smart Cities Institute; a Long period member of the EU-COST Actions. He offers tutoring on a voluntary basis, to students who are writing their thesis about urbanism and social aspects topics, he participates in international conferences related to his fields of interest and he has published more than 50 articles, researches, and books.

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Exploring Perspectives on the Circular Economy: A Review of Key Sources and Insights

ABSTRACT

INTRODUCTION

Circular economy is an economic model that focuses on the sustainable use of resources and the reduction of waste. Humanity needs to embrace the principles of the circular economy for a sustainable future. It is crucial to recognize the importance of circular economy in preserving natural resources, preventing resource depletion, reducing waste generation, decreasing environmental pollution, promoting economic growth and employment opportunities, and encouraging innovation and sustainable technologies.

In the functioning of a circular economy, waste management involves the recovery of energy or valuable components from waste, extending the lifespan and multiple uses of products, designing products with recyclability and reusability in mind, and utilizing resource efficiency through product sharing and collaborative consumption.

The foundations of the circular economy can be traced back to periods when waste management and recycling practices emerged. People began to realize the significance of reusing resources and reducing waste. For instance, recycling practices such as melting down bronze statues to create new ones were observed in the Ancient Roman Empire. With the onset of the Industrial Revolution, production processes accelerated, and demands increased, leading to rapid depletion of natural resources. People started expressing concerns about the limited nature of resources and sustainability.

In the latter half of the 20th century, with the rise of environmental awareness, the concept of the circular economy gained further importance. Efforts were made towards resource conservation, waste reduction, and recycling. Recycling facilities were established, and waste management practices were developed. Today, the concept of the circular economy is increasingly accepted. Many countries and companies are adopting circular economy principles in alignment with their sustainability goals. The circular economy focuses on resource efficiency, waste reduction, promotion of recycling, and increased reuse. In this study, some important sources that provide in-depth information on circular economy and offer different perspectives will be examined.

LITERATURE REVIEW / THEORETICAL BACKGROUND

In this study's context, books such as "Cradle to Cradle: Remaking the Way We Make Things," "The Circular Economy: A Wealth of Flows," "Waste to Wealth: The Circular Economy Advantage," "Products That Last," "Biomimicry: Innovation Inspired by Nature," "The Future of Packaging: From Linear to Circular," "Thinking in Systems: A Primer," "The Circular Economy: A User's Guide," "The Circular Economy and the Global South: Sustainable Lifestyles and Green Industrial Development," and "Designing for the Circular Economy" have been selected.

METHODOLOGY

The methodology of this study is literature review and book reviews.

RESULTS

This study has undertaken a comprehensive examination of the circular economy by analyzing a range of sources that provide extensive information and diverse perspectives. The selected books, including titles such as "Cradle to Cradle: Remaking the Way We Make Things," "The Circular Economy: A Wealth of Flows," "Waste to Wealth: The Circular Economy Advantage," "Products That Last," "Biomimicry: Innovation Inspired by Nature," "The Future of Packaging: From Linear to Circular," "Thinking in Systems: A Primer," "The Circular Economy: A User's Guide," "The Circular Economy and the Global South: Sustainable Lifestyles and Green Industrial Development," and "Designing for the Circular Economy," offer valuable insights into the circular economy and its practical implementation.

The objective of this research is to enhance understanding and awareness of the circular economy, providing illumination on its principles, strategies, and potential benefits. By delving into these sources, the study aims to contribute to a comprehensive analysis of the circular economy and its relevance in achieving sustainability objectives.

DISCUSSION

The roots of the circular economy can be traced back to historical periods when societies recognized the significance of waste management and recycling practices. Throughout history, civilizations acknowledged the importance of reusing resources and minimizing waste. Examples of recycling practices, such as the melting down of bronze statues to create new ones, can be found in ancient civilizations like the Roman Empire. However, the advent of the Industrial Revolution brought about accelerated production processes and heightened demands, leading to the rapid depletion of natural resources. This raised concerns about the limitations of resources and the need for sustainability.

In the latter half of the 20th century, there was a growing environmental awareness that further propelled the concept of the circular economy. Significant efforts were made to conserve resources, reduce waste, and promote recycling. Recycling facilities were established, and waste management practices were developed. Today, the concept of the circular economy is increasingly embraced on a global scale. Many countries and companies are aligning their sustainability goals with circular economy principles. These principles prioritize resource efficiency, waste reduction, the promotion of recycling, and increased reuse as fundamental tenets.

