

dr hab. Krzysztof FALKOWSKI, prof. SGH

Szkoła Główna Handlowa w Warszawie

e-mail: kfalkow@sgh.waw.pl

ORCID: 0000-0002-4639-0118

DOI: 10.15290/oes.2023.01.111.01

SUSTAINABLE COMPETITIVENESS OF THE VISEGRAD GROUP COUNTRIES¹

Summary

Purpose – The main objective of this paper is to present the results of an analysis of sustainable competitiveness of the Visegrad Group (V4) countries in comparison with other EU member states, including the aspects of the European Green Deal and the challenges associated with its implementation in the V4 countries from the perspective of their sustainable competitiveness. The analysis is preceded by a synthetic discussion of the issue of sustainable competitiveness in theoretical terms.

Research method – To achieve the objectives of the study, the methods of literature review (on theoretical analysis of sustainable competitiveness), and analysis of source materials (on sustainable competitiveness of V4 countries) and of available statistical data (on the structure of energy production in V4 countries) were used.

Results – Although sustainable competitiveness of the Visegrad countries varies, as a group they perform much better than other EU Member States when compared to the rest of the world. As a result of the implementation of the European Green Deal, an improvement in the overall sustainable competitiveness of the V4 countries can be expected in the long term, despite short-term costs related to the planned ecological transition and digital transformation.

Originality/value/implications/recommendations – Although the number of publications on sustainable competitiveness in the contemporary international economic literature is growing, there is still a lack of research studies in this area dedicated to the V4 countries. This paper fills this research gap.

Keywords: sustainable competitiveness, ecological transition, digital transformation, Visegrad Group sustainable countries, European Green Deal.

JEL classification: L60, O11, O21

¹ Article received on 28.10.2022, accepted on 20.02.2023.

1. Introduction

Nowadays, as humanity is faced with many environmental and social challenges in connection with its dynamic development, economists dealing with the issue of international competitiveness are increasingly highlighting the need for extending the scope of research in this area. In line with this approach, growing importance is placed on the so-called ‘sustainable competitiveness’, which, by definition, focuses not so much on improving the productivity of the use of available resources, but emphasises the pursuit of social sustainability and the sustainable use of the environment.

Despite the growing number of studies on sustainable competitiveness in contemporary international economic literature; there is, however, still a lack of studies dedicated to the Visegrad Group countries (V4 countries) in this regard. Indeed, while there are studies on the overall international competitiveness of the economies of the V4 countries [Molendowski, Folfas, 2019; Szczodrowski, 2018; Molendowski, 2017; Kiendl-Wendner, Wach, eds., 2014], there is a noticeable lack of economic analyses dedicated to the issue of sustainable competitiveness of these countries. This paper aims to fill this research gap.

The main aims of this paper are: (1) to discuss the issue of sustainable competitiveness in theoretical terms; (2) to present the sustainable competitiveness of the V4 countries, i.e., Czechia, Poland, Slovakia and Hungary, in comparison with other EU countries; (3) to elaborate on the European Green Deal and the challenges of its implementation in the V4 countries from the point of view of their sustainable competitiveness.

In this paper, it is argued that although sustainable competitiveness of the Visegrad countries varies, as a group they perform much better when compared to the rest of the world than other EU Member States. In connection with the implementation of the European Green Deal, an improvement in the overall level of sustainable competitiveness of the V4 countries should be expected in the long term, despite the short-term costs related to the ecological transition and digital transformation.

2. Sustainable competitiveness, its determinants and measurement

The dynamic development of the global economy, and of the human civilisation itself, accompanied by many challenges, including growing income inequalities, increasing disparities in productivity resulting from unequal access to

education, health care and innovation, increasing social exclusion (also in highly developed countries), or even climate change and its negative consequences, have all contributed to the introduction of the concept of ‘sustainable competitiveness’ into economic discourse.

The concept of sustainable competitiveness presents a slightly different (broader) approach to the phenomenon of competitiveness [Balkytė, Tvaronavičienė, 2010]. While it does not completely negate the traditional approach, according to which competitiveness is equated with the level of the country’s economic development and its ability to achieve a faster improvement in the standard of living than other countries as a result of desirable changes in productivity [Porter, 1990], it goes beyond the strictly economic dimension, taking into account environmental and social aspects as equally important and significant [Cheba, Bąk, Szopik-Depczyńska, 2020]. Thus, it relates directly to the concept of sustainable development, understood as development aimed at securing the needs of the present without compromising the ability of future generations to meet them [World Commission on Environment and Development, 1987].

