

Article

Comparative Analysis of Business Environment Dynamics in Central and Eastern Europe: A Multi-Criteria Approach

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Abstract: The COVID-19 pandemic has negatively impacted the world economy and global society. However, small- and medium-sized enterprises are among the most vulnerable and affected groups of businesses, and in some cases, life-saving interventions have resulted in serious existential implications. The difficulties of insufficient demand, non-negligible fixed costs, and inadequate financing are unsustainable for many firms. Thus, the main aim of this study is to evaluate the variables influencing business activities, apply macroeconomic variables to compare the business environments in fifteen European countries, and utilize appropriate statistical techniques to confirm the results. Significant differences exist in the business climate across selected European countries, as identified by the TOPSIS method, CPI, and GCI. Low levels of corruption, strong economic stability, and high competitiveness make countries like Germany and Austria attractive for business environments. Estonia is also a leader in technological innovation and low corruption. Conversely, Bulgaria and Romania are struggling with higher levels of corruption and reduced competitiveness, potentially impeding business endeavours. The Visegrad Group countries are in the middle of the spectrum, scoring average to good but with opportunities for improvement in corruption and innovation. Overall, the business climate in these countries is diverse, reflecting their unique economic, political, and social circumstances.

Keywords: COVID-19 pandemic; business environment; Central and Eastern Europe; TOPSIS method; CPI; GCI



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1. Introduction

Despite economists' long-term efforts worldwide to forecast the most accurate economic development, crises usually come quite unexpectedly. This is especially true when their cause is anything other than a financial event, as is the case here. The COVID-19 pandemic, which broke out at the turn of 2019 and 2020, affected the lives of everyone in society, paralyzed the whole world, and, for a time, completely shocked the world's most advanced economies, including people, industry, manufacturing, services, social life and culture, and the economy, not to mention international trade. The associated effects of the ongoing pandemic can be considered unprecedented, especially since firms have faced entirely new and hitherto unknown challenges. Moreover, the measures taken to limit the spread of the virus have, according to Michulek et al. (2024), affected the whole concept of globalization, which has been a global objective for at least the last decade. The current economic recession caused by the COVID-19 pandemic has also hit small-, medium-sized, and large enterprises harder than the 2009 crisis (Makni 2023). As a result of the various measures taken to prevent the spread of the disease, many enterprises had to limit or completely halt their business activities (Bugaj et al. 2023), which caused considerable problems for the economies of the countries concerned (Ghomi et al. 2020). No world economy or global society escaped the adverse effects of the pandemic. However, small- and medium-sized enterprises are among the most vulnerable and affected groups of businesses, and in some cases, life-saving measures have had an existential impact. Insufficient

demand, low liquidity, and non-negligible fixed costs are burdens that are intolerable for many such businesses. The COVID-19 pandemic significantly challenged the business climate, affecting economies in unprecedented ways. The importance of long-duration crisis events for certain macroeconomic variables, like GDP, inflation, unemployment, and foreign direct investment, in different regions and industries has not yet been fully explored. The pandemic affected these dynamically, with various sectors, geographical regions, and economies responding differently. While studies already exist on how the pandemic has affected certain aspects of an economy, there still exist gaps in understanding how the pandemic has affected macroeconomic factors and their subsequent effect on the business environment. Given the complexity of macroeconomic factors, their dynamic development during the COVID-19 pandemic, and regional specificities, it is necessary to *assess the impact of key macroeconomic indicators on the business environment of selected European countries and, as a consequence of the COVID-19 pandemic, have influenced these indicators and the quality of the business environment.*

