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An Overview on Sustainable Competitiveness in the Visegrad Group Countries – Comparative Analysis

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Abstract: The article provides a comprehensive comparative analysis of the sustainable competitiveness of the Visegrad Group (V4) countries, including the Czech Republic, Poland, Slovakia, and Hungary, focusing on the economic aspects of sustainable production. The study utilizes the Global Sustainable Competitiveness Index (GSCI), based on 190 measurable and comparable quantitative indicators, categorized into dimensions such as Natural Capital, Social Capital, Intellectual Capital, Resource Efficiency, Economic Sustainability, and Governance Performance. The analysis reveals that all Visegrad Group countries have made significant progress in integrating sustainability principles into their policies and economic practices from 2013 to 2023, although differences in the intensity of these changes are noticeable. The Czech Republic has shown the highest growth dynamics in the GSCI, while Hungary recorded the lowest index values. Furthermore, the article highlights how updates and revisions to the sustainable competitiveness model, including the integration of new indicators and methodological improvements, have contributed to better reflecting the countries' performance in sustainability. In conclusion, the analysis underscores that the Visegrad Group countries are committed to promoting sustainable development, balancing economic growth with environmental protection and social progress, despite challenges such as economic disparities and environmental degradation.

Keywords: sustainable competitiveness; Visegrad Group Countries; GSCI

JEL Classification: L60; O11; O21

1. Introduction

Sustainable competitiveness has become an increasingly important concept in the field of economics, as it focuses on not only improving resource productivity but also emphasizes social sustainability and the responsible use of the environment (FAO, 2017). The Visegrad Group (V4) countries, including Czechia, Poland, Slovakia, and Hungary, have gained attention for their economic performance and potential for growth (Kowalska et al., 2018; Kowalska & Kovárník, 2018). The economic aspects of Global Sustainable Competitiveness in the Visegrad Group countries are multifaceted. Falkowski (2023) highlights the potential for improvement in sustainable competitiveness through the implementation of the European Green Deal, despite short-term costs.

As indicated by (Bogoslov et al., 2022), the European Green Deal aims to transform the EU into a well-functioning and resilient society based on a competitive economy and ecological environment. However, (Chatzistamoulou & Kounetas, 2023) point out the negative impact of the European Green Deal on entrepreneurship and competition. According to them, the European Green Deal may prioritize the environmental dimension over the free market and introduce government interventions and regulations that could disrupt entrepreneurship and competition. Despite this criticism, (Szabó et al., 2022) consider the European Green Deal crucial for achieving long-term sustainable development goals.

Dziembała, (2020) emphasizes the need for a diversified EU cohesion policy to promote sustainable competitiveness, particularly in less developed regions. Bačík, et al., (2019) assesses the economic performance and competitiveness of the V4 countries, with the Czech Republic standing out as the most successful. Chetverikova, (2020) provides a comprehensive analysis of the structural changes in the economies of the Visegrad Group, including industry and employment structure, and the innovation sphere. These studies collectively underscore the importance of sustainable development, regional disparities, and economic performance in shaping the sustainable competitiveness of the Visegrad Group countries.

The Global Sustainable Competitiveness Index is influenced by a range of factors at both micro and macro levels, including added value creation, quality management, and social responsibility (Okunevičiūtė Neverauskienė et al., 2020). This index is also shaped by the triple bottom line concept, which balances economic prosperity, environmental issues, and social sustainability (Herciu & Ogrean, 2014). Higher competitiveness, as measured by the Global Competitiveness Index, is linked to improved economic performance and sustainability (Rajnoha & Lesnikova, 2022). The concept of Sustainable Competitiveness integrates economic, social, and environmental sustainability, and is measured by the Sustainability Adjusted Global Competitiveness Index (Doyle & Perez-Alaniz, 2017).

This article explores the economic aspects of sustainable production in the Visegrad countries in comparative analysis.

2. Methodology

The study used statistical materials published in the form of The Global Sustainable Competitiveness Index. The GSCI considers the issues of 190 measurable and comparable quantitative indicators (SolAbility, 2023). These indicators are categorized into dimensions that contribute to a country's success: Natural Capital, Social Capital, Intellectual Capital, Resource Efficiency, Economic Sustainability and Governance Performance (Figure 1).