CONCLUSION

The circular economy provides a promising framework to attain sustainability through the sustainable utilization of resources and waste reduction. Embracing circular economy principles is imperative for the well-being of future generations. This economic model brings forth various advantages, such as safeguarding natural resources, preventing resource depletion, minimizing waste production, reducing environmental pollution, fostering economic growth and employment prospects, and driving innovation and sustainable technologies. Transitioning to a circular economy necessitates the adoption of waste management practices that prioritize energy recovery, extending product lifespans, promoting recyclability and reusability, and maximizing resource efficiency.

KEYWORDS

Circular economy, sustainability, waste management, resource efficiency, environmental awareness

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Sema Yılmaz Genç

Sema Yılmaz Genç was born in Istanbul on 25/07/1980. She completed her undergraduate studies at Kocaeli University, Department of Economics, in 2002. In 2004, she obtained her master's degree from Kocaeli University, Department of Economic Policy, with a thesis titled "Capital Accumulation Problem in Turkey: Perspectives of Capital Accumulation Models." Continuing her academic journey, she earned her Ph.D. from Marmara University, Institute of Social Sciences, Department of Economic History in 2008. Her doctoral thesis focused on "An Assessment on the Contributions of Galbraith to Economic Thought."

In 2009, Sema Yılmaz Genç began her career as an assistant professor at Kocaeli University. She held the position of Head of the Department at Kocaeli University, Ali Riza Veziroğlu Vocational School, Marketing and Advertising Department from 2010 to 2020. In 2018, she was granted the title of associate professor in the field of Economic Thought. Since 2021, she has been serving as an Associate Professor at Yıldız Technical University, known as the top university for Economics in Turkey. Her research interests span economic methodology, economic thought, economic sociology, institutional economics, and economic history. Notably, she has been recognized as the most published academician in her field at her university for the year 2022.

Rahmi Deniz Özbay

Rahmi Deniz Özbay was born on March 26th, 1966, in the city of Istanbul. In 1987, he received his Bachelor of Business Administration degree from Marmara University's Department of Business Administration. In 1992, he successfully completed his master's degree in the Department of Economic History at Marmara University. The title of his thesis was "Ottoman Finance in the Second Half of the 19th Century." In 2003, he completed the requirements for the Ph.D. programme in Economic History at Marmara University's Institute of Social Sciences by writing a thesis titled "State Labour Employment in the Ottoman Empire in the 19th Century." This earned him the degree of doctor. Between the years 1999 and 2000, he held the position of Visiting Researcher at the British Library in London. In 2011, he was promoted to the position of associate professor in the department of Economic History, and

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in 2016, he was awarded the title of professor. He was an employee of Marmara University from 1992 until 2021. His most recent position was at Istanbul Commerce University. Additionally, he serves on the scientific committee of the Ataturk Research Centre as a member. His academic specialisations include Ottoman Turkish and Caucasian history, as well as Ottoman Economic History, Technology History, and Labour History.

Suzana Trajkovska
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CIRCULAR THINKING: DRIVING ECONOMIC AND ENVIROMENTAL INNOVATION IN NORTH MACEDONIA

ABSTRACT

The adoption of circular thinking has gained prominence as a transformative approach to achieve sustainable development by simultaneously addressing economic and environmental challenges. This abstract investigates the potential of circular thinking in North Macedonia, focusing on its role in fostering economic growth and promoting environmental innovation.

The implementation of circular thinking requires addressing various challenges, including limited awareness and understanding of circular concepts, the need for supportive policies and regulations, and the development of adequate infrastructure for waste management and recycling. It employs a descriptive and analytical methodology, drawing insights from the literature and case studies to examine the potential of circular thinking in North Macedonia. The analysis explores current initiatives, challenges, and prospects associated with implementing circular practices.

Embracing circular practices can stimulate economic growth by creating new business opportunities and green jobs. By analysing project based best practices, the findings will contribute towards promotion of the circular thinking and boost activities.

INTRODUCTION:

The concept of circular thinking has emerged as a powerful approach to drive economic growth while ensuring environmental sustainability. This abstract explores the potential of circular thinking in North Macedonia, highlighting its role in fostering economic development and promoting environmental innovation.