In the same vein, K. Aiginger, S. Barenthaler-Sieber and J. Vogel (2013) proposed their definition of sustainable competitiveness, according to which it should be understood as the ability of a country (region, location) to achieve goals far greater than just GDP for its citizens, both today and tomorrow. It should be mentioned that in this context, the so-called ‘decoupling’ is increasingly highlighted in the economic literature, but also in political activities (e.g. in the EU strategy known as the European Green Deal) (European Commission, 2019; Raworth, 2017; Szigeti, Toth, Szabo, 2017; Washington, Tomey, 2016). Referring to the correlation between the growth of output (GDP) and the decline of environmental quality, the need to realise economic growth without a concurrent increase in the use of material resources and negative environmental impacts is promoted and justified (Bithas, Kalimeris, 2018; Daly, 2014), thus accepting the crucial importance of sustainable development and sustainable competitiveness.

It should be stressed that it was Porter and Linde [1995] who were the first to draw attention to the fact that there is a direct relationship between competitiveness and the environment, thus claiming that environmental aspects must be taken into account in the competitive strategies of enterprises and entire economies. In turn, the legitimacy of including social aspects in competitiveness studies was emphasised by, e.g., Doyle, Perez-Alaniz [2017], Thore, Tarverdyan [2016], Aiginger, Vogel [2015], as well as Giddings, Hopwood, O’Brien [2002].

The World Economic Forum, taking into account the opinions of economists involved in competitiveness research, has proposed its definition of the phenomenon, according to which sustainable competitiveness means the country's ability to improve its productivity over the long term while ensuring social and environmental sustainability [World Economic Forum, 2014].

The aforementioned social sustainability aims to enable all members of society to live long lives in the best possible health, to share equitably in the distribution of national income and to feel secure in their private and working lives. The implication of the above is that this will lead to maximising their contribution to the overall economic well-being of the country (by raising the productivity of the economy, among other things), but also to improvements in individual quality of life. In turn, environmental sustainability boils down to the need to ensure the rational and efficient management of the available natural resources to ensure the well-being of present and future generations [World Economic Forum, 2014].

For social sustainability as an important dimension of sustainable competitiveness, the following aspects are particularly important [World Economic Forum, 2014]: (1) effective satisfaction of basic needs (including access to sanitation, drinking water and healthcare); (2) counteracting social exclusion (an important role of actions to reduce unemployment, reduce the size of the shadow economy, improve the level of social protection), (3) ensuring social cohesion (including, above all, levelling income inequalities in society, increasing social mobility, as well as effectively combating youth unemployment). On the other hand, in the case of environmental sustainability, activities aimed at: (1) increasing the effectiveness of environmental protection policy (including protection of biodiversity, protection of land and forested areas, as well as compliance with ratified international treaties on environmental protection); (2) rational use of the available renewable resources; (3) counteracting environmental degradation; are particularly important [World Economic Forum, 2014].

In turn, the Swiss-Korean think-tank SolAbility defines sustainable competitiveness as "the ability to generate and sustain inclusive wealth without diminishing the future capability of sustaining or increasing current wealth levels" in an environment of ever-intensifying competition between countries [SolAbility, 2017].

It is worth adding here that the literature uses also the concept of 'responsible competitiveness', which is identical to sustainable competitiveness in its meaning. According to A. MacGillivray, J. Sabapathy and S. Zadek (2003), 'responsible competitiveness' should be understood as the adaptation of the strategic activities of the state's public policy and enterprises in the social and environmental sphere

to ensure sustainable development, which will give the possibility to effectively increase the importance of a given economy on the international arena (its competitive position), as measured by the level of socioeconomic development. S. Zadek (2006) also very clearly emphasises the need for the state to actively support the efforts of enterprises to improve their market competitiveness by taking into account social and environmental aspects of their activities to a greater extent than before. Without such support and the creation of a number of incentives for enterprises by the government, it is difficult to expect effective changes in this respect.

An important issue concerning sustainable competitiveness is its measurement. As in the case of competitiveness per se, there is no single, universally accepted method for measuring it (see: Cheba, Bak, Szopik-Depczyńska, 2020; Bilbao-Terol, Arenas-Parra, Onopko-Onopko, 2019; Doyle, Perez-Alaniz, 2017; Popescu, Sima, Nica, Gheorghe, 2017).

The Swiss-Korean think-tank SolAbility, which has been publishing the Global Sustainable Competitiveness Index (GSCI) since 2012, has also proposed its own methodology for measuring sustainable competitiveness. As data from the SolAbility report (2021) is used to assess the sustainable competitiveness of the Visegrad countries later in this article, it is worth introducing this methodology briefly.

SolAbility's methodology for measuring sustainable competitiveness is derived from the three-dimensional model of sustainability, in which three main dimensions coexist and interact: economic, social and environmental (SolAbility, 2017). In turn, the level of sustainable competitiveness itself is determined by five main groups of factors (pillars), namely:

- natural capital (natural resources, their availability and level of depletion);
- social capital (health, security, extent of freedom and equality, level of life satisfaction);
- resource efficiency (use of available resources);
- intellectual capital (ability to generate wealth and create jobs through innovation and value-added sectors in globalised markets);
- governance performance (creating a framework for sustainable and balanced wealth).