More than 90% of the indicators used to assess sustainable competitiveness are purely quantitative performance metrics. Data sources were selected based on their reliability and the availability of global data. The majority of indicators were sourced from the most important organizations in the world incl. the World Bank's indicator database, with additional datasets and indicators obtained from various UN agencies and the IMF. Furthermore, reputable external indexes published by non-governmental organizations were incorporated, such as Transparency International, Reporters Without Borders, The New Economics Foundation, The Institute for Economics and Peace, the Fund For Peace, and the

Figure 1. Sustainable Competitiveness elements (own processing based on (SolAbility, 2023))

V-Dem Project. The subject of the analysis included data on food security from Poland, the Czech Republic, Hungary, and Slovakia. The basic time range of data covers the years 2013-2023 (some analyses, due to lack of data, start in 2014). The article uses the basic methods of statistical analysis of data, i.e., Pearson's correlation, trend lines, and dynamics indicators. Time series of the GSCI, its value in each country, was presented for the countries of the Visegrad Group. A trend function line and a determination coefficient R^2 was determined for them. It is generally accepted that $R^2 \geq 0.70$ fits the data well.

3. Results and Discussion

Sustainable competitiveness in the Visegrad Group countries, comprising Poland, Czech Republic, Slovakia, and Hungary, is a multifaceted concept encompassing various economic, social, and environmental dimensions. These countries have made significant strides in integrating sustainability principles into their economic policies and practices, aiming to achieve long-term economic growth while preserving natural resources and promoting social well-being.

The analysis of The Global Sustainable Competitiveness Index in the Visegrad countries, over the past ten years, indicates that it has changed significantly. However, in each of these countries, he intensity of those changes varied. Although the countries analyzed were chosen for comparison due to their numerous similarities, there is a noticeable disparity in their level of sustainable competitiveness. The GSCI developed most dynamically in Czechia, where also it was the highest (for the most of the studied period). The worst situation has been noticed in Hungary, where it recorded the lowest values of the GSCI for most of the studied period (Figure 2).

In Czechia, in 2013-2023, the value of GSCI increased by almost 2 points, however, the largest increase, from 52.7 to 55.2 points was recorded in the years 2019-2020. After this period, there was a decrease 52.9 and 52.4 in 2022. The last year was better again and the GSCI increased. The average annual growth rate throughout the entire period studied was

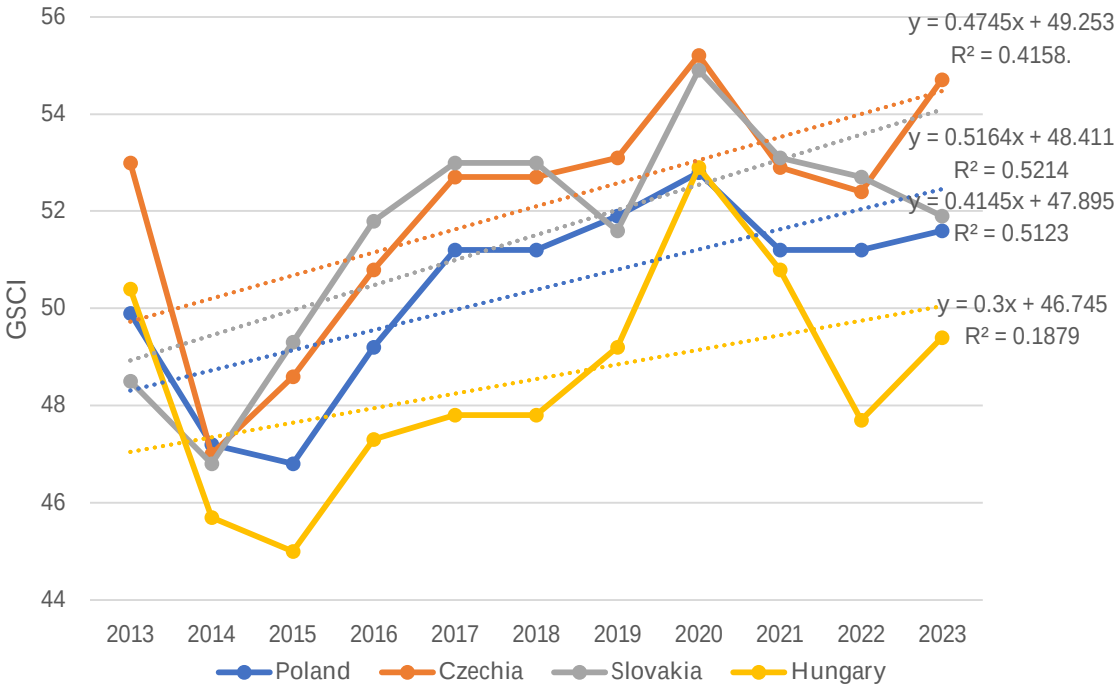

Figure 2. Values of Global Sustainable Competitiveness Index in Visegrad Group countries in years 2013-2023 – scale from 0 to 100 (SolAbility, 2013, 2014, 2015, 2016, 2017, 2018, 2018, 2019, 2019, 2020, 2021, 2022, 2023)

