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Sustainable entrepreneurship and its determinants. The case of selected Central Eastern European Countries: From the global financial crisis to the COVID-19 pandemic

Zrównoważona przedsiębiorczość i jej determinanty. Przypadek wybranych krajów Europy Środkowo-Wschodniej. Od globalnego kryzysu finansowego do pandemii COVID-19

Abstract

Sustainable entrepreneurship (SE) is a complex and topical research problem. This article assesses the impact of selected determinants on SE in five Central Eastern European countries (Bulgaria, Croatia, Hungary, Poland and Romania) from 2008 to 2021. Contextual factors, such as macroeconomic stabilization, access to finance, knowledge creation, entrepreneurial capabilities, legal regulations, and environmental index, are analyzed. The article's original contribution to knowledge consists in the construction of an SE indicator and an assessment of the external factors that affect it in the individual countries under investigation. The Correlation Coefficient, Ordinary Least Squares, and the Vector Auto-Regression (VAR) models all demonstrate that external factors significantly impact SE. Moreover, these models show that the relationships between the explained and explanatory variables differ in strength and direction. The results confirm the necessity of coordinating entrepreneurship development policy (EDP) with macroeconomic, financial, and environmental policy. It is essential to use effective economic support tools and have the EU apply more pressure on countries that emit harmful substances.

Keywords: sustainable development, economic policy, environmental policy, sustainable entrepreneurship, macroeconomic stabilization.
JEL: E60, F63, L26, L31, Q01

Streszczenie

Zrównoważona przedsiębiorczość (SE) należy do złożonych i aktualnych problemów badawczych. Celem artykułu była ocena wpływu wybranych determinant na SE w pięciu krajach Europy Środkowo-Wschodniej (Bułgarii, Chorwacji, Polsce, Rumunii i na Węgrzech) w latach 2008–2021. Wzięto pod uwagę następujące czynniki: stabilizację makroekonomiczną, dostęp do źródeł finansowania, kreowanie wiedzy, zdolności przedsiębiorcze, regulacje prawne oraz indeks środowiskowy. Wkład do stanu badań polegał na stworzeniu oryginalnego wskaźnika SE i oceny czynników zewnętrznych wpływających na przedsiębiorczość w badanych krajach. Wykorzystane w badaniu współczynniki korelacji, metoda najmniejszych kwadratów oraz model wektorowo-autoregresyjny potwierdziły, że czynniki zewnętrzne znacząco wpływają na SE. Co więcej, modele pokazują różną siłę i kierunek zależności pomiędzy zmiennymi objaśnianymi i objaśniającymi. Wyniki badań potwierdzają konieczność koordynacji polityki rozwoju przedsiębiorczości z polityką makroekonomiczną, finansową i ochrony środowiska. Niezbędne jest również stosowanie skutecznych narzędzi wsparcia gospodarczego oraz większej presji ze strony UE na kraje emitujące szkodliwe substancje.

Słowa kluczowe: zrównoważony rozwój, polityka gospodarcza, stabilizacja makroekonomiczna, zrównoważona przedsiębiorczość, polityka ekologiczna.

JEL: E60, F63, L26, L31, Q01

1. Introduction

Sustainable entrepreneurship (SE) contributes to economic, social, environmental, and civilizational development. It involves seeking out, and making use of, opportunities from the business environment and implementing innovative solutions (Terán-Yépez et al., 2020). SE focuses on identifying, assessing, and exploiting opportunities to put new products and services on the market in line with the principles of sustainable development (SD) (Shepherd, Patzelt, 2011; Johnson, Hörisch, 2021). SE is a comprehensive concept that takes the mutual relations between the enterprise and the market, society, and the environment into account. SE plays a key role in resolving ecological problems by ensuring that products and services, and production methods are both environmentally friendly and economically competitive (Masciarelli, Leonelli, 2020). Finally, SE and SD strive to ensure the long-term value of goods and to preserve resources for future generations (Hockerts, Wüstenhagen, 2010; Henry et al., 2022). To summarize: SE responds to climate change, limited resources, social requirements, and expectations (Biggeri et al., 2022).

The term "sustainable entrepreneurship" appears alongside or in place of e.g.. "green entrepreneurship", "environmental entrepreneurship", "ecological entrepreneurship", "ecopreneurship", "enviropreneurship", "sustainopreneurship", and "social entrepreneurship" (Rodríguez-García et al., 2019; Hoogendoorn et al., 2019; Tharindu, Koggalage, 2020). However, its conceptual scope and the area it covers are much broader because it combines economics, social and ecological goals. SE includes initiatives that support the development of local communities, and which implement eco-innovations and environmentally friendly solutions (Bischoff, Volkmann, 2018; Lee et al., 2022).

Entrepreneurs identify SD as an opportunity to run a business on a global scale, maintain financial stability, create a good investment climate, and support national and regional institutions in protecting human rights and maintaining security (Bapoo et al., 2022; Fidlerová et al., 2022).

Although the theoretical aspects of SE (Rosário et al., 2022), along with its determinants (Middermann et al., 2020), opportunities, threats and prospects (Lüdeke-Freund, 2020) have been thoroughly analyzed, there is no consensus in the SE literature regarding its determinants and measurement, and there is no universally accepted SE indicator (Roomi et al., 2021; Soleymani et al., 2021; Gu et al., 2022).

This paper includes the first attempt to create a proprietary SE indicator and to identify those factors (FSE) that affect it in developing EU countries This is intended to supplement the literature on the subject and to indicate the theoretical and empirical implications that are scientifically significant and relevant to running a business.

The paper also aims to assess the impact of selected SE determinants in five Central Eastern European Countries (5CEECs) that are EU members, but outside the euro zone. Two Central Eastern European countries that have been EU member states since 2004 (Hungary and Poland), two since 2007 (Bulgaria and Romania), and one since 2013 (Croatia) were selected. The analysis covers the period 2008–2021, i.e., from the onset of the global financial crisis until the worst two years of the COVID-19 pandemic.

The following determinants were identified: macroeconomic stabilization (MSP); access to finance (FinA); creation of knowledge (KR); entrepreneurial capabilities (CE); legal regulations (LR); and environmental index (ExpENV). The research sample comprises countries with similar socio-economic development levels and relatively low levels of green innovations (Sobczak et al., 2022).

The central hypothesis of the paper is: The impact of the SE determinants on the 5CEECs from 2008 to 2021 varies in strength and direction. This hypothesis is predicated on the fact that, although these countries have many common features, they are alsocharacterized by differences in the structure of their economies, their legal regulations, their environmental policies, and especially the measures they have implemented to foster and promote entrepreneurship (Ronzon, M'Barek, 2018; Pieloch-Babiarz et al., 2021; Romero-Colmenares, Reyes-Rodríguez, 2022). This paper also examines whether, and in so how, SE has progressed during the period under consideration, which of the factors are the most important, and whether these factors should be analyzed as an integrated system with a view to implementing policies that will support entrepreneurs in a more coordinated manner.

SE indicators and determinants were created to verify the primary purpose of the study. Pearson's R, Spearman-s Rho, Gamma, and Kendall rank correlation coefficients, the Ordinary Least Squares Method (OLS: $p<0.05$), and the Vector Auto-Regression model (VAR) were employed to verify the research hypothesis.

The paper consists of the following parts: the introduction; conceptual background; research methodology; research results; discussion; and conclusions. The literature review includes publications from the Web of Science, Scopus, Eurostat, OECD and World Bank databases, but not the hyped GPT-3. Manual selection assisted in making the research less arbitrary.