SolAbility's sustainable competitiveness model is based on a pyramid, where each level (which is the next group of factors), starting with natural capital, is required to support the next higher level. Thus, the final level of sustainable competitiveness is the sum and result of competitiveness in each individual area.

The absolute majority (more than 90 per cent) of the 189 indicators used to measure sustainable competitiveness according to the methodology presented here

are purely quantitative performance indicators from the World Bank, the UN and IMF databases, plus additional data from Transparency International, Reporters Without Borders, The New Economics Foundation, The Institute for Economics and Peace, the Fund For Peace and the V-Dem Project. The Global Sustainable Competitiveness Index (GSCI), on the other hand, is composed of scores for five further sub-indexes, corresponding to the five groups of factors (pillars), indicated above, with the same weighting.

As with the methods of measuring international competitiveness, the SolAbility method of measuring sustainable competitiveness outlined above has certain strengths and weaknesses. With this type of synthetic measures based on the author's method characterised by a certain subjectivity in the selection of variables used and determination of their weights, questions may arise as to the scope of coverage of the analysed issue (in this case, sustainable competitiveness) or its universal applicability. However, there is no doubt that the methodology developed and used by SolAbility for its annual Global Sustainable Competitiveness Report is the most comprehensive and widely available ranking of countries in terms of their sustainable competitiveness.

3. Sustainable competitiveness of the Visegrad Group countries in comparison with other EU member states

To start with, it is worth emphasising that for years the European Union (especially the Scandinavian EU member states) has been one of the world leaders in terms of sustainable competitiveness. Moreover, this position has further improved over the last decade in comparison to other world regions, which only proves the effectiveness of the EU's sustainability policy [Institute for Sustainability Leadership, 2020]. It is, of course, important to realise that maintaining this position will require the EU's continued determination to pursue new and increasingly difficult climate-related goals and to further eliminate emerging social inequalities, especially in today's highly turbulent world and with the increasing diversity of interests among individual member states, which inevitably has and will have an impact on its sustainable competitiveness. This challenge will also affect the V4 countries, as an integral part of the EU.

When talking about the sustainable competitiveness of the EU, it is important to realise that there is a relatively strong differentiation among the member states in this respect (Table 1).

TABLE 1

Sustainable competitiveness of V4 countries vs. other EU member states in 2021

Country	Overall		Natural Capital		Resource Efficiency		Intellectual Capital		Social Capital		Governance Performance	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Austria	9	56.6	65	49.1	68	50.3	18	58.7	6	60.7	10	64.0
Belgium	24	53.0	141	36.9	86	48.0	19	58.5	5	61.2	31	60.4
Bulgaria	44	49.6	51	51.9	145	37.8	47	47.4	56	49.0	24	61.7
Croatia	14	55.1	11	61.4	99	47.0	40	49.1	29	54.5	15	63.6
Cyprus	62	47.5	127	38.8	148	36.7	41	48.8	27	55.4	46	57.8
Czechia	26	52.9	111	40.7	127	41.7	23	55.7	18	56.7	3	69.7
Denmark	4	60.2	45	53.2	24	56.4	5	66.8	9	60.4	11	64.0
Estonia	11	56.1	73	48.1	116	43.8	27	54.9	8	60.4	1	73.2
Finland	2	60.7	17	59.8	67	50.6	10	64.3	4	62.3	4	66.3
France	8	56.8	41	54.2	20	57.3	17	58.7	26	55.4	44	58.3
Germany	10	56.6	78	46.2	52	52.3	11	63.2	19	56.1	5	65.0
Greece	42	49.6	87	44.7	114	44.7	35	50.3	48	50.7	47	57.8
Hungary	36	50.8	82	45.5	95	47.4	22	56.3	76	45.8	38	59.1
Ireland	7	57.6	56	51.4	19	57.7	32	51.2	24	55.8	2	71.7
Italy	32	51.7	90	44.2	57	51.4	34	50.5	28	54.6	48	57.7
Latvia	22	53.5	30	57.6	88	47.9	44	48.1	44	51.4	17	62.6
Lithuania	25	53.0	48	52.6	76	49.7	36	50.0	38	53.4	36	59.3
Luxembourg	19	53.9	55	51.5	73	49.8	52	46.0	10	59.8	18	62.5
Malta	31	51.7	84	45.1	87	48.0	43	48.5	35	53.5	16	63.4
Netherlands	20	53.9	103	41.4	71	50.1	15	60.3	17	57.9	34	59.7
Poland	35	51.2	77	46.2	143	38.2	26	55.5	33	53.7	19	62.3
Portugal	16	54.8	64	49.5	84	48.6	25	55.5	14	59.4	26	60.9
Romania	29	52.3	40	54.7	40	54.0	98	38.7	36	53.5	25	60.9
Slovakia	23	53.1	58	51.0	110	44.9	29	52.8	21	56.0	29	60.7
Slovenia	18	54.3	72	48.1	128	41.7	21	57.5	7	60.5	14	63.7
Spain	27	52.7	66	49.0	74	49.8	53	45.3	22	56.0	13	63.7
Sweden	1	61.2	15	60.2	18	58.0	4	67.9	3	62.4	49	57.6