Therefore, the main aim of this study is to evaluate the variables impacting business activities, to compare the business environments across fifteen European countries using macroeconomic variables, and to verify the results using appropriate statistical techniques. Focusing on macroeconomic indicators quantified for the period 2020–2023 is necessary to evaluate the development of the business environment in the chosen European countries over a 4-year horizon by analysing the fundamental macroeconomic parameters: gross domestic product, foreign direct investment, inflation, unemployment, export, and import. Fifteen European countries, the majority of which are categorized as Central and Eastern European based on geographic and cultural traits, were subjected to a comparative analysis of their economic environments. These nations, which belonged to the Eastern Bloc in the past, are currently EU members. The nations of the Visegrad Group (Slovakia, the Czech Republic, Poland, and Hungary) and the Soviet-influenced Eastern Bloc (Bulgaria, Romania, Slovenia, and Croatia) underwent comparable changes in their economic systems, and the evolution of their national economies was shaped by comparable historical conditions. The Baltic countries (Estonia, Latvia, and Lithuania) are a community of states with comparable economic climates, and their cooperative behaviour is similar to that of the Visegrad Group. Nevertheless, because of their level of economic progress, these nations are known for having high-income economies. During the 2004 accession of the Czech Republic, Poland, Lithuania, Latvia, Estonia, Slovakia, Slovenia, and Hungary to the European Union (EU) structures (Bulgaria and Romania in 2007 and Croatia in 2013), the countries of Central and Eastern Europe viewed sustainable development as an ambitious challenge for their development (Michalkova et al. 2024; Varbanova et al. 2023). Due to their potential to provide new perspectives and suggestions for improving the circumstances in other countries based on their economic performance and business attractiveness, Germany, Italy, France, and Austria, which are important trading partners of Central and Eastern European nations and are recognized for having a pro-business environment, were also included (Coleman and Cuestas 2024; Mititean and Sarma 2023). To identify shared perspectives on current topics, including foreign policy, economics, regional development, and cultural cooperation, this grouping opens up the possibility for more robust coordination and consultation mechanisms. The results compare conditions between nations during each analysis period, and the most favourable business environment can be identified. The relationship between the global multi-criteria indices, the Corruption Perception Index (CPI), the Global Competitiveness Index (GCI), and c_i is also tested to confirm the multi-criteria decision analysis (TOPSIS) method's results. Subsequently, the differences in multi-criteria index levels between the countries were determined using Tukey's HSD, which was computed to identify homogeneous subsets of the countries, sections containing economies with similar business environments within the subsets, and those with different business conditions between the subsets, and to ascertain the statistically significant differences between the countries.

This study is divided into the following sections. The most recent and relevant research in the field is included in the Literature Review, which also provides the theoretical background. The Methodology section explains the use of the TOPSIS method for evaluating the business environment in selected European countries, analysing selected macroeconomic indicators for the period 2020–2023, and using not only correlation analysis but also one-way analysis of variance and Tukey's HSD test to identify statistically significant differences between countries. The results of the analyses are presented in the Results and Discussion section, along with statistical verification. These findings are discussed and compared to other international studies. The most important findings are highlighted in the Conclusion section, as well as their limitations and further research challenges.

2. Literature Review

The business environment, which is the primary factor influencing how individual firms operate in the market, is typically defined as a set of factors that lead to the formation and development of business units as well as the ongoing expansion of national economies (Cajka 2022). Vasanicova et al. (2021) defined the business environment as a combination of all the factors that influence and affect the field of business. Kroslovakova et al. (2021) described it as a set of conditions that facilitate or hinder the establishment and growth of enterprises. The external factors that exist outside of firms and sectors and have an impact on their business activities are included in the business environment, according to Barkociova et al. (2023). Valaskova and Nagy (2023) refer, in their study, to the business environment as a comprehensive set of conditions, whether economic, social, political, or institutional, that create a climate in which commercial operations are carried out.

Over time, the business environment plays a key role in supporting the market economy. Consequently, it is the responsibility of the state to provide assistance to this environment and to create favourable conditions for economic development. According to Hudakova et al. (2023), the state should aim to reduce the administrative barriers that may hinder entrepreneurs and their efforts. The quality of the business environment is shaped not only by historical and socio-psychological attributes but also by factors such as the level of science and technology, as well as the quality of human resources (Starecek et al. 2021). According to Belanova et al. (2023), the business environment encompasses those internal and external factors that impact business, as it defines the quality of business conditions for the economy. If the business environment is good, this can lead to an improvement in global competitiveness (Dvorsky et al. 2021). Teixeira et al. (2024) consider the quality of the business environment to be the primary factor influencing the country's long-term economic competitiveness. However, definitions of national competitiveness vary, incorporating a wide range of entry factors, but they define competitiveness in the context of the ability to assert oneself in the international market and the global economy, with the primary objective of raising the standard of living of the population. It should be stressed that it is the state that plays an important role in changes to national competitiveness, given that it can influence it by monitoring macroeconomic indicators.