2. Conceptual background

The increasing significance of social and environmental problems has contributed to the creation of new trends in the development of enterprises and entrepreneurship. SD has created entrepreneurial opportunities to solve social and ecological problems (Aagaard, 2016; Pieloch-Babiarz et al., 2021). SE assists in implementing SD goals, and it provides opportunities for entrepreneurs to start new businesses, win new markets, create a favorable investment climate, and produce a wide range of ecological goods and services (Cohen, Winn, 2007; Schaltegger, Wagner, 2011; Romero-Colmenares, Reyes-Rodríguez, 2022). SE involves limiting the depletion of natural resources, and aims to curb the emission of harmful substances into the atmosphere, reduce climate change, and support local communities (Gregori, Holzmann, 2020; Johnson, Hörisch, 2021).

SE is a relatively new term. It was coined in connection with the rapid development of SD (Roomi et al., 2021). Due to the many meanings that can be ascribed to it, its conceptualization requires a holistic approach. There is no consensus in the literature on the conceptualization of SE, and therefore no single universally accepted definition (Welter et al., 2019; Xu et al., 2022).

SE combines elements of green and social entrepreneurship, and represents the next stage in the evolution of both approaches. Green entrepreneurship focuses on environmental protection issues, while the entrepreneur uses natural resources to efficiently produce ecological goods and services. This is related to the green sector and is intended to generate profits while improving the quality of life of local communities (Hockerts, Wüstenhagen, 2010; Tharindu, Koggalage, 2020; Zameer et al., 2020). Social entrepreneurship pursues social goals and combines activities intended to produce economic gain and public benefits (Biggeri et al., 2022). SE's primary goal is to generate healthy financial returns while not harming society or the environment, whereas social and environmental entrepreneurship is primarily intended to generate positive non-financial returns (Kraus et al., 2018; Mansouri, Momtaz, 2022).

SE is aimed at achieving economic, social and environmental goals. All sectors of the economy are included, so that business can be conducted in a manner that is compatible with SD. SE makes use of opportunities, threats, and available resources (Bajdor et al., 2021; Di Vaio, 2022). SE contributes to SD by combining political, business and social activities and directing them towards socially and environmentally friendly economic ends (Groot, Pinkse, 2015; Davies, Chambers, 2018).

SE is often a creative activity that poses complex challenges and requires support by way of clusters, networks, innovation systems, and entrepreneurial ecosystems (Volkmann et al., 2019; Fichter, Tiemann, 2020). It should be emphasized that business stakeholders are significant motivators of SE (Welter et al., 2019; Bischoff, 2021).

Table 1.
Selected definitions of SE

Author	Definitions of SE
C. Fussler, P. James (1996)	"A breakthrough discipline for innovation and sustainability".
A. R. Anderson (1998)	"… a unique perspective that combines the creation of environmental, social and economic values, which focuses on ensuring the well-being of future generations".
S. L. Hart, M. B. Milstein (1991)	"… a source of creative destruction".
T. J. Dean, J. S. McMullen (2007)	SE is "the process of discovering, evaluating, and exploiting economic opportunities that are present in market failures which detract from sustainability, including those that are environmentally relevant".
B. Cohen, M. I. Winn (2007)	SE is "an examination of how opportunities to bring into existence future goods and services are discovered, created, and exploited, by whom, and with what economic, psychological, social, and environmental consequences."
D. F. Pacheco, T. J. Dean, D. S. Payne (2010)	We transcend the game theory literature to introduce a more complete understanding of SE, which lies in expanding the concept of the sustainable entrepreneur from discoverer of opportunity in extant economic structures to structural agent who develops institutions to change the "rules of the game" and thereby drives sustainable behaviors.
K. Hockerts, R. Wüstenhagen (2010)	"Sustainable Entrepreneurship is about a combination of economic, social and environmental value creation."

Author	Definitions of SE
D. A. Shepherd, H. Patzelt (2011)	"The goals of sustainable entrepreneurship are to preserve nature, life *support*, and community in the pursuit of perceived opportunities to bring into existence future products, processes, and services for gain, where gain is broadly construed to include economic and non-economic gains to individuals, the economy, and society."
S. Schaltegger, M. Wagner (2011)	SE is "an innovative, market-oriented and personality driven form of creating economic and societal value by means of break-through environmentally or socially beneficial markets or institutional innovations."
K. Groot, J. Pinkse (2015)	SE is "the discovery, creation, and exploitation of entrepreneurial opportunities that contribute to sustainability by generating social and environmental gains for others in society."
I. A. Davies, L. Chambers (2018)	SE "can make a significant contribution in improving environmental sustainability while running a profitable business."
K. Fichter, I. Tiemann (2020)	SE is the discovery, creation, evaluation and exploitation of opportunities to create innovative goods and services that are consistent with regional, national and SD goals.
P. Gregori, P. Holzmann (2020)	SE "has been embraced as a potential solution to the grand social and environmental challenges such as climate change and gaping social inequalities."
M. A. Roomi, J. M Saiz-Alvarez, A. Coduras (2021)	"Sustainable entrepreneurship is consistently recognized as an important engine for economic and non-economic development, a driver of job creation, and a supplier of innovative products and services."
M. P. Johnson, J. Hörisch (2021)	SE bears great potential to contribute to SD, especially in its potential to replace unsustainable products and services with sustainable ones, to create additional environmental and social value, and to transform markets and societies toward sustainability.
P. Bajdor (2021)	Sustainable entrepreneurship is a comprehensive concept assuming the existence of mutual relations between the enterprise and the market, society and the environment.
G. Xu, G. Hou, J. Zhang (2022)	"Sustainable entrepreneurship can be interpreted as something focused on the preservation of nature, life support, and community in the pursuit of perceived opportunities to bring into existence future products, processes, and services, where the pursuit of opportunities brings about the gain which is broadly construed to include economic and noneconomic gains to individuals, the economy, and society."

Source: based on the literature of the subject. The hyped GPT-3 was not used.

The internal factors impacting SE are the skills and knowledge of the entrepreneurs, their approach to environmental protection, social awareness, and acceptable level of risk (Lotfi et al., 2018; Khan et al., 2020). The implementation of SD tasks is also influenced by external, contextual aspects, such as: macroeconomic conditions; legal regulations; the government's approach to promoting ecological activities and a healthy lifestyle, and thus institutional support for ecologically and socially responsible activities; the ecological attitude of consumers; the level of market competition; and the availability of external sources of financing (Tunio et al., 2021; Diepolder et al., 2021). Public and private support for SE is important and can be obtained through business development organizations, financial institutions, private investors, universities and clusters (Kanda et al., 2018).

Although external conditions are considered essential for SE (Xianyue et al., 2019; Fragoso et al., 2020; Méndez-Picazo et al., 2021), there is a dearth of research examining the contextual factors of SE. This may be due to two closely related

examination problems (Roomi et al., 2021). The first has to do with determining the SE indicator, as there is no single universally accepted SE indicator. Researchers therefore employ different research methodologies, from the selection of diagnostic variables to the method of creating the final indicator. The difficulties of measuring SE mean that assessing the impact of the factors that affect it also requires the adoption of specific research frameworks and assumptions.

Among the few propositions for measuring SE, the one suggested by Roomi et al. (2021) appears to be especially promising, as they propose measuring sustainable entrepreneurial activity (SEA), from a combined social, economic, and environmental standpoint, with and without the eco-innovation component. They created a structural equation in which the variables explaining SEA were the social area, eco-innovation (the economic area), and the environmental area of the country or economy under investigation.

Soleymani et al. (2021) identify the SE indicators using the Fuzzy Delphi. They focus on 69 indicators in three main areas: sociocultural (social trust, social altruism and empathy among the local population); economic (utilization of facilities, cost management of goods and services for business stability, management); and ethical (financial business transparency, ethics in using biological resources, and human resource management).