Source: author's own elaboration based on: SolAbility [2021].

As far as the V4 countries are concerned, in comparison with other EU member states, Slovakia (15th position in the EU) and Czechia (18th position) fare the best. On the other hand, Poland (23rd position) and Hungary (24th position) fare poorly in this respect. It is worth noting at this point that taking into account the overall score of individual V4 countries in the global ranking of sustainable competitiveness (which takes into account 180 countries in the world), Slovakia was ranked 23rd, Czechia – 26th, Poland – 35th and Hungary – 36th. Thus, compared to the world as a whole, the sustainable competitiveness of the V4 countries is much higher than within the EU. However, this does not change the fact that among the V4 countries, Slovakia has the highest level of sustainable competitiveness, while Poland and Hungary have the lowest.

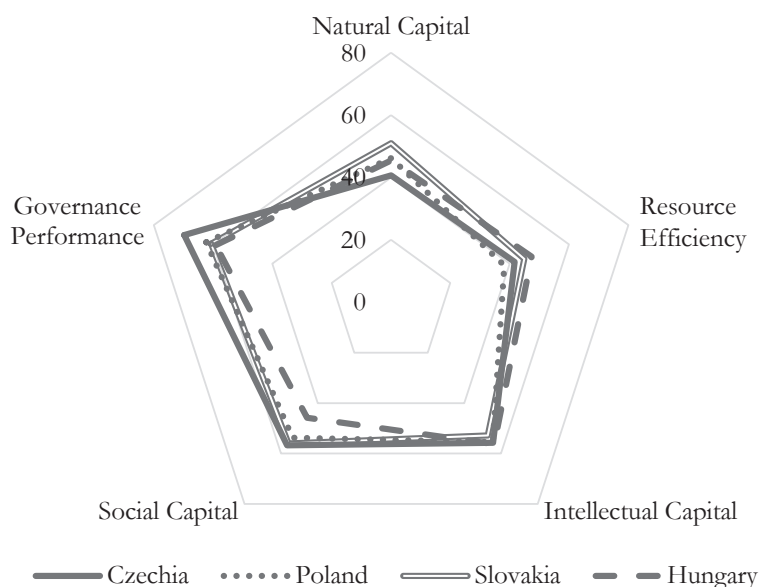
When analysing the sustainable competitiveness of the V4 countries, it is necessary to take a closer look at the differentiation of the competitive position of these countries in terms of the 5 basic areas (pillars) of sustainable competitiveness, i.e.: natural capital, resource efficiency, intellectual capital, social capital and governance performance (Table 1).

The analysis clearly shows that the V4 countries perform best in terms of governance performance and intellectual capital, which, especially in today's digital economy, should be viewed very positively. On the other hand, they are all by far the worst in terms of resource efficiency. Suffice it to say that Hungary ranked 95th in this respect, Slovakia 110th, Czechia 127th and Poland 143rd out of 180 classified countries. At this point, it is worth mentioning that resource efficiency is understood as how available resources (including, but not limited to, natural resources, human resources, and financial resources) are managed and utilised – regardless of whether these resources are scarce or abundant – in such a way as to minimise the costs of their use and the impact on the environment [SolAbility, 2021]. This weak competitive position of all V4 countries (albeit Poland in particular) in this respect should be seen as their particularly significant weakness and a huge challenge for the future.

Quite significant differences in the competitive position in the 5 pillars of sustainable competitiveness are found among the V4 countries themselves (Chart 1). The smallest disparities in this respect are found in relation to intellectual capital. The gap between the best-performing Hungary and the weakest Slovakia is only 3.5 points. In the case of natural capital, social capital and governance performance, on the other hand, the disproportions are much greater. The largest ones are observed in terms of social capital (the gap is as large as 10.9 points between the best-performing Czechia and the worst-performing Hungary). In the case of natural capital, the gap is 10.3 points and in the case of governance performance – 10.6 points.