One of the most important macroeconomic aggregates that gauges the added value generated in a country during a period is the gross domestic product. Macroeconomic uncertainty in the contemporary world, including uncertainty caused by the COVID-19 pandemic and the conflict in Ukraine, makes GDP monitoring a crucial goal in the development of public policy (Alghamdi et al. 2024). Monitoring the year-on-year change in GDP during the pandemic in 2020 was critical for all European countries, as between April and June, the peak of the first national lockdown, the countries' GDP declined significantly (Pinilla et al. 2021; Svabova et al. 2022). Abbass et al. (2022) concluded that the pandemic had the greatest impact on sectors that are dependent on physical interaction, such as the tourism and catering sector, transport, or wholesale and retail trade, but, according to Wysokinska (2023), recorded the smallest decline, and these sectors also recovered most rapidly. Demiraj et al. (2022) indicated in their study that the high degree of openness of the economy and the high level of specialization in the car industry in the Visegrad Group

countries exacerbated the fall in GDP. The automotive industry in Romania faced significant challenges due to measures that decreased car demand, leading many companies to halt production (Velica et al. 2022). Bulgaria, with its lower dependence on car manufacturing, fared better during the first wave (Coker-Farrell et al. 2021). In the third quarter of 2020, there was a strong recovery in European economies as retail turnover, industry, and exports bounced back from the spring downturns (Di Bartolomeo et al. 2022).

Foreign direct investment is frequently susceptible to economic shocks and other crises (Hvolkova et al. 2023). Previous research has revealed the negative consequences of financial crises (Sukhadolets et al. 2021; Silva et al. 2021; Saleh 2023; Nica et al. 2023) and natural disaster-related events (Liang et al. 2023) on FDI. Only a few studies have been conducted on how COVID-19 has impacted FDI. Using weekly data, Hejazi and Tang (2021) investigated the influence of lockdown policies on FDI inflows into Canada and discovered that COVID-19 had a detrimental effect on FDI flows, particularly from North and South American countries. According to Veljanoska and Mazahrih (2023), the overall FDI inflows were adversely affected by COVID-19 case counts. Additionally, they demonstrate that North and South America, followed by Europe, experienced the most severe impacts of COVID-19 on FDI. Recently, major challenges have been disrupting global FDI flows. FDI dynamics were already weakening globally before the COVID-19 pandemic, with a steady drop in aggregate FDI flows from 2015 to 2018 and just a slight increase of around 3% from 2018 to 2019 (Iqbal 2024). Compared to the same period in 2019, FDI inflows to Central, East, and Southeast Europe decreased by 58% in the first half of 2020. FDI declined less than in developed countries but not as much as worldwide. The countries of Central, East, and Southeast Europe were impacted differently. According to Grieveson et al. (2021), the decline in FDI exceeded 35% in these regions and 8% in the Western Balkans. Meanwhile, Al-Kasasbeh et al. (2022) concluded that Russia saw a decrease in FDI inflows in the first half of 2020 after experiencing abnormally high levels the previous year. In Central and Eastern European nations, as part of an economic slowdown, FDI decreased by 17% in 2019, reaching a level lower than any of the previous three years, ending a three-year growth period for these countries. While foreign investment inflows to Romania stagnated at a reasonably high level (Goschin et al. 2021), the primary targets of FDI in the region, notably Poland, the Czech Republic, and Hungary, received less FDI than they had a year earlier (Chetverikova 2022). Countries with higher rates of economic development compared to the previous year, such as Slovakia (Lomachynska et al. 2020), Estonia, and Lithuania (Cieslik and Gurshev 2023), experienced an increase in foreign investments. In Poland and Hungary, manufacturing received a high and rising share of FDI, but the percentage decreased in other countries (Chetverikova 2022). Although services with low capital intensity are not included in the FDI data, the interest of investor interest has been shifting towards these sectors. According to Milovanovic et al. (2024), financial crises cause investors to have limited cash, whereas natural hazards destroy physical infrastructure such as roads and industrial parks. One of the most notable aspects of the COVID-19 pandemic, in contrast to these shocks, was the enforced adoption of infection control strategies such as lockdowns and social distancing. These measures increase the cost of pre-investment research, labour and site costs, and ongoing FDI expenses.