Gu et al. (2022) use the triple bottom line to measure sustainability. They make three regressions with the economic bottom line (GDP), environmental bottom line, and social bottom line, and they divide innovation entrepreneurship into green and non-green parts and business entrepreneurship.

Gu and Wang (2022) also present an approach to determining the indicator based on TBL. The authors choose the following variables: economic value, ecological value, social value, innovation, business, and decision-making spirit.

Aliabadi et al. (2022) created an SE indicator based on the summative content analysis. They weighed the criteria and sub-criteria using the fuzzy analytic hierarchy process. For this purpose, they identify 25 key SE experts and then they analyze the data using MICMAC software. They confirm that ecological, economic, and institutional dimensions are of greater importance in a sustainable startup ecosystem.

SE indicators can be divided into qualitative or quantitative, general or specific, and absolute or relative categories. General indicators include financial results, energy and water consumption, and emission of harmful substances. These indicators can be used to compare a company's performance. Specific indicators are defined differently and measured following the characteristics of each industry or firm (Azapagic, Perdan, 2000; Bae, Smardon, 2011). SE indicators are intended to monitor and evaluate the effectiveness and performance of sustainable business goals and targets, communicate with stakeholders, and help compare the results of SD.

3. Methodology

This study primarily aims to assess the impact of selected external factors on SE in 5CEECs from 2008 to 2021. All five have experienced an economic transformation

and are characterized by a lower socio-economic development level than Western EU countries (Mann, 2015; Berkowitz et al., 2020; Pieloch-Babiarz et al., 2021). It is not without significance that their green sectors, construed as activities aimed at offering green products and services, is relatively low (Kovalchuk, Kravchuk, 2019; Kakoulaki et al., 2021). Moreover, due to the structure of the energy balance, harmful emissions are high (Stavytskyy et al., 2018; Komarnicka, Murawska, 2021; Misztal et al., 2021), and more restrictive environmental protection regulations need to be introduced. Despite the delays in development, more entrepreneurs have taken an interest in socially and ecologically responsible activities in recent years (Kudłak et al., 2018; Cuiyun, Chazhong, 2020). Reducing barriers and creating favorable conditions for SE is therefore important.

Certain simplifying assumptions had to be adopted and proprietary indicators constructed in order to access the relationship between SE and the factors that comprise it. The SE indicator used in this study was constructed using diagnostic variables. These were divided into stimulants and destimulants and normalized. The diagnostic variables were designated as the SE's economic, social and environmental pillars (Table 2). No assumptions were made regarding collinearity between the variables or their impact on SE.

The selection of factors influencing SE was informed by the approach proposed by the OECD-Eurostat Entrepreneurship Indicators Program (EIP) to assess entrepreneurship determinants. Some modifications were made due to the need to introduce ecological and social factors. Moreover, the economic practices and empirical research of the economies under investigation indicate that factors such as macroeconomic stabilization (MSP), access to finance (FinA), creation of knowledge (KR), entrepreneurial capabilities (CE), legal regulations (LR), and environmental index (ExpENV) are essential for SE. These factors are important for entrepreneurs because they affect the business climate, the level of competitiveness, and the quality of operations. Knowledge and R&D expenditure contribute to developing new forms of economic activity (Marco-Fondevila et al., 2018; Tur-Porcar et al., 2018; Sendra-Pons et al., 2022).

These factors vary between the 5CEECs during the analyzed period. There are several reasons for this, including different levels of enterprise sector development, differing institutional and legal regulations, and diverse R&D and environmental protection expenditures. Market competitiveness and business conditions also vary (Varga et al., 2020). These differences cause disparities in relative indices. The estimations of models that assess the phenomenon may therefore give different results. In this context, the main research hypothesis is as follows:

H: *T the impact of SE determinants differed in strength and direction in the 5CEECs from 2008 to 2021.*

The research covers the period after 2008, i.e., after the 5CEECs joined the European Union (EU) and therefore had access to EU socio-economic development funds. Since 2008, SD has assumed greater importance and more green goods and services have been produced. Entrepreneurs can obviously see benefits and prospects in building new, green businesses.

SD research exhibits positive dynamics in the 5CEECs. Moreover, it is greatly affected by macroeconomic conditions. Business in these countries is impeded by low levels

of R&D expenditure and inordinately long and complicated bureaucratic procedures. Governments should therefore take steps to introduce legislation, systems, and mechanisms to support SE. The following four sub-hypotheses were therefore formulated:

H1: *The trend of the SE indicator is positive in all the surveyed countries from 2008 to 2021*;

H2: *MSP has the highest statistically significant impact on SE among the analyzed determinants*;

H3: *Determinants influencing SE should to be viewed as a whole*;

H4: *The development of SE is continuous (there is an autoregression).*

Pearson's R, Spearman-s Rho, Gamma and Kendall rank correlation coefficients, the Ordinary Least Squares Method (OLS), and the Vector Autoregression model (VAR) were used to verify these hypotheses. The numerical series is stationary and satisfies the conditions of both methods (Raykov, Marcoulides, 2017). This was verified and confirmed using the following statistical tests: KPSS; White's, Durbin-Watson and Breuscha-Godfrey, Doornik-Hansen, and Variance Inflation Factor. The ranges of correlation strength proposed by Evans (2006) were adopted.

The research was conducted in stages. First, the SE indicator was constructed using the following formula:

$$SE_i = SE_{Ei} + SE_{Si} + SE_{ENVi} = \frac{\frac{1}{n}\sum_{j=1}^{n} z_{ij}}{L} \quad (i=1,2,\ldots,n) \tag{1}$$

Where; SEi is the synthetic indicator in year i; n is the number of metrics; SEEi is the economic pillar of SE in year i; SESi is the social pillar of SE in year i; SEENVi is the environmental pillar of SE in year i; L is the working-age population; and *zij* is the normalized value of variable j in year i.

Next, the explanatory variables are transformed to unify their measuring scales using the following formulas (Aivazian, 2005):

for the stimulants:

$$z_{ij} = \frac{y_{ij} - \min_i\{y_{ij}\}}{\max_i\{y_{ij}\} - \min_i\{y_{ij}\}}, z_{ij} \in [0;1]; \tag{2}$$

for the destimulants:

$$z_{ij} = \frac{\max_i\{y_{ij}\} - y_{ij}}{\max_i\{y_{ij}\} - \min_i\{y_{ij}\}}, z_{ij} \in [0;1]. \tag{3}$$

where: *zij* stands for the normalized value of variable j in year i; *yij* is the value of variable j in year i; is the minimum value of variable j in year i; and is the maxium value of variable j in year i.

Thirty-two explanatory variables that met the statistical, substantial and formal criteria were used to calculate the SE, SEE, SES, and SEENV values. A preliminary analysis of the degree of correlation between variables was conducted in order to

eliminate those that were superfluous. A Pearson R value of |0.75| was adopted as the threshold value (Dziekański, 2014). Variables were selected on the basis of a perusal of the literature (Roomi et al., 2021; Pieloch-Babiarz et al., 2021; Gu et al., 2022) and availability. The variables that were finally selected are presented in Table 2.