It is also worth noting that among the V4 countries, Slovakia has the highest competitiveness in the area of natural capital, while Hungary (despite its poor overall level of sustainable competitiveness) performs best in the areas of resource efficiency and intellectual capital. Czechia, in turn, has the highest competitiveness among the V4 countries in social capital and governance performance (Chart 1). This shows that only Poland does not lead in any of the pillars of sustainable competitiveness among the V4 countries.

CHART 1
Competitive position of the V4 countries in terms of the 5 basic pillars of sustainable competitiveness in 2021



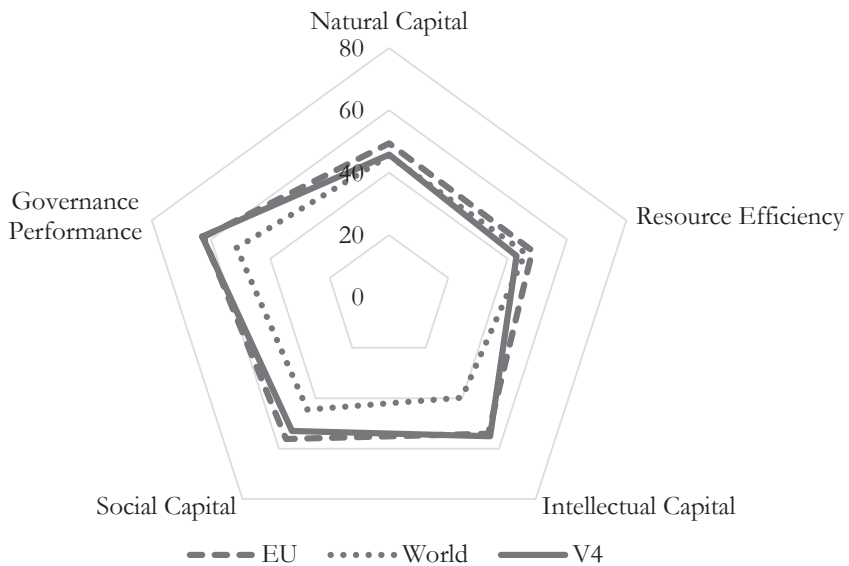
Source: author's own elaboration based on: SolAbility [2021].

If, in turn, one should look at the competitive position of the V4 countries in terms of the pillars of sustainable competitiveness compared to the EU and global average (Chart 2), it becomes apparent that, while they do not fare too well overall among the the EU countries, they are more competitive in terms of intellectual capital, social capital and governance performance, taking into account all countries in the modern world. Particularly noteworthy is the very strong competitive position of the V4 countries against the rest of the world in terms of intellectual capital. In the era of a dynamically developing digital economy, where modern

ICT technologies, innovations and highly qualified human capital are of great importance, having advantages in this field in relation to international competitors outside the EU is a great opportunity for the V4 countries to effectively raise the competitiveness of their economies in the real sphere on the international arena.

CHART 2

Competitive position of the V4 countries in terms of the 5 basic pillars of sustainable competitiveness vs. the EU and the rest of the world in 2021



Source: author's own elaboration based on: SolAbility [2021]

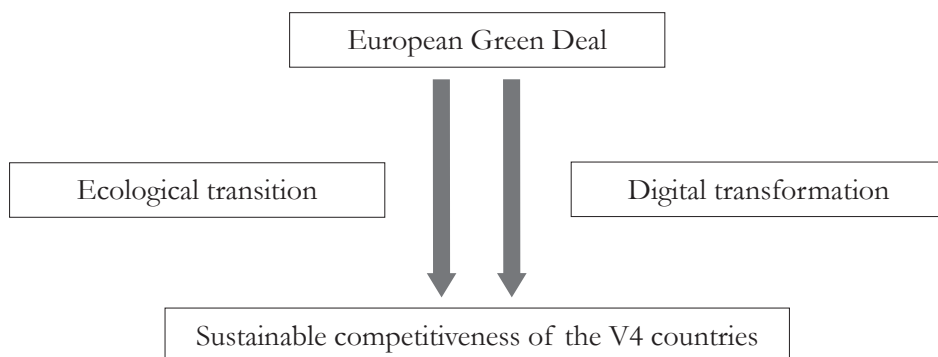
4. The European Green Deal and the sustainable competitiveness of the Visegrad Group countries

The European Green Deal (EGD), a specific response to the ongoing climate crisis and environmental degradation, is a development strategy for the European Union to become a climate-neutral area by 2050 [Schunz, 2022; Eckert, Kovalevska, 2021]. According to the assumptions, as a consequence of the implementation of the EGD [European Commission, 2019], the EU is to ultimately become a climate-neutral, fair and prosperous area with an economy that is both modern, resource-efficient and environmentally friendly. A particular challenge for the EU will be, among other

things, to create a safe and clean energy system by 2050, to create and implement a circular economy; and to rationalise energy use in industry and households. Incidentally, this last objective becomes particularly important in the context of the current energy crisis in Europe. Of course, all of the above activities also fit directly into the implementation of the EU's concept of sustainable development.