LITERATURE REVIEW / THEORETICAL BACKGROUND:

This section discusses the concept of circular thinking and its key principles, including designing out waste and pollution, extending product lifespans, and regenerating natural systems. It highlights the relevance of circular thinking in promoting sustainable development and addressing economic and environmental challenges.

METHODOLOGY:
The paper adopts a descriptive and analytical approach, relying on case studies to examine the potential of circular thinking in North Macedonia. It explores current initiatives, challenges, and opportunities in implementing circular practices.

RESULTS:
The analysis reveals the potential benefits of circular thinking, including economic growth, job creation, waste reduction, resource conservation, and environmental protection. It also identifies the challenges associated with limited awareness, policy gaps, and the need for infrastructure development.

DISCUSSION / POLICY IMPLICATIONS:
This section discusses the implications of circular thinking for policymakers, emphasizing the importance of raising awareness, developing supportive policies and regulations, fostering collaboration, and investing in waste management and recycling infrastructure. It highlights the potential of circular thinking in transforming North Macedonia's economy and promoting sustainable development.

CONCLUSION:
The abstract concludes by emphasizing the significance of circular thinking in driving economic and environmental innovation in North Macedonia. It highlights the need for collective efforts from stakeholders, including policymakers, businesses, and citizens, to embrace circular practices and realize the potential benefits.

KEYWORDS:
circular thinking, economic growth, environmental innovation, resource management, waste reduction.

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An Academic and Practitioner in Sustainable Entrepreneurship

Suzana Trajkovska Kochankovska embodies a unique blend of academic rigor and practical expertise, which converge to establish her as a seasoned professional and influential advocate for sustainable entrepreneurship. With a commitment to supporting social enterprises and mentoring the next generation of eco-conscious business leaders, she has left an indelible mark on the world of responsible business practices.

Professional Accomplishments:

As a Regional Structure Support Expert, Suzana's contributions have been transformative trough the results of evaluation the directions for future are designed to foster social enterprises.

The commitment to circular business models and sustainable practices is evident through the invaluable mentorship and program development initiatives by different donors as EU, UNDP. The efforts in conducting meticulous due diligence assessments for green working environments have been instrumental in fostering ethical responsibility and ecological sustainability in workplaces.

Trough the research she has provided profound insights into the entrepreneurial landscape, offering valuable perspectives on emerging trends and their impact on the business world.

The academic engagement has not only enriched the professional capabilities but also honed her skills in research and analysis with a strong aptitude for dissecting the entrepreneurial environment, enabling to identify emerging market trends and make informed projections about the landscape's future.

AUTHOR - Suzana Trajkovska

Suzana Trajkovska Kochankovska is supporting sustainable entrepreneurship as a mentor, and a well-rounded professional who continues to shape the future of responsible business practices. Her academic depth and practical acumen make her a powerful force for positive change in the world of socially conscious entrepreneurship.

SUSTAINABLE AGRICULTURE, ENVIRONMENTAL ATTRIBUTES, AND CLIMATE RESILIENCE IN FOOD SYSTEMS

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Determinants of local food consumption: proposal of a conceptual model

ABSTRACT

INTRODUCTION

Unsustainable production and consumption are regarded as the main causes of environmental degradation, loss of biodiversity and climate change. According to the UN's findings, 13.3% of world food is lost after harvesting and before reaching the final consumer. Locally sourced food has been recognized as a possible solution towards more sustainable food consumption, due to higher level of resilience and adaptability of short food supply chains.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Locally produced food positively affects the environment, taking into consideration reduced food miles. This study builds upon extant literature on the determinants of sustainable, green, eco-friendly food consumption to propose a comprehensive conceptual framework of the determinants of consumer purchase intentions related to locally sourced food. The Theory of Planned Behavior emerged as the most extensively applied framework to examine consumer behavioral intentions.

METHODOLOGY

Systematic review of literature available in databases ScienceDirect, Emerald, ProQuest, Wiley Online Library has been performed, using search terms "local food", "sustainable food", "behavioral intentions", "Theory of planned behavior". The focus has been on papers published in English language in the period between January 2000 and June 2023.

RESULTS

Taking into account motives for local food purchases we propose health consciousness, environmental concern and concern for local economy and community as the antecedents of consumer attitudes towards local food purchases and extend the framework of the direct determinants of consumer purchase intentions by the inclusion of moral norms, perceived value and trust into local food suppliers.