Table 2:
Diagnostic variables used in the SE and its pillars

Synthetic index	Diagnostic variable	Description	Stimulant	Destimulant
Economic entrepreneurship	y1	Total number of companies in country	✓	
	y2	Turnover or gross premiums [million euro]	✓	
	y3	Production value [million euro]	✓	
	y4	Value added at factor cost [million euro]	✓	
	y5	Gross operating surplus [million euro]	✓	
	y6	Total purchases of goods and services [million euro]	✓	
	y7	Gross investment in tangible goods [million euro]	✓	
	y8	Investment rate (investment/value added at factors cost) [%]	✓	
	y9	Share of personnel costs in production [%]		✓
	y10	Average personnel costs [thousand euro]		✓
Social entrepreneurship	y11	Wages and Salaries [million euro]	✓	
	y12	Social security costs [million euro]	✓	
	y13	Total number of employees in country	✓	
	y14	Turnover per person employed [thousand euro]	✓	
	y15	Apparent labor productivity [thousand euro]	✓	
	y16	Gross value added per employee [thousand euro]	✓	
	y17	Growth rate of employment [%]	✓	
	y18	Number of persons employed per enterprise	✓	
	y19	Investment per person employed [thousand euro]	✓	
	y20	Personnel costs [million euro]		✓
Environmental entrepreneurship	y21	Carbon dioxide emission [metric tons (tonnes)]		✓
	y22	Methane emission [metric tons]		✓
	y23	Nitrous oxide emission [metric tons]		✓
	y24	Sulphur oxides emission [metric tons]		✓
	y25	Ammonia emission [metric tons]		✓
	y26	Carbon monoxide emission [metric tons]		✓
	Y27	Nitrogen oxides emission [metric tons]		✓
	y28	Generation of total waste [metric tons]		✓

Source: own study on the basis of Eurostat [https://ec.europa.eu/Eurostat], access: Nov. 30, 2022.

Next, indicators of the factors (FSE) that influence SE were constructed. These were based on selected diagnostic variables presented in Table 3 (OECD, 2011). The following formula:

$$F_{SE} = M_{SP} + Fin_A + K_R + C_E + L_R + Exp_{ENV} \quad (4)$$

Where: MSP is macroeconomic stabilization; Fin_A is access to finance; K_R is knowledge creation; C_E is entrepreneurial capabilities; L_R is legal regulations; and Exp_{ENV} is the environmental index.

The methods used to construct the SE indicator were also used to calculate the Fin_A, K_R, C_E, L_R, and Exp_{ENV} indicators (stimulants: x_1, … x_{15}) (Formula 2 and Formula 3).

Table 3.
Diagnostic variables used to calculate the Fin_A ; K_R ; C_E ; L_R ; Exp_{ENV} indicators.

Index	Diagnostic variable	Description
Fin_A	x_1	Ease in accessing loans
	x_2	Venture capital investments (USD), current prices
	x_3	Angel investment by country (€M)
K_R	x_4	Gross domestic expenditure on R&D (percentage of GDP)
	x_5	Patents – International collaboration in technology development (number)
	x_6	Innovation index Innovation index Innovation index Innovation index
C_E	x_7	Tertiary educational attainment (%)
	x_8	Self-employment (thousand)
	x_9	International mobility of students
L_R	x_{10}	Ease of doing business
	x_{11}	Corporate income tax rate (%)
Exp_{ENV}	x_{12}	Environmentally adjusted multifactor productivity growth (percentage points)
	x_{13}	Adjustment for pollution abatement (percentage points)
	x_{14}	National expenditure on environmental protection (million euro)
	x_{15}	Environmental protection investments of total economy (million euro)

Source: own study based on Eurostat, OECD, and the Global Economy.

The following formula was used to calculate the MSP (Kołodko, 1993):

$$MSP = a+b+c+d+e = [(\Delta GDP^*U)+(U^*HICP)+(HICP^*G)+(G^*CA)+(CA^*\Delta GDP)]^*k \quad (5)$$

Where: $a = \Delta GDP^*U^*k$ is the area of a triangle known as a real sphere triangle, and it characterizes the relation between the rate of economic growth and the unemployment rate; $b = U^*HICP^*k$ is the stagflation triangle, which depends on the unemployment rate and the inflation rate; $c=ICP^*G^*k$ is the budget and inflation triangle; $d=G^*CA^*k$

is the financial equilibrium triangle and depends on the budget and the current account balance; $e=CA^*\Delta GDP^*k$ is the external sector triangle and shows the variability of the current account balance and the rate of economic growth; the value of the coefficient is calculated as k=½ sin72°=0.475; and the other designations are as above.

The next step was to examine the strength and direction of the linear relationship between the SE and MSP, Fin_A, K_R, C_E, L_R, Exp_{ENV} using Pearson's R, Spearman-s Rho, Gamma and Kendall rank correlation coefficients. The ranges of correlation strength suggested by Evans (2006) were adopted: |rxy| = 0—no correlation; 0 <|rxy| ≤ 0.19—very weak; 0.20 ≤ |rxy| ≤ 0.39—weak; 0.40 ≤ |rxy| ≤ 0.59—moderate; 0.60 ≤ |rxy| ≤ 0.79—strong; 0.80 ≤ |rxy| ≤ 1.00—very strong.

A regression analysis was then applied to assess the links between SE and FSE and its subindices. The simple linear regression was determined using formulas (6) and (7) (Schmidheiny, 2019):

$$SE_i=\beta_0+\beta_1 F_{SEi}+\varepsilon i \tag{6}$$

$$SE_i = \beta_0 + \beta_1 M_{SPi} + \beta 2 Fin_{A\,i} + \beta_3 K_{Ri} + \beta_4 C_{Ei} + \beta_5 L_{Ri} + \beta_6 Exp_{ENVi} + \varepsilon_i \tag{7}$$

Where: β_0 is the intercept; β_1 is the slope; ε_i denotes the *i*-th residual; and *I* is the observation index.

The estimated models are given by the equations:

$$SE = \hat{\beta}_0 + \hat{\beta}_1 FSE_i + e_i = \widehat{SE}_i + e_i \tag{8}$$

$$SE = \hat{\beta}_0 + \hat{\beta}_1 M_{SPi} + \hat{\beta}_2 Fin_{Ai} + \hat{\beta}_3 K_{Ri} + \hat{\beta}_4 C_{Ei} + \hat{\beta}_5 L_{Ri} + \hat{\beta}_6 Exp_{ENVi} + e_i = \widehat{SE}_i + e_i \tag{9}$$

The residual for each observation is therefore:

$$e_i = SE_i - \widehat{SE}_i = SE - (\hat{\beta}_0 + \hat{\beta}_1 F_{SEi}) \tag{10}$$

$$e_i = SE_i - \widehat{SE}_i = SE_i - \left(\hat{\beta}_0 + \hat{\beta}_1 M_{SPi} + \hat{\beta}_2 Fin_{Ai} + \hat{\beta}_3 K_{Ri} + \hat{\beta}_4 C_{Ei} + \hat{\beta}_5 L_{Ri} + \hat{\beta}_6 Exp_{ENVi}\right) \tag{11}$$

Ordinary least squares (OLS) regression was used for the regression analysis, as this is the most common method. The OLS procedure minimizes the sum of squared residuals (Raykov and Marcoulides, 2017):

$$s\left(\hat{\beta}_0, \hat{\beta}_1\right) = \sum_{i=1}^{n} e_i^2 = \sum_{i=1}^{n} (SE_i - SE_i)^2 = \sum_{i=1}^{n} \left(SE_i - \hat{\beta}_0 - \hat{\beta}_1 F_{SEi}\right)^2 \rightarrow min \tag{12}$$

$$s\left(\hat{\beta}_0, \hat{\beta}_1\right) = \sum_{i=1}^{n} \left(SE_i - \hat{\beta}_0 + \hat{\beta}_1 M_{SPi} + \hat{\beta}_2 Fin_{Ai} + \hat{\beta}_3 K_{Ri} + \hat{\beta}_4 C_{Ei} + \hat{\beta}_5 L_{Ri} + \hat{\beta}_6 Exp_{ENVi}\right)^2 \rightarrow min \tag{13}$$