For governing bodies across the world, the impact of the COVID-19 pandemic on unemployment has been substantial. Policymakers and citizens were highly concerned about unemployment's steady rise during the pandemic, fearing that the combination of the pandemic's impact on recent labour market developments would increase job insecurity. Job insecurity is defined as a perceived threat to job continuity and stability that reduces an individual's quality of life (Ibanescu et al. 2023). Unemployment in the EU mainly increased as a result of the lockdowns implemented (Pedauga et al. 2022), forcing businesses to limit operations (Eric et al. 2021) or introduce layoffs (Svabova et al. 2021). According to Gavriluta et al. (2022), the impact of the COVID-19 pandemic on unemployment varied by sector, since the transport sector (Konecny et al. 2021), industry (Schmitt 2024), tourism (Drammeh 2024), entertainment and recreation (O'Keeffe and Papadopoulos 2021) suf-

fered significantly more than the health sector (Beller et al. 2023) or wholesale and retail trade (Gupta et al. 2023). Both developed and developing countries continue to experience high unemployment, which weakens their overall financial and economic stability. Unemployment rate forecasting has gained the attention of many researchers in recent years (Svabova and Gabrikova 2021; Almeahmadi 2021; Shi et al. 2022). Ahmad et al. (2023) aimed to research the influence of COVID-19 on unemployment rates. For policymakers, forecasting the unemployment rate accurately is essential since it is crucial to national financial planning and development. According to their results, the pandemic will cause unemployment rates to rise in the upcoming years, with a recovery period of at least five years. Similar conclusions were reached in studies by Adib et al. (2021) and Zhang and Yang (2024).

Another important macroeconomic indicator is inflation, which was also negatively affected by the COVID-19 pandemic. A study conducted by Tudorache and Nicolescu (2022) demonstrated that the COVID-19 pandemic had a significant influence on inflation growth in all European economies. It appeared that the pandemic had a significant impact on inflation, as evidenced by the evolution of the indicator, showing increases in all countries, and by how closely it correlated with the number of COVID-19 cases in Western European countries. In comparison, Central and Eastern European countries experienced higher inflation due to the pandemic. The governments of Southern Europe responded with significant fiscal policies that compare favourably with those of neighbouring regions and with responses to previous crises. According to Moreira et al. (2024), they characterized and classified the social policy responses and measures adopted in countries, like Greece, Italy, Portugal, and Spain, in response to rising inflation. Additionally, Miron and Panescu (2023) and Usman (2023) examined the impact of the nominal effective exchange rate and related correlations that influence inflation in the non-Euro areas of Central and Eastern European countries. However, a study by Necula et al. (2022) focused on the pass-through of external shocks, mostly from the US and the Euro area, to the CEE region, using a GVAR model to compare the results for these nations with developed economies. Generally, Pappa et al. (2023) and Baba et al. (2024) noticed that since the outbreak of the pandemic, inflation in Europe has been increasingly backward-looking and sensitive to shocks in commodity prices.

International trade was no exception, and the pandemic had significant effects, especially in 2020, a year marked by historic shifts, with a lasting impact, despite the sharp recovery in global trade in 2021. Although trade flows have since returned to pre-pandemic levels, the trade effects continue to vary across different goods, services, and business partners (Crozet et al. 2022). As the burden of the pandemic increased in the exporting countries, production volumes declined, which, according to Halmai (2022), led to a reduction in export supply. As the two main pillars of EU economic integration, Ambroziak (2021) examined international trade and the free movement of goods within the EU, concluding that, while EU legislation was not initially designed for a pandemic, it provided effective responses in international trade (including intra-EU trade) and product placement. Various empirical analyses, global data, and statistics show that the impact of the pandemic is heterogeneous across different sectors (Tan et al. 2022) and that its scope differs by country (Orlando et al. 2022). International trade faced significant disruptions during the early pandemic months, but exports and imports resumed soon afterward (Nacewska-Twardowska 2022), and commodity prices stabilized (Halmai 2022). Notably, international trade issues were partly linked to globalization and the dependence on imports of key commodities (Kral and Janoskova 2023; Antonietti et al. 2023). One month after the outbreak and official declaration of the pandemic, in April 2020, EU imports and exports fell sharply, with imports down by -28% and exports by -31% (Cengiz and Manga 2022). Similarly, the USA saw a decrease in imports of -25% and exports of -29% (Zhou et al. 2022). China, however, fared relatively better, with imports decreasing by -14% but exports increasing by 3% (Wang and Mo 2022). Jindrichovska and Ugurlu (2021) note that the largest import and export gap appeared in the second quarter