It should also be emphasised that the implementation of the EGD assumes the necessary ecological transition and digital transformation of the EU (all the EU member states, including the V4 countries), which will also affect the sustainable competitiveness of these countries (Chart 3). Undoubtedly, this transformation will be a major challenge for both the economies of individual countries and the EU. A particular challenge, it seems, will face the European industry. This is because it will be difficult to maintain its current high competitive position on the global market while decarbonising energy-intensive industries.

CHART 3
The European Green Deal and the sustainable competitiveness of the V4 countries



Source: author's own elaboration.

The increased protection of biodiversity, the creation of a sustainable food production system and sustainable rural areas are also intended to be the result of the ecological transition within the EGD, in addition to climate protection through reduced air pollution. An important objective of the transition is also the creation of a circular economy in the EU. The overarching goal, of course, is to improve the quality of life of Europeans by improving the quality of the environment [European Commission, 2019].

An important element of the environmental transition is the energy transition. It implies the transformation of the existing energy system in the EU, still based

in some member states on non-renewable energy sources (mainly fossil fuels), to an energy system based on renewable and low-carbon sources. This process will involve the gradual replacement of hydrocarbons and uranium fuel by renewable energy sources to completely decarbonise energy-intensive sectors of the economy, such as industry, energy, transport, construction and agriculture. It is expected that the energy transition understood in such a way, converging with the objectives of sustainable development, will be conducive not only to the protection of the environment or improvement of the quality of life but will also, as a consequence, lead to the strengthening of the sustainable competitiveness of the EU member states, including the V4 countries.

The digital transformation implemented under the EGD, in turn, envisages, among other things, building a digitally inclusive society by supporting social inclusion processes and increasing citizens' participation in the digital public space, with an increased level of their security in the digital environment [European Commission, 2021].

Undoubtedly, the implementation of the ambitious objectives of the EGD will have an impact on all pillars of sustainable competitiveness of the EU member states (including, of course, the V4 countries), i.e.: natural capital, resource efficiency, intellectual capital, social capital and governance performance [SolAbility, 2017]. However, given the current level of competitiveness of the V4 countries in terms of the above-mentioned pillars of sustainable competitiveness, the biggest challenge for these countries will be to implement the principles of the EGD in two pillars, i.e. natural capital and especially resource efficiency.

For the V4 countries, the industrial transformation will be a particularly difficult, but also extremely important challenge. All of them will have to face the challenge of creating greener, more 'digital' and more circular industries than today. This will be required not only by the necessity of achievement of the objectives of the EGD but also by the realities of today's global economy.

Given the above, there is no doubt that the modernisation and decarbonisation of energy-intensive industrial sectors (e.g. production of steel, cement and chemicals) must be a priority in the V4 countries, especially in Poland and Czechia. This challenge will be all the greater in Poland and Czechia, as in these two V4 countries energy is still largely produced from solid fossil fuels. In the case of Czechia, the share of fossil fuels in the total energy mix was 43.3%, while in Poland it was as high as 69% in 2020 (Table 2). Moreover, the industrial sector of both Czechia and Poland is characterised by high energy intensity, which will be another obstacle to this transition.

TABLE 2

Energy mix in the V4 countries vs. other EU member states in 2020
(%, share of total production)

Country	Renewable energy	Nuclear energy	Solid fossil fuels	Natural gas	Crude oil	Other
Austria	84.9	0.0	0.0	5.1	4.5	5.5
Belgium	29.9	62.8	0.0	0.0	0.0	7.3
Bulgaria	23.8	40.0	34.5	0.4	0.0	1.3
Croatia	62.3	0.0	0.0	18.9	16.2	2.6
Cyprus	96.3	0.0	0.0	0.0	0.0	3.7
Czechia	22.1	31.9	43.3	0.7	0.4	1.6
Denmark	45.6	0.0	0.0	12.5	37.9	4.0
Estonia	42.0	0.0	0.0	0.0	0.0	58.0
Finland	64.4	30.1	0.0	0.0	0.0	5.5
France	22.8	75.2	0.0	0.0	0.5	1.5
Germany	47.5	16.9	23.9	4.1	2.0	5.6
Greece	64.8	0.0	33.0	0.1	1.9	0.2
Hungary	29.3	38.3	8.8	12.5	7.9	3.2
Ireland	45.5	0.0	0.0	46.7	0.0	7.8
Italy	72.6	0.0	0.0	8.7	14.3	4.4
Latvia	99.3	0.0	0.0	0.0	0.0	0.7
Lithuania	83.9	0.0	0.0	0.0	1.6	14.5
Luxembourg	85.3	0.0	0.0	0.0	0.0	14.7
Malta	100.0	0.0	0.0	0.0	0.0	0.0
Netherlands	26.0	3.5	0.0	62.9	2.7	4.9
Poland	21.6	0.0	69.0	5.9	1.6	1.9
Portugal	98.0	0.0	0.0	0.0	0.0	2.0
Romania	25.9	12.9	11.6	33.1	14.5	2.0
Slovakia	32.3	59.8	3.6	0.8	0.0	3.5
Slovenia	30.8	42.7	24.7	0.1	0.0	1.7
Spain	55.4	42.8	0.0	0.1	0.1	1.6
Sweden	62.8	34.5	0.0	0.0	0.0	2.7