In the final stage, the Vector Auto-Regression model (VAR) was built. This is described by the formula (George et al., 2008):

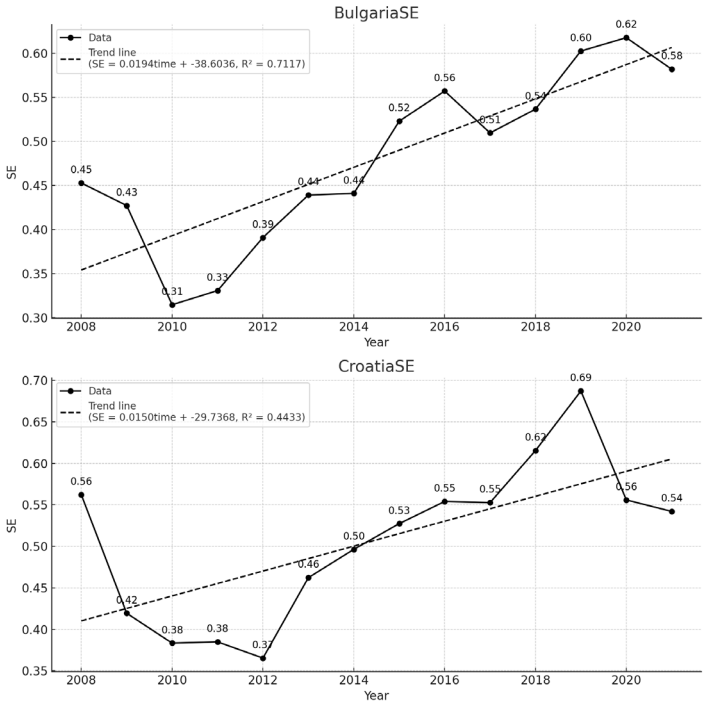
$$SE_{vt} = \sum_{i=1}^{np} \left(A_i\, SE_i - i + E_t\right) \tag{14}$$

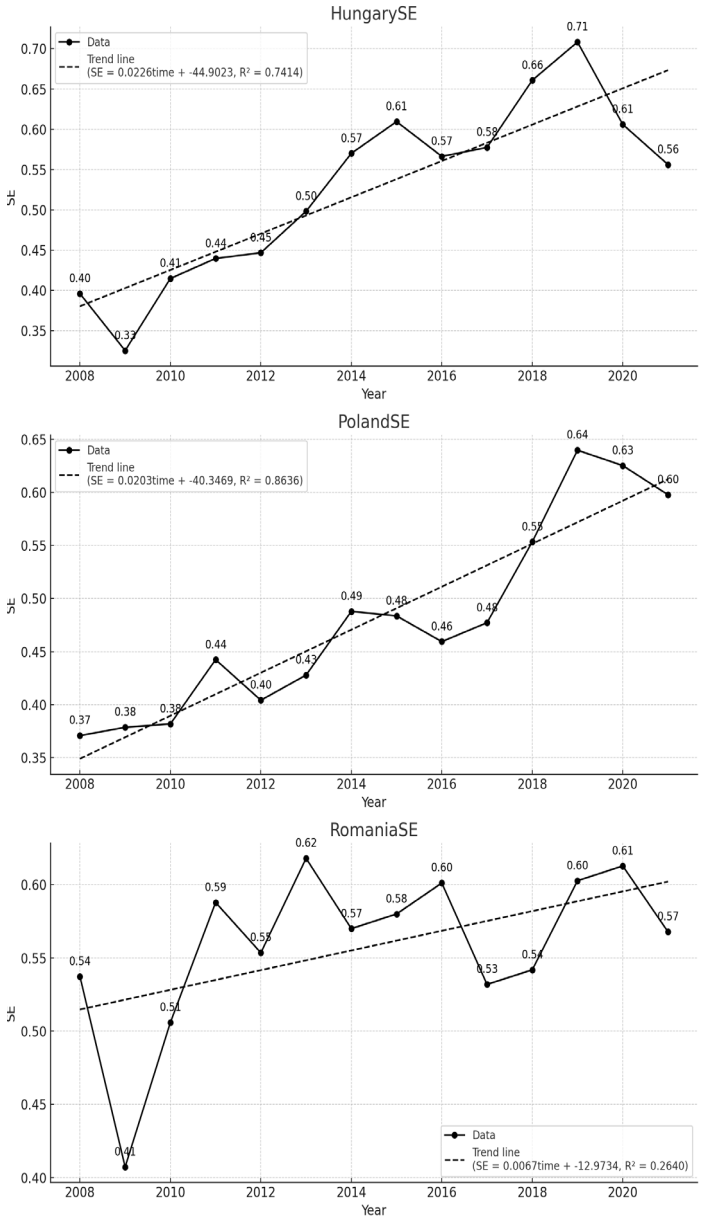
Where: is the vector of values of the analyzed processes at time t (including all variables in the model); Ai is the matrix of parameters with delays of variables from vector Ent; and Et is the vector of stationary random disturbances.

4. Results

Figure 1 presents SE in the 5CEECs from 2008 to 2021. All the 5CEECs show a positive trend in the SE over this period, which should be assessed as a favorable situation. The activities in 5CEECs from 2008 to 2021 undertaken for SE are effective and efficient. The highest dynamics is in Hungary (SE = 0.0226time + 0.3576; R^2 = 0.7414). The lowest dynamics is in Croatia (SE = 0.015time + 0.3952; R^2 = 0.4433).

Figure 1.
The SE indicator from 2008 to 2021





Source: own study on the basis of Eurostat https://ec.europa.eu/Eurostat, accessed: Dec. 1, 2022.

Table 4 shows the descriptive statistics of SE in the 5CEECs from 2008 to 2021. The highest average level of SE is in Romania (SD = 0.05, median = 0.57). The lowest average level of SE is in Bulgaria and Poland (SD = 0.09, median = 0.78). The maximum level is in Hungary (2019) and the minimum level is in Bulgaria (2010).

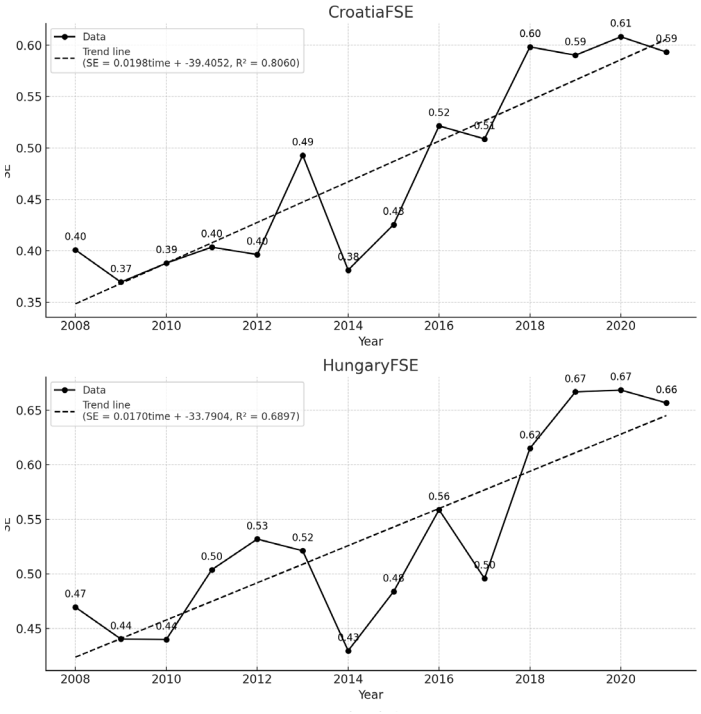
Table 4.
The descriptive statistics of the SE indicator in the period from 2008 to 2021