DISCUSSION / POLICY IMPLICATIONS

Although the present study, which has focused on the proposal of a conceptual framework, does not provide readily applicable policy implications, an empirical examination of the proposed model would provide evidence-based knowledge on the main antecedents of local food consumption and direct policy-makers to priority areas for behavioral interventions.

CONCLUSION

An examination of the proposed framework would indicate relative importance of the determinants of customer purchase intentions towards local food, whereas the strongest direct predictor of intentions should be prioritized in communication strategies and communication campaigns aimed at promoting local food consumption. Empirical examination of the proposed framework in a developing economy would contribute to the body of knowledge on sustainable food consumption.

KEYWORDS

local food consumption, Theory of planned behavior, short food supply chains

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IMPLICATIONS OF ENVIRONMENTAL CREDENCE ATTRIBUTES ON FOOD MARKETING

ABSTRACT

INTRODUCTION

Food products with environmental credence attributes generates differentiation on the assumption that consumer willingness to pay more derives from these attributes. This paper provides an overview of studies examining their impact on consumer's and possible implications for marketing aspects. By drawing some guidelines for development in the food production with environmentally creditable attributes, the conclusions indicate some issues that could also be subject to further research.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Food quality perception differs according to intrinsic and external product features (Oude et al., 1995, p.177-183). Credence attributes as desirable benefits can't be promptly experienced and are difficult to assess during buying (Darby et al., 2008, p.476-486). Attributes and food quality drive value perception and buy intent, which can influence spending (Saba et al., 2003, p. 637-645). Consumer behavior related to credence attributes effects buying preferences and marketing strategies implementation (Del Giudice et al., 2018, p.307-313).

METHODOLOGY

By using scientific databases (Google Scholar, Web of Science/CAB abstracts, Scopus, Copernicus and EBSCO) an extensive search of the literature relating to environmental credence attributes and implications on food marketing was conducted.

The analyses was focused on two outcomes:
-Credence attributes related to intrinsic and extrinsic attributes,
-Indications environmental credence attributes has on food marketing

The selection process of analyzed publications followed the PRISMA guideline.

RESULTS

Different studies have examined the impact of several credence attributes on consumers' buying intentions influencing customers' willingness to pay more. This situation is affecting the categorization of attributes, where findings from data base

of 40 studies are summarized. Results show that the significance of attributes does not change the practice of using different evaluation techniques, which suggests that methodology affects the magnitude of these attributes, not their significance.

DISCUSSION / POLICY IMPLICATIONS

Credence attributes are likely to be crucial factors for purchasing food. Consumers highly value them in relation to their personal health issues but are less concerned with sustainability of public goods, such as environment and biodiversity conservation. The reason could be scarce knowledge about environmental credence attributes. To avoid this, marketing should emphasize environmental outcomes as the primary focus of all efforts, allowing for the consideration of obvious features.

CONCLUSION

The purchase decisions for food with credence attributes is primarily driven by personal health or experienced eating quality. Targeting motivated consumers, positioning brands and communication strategies should focus on convincing that environmental attributes confer an added value. Future research should be devoted to understanding the claims used for environmental credence attributes and marketing strategies that enhance trust and loyalty toward environmentally safe products.

Key words:Credence attributes, Environment, Marketing, Consumers behavior, Consumer preferences

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POWDER RECYCLING FOR REDUCING THE PRICE OF ADDITIVE MANUFACTURING PRODUCTS AND REDUCING METALLIC WASTE DISPOSAL TO ENVIRONMENT

ABSTRACT

INTRODUCTION

Metal additive manufacturing (AM), also known as 3D metal printing, enabled the production of complex and customized parts with high precision. However, effective management of metal powder in 3D printers is challenging as >80% of powder is wasted in this process. Powder recycling and Powder rejuvenation are available ideas to reduce cost and to protect environment from metallic waste. Here, 4 powder recycling strategies and powder reconditioning process are proposed to reduce powder waste in 3D printing process.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Industry is getting huge advantage of 3D printing [1,2]. However, reducing powder waste for cost and environment purposes is critical inline with EU directives [3,4]. Different powder recycling strategies were introduced [5,6] and reported the impact of various recycling strategies on powder waste reduction and quality of parts printed from recycled powder [7-10]. Here, we designed four strategies to develop a sustainable and cost-effective powder recycling process in 3D printing process.