Source: author's own elaboration based on Eurostat data [2022].

5. Conclusions

Nowadays, with the development of human civilisation and the intensification of numerous environmental and social challenges accompanying this development, economic research and analysis on the issue of the international competitiveness of economies, taking ever greater account of the aforementioned environmental and social aspects in this research and analysis, is gaining particular importance. In this context, a new term ‘sustainable competitiveness’ has emerged, which is becoming increasingly popular in the international economic literature. From the point of view of standards of living and quality of life, it is not possible to compete effectively and efficiently in the modern world without ensuring social balance and sustainable use of the environment.

The analysis conducted in this paper shows that the V4 countries display significant differences in terms of their sustainable competitiveness. Slovakia is the most sustainably competitive V4 country, while Poland and Hungary have the lowest sustainable competitiveness. As a Group, the V4 countries are by far the most competitive in terms of governance performance and intellectual capital, which – especially in the era of the modern digital economy – should be assessed positively. On the other hand, none of them is competitive in terms of resource efficiency (particularly Poland). Also noteworthy is the fact that, as a group, the V4 countries fare much better in terms of sustainable competitiveness when compared to the rest of the world than other EU Member States.

In connection with the implementation of the European Green Deal – the EU’s development strategy to transform it into a climate-neutral and resource-efficient area by 2050 – it is to be expected that the overall sustainable competitiveness of the V4 countries will improve in the long term, despite certain costs associated with the planned ecological transition and digital transformation. Undoubtedly, however, this effect will vary at the level of individual V4 countries, as a consequence of differences not only in their actual commitment to this ambitious strategy but also in the structures of their economies, including the energy intensity of their industry and how primary energy is generated in them. In particular, this will be a major challenge for Poland and the Polish economy.

Taking into account, on the one hand, the growing importance of the issue of sustainable competitiveness in the contemporary world and, on the other hand, the structural problems of the V4 economies, it seems fully justified to conduct further in-depth research on the sustainable competitiveness of these countries. Specifically, it is necessary to identify the main determinants of their sustainable competitiveness to formulate recommendations for the governments of

these countries with regard to taking decisions and actions for effective ecological transition and digital transformation towards the implementation of the concept of sustainable development by improving the sustainable competitiveness of their economies. In this respect, there is also an emerging space for the application of analytical methods based on econometric models.

References

- Aiginger K., Barenthaler-Sieber S., Vogel J., 2013, *Competitiveness under new perspectives*. “Working Paper”, No. 44.
- Aiginger K., Vogel J., 2015, *Competitiveness: from a misleading concept to a strategy supporting Beyond GDP goals*, “Competitiveness Review”, Vol. 25(5), pp. 497–523, DOI: 10.1108/CR-06-2015-0052.
- Balkytė A., Tvaronavičienė M., 2010, *Perception of competitiveness in the context of sustainable development: Facets of “sustainable competitiveness”*, “Journal of Business Economics and Management”, Vol. 11(2), pp. 341–365, DOI: 10.3846/jbem.2010.17.
- Bilbao-Terol A., Arenas-Parra M., Onopko-Onopko V., 2019, *Measuring regional sustainable competitiveness: a multi-criteria approach*, “Operational Research”, Col. 19, pp. 637–660, DOI: 10.1007/s12351-017-0367-9.
- Bithas K., Kalimeris P., 2018, *Unmasking decoupling: redefining the resource intensity of the economy*, “Science of the Total Environment”, Vol. 619, pp. 338–351, DOI: 10.1016/j.scitotenv.2017.11.061.
- Cheba K., Bąk I., Szopik-Depczyńska K., 2020, *Sustainable competitiveness as a new economic category – definition and measurement assessment*, “Technological and Economic Development of Economy”, Vol. 26(6), pp. 1399–1421.
- Daly H., 2014, *From Uneconomic Growth to a Steady-State Economy. Advances in Ecological Economics*, Edward Elgar, Cheltenham.
- Doyle E., Perez-Alaniz M., 2017, *From the Concept to the Measurement of Sustainable Competitiveness: Social and Environmental Aspects*, “Entrepreneurial Business and Economics Review”, Vol. 5(4), pp. 35–59, DOI: 10.15678/EBER.2017.050402.
- Eckert E., Kovalevska O., 2021, *Sustainability in the European Union: Analyzing the Discourse of the European Green Deal*, “Journal of Risk and Financial Management”, Vol. 14(2), pp. 1–22, DOI: 10.3390/jrfm14020080.
- European Commission, 2021, *2030 Digital Compass: the European way for the Digital Decade*, COM/2021/118.
- European Commission, 2019, *The European Green Deal*, COM/2019/640.
- Eurostat (2022), https://ec.europa.eu/eurostat/databrowser/view/nrg_bal_c/default/table?lang=en [date of access: 22.02.2022].