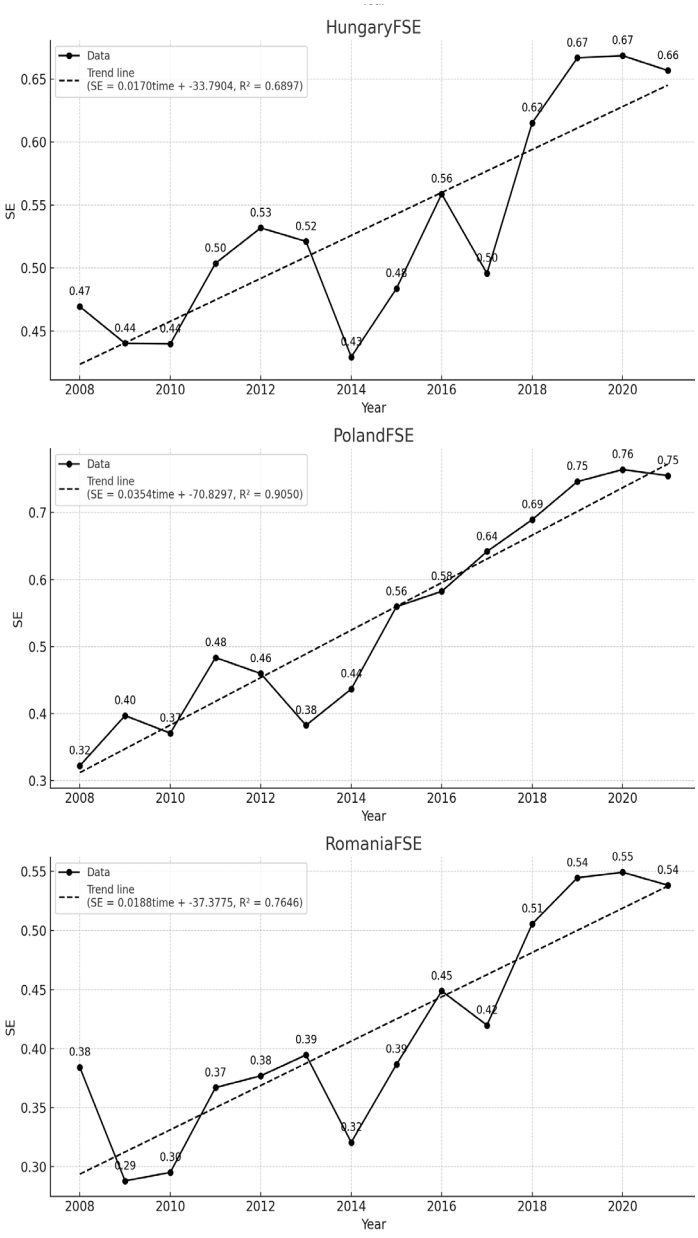
Country	Descriptive statistics				
	Mean	SD	Median	Min	Max
Bulgaria	0.48	0.09	0.48	0.31	0.62
Croatia	0.51	0.09	0.53	0.37	0.69
Hungary	0.53	0.11	0.56	0.33	0.71
Poland	0.48	0.09	0.48	0.37	0.64
Romania	0.56	0.05	0.57	0.41	0.62

Source: own study on the basis of Eurostat https://ec.europa.eu/Eurostat, accessed Dec. 1, 2022.

Figure 2 presents FSE in the 5CEECS from 2008 to 2021. All the 5CEECs show a positive trend in the FSE over this period, which should be assessed as a favourable situation. Their policies on the environment, macroeconomic stabilization, access to finance, knowledge creation, entrepreneurial capacity, and legal regulations have delivered positive results. The most dynamic is Poland (FSE = 0.0354time + 0.2764; $R^2 = 0.905$). The least dynamic is Hungary (FSE = 0.017time + 0.4065; $R^2 = 0.6897$).

Figure 2.
The indicator of factors influencing SE from 2008 to 2021





Source: own study on the basis of Eurostat https://ec.europa.eu/Eurostat, accessed Dec. 1, 2022.

Table 5 shows the descriptive statistics of FSE in the 5CEECs from 2008 to 2021. The highest average level of FSE is in Romania (SD = 0.05, median = 0.57). The lowest average level of FSE is in Bulgaria and Poland (SD = 0.09, median = 0.78). The maximum level is in Hungary (2019) and the minimum level is in Bulgaria (2010).

Table 5.
The indicator of factors influencing SE from 2008 to 2021.

Country	Descriptive statistics				
	Mean	SD	Median	Min	Max
Bulgaria	0.59	0.15	0.56	0.41	0.80
Croatia	0.48	0.09	0.46	0.37	0.61
Hungary	0.53	0.08	0.51	0.43	0.67
Poland	0.54	0.15	0.52	0.32	0.76
Romania	0.42	0.09	0.39	0.29	0.55

Source: own study on the basis of Eurostat https://ec.europa.eu/Eurostat, accessed Dec. 1, 2022.

Table 6 presents the Pearson's R, Spearman-s Rho, Gamma and Kendall rank correlation coefficients between SE and MSP, FinA, KR, CE, LR, ExpENV, FSE in 5CEECs from 2008 to 2021. In most cases, there is a strong or very strong, positive correlation ($p < 0.05$, bolded in Table 6).

In all the 5CEECs, the correlation coefficients are significant only between SE and FSE ($p < 0.05$). There is a positive relationship between these variables and different levels of correlation coefficients regarding strength of impact. The highest level of correlation is in Poland (Pearson's R = 0.927), and the lowest level of correlation is in Hungary (Gamma and Kendall rank = 0.507).

The correlation coefficients between SE and MSP, FinA, KR, CE, LR, ExpENV have different levels of strength and direction of impact. The highest level of the correlation coefficient is in Poland (positive relationship between SE/MSP; Spearman-s Rho = 0.932). The lowest level of the correlation coefficient is in Bulgaria (positive relationship between SE/LR; Pearson's R = 0.023). Moreover, there is a negative relationship between SE and LR (in Croatia, Hungary, and Poland), SE and ExpENV (in Hungary and Romania), SE and KR (in Hungary).

Table 6.
The Pearson's R, Spearman-s Rho, Gamma and Kendall rank correlation coefficients from 2008 to 2021

Country	Correlation	SE						
		MSP	FinA	KR	CE	LR	ExpENV	FSE
Bulgaria	Pearson's R	**0.638**	**0.892**	**0.741**	**0.847**	0.023	**0.599**	**0.902**
	Spearman-s Rho	**0.744**	**0.881**	**0.569**	**0.890**	0.326	**0.604**	**0.899**
	Gamma	**0.533**	**0.714**	0.385	**0.714**	0.227	**0.451**	**0.758**
	Kendall rank	**0.530**	**0.714**	0.385	**0.714**	0.223	**0.451**	**0.758**