of 2020, but despite this sharp decline, the situation improved rapidly, and global trade levels have now surpassed those before the pandemic.

Generally, the COVID-19 pandemic significantly impacted world economies, but opinions vary among authors on its effects, as it has caused a global recession. Many authors (Bei and Wang 2023; Uminski et al. 2023; Cramarenco et al. 2023) report that the pandemic triggered a global economic downturn, with businesses closing, disrupted supply chains, and rising unemployment. The IMF forecasted a global economic contraction in 2020, with advanced economies experiencing notable contraction (Desalegn et al. 2022). Raptou et al. (2022) highlight that the COVID-19 pandemic exacerbated pre-existing economic inequalities, disproportionately affecting low-income workers and small businesses, which were hardest hit by the economic downturn. According to Choi et al. (2022), the pandemic further exposed and worsened inequalities in the global economy, suggesting that governments should prioritize policies to promote and strengthen economic and social cohesion, such as increased investments in healthcare, education, and infrastructure. Ettman et al. (2020) stressed the impact of the pandemic on the global debt crisis, while Federspiel et al. (2022) noted that government and business borrowing to finance pandemic-related costs would lead to a sharp increase in the debt level, potentially posing a long-term risk for economic growth and financial stability (Ciocirlan et al. 2023). Bieber (2022) noted that the pandemic has accelerated existing trends toward deglobalization and protectionism, with countries tending to adopt more nationalist economic policies in response to the pandemic, which may hurt global trade and investment. However, opinions among authors on the effects of the pandemic on the global economy remain diverse, as many analyses confirm that it further exposed and deepened existing inequalities and vulnerabilities within the global economic system.

3. Methodology

The comparative analysis of the business environment includes fifteen European countries, most of which are classified as Central and Eastern European based on both geographic and cultural characteristics (Radulescu et al. 2018). These countries, formerly part of the Eastern Bloc, are members of the European Union. The countries of the Soviet-influenced Eastern Bloc (Bulgaria, Romania, Slovenia, and Croatia) and the Visegrad Group (Slovakia, the Czech Republic, Poland, and Hungary) underwent comparable economic system transitions, with the development of their respective national economies shaped by similar historical circumstances. The Baltic countries (Estonia, Latvia, and Lithuania) form a community of nations with a similar economic climate, and their cooperative behaviour is similar to that of the Visegrad Group. Nonetheless, these countries are classified as high-income economies due to their economic development. In 2004, the Central and Eastern European countries viewed sustainable development as an ambitious objective, coinciding with the accession of the Czech Republic, Poland, Lithuania, Latvia, Estonia, Slovakia, Slovenia, and Hungary to the EU structures (Bulgaria and Romania joined in 2007 and Croatia in 2013) (Rusu and Roman 2018). Germany, Italy, France, and Austria, significant trading partners of Central and Eastern European countries and economies with pro-business environments, were also included, as they may offer new perspectives and suggestions for improving conditions in other nations based on their economic performance and business attractiveness (Kowalska and Misztal 2023). These nations were chosen for their similar geographic, historical, and economic characteristics, which make them highly relevant to the study of business environments. Most of the chosen countries were part of the Soviet-influenced Eastern Bloc, undergoing significant changes after communism fell and sharing the evolution from state-controlled to market economies, creating a favourable basis for comparison. Their accession to the European Union between 2004 and 2013 is another aspect that enables us to explain their level of development and access to international markets. The inclusion of Western European countries, namely Germany, Italy, France, and Austria, in the sample as the rest of Central and Eastern Europe reflects the significance of these countries as major trading partners with the selected regions,

as well as their favourable attributes, which serve as a benchmark for economic growth. Therefore, this combination of economies in transition and developed economies provides an opportunity to thoroughly compare and contrast how business environments are affected by history, location, and development.