- Giddings B., Hopwood B., O'Brien G., 2002, *Environment, Economy and Society: fitting them together into sustainable development*, "Sustainable Development", Vol. 10(4), pp. 187–196, DOI: 10.1002/sd.199.
- Institute for Sustainability Leadership, 2020, *Developing the EU's "competitive sustainability" for a resilient recovery and dynamic growth*, Institute for Sustainability Leadership, Cambridge.
- Kiendl-Wendner D., Wach K. (eds.), 2014, *International Competitiveness in Visegrad Countries: Macro and Micro Perspectives*, FH Joanneum University of Applied Sciences, Graz.
- MacGillivray A., Sabapathy J., Zadek S., 2003, *Responsible Competitiveness Index 2003 – Aligning corporate responsibility and the competitiveness of nations*, AccountAbility, Copenhagen.
- Molendowski E., 2017, *Międzynarodowa pozycja konkurencyjna gospodarki – polska na tle państw grupy wyszehradzkiej w okresie poakcesyjnym*, "Comparative Economic Research. Central and Eastern Europe", Vol. 20(4), pp. 5–21.
- Molendowski E., Folfas P., 2019, *Effects of the Pillars of Competitiveness on the Competitive Positions of Poland and of The Visegrad Group Countries in the Post-Accession Period*, "Comparative Economic Research. Central and Eastern Europe", Vol. 22(2), pp. 55–67.
- Popescu G.H., Sima V., Nica E., Gheorghe I.G., 2017, *Measuring Sustainable Competitiveness in Contemporary Economies – Insights from European Economy*, "Sustainability", Vol. 9(7), pp. 12–38, DOI: 10.3390/su9071230.
- Porter M.E., 1990, *The Competitive Advantage of Nations*, "Harvard Business Review", March–April, pp. 73–91.
- Porter M.E., van der Linde C., 1995, *Toward a New Conception of the Environment Competitiveness Relationship*, "Journal of Economic Perspectives", Vol. 9(4), pp. 97–118, DOI: 10.1257/jep.9.4.97.
- Raworth K., 2017, *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist*, Random House, London.
- Schunz S., 2022, *The "European Green Deal" – a paradigm shift? Transformations in the European Union's sustainability meta-discourse*, "Political Research Exchange", Vol. 4(1), pp. 1–23, DOI: 10.1080/2474736X.2022.2085121.
- SolAbility, 2017, *The Global Sustainable Competitiveness Index 2017*, SolAbility, Zurich–Seoul.
- SolAbility, 2021, *The Global Sustainable Competitiveness Index 2021*, SolAbility, Zurich–Seoul.
- Szczodrowski G., 2018, *Międzynarodowa konkurencyjność gospodarek Grupy Wyszehradzkiej*, "Contemporary Economy", Vol. 9(2), pp. 15–24.
- Szigeti C., Toth G., Szabo D.R., 2017, *Decoupling – shifts in ecological footprint intensity of nations in the last decade*, "Ecological Indicators", Vol. 72, pp. 111–117, DOI: 10.1016/j.ecolind.2016.07.034.

-
- Thore S., Tarverdyan R., 2016, *The sustainable competitiveness of nations*, “Technological Forecasting and Social Change”, Vol. 106, pp. 108–114, DOI: 10.1016/j.techfore.2016.02.017.
- Washington H., Tomey P., 2016, *A Future Beyond Growth. Towards a Steady-State Economy*, Routledge, London.
- World Commission on Environment and Development, 1987, *Our Common Future. World Commission on Environment and Development*, Oxford University Press, Oxford.
- World Economic Forum, 2014, *Assessing Progress toward Sustainable Competitiveness*, [in:] *The Global Competitiveness Report 2014–2015*, Schwab K. (ed.), World Economic Forum, Geneva, pp. 53–83.
- Zadek S., 2006, *Responsible competitiveness: reshaping global markets through responsible business practices*, “Corporate Governance”, Vol. 6(4), pp. 334–348, DOI: 10.1108/14720700610689469.