the highest compared to other countries of the Group. In Czechia, on average, in 2013-2023 the GSCI increased annually by almost 0.5 points, with a good fit at $R^2 = 0.42$. Czechia stands out as the sole country in the group where the GSCI has significantly decreased. Other countries of the Group recorded an increase or slight fluctuations in GSCI throughout the entire period studied. The GSCI in Slovakia increased very intensively. During the analyzed period, the GSCI in this country became much larger, for about 6.6% (from 48.5 points to almost 51.9). In this case, the average annual increase in sustainable competitiveness area during the period under consideration is over 0,5 points, with a good fit ($R^2 = 0.52$). Poland also showed a good fit of the trend line ($R^2 = 0.51$) over the period considered. In the case of this country, the GSCI has increased since 2013 by 3.3% (from over 49.9 points to 51.6). Despite the growing tendency, the average annual growth of the sustainable competitiveness area amounted to about 0.4 points. What is interesting, the GSCI in Hungary was the lowest among the countries surveyed in 2023 but it was not in 2013. At the beginning of the analyzed period, the index rated 50.4 points and it was on the second place, just behind the Czechia. Hungary is the only country which shows the decrease in GSCI. In the analyzed period, in this country it decreased for almost 2% (from 50.4 points to almost 49.4). The average annual rate was decreasing by about 0.3 points. Moreover, the trend line fit in this case was very low.

The components of The Global Sustainable Competitiveness Index are: Natural Capital, Social Capital, Intellectual Capital, Resource Efficiency, Economic Sustainability and Governance Performance and they were also assessed (Figure 3). Over years, the Sustainable Competitiveness model underwent updates and revisions to adapt to changes in global trends, emerging issues, and advancements in sustainability metrics. These changes have

included such areas as integration of new indicators, methodological refinements and data sources. The model has incorporated additional indicators to better capture the sustainability performance of countries, reflecting evolving priorities and challenges. Moreover, there have been adjustments to the methodology used for data collection, analysis, and interpretation to enhance the accuracy and reliability of the assessment. Furthermore, the model has utilized more recent and comprehensive datasets to provide a more current and nuanced understanding of sustainability trends and challenges.

Overall, the changes in the Sustainable Competitiveness model aimed to improve its effectiveness in measuring and monitoring the sustainability performance of countries and informing policy decisions at national and international levels.

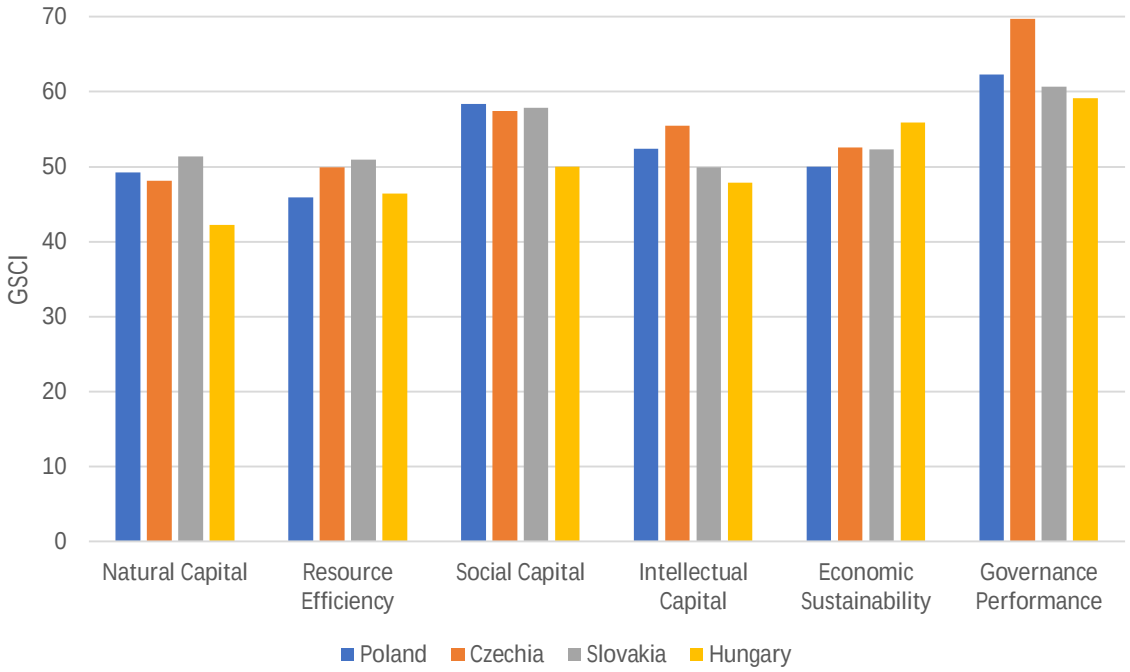

Figure 3. The Global Sustainable Competitiveness Index components in Visegrad Group countries in 2023 in points (SolAbility, 2023)