Key macroeconomic variables, including gross domestic product (GDP), foreign direct investment (FDI), inflation (I), unemployment (U), export (EX), and import (IM), were quantified for the period 2020–2023 to evaluate the development of the business environment within individual countries. These macroeconomic factors influence the business environment by affecting economic stability, the need for goods and related services, and the investment climate. High levels of GDP combined with low unemployment reflect a healthy economy and uplift the spending power of citizens within the country, encouraging business development. Foreign direct investment delivers both financial and technical expertise, while inflation and unemployment influence the cost and overall demand levels. International trade increases economic output and competitive advantage, although an increasing reliance on imports could weaken the economy. Thus, it is reasonable to argue that all of these aspects are highly interconnected, collectively contributing to an attractive business environment. The 4-year average values for each nation are presented in Table 1.

Table 1. Four-year average values of analyzed indicators.

	GDP					FDI				
	AT	BG	HR	CZ	EE	AT	BG	HR	CZ	EE
avg.	427,649.0	78,104.1	63,364.8	259,062.7	33,073.1	9556.5	1576.9	583.0	134,420.0	2384.7
st. dev.	37,187.7	12,569.9	9768.3	34,637.5	4041.9	8976.2	503.3	572.9	81,579.7	1940.8
min.	380,888.5	61,607.7	50,543.1	215,805.4	27,430.0	1452.0	773.1	−242.0	44,177.0	315.0
max.	477,248.8	93,948.0	76,471.7	305,966.5	37,682.4	24,659.0	2019.0	1261.0	251,539.0	5560.9
med.	426,229.5	78,430.4	63,222.3	257,239.4	33,590.0	6057.5	1757.8	656.5	120,982.0	1831.4
	FR	DE	HU	IT	LV	FR	DE	HU	IT	LV
avg.	2,565,535.5	3,754,787.5	164,271.4	1,878,859.7	35,669.1	66,797.7	139,638.2	6,998,620.2	29,026.0	802.0
st. dev.	178,343.9	269,824.6	21,542.39	156,343.8	4136.1	36,185.0	41,268.2	29,079,605.4	17,200.1	946.0
min.	2,317,832.0	3,403,730.0	137,866.0	1,661,239.8	30,109.5	24,724.0	74,679.0	−27,391,041	4464.0	−105.0
max.	2,803,100.0	4,121,160.0	196,391.4	2,085,375.6	40,348.0	111,732.0	180,851.0	52,241,870.0	45,989.0	2338.0
med.	2,570,605.0	3,747,130.0	161,414.1	1,884,411.8	36,109.4	65,367.5	151,511.5	1,574,826.0	32,825.5	487.5
	LT	PL	RO	SK	SI	LT	PL	RO	SK	SI
avg.	61,434.1	626,981.2	268,140.2	106,539.4	54,862.7	1448.2	39,564.2	5611.7	906.7	862.1
st. dev.	8734.1	84,884.4	40,232.9	11,016.3	5920.4	1644.4	13,058.0	3458.8	773.7	345.0
min.	49,873.2	526,147.2	220,486.6	93,444.1	47,044.9	−1072.1	18,376.0	558.0	−387.2	536.2
max.	71,986.2	750,800.7	324,578.2	122,812.8	63,089.6	3437.9	50,596.0	10,307.0	1528.1	1442.0
med.	61,938.6	615,488.5	263,748.0	104,950.4	54,658.2	1713.5	44,642.5	5791.0	1242.9	735.2
	I					U				
	AT	BG	HR	CZ	EE	AT	BG	HR	CZ	EE
avg.	5.68	4.43	4.95	5.85	3.25	6.35	6.08	6.78	4.68	6.70
st. dev.	3.77	2.56	3.73	3.57	3.91	1.09	1.59	0.78	3.48	0.43
min.	1.40	1.70	0.00	3.30	−0.60	5.10	4.30	5.90	2.60	6.20
max.	10.80	8.60	8.70	12.00	9.10	8.10	8.60	7.60	10.70	7.30
med.	5.25	3.70	5.55	4.05	2.25	6.10	5.70	6.80	2.70	6.65
	FR	DE	HU	IT	LV	FR	DE	HU	IT	LV
avg.	5.45	5.08	7.43	4.60	3.65	7.20	5.08	5.40	7.83	7.05
st. dev.	5.01	3.80	5.57	4.13	3.34	0.96	2.74	2.25	1.88	0.84
min.	0.50	0.40	3.40	−0.10	0.10	5.60	3.10	4.10	4.80	6.00
max.	13.50	10.70	17.00	10.70	9.10	8.00	9.80	9.30	9.50	8.10
med.	3.90	4.60	4.65	3.90	2.70	7.60	3.70	4.10	8.50	7.05