METHODOLOGY

Four distinct strategies A, B, C, D and powder rejuvenation are considered while rejuvenated powder is considered almost as virgin powder here:

- A: consistently mixing recycled and virgin powder after each build.
- B: mixing the used powder with powder of the same age after each cycle.
- C: reusingrecycled powder after each build without mixing with other powders.
- D: adding recycled powder to the top of unused virgin powder without mixing.
- Rejuvenation: remelting and reproducing recycled powders as alternative to old powder.

RESULTS & DISCUSSION

The best strategy will minimize powder waste and maximize the number of prints:

- A: Part quality is comparably good but still the fresh powder is being used in each cycle too.

- B: Maintains a balance between the recycled and fresh powders.
- C: Reuses the most recycled powder but challenges generating sufficient reuse powder for subsequent builds.
- D: doesn't reduce the part's quality but doesn't significantly minimize the process cost either.

CONCLUSION,

Strategy A has more benefits compared to other strategies considering the part quality and traceability especially for regulated components produced in industry. Strategies B, C and D exhibit benefits in terms of diminishing powder waste but challenge with generating enough recycled powder for subsequent cycles. Powder reconditioning, as a new approach in powder recycling methods, can complement the deficit of all these strategies as is currently under our investigation.

KEYWORDS: Additive manufacturing, Powder recycling, Powder reconditioning, Strategies.

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Agricultural Productivity And Carbon Emissions In Europe

ABSTRACT

INTRODUCTION

Agriculture is one of the key common policy making areas of the EU. Common Agricultural Policy (CAP), as a welfare programme for the European farmers, was first put in the 1960. Since then, CAP has been the largest item in the EU budget for years, with substantial financial transfers to the agricultural sector. Today, CAP remains among the major expenditure items, accounting for 33.1% of the 2021 EU-27 budget. With the aim of ensuring a stable supply of affordable food, CAP seeks improvement in agricultural productivity. Practical outcomes of ambitious common agricultural policies implemented at the EU level, have attracted much academic interest. A number of studies devoted to assessment of agricultural productivity and convergence. Yet, traditional productivity measures ignore negative environmental impact of production. Agricultural activities often result in unintended social costs (externalities), such as loss of biodiversity, emission of GHGs, and loss of soil nutrients. Relying on market prices and quantities of agricultural goods produced in calculation of productivity measures, the literature on measurement of agricultural productivity ignored negative environmental impact of agricultural production.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Considerable research focused on assessment of agricultural productivity changes over the past few decades, revealing mixed results and remaining far from conclusive. In an extensive investigation of global agricultural productivity trends, Alston et.al. (2010) pointed to slowing down in agricultural land and labour productivity in high income countries over the period 1990 - 2005. In contrast, research by Fuglie and Wang (2012) reported positive total factor productivity growth rates for West and Central Europe from 1961 to 2009. A number of research on agricultural productivity has been devoted to investigation of relative total productivity across nations (Galanapoulos et.al., 2004; Ball et.al., 2010; Rezitis, 2010; Swinnen and Vranken, 2010; Cechura et.al., 2014; Barath and Ferto, 2017). Focusing particularly on 11 EU countries (Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, the Netherlands, Sweden and the UK) and the US between 1973 and 2002, Ball et.al. (2010) found relatively higher TFP for

US in comparison to 9 EU countries. Only Belgium and the Netherlands had higher levels of TFP compared to US 1973, where US caught up with both of them by the early 1990s. Employing more sophisticated econometric means to test convergence hypothesis, using the same dataset, Rezitis (2010) found wide variation in TFP growth rates across the countries in dataset and supporting evidence for b and long run convergence among sample countries. Extending the empirical analysis to include a wider set of EU members (EU15) together with candidate countries (12) over the period 1993-1999, Galanapoulos et.al. (2004) conducted Malmquist Productivity Index estimates. Their findings indicate historically higher agricultural productivity rates for the EU member states compared to new comers, resulting a significant productivity gap. A recent study by Barath and Ferto (2017) reinvestigated relative productivity levels for 23 EU member states between 2004 – 2013. They reported evidence of TFP convergence among member states.