The natural capital encompasses various elements such as land area, population, geographical features, climate, biodiversity, and the abundance of natural resources, both renewable and non-renewable. It also considers the extent of depletion or degradation of these resources. These factors, alongside the depletion of non-renewable resources caused by human activities and climate change, determine the potential for sustaining the well-being of a nation's population and economy in the future. In 2023 Slovakia scored the highest result of the Visegrad Group. Countries. It is because of its diverse geography, favorable climate, and abundant water resources. The country's rich biodiversity, supported by various ecosystems, benefits from conservation efforts and sustainable resource management practices. Additionally, this country scored also the highest in the field of resource efficiency. Greater resource efficiency correlates with increased economic competitiveness. Due to Slovakia’s effective utilization of available resources, this country is contributing to enhanced economic competitiveness and sustainability, especially among the Group countries. On the

other hand, any economic downturns have a detrimental impact on social capital, which is the next component of the GSCI. With reduced financial resources allocated to social aspects such as health and community development, coupled with increased crime rates and individual despair, the long-term competitiveness of a nation's economy is negatively affected. Poland is the country that scored the highest result. The key aspect is the effective utilization of available resources in Poland, such as human, technological, natural, and financial resources. Additionally, there is a strong emphasis on optimizing resource management practices, both domestically and in imports. This efficient resource management contributes to operational competitiveness, particularly in a world where resources are increasingly constrained. What is really interesting, the intellectual capital area is the highest in Czechia. It pertains to the capacity to create wealth and employment opportunities by fostering innovation and cultivating value-added sectors within the global marketplace. Furthermore, governance performance is the highest in Czechia too. It involves establishing a framework that ensures sustained and sustainable wealth creation through the allocation of resources, development of infrastructure, guidance on market dynamics, and structuring of employment opportunities. It is particularly strong in Czechia due to its effective framework for allocating resources, well-developed infrastructure, guidance on market dynamics, and structuring of employment opportunities. The last but not least, economic sustainability is the only field of the GSCI where Hungary scored the highest. Economic sustainability and competitiveness indicate the capacity to create wealth by pursuing sustainable economic growth and leveraging all available opportunities. In Hungary, a well-educated and skilled workforce can drive productivity and innovation, leading to higher economic sustainability and competitiveness.

Nowadays The Sustainable Competitiveness Index relies on 190 measurable indicators (not 73 like in 2013) categorized into 6 pillars (not 4 like in 2013). These indicators have been standardized to ensure comparability. Additionally, a trend analysis of performance data from the past 5 years has been conducted to generate a secondary score, providing insights into both the present status and future prospects of a country's sustainable competitiveness.

5. Conclusions

In summary, the following observations can be made:

- Slovakia stands out for its rich natural capital and high resource efficiency, resulting from its diverse geography, favorable climate, and abundant water resources.
- Poland achieves the highest scores in terms of social capital, reflecting the effective utilization of available human resources and emphasis on optimizing resource management practices.
- Czech Republic excels in the area of intellectual capital and management efficiency, attributed to effective resource management, well-developed infrastructure, and a conducive climate for innovation.

- Hungary distinguishes itself in the field of economic sustainability, indicating the ability to generate wealth through sustainable economic development and the utilization of available opportunities.

In recent years, the Visegrad Group countries have focused on enhancing their natural capital by implementing policies to protect and conserve biodiversity, forests, and water resources. They have also emphasized resource efficiency, aiming to optimize the use of available resources while minimizing waste and environmental impact. Additionally, efforts to strengthen social capital have included investments in healthcare, education, and social welfare programs to improve quality of life and ensure social inclusion.

Governance performance plays a crucial role in sustainable competitiveness, with the Visegrad Group countries striving to establish transparent and accountable governance frameworks that promote sustainable development. This includes measures to combat corruption, strengthen the rule of law, and enhance institutional capacity to address environmental and social challenges effectively.

All things considered, the Visegrad Group countries are actively working to enhance their sustainable competitiveness by balancing economic development with environmental protection and social progress. While facing various challenges, such as economic disparities and environmental degradation, these countries are committed to advancing sustainable development goals and fostering a resilient and inclusive economy for future generations. In conclusion, the analysis conducted in this paper sheds light on the economic aspects of sustainable competitiveness in the Visegrad countries. Further research and focus on sustainable competitiveness are crucial for facilitating economic growth and ensuring a prosperous future for the Visegrad countries.

Conflict of interest: none.

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