Country	Correlation	SE						
		MSP	FinA	KR	CE	LR	ExpENV	FSE
Croatia	Pearson's R	**0.684**	**0.786**	0.502	**0.682**	**-0.788**	**0.700**	**0.738**
	Spearman-s Rho	**0.631**	**0.727**	0.433	**0.613**	**-0.724**	**0.604**	**0.701**
	Gamma	**0.533**	**0.516**	0.275	**0.407**	**-0.563**	**0.495**	**0.516**
	Kendall rank	**0.530**	**0.516**	0.275	**0.407**	**-0.551**	**0.495**	**0.516**
Hungary	Pearson's R	**0.885**	**0.710**	-0.393	**0.834**	**-0.814**	-0.278	**0.660**
	Spearman-s Rho	**0.846**	**0.609**	-0.376	**0.846**	**-0.714**	-0.257	**0.538**
	Gamma	**0.736**	**0.429**	-0.209	**0.692**	**-0.483**	-0.165	**0.507**
	Kendall rank	**0.736**	**0.429**	-0.209	**0.692**	**-0.478**	-0.165	**0.507**
Poland	Pearson's R	**0.889**	**0.840**	**0.861**	**0.816**	-0.242	**0.710**	**0.927**
	Spearman-s Rho	**0.932**	**0.745**	**0.921**	**0.771**	-0.198	**0.763**	**0.881**
	Gamma	**0.798**	**0.560**	**0.802**	**0.604**	-0.044	**0.582**	**0.736**
	Kendall rank	**0.789**	**0.560**	**0.802**	**0.604**	-0.044	**0.582**	**0.736**
Romania	Pearson's R	**0.660**	0.030	0.499	0.457	**0.624**	-0.241	**0.564**
	Spearman-s Rho	0.511	0.059	0.420	0.454	**0.678**	-0.231	**0.547**
	Gamma	0.371	0.055	0.289	0.348	**0.506**	-0.121	**0.529**
	Kendall rank	0.367	0.055	0.287	0.344	**0.500**	-0.121	**0.529**

Note: $p < 0.05$ ($n = 14$).

Source: own study on the basis of Eurostat https://ec.europa.eu/Eurostat, accessed: Dec. 1, 2022.

Table 7 shows the OLS regressions between SE and FSE in 5CEECs from 2008 to 2021. The results meet the OLS estimation conditions, including no collinearity, homoscedasticity, normal distribution of variables, and no autocorrelation.

The FSE components have a statistically significant impact on SE in all the 5CEECs. The relationship between the examined variables is positive, with different levels of strength. The highest level is in Hungary (0.842), and the lowest level of relationship is in Romania (0.344).

The coefficient determination ranges from 0.318 (Romania, which means an unsatisfactory fit to the data) to 0.859 (Poland, which means a good fit).

Table 7.

The Results of the OLS regressions from 2008 to 2021

Country	Independent variable	Coefficient	Std. error	p-value	R^2
Bulgaria	Const	0.143	0.048	0.0116	0.814
	F_{SE}	0.573	0.079	<0.0001	
Croatia	Const	0.148	0.097	0.1523	0.545
	FSE	0.755	0.199	0.0026	
Hungary	Const	0.077	0.150	0.6178	0.435
	FSE	0.842	0.277	0.0102	

Country	Independent variable	Coefficient	Std. error	p-value	R^2
Poland	Const	0.186	0.036	0.0002	0.859
	FSE	0.543	0.063	<0.0001	
Romania	Const	0.416	0.062	<0.0001	0.318
	FSE	0.344	0.145	0.0356	

Note: $p<0.05$; $SE= \alpha_0+ \alpha_1 \cdot F_{SE} + \varepsilon_i$
Source: own study on the basis of Eurostat https://ec.europa.eu/Eurostat, accessed: Dec. 1, 2022.

Table 8 presents the results of the OLS regressions between SE and MSP, FinA, KR, CE, LR, ExpENV in the 5CEECs from 2008 to 2021. The results meet the OLS estimation conditions.

In all the 5CEECs, the FSE components have a statistically significant impact on SE. The relationship between the examined variables is mostly positive (negative in three cases), with different levels of strength. The highest (positive) level is in Poland (relationship between SE and MSP, 0.818), as is the lowest level (relationship between SE and LR, 0.152). The lowest negative relationships are between SE and LR (in Hungary = 0.314), and SE and CE (in Poland = 0.368 and Romania = 0.477).

The coefficient determination ranges from 0.723 (Croatia, which means a satisfactory fit to the data) to 0.945 (Poland and Romania, which means a very good fit).

Table 8.
The results of the OLS regressions from 2008 to 2021

Country	Independent variable	Coefficient	Std. error	p-value	R^2
Bulgaria	Const	0.223	0.034	<0.0001	0.896
	FinA	0.266	0.035	<0.0001	
	ExpENV	0.168	0.051	0.0076	
Croatia	Const	0.364	0.034	<0.0001	0.723
	FinA	0.236	0.055	0.0012	
	KR	0.162	0.079	0.0656	
Hungary	Const	0.217	0.140	0.1525	0.88
	MSP	0.599	0.189	0.0101	
	KR	0.324	0.178	0.0988	
	LR	−0.314	0.111	0.018	
Poland	Const	−0.075	0.091	0.4344	0.945
	MSP	0.818	0.205	0.004	
	FinA	0.215	0.064	0.0102	
	CE	−0.368	0.131	0.0229	
	LR	0.152	0.050	0.0165	
	ExpENV	0.301	0.109	0.0244	
Romania	Const	0.152	0.103	0.178	0.945
	MSP	0.513	0.146	0.0079	
	KR	0.367	0.132	0.0235	
	CE	−0.477	0.168	0.0218	
	LR	0.171	0.073	0.0464	
	ExpENV	0.418	0.155	0.0276	

Note: $p<0.05$; $SE = \alpha_0 + \alpha_1 \cdot M_{SP} + \alpha_2 \cdot Fin_A + \alpha_3 \cdot K_R + \alpha_4 \cdot C_E + \alpha_5 \cdot L_R + \alpha_6 \cdot Exp_{ENV} + \varepsilon_i$
Source: own study on the basis of Eurostat https://ec.europa.eu/Eurostat, accessed: Dec. 1, 2022.

Table 9 shows the results of the VAR models. Estimation is between SE and SE(t-1) in the 5CEECs from 2008 to 2021. For the purposes of the analyses, a single lag between explanatory variables was adopted for all the 5CEECs. The choice of lag lengths is in line with the results of the information criteria of the Akaike, Schwartz-Bayesian and Hannan-Quinn models. According to these criteria, models with one lag length provide the most information.

The models show that SE has a statistically significant on SE(t-1) in all the 5CEEs except Romania. The relationship between the examined variables is positive, with different levels of strength. The highest level is in Poland (0.899), and the lowest in Romania (0.322; no statistical significance).

The coefficient determination ranges from 0.105 (Romania, which means an unsatisfactory fit to the data) to 0.794 (Poland, which means a satisfactory fit).

Table 9.
The results of the VAR models from 2008 to 2021

Country	Dependent variable	Independent variable	Coefficient	Std. error	p-value	R^2
Bulgaria	SE	const	0.063	0.080	0.448	0.719
		$SE_{(t-1)}$	0.887	0.167	0.000	
Log-likelihood = 20.294						
Determinant of covariance matrix = 0.003						
AIC = -2.814						
BIC = -2.728						
HQC = -2.832						
Portmanteau test: LB(3) = 2.413, df = 2 [0.299]						
Croatia	SE	const	0.137	0.105	0.217	0.536
		$SE_{(t-1)}$	0.726	0.204	0.004	
Log-likelihood = 17.416						
Determinant of covariance matrix = 0.004						
AIC = -2.372						
BIC = -2.285						
HQC = -2.390						
Portmanteau test: LB(3) = 1.445, df = 2 [0.48]						
Hungary	SE	const	0.118	0.081	0.171	0.718
		$SE_{(t-1)}$	0.798	0.151	0.000	
Log-likelihood = 19.335						
Determinant of covariance matrix = 0.0030						
AIC = -2.667						
BIC = -2.580						
HQC = -2.685						
Portmanteau test: LB(3) = 2.402, df = 2 [0.301]						