METHODOLOGY

Drawing on methodology proposed by Chung et.al. (1997), the objective of this study is to investigate agricultural productivity differences and convergence across Europe, accounting for unwanted by-products – GHGs. Agricultural productivity of 26 EU member states and Türkiye assessed utilising Malmquist – Luenberger Productivity Index, for the years 2002 - 2020. In addition, b-, s-, stochastic convergence tested, employing cross – section and time series approaches. The input and output data are from FAO Statistical database (FAOSTAT, 2023). GHGs data are gathered from Climate Watch historical GHG database (Climate Watch, 2023). Output variable, agricultural produce, represents good output. Bad output variable is agricultural GHGs measured in metric tonnes. Input variables are agricultural land, agricultural labour, fertilisers and agricultural capital.

RESULTS

Preliminary findings indicate long run convergence, and presence of catching-up in agricultural productivity among countries.

CONCLUSION

The study aims to contribute to the literature at least two important ways. First, employing an environmentally sensitive productivity index, we account for undesirable outcome of agricultural production. To the best of our knowledge, this is to be the first research on assessment of European agricultural productivity, incorporating negative effect of environmentally harmful by-products. Second, existing research remains limited in terms of both country and time dimensions of the dataset utilised. This study extends the analysis to 26 member states and Türkiye, over a longer period of time (2002 – 2020). Given the existing differences in terms of resource endowments between the old member states and the new member states, we expect to reveal patterns of agricultural productivity development across member states.

KEYWORDS
GHG, Malmquist-Luenberger Productivity Index.

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Does farm certification for sustainable agriculture contribute to food export? A case study in middle-income countries

ABSTRACT

INTRODUCTION

Agriculture contributes to economic growth while endangering the environment and causing global climate changes. This sector requires transformation in terms of sustainability and greening practices and payment (EC, 2019; EC, 2020; FAO, 2018; World Bank, 2021). Private standards in agriculture are created to support food traceability, safety and security. Simultaneously, they contribute to responsible agriculture and sustainability aims, with the focus on environmental sustainability.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Implementation of private standards in agriculture practices is a catalyst for transforming agricultural systems into environmentally sustainable ones, while supporting export performances of national economies (Andersson, 2019; Bain, 2010; Fiankor et al., 2020; Henson et al, 2011; Kleemann, 2016; Laosutsan, Shivakoti & Soni, 2019; Masood & Brümmer, 2014; Nupueng, Oosterveer & Mol, 2022). This support is more expressed in less developed countries than in high-income countries (Andersson, 2019).

METHODOLOGY

The GLOBALG.A.P. standard is the leading private standard in plant production, oriented towards the holistic approach to sustainability and environmental responsibility on farms (GLOBALG.A.P., 2022). Using the example of 13 middle-income countries of Europe and Central Asia, we examined the impact of the GLOBALG.A.P. certification on national export results in the fruit and vegetable sector during the period 2010-2021. Descriptive statistics and panel regression were used for this analysis.

RESULTS

The panel regression results confirmed a statistically significant impact of the change of the GLOBALG.A.P. certified farmers' number on the: (a) growth of export values in the fruit and vegetable sector ($p=0.000$; $R2 =0.586$); (2) growth of export values of fruit and vegetable to high-value markets ($p=0.000$; $R2=0.806$), as well as (c) on the growth of the percentage share of fruit and vegetable export to high-value markets compared to the total export of these two sectors ($p=0.011$; $R2 =0.586$).

DISCUSSION / POLICY IMPLICATIONS

The obtained results confirm and complement similar results reached by other authors (Andersson, 2019; Bain, 2010; Fiankor et al., 2020; Henson et al, 2011; Laosutsan, Shivakoti & Soni, 2019; Nupueng, Oosterveer & Mol, 2022). However, they do not confirm the findings of Kleemann (2016), Masood & Brümmer (2014) and Schuster & Maertens (2015), who question the contribution of the GLOBALG.A.P. certification to export results in less developed economies, particularly from farmers' perspective.

CONCLUSION

Stimulating the reforms focused on greening economies and improving resource and energy efficiency is crucial for all countries, particularly the less developed ones. Private standards in agriculture, based on sustainability principles, can significantly assist this turn. Their implementation requires fulfilling numerous pre-conditions, the most significant being building trust between all participants of the food supply chain and strengthening farmers' financial resources.