Country	Dependent variable	Independent variable	Coefficient	Std. error	p-value	R^2
Poland	SE	const	0.065	0.066	0.348	0.794
		$SE_{(t-1)}$	0.899	0.138	<0.0001	
Log-likelihood = 23.776						
Determinant of covariance matrix = 0.0026446519						
AIC = -3.350						
BIC = -3.263						
HQC = -3.368						
Portmanteau test: LB(3) = 3.883, df = 2 [0.144]						
Romania	SE	const	0.380	0.159	0.036	0.105
		$SE_{(t-1)}$	0.322	0.284	0.281	
Log-likelihood = 20.133						
Determinant of covariance matrix = 0.003						
AIC = -2.780						
BIC = -2.703						
HQC = -2.808						
Portmanteau test: LB(3) = 0.960, df = 2 [0.619]						

Note: $p<0.05$; $SE= \alpha_0 + \alpha_1 \cdot SE_{(t-1)} + \varepsilon_i$
Source: own study on the basis of Eurostat https://ec.europa.eu/Eurostat, accessed Dec. 1, 2022.

5. Discussion

SD requires diverse, integrated tasks around the world in four key areas: responsible, long-term economic growth for all nations and communities; equitable benefit sharing; protection of natural resources; and promotion of social development (Lotfi et al., 2018; Marco-Fondevila et al., 2018; Pieloch-Babiarz et al., 2021). Only such an approach allows for long-term planning while taking into consideration the economic aspects and the rational use of environmental resources on a local and global scale in an ethical and responsible manner (Hockerts, Wüstenhagen, 2010; Tur-Porcar et al., 2018). The development of SE is favored by three main factors: compressing ecological standards; the rapid development of markets for ecological goods and services; and increasing consumer interest in acquiring ecological products (Shepherd, Patzelt, 2011; Kraus et al., 2018; Johnson, Hörisch, 2021).

The present study supplements the literature on creating an SE indicator and determining the impact of external factors on its level (Bae, Smardon, 2011; Roomi et al., 2021; Soleymani et al., 2021; Gu et al., 2022; Gu, Wang, 2022).

It confirms that constructing an SE indicator requires an original approach and research methodology (Azapagic, Perdan, 2000; Roomi et al., 2021). The need to access all the relevant data on economic activity focused on social and ecological responsibility requires that the phenomenon be simplified.

The results also confirm that SE is becoming increasingly important (Kraus et al., 2018; Diepolder et al., 2021; Aliabadi et al., 2022). Moreover, it was found that the value of the SE indicators in the 5CEECs show an additive trend, which should be assessed positively.

The impact of various external factors on the SE indicator is statistically significant, which shows that the selected indicators are important (Stavytskyy et al., 2018; Fragoso et al., 2020; Méndez-Picazo et al., 2021; Sendra-Pons et al., 2022). Furthermore, their impact varies across countries, which means that decisions on sustainable initiatives should be made with regard to the internal conditions of individual countries.

The results of the present study indicate that the EU and member state authorities and institutions charged with supporting business activity should create conditions conducive to SE and promote it over less responsible business practices. Moreover, creating a framework for sustainable economic activity should include macroeconomic and financial factors (credits and loans for sustainable business). It is also necessary to undertake initiatives to increase environmental and social awareness. The 5CEECs require a coordinated system of motivation and knowledge and informational support for entrepreneurs interested in acting within the SD framework.

The analysis confirms the main research hypothesis: the strength and direction of the impact of individual variables on SE vary in the 5CEECs. This is consistent with other studies that note that these countries have different structures and capabilities, different social and environmental awareness, and different consumer attitudes to SD.

An examination of the SE trend line justifies accepting the first sub-hypothesis H1. This is a positive phenomenon indicating that entrepreneurs in the 5CEECs are beginning to see SE as an opportunity to reap new profits and enter new markets.

The second sub-hypothesis (H2) cannot be accepted, although it is worth noting that macroeconomic stabilization affects SE in Hungary, Poland and Romania. FinA influences SE in Bulgaria, Croatia and Poland. ExpENV affects SE in Bulgaria, Poland and Romania.

KR affects SE in Croatia, Hungary and Romania, CE affects SE in Poland and Romania, and LR affects SE in Hungary, Poland and Romania. The results reveal that there is considerable variation in the impact of individual variables. The impossibility of determining which factor has the highest statistically significant impact on SE is another argument in favor of introducing a more coordinated policy towards entrepreneurs in the 5CEECs.

The third sub-hypothesis (H3) can be accepted as well. The OLS estimation indicates that the FSE indicator has a statistically significant impact on SE in all the 5CEECs. Government authorities would therefore be well advised to use the mechanisms at their disposal to stimulate SE.

The fourth sub-hypothesis (H4) should be accepted insofar as it applies to first-order autoregression in SE in Bulgaria, Croatia, Hungary and Romania. SE is gradually gaining traction, and decisions to create new businesses are often influenced by the experience of other entrepreneurs.

This study has significant limitations, and the results are influenced by the method of determining the SE indicator, the method of normalizing the variables, and the choice of estimation methods.

The authors would like to assess the impact of internal factors and other external factors on SE as a future research project. Other areas for future research would be to analyze the situation in other EU countries, and to conduct a comparative analysis of the level of sustainable, green, and social entrepreneurship in selected countries.

6. Conclusions

SE is the undertaking of business activities in pursuit of economic, social and environmental goals. It is determined by several internal and external factors, the correct separation of which allows for a more coordinated policy to promote it.

SE is developing in the 5CEECs analyzed here, and it is worth mentioning that SE-ENV is its essential pillar. The dynamics are positive, although it should be noted that they vary considerably. Analyzing the factors that influence SE makes it possible to assess how it is affected by macroeconomic stabilization, access to finance, knowledge creation, entrepreneurial capabilities, legal regulations, and the environmental index.

However, in Bulgaria and Croatia, the driving factor of SE is FinA. This state of affairs may have arisen because the enterprise sector is more heavily dependent on external financing than macroeconomic conditions. On the other hand, the driving factor is MSP in Hungary, Poland, and Romania. Entrepreneurs analyze macroeconomic conditions and their impact on business development prospects.

The results allow for the formulation of several important theoretical and empirical implications. This study supplements the literature with a review of the definition of SE, the development of an indicator for measuring SE, and an indication of the factors that influence its development in selected CEECs. Potential future SE research directions are also suggested.

The present study has practical implications related to the increasing support for SE at the state, macroeconomic and microeconomic levels, the increasing availability of credit and loans for green activities, and the implementation of new legal regulations supporting green entrepreneurship. It is also important to apprise entrepreneurs (Hägg, Kurczewska, 2021) of the opportunities offered by SD, and to focus on new strategic solutions/factors that foster the development of green and social initiatives.

This paper is an important supplement to the current research on sustainable entrepreneurship. It fills a gap in the literature and is part of the authors' research devoted to the factors that influence SE. The factors considered here are theoretically and practically important in running a business. They can be an inspiration and a source of academic debate. The authors would like to focus on all EU countries in their further research.

Every attempt was made to separate the internal factors (assets, financial situation, ecological orientation of entrepreneurs, resources) that affect SE. Preliminary econometric models prove that the impact of exogenous and endogenous factors

varies in individual EU countries. Moreover, macroeconomic factors are crucial in larger economies, whereas the financial situation of enterprises and the availability of external sources of financing are decisive in smaller economies.

Preparing an SE indicator for listed companies based on their sustainable development also seems promising. The authors intend to create ADL models companies listed on the Warsaw Stock Exchange.

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