KEYWORDS

agriculture, farm certification, environmental sustainability, export performance, middle-income countries

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Economic Loss Assessment of Regional Industrial Chains under Extreme Climate Risk: Based on Torrential Rain and Drought Disasters

ABSTRACT

Overview:

In recent years, extreme weather has taken place around the world, and long-term climate change is considered to be the main driver. For example, China is one of the countries severely affected by natural disasters, especially in the past two years. It has experienced relatively severe extreme rainstorms, high temperature and drought events. In 2021, the direct economic losses caused by natural disasters in China will account for about 0.29% of the annual GDP, and the economic losses caused by climate change cannot be underestimated. Based on (Pendall et al., 2010), the climate risk external shocks faced by the regional economy can be divided into two categories: the first category is "slow burning", and the medium and long-term climate disasters belong to this category; the second category is "dramatic change", extreme natural disasters fall into this category. These two types of shocks have different targets and economic consequences (Pérez and Barreiro-Hurlé, 2009; Arto et al., 2015; Lenzen et al., 2019; Tan et al., 2019; Huang et al., 2022), and have different impacts on regional industrial linkages, resulting in differential changes in the resilience of regional industrial chains.

Therefore, this paper intends to identify the key industries in the industrial chain through the social network analysis method. From the perspective of industry supply and demand and key industries, based on the ARIO model, we assess the direct and indirect economic losses of industries and their industrial chains caused by two types of risk. Then we simulate the total economic changes caused by different losses in key industries through scenario analysis. Combining the industrial chain resilience evaluation indicators in the existing literature and the collation network indicators in the social network analysis, the industrial chain resilience evaluation system is constructed in this paper.

Methods:

Our research is based on three methods: Social network analysis (SNA), adaptive regional input-output (ARIO) model and quantification of resilience indicators. Social network analysis is used to identify key industries in two categories of climate risk. The social network analysis method is based on the network. The network construction data mainly comes from the input-output table data in the official website of CEADs.

The input-output table data can be divided into the whole country and each province in the country. Social network analysis includes two categories of indicators: overall network indicators and individual network indicators. Three indicators of network density, average path length and clustering coefficient are proposed to be used in the overall network indicators. The individual network indicators are proposed to use the following indicators: degree centrality, betweenness centrality, closeness centrality, and eigenvector centrality. The ARIO model has been used by several scholars (Hallegatte, 2008; Hallegatte, 2014; Koks and Thissen, 2016; Galbusera and Giannopoulos, 2018; Kajitani and Tatano, 2018), and it is one of the most effective tools for simulating the short-term economic impact of disasters and post-disaster economic recovery. The ARIO model measures the indirect economic losses of key nodes (industries) and their industrial chains from two aspects: the supply shortage in the emergency period and the increase in demand in the reconstruction period, and analyzes the disaster losses under different scenarios, as well as the affected areas in the industrial chain. Finally, this paper intends to evaluate the resilience of regional industrial chains caused by disasters by constructing an industrial chain resilience evaluation index system. The specific indicators used include network indicators and resilience indexes. The secondary indicators included in the network indicators include the overall network indicators in social network analysis: network density, average path length and clustering coefficient. The secondary indicators included in the resilience index are recovery time and recovery degree.

Results:
The indirect economic losses caused by rainstorms, floods and droughts cannot be ignored. In particular, drought events are often persistent, and their indirect economic losses are of the same magnitude as those of rainstorms and floods. Both indirect economic losses exceed direct economic losses. The indirect losses caused by inter-regional and inter-industry industrial linkages have had a huge impact on the local economic system. Agriculture is the most vulnerable industry in both storm and flood disasters and drought disasters.

Conclusion:
The research results of this work could be used to analyze the indirect economic loss assessment of flood and drought disasters in China (or any similar region) through economic models. It can provide a reference for the study of other catastrophe cases. Due to the complexity of post-disaster reconstruction and the impact of reconstruction policies on indirect economic losses caused by disasters, the actual recovery and reconstruction is affected by various factors such as the local and external economic environment, labor supply, price levels, and long-term fiscal and financial policies.

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This publication is based upon work from COST Action CA20112 PROFEEDBACK, supported by COST (European Cooperation in Science and Technology). COST (European Cooperation in Science and Technology) is a funding agency for research and innovation networks. Our Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation. Visit www.cost.eu

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