Table 1. Cont.

	I					U				
	LT	PL	RO	SK	SI	LT	PL	RO	SK	SI
avg.	3.73	6.50	5.88	5.78	4.75	7.35	4.85	6.15	6.53	5.60
st. dev.	3.27	2.69	2.87	3.63	4.11	0.67	2.98	0.69	0.42	1.97
min.	0.50	3.70	2.30	2.00	−0.30	6.90	2.80	5.60	5.80	3.70
max.	8.70	10.90	9.70	11.00	10.10	8.50	10.00	7.30	6.80	8.90
med.	2.85	5.70	5.75	5.05	4.60	7.00	3.30	5.85	6.75	4.90
	EX					IM				
	AT	BG	HR	CZ	EE	AT	BG	HR	CZ	EE
avg.	57.30	61.70	51.08	72.78	78.43	68.83	70.28	67.15	75.40	79.95
st. dev.	3.94	4.43	6.52	2.38	5.98	27.19	22.73	25.92	15.36	7.57
min.	51.60	56.10	41.40	69.90	69.20	48.10	54.20	48.40	63.20	69.80
max.	62.10	68.50	59.20	76.50	85.80	115.60	109.50	111.80	101.70	90.90
med.	57.75	61.10	51.85	72.35	79.35	55.80	58.70	54.20	68.35	79.55
	FR	DE	HU	IT	LV	FR	DE	HU	IT	LV
avg.	31.18	47.20	82.75	33.30	65.38	58.73	62.70	78.60	57.10	73.93
st. dev.	2.79	2.62	4.96	2.77	4.09	46.16	37.87	2.27	47.43	15.83
min.	27.30	43.50	78.70	29.40	60.80	29.50	37.70	76.10	25.80	59.40
max.	34.70	50.90	91.20	36.60	72.00	138.60	128.20	81.70	139.10	100.70
med.	31.35	47.20	80.55	33.60	64.35	33.40	42.45	78.30	31.75	67.80
	LT	PL	RO	SK	SI	LT	PL	RO	SK	SI
avg.	79.63	57.80	39.90	92.00	84.88	75.60	67.35	64.70	84.50	77.28
st. dev.	4.89	3.43	2.22	5.07	5.86	8.68	28.20	36.24	7.69	5.84
min.	73.10	53.00	36.90	85.10	77.80	63.80	47.30	41.20	72.40	68.80
max.	86.80	62.70	43.00	99.40	94.10	88.30	116.00	127.40	92.10	85.30
med.	79.30	57.75	39.85	91.75	83.80	75.15	53.05	45.10	86.75	77.50

Note: AT Austria, BG Bulgaria, HR Croatia, CZ Czech Republic, EE Estonia, FR France, DE Germany, HU Hungary, IT Italy, LV Latvia, LT Lithuania, PL Poland, RO Romania, SK Slovakia, SI Slovenia. Source: own processing according to <https://ec.europa.eu/eurostat/data/database> (accessed on 30 May 2024).

The COVID-19 pandemic was a significant challenge that each country faced during the analysed period, and it influenced overall economic and political conditions (Tkacova and Gavurova 2023). Therefore, it is undeniable that the economies within Central and Eastern Europe are varied in their levels of development. The following methodological steps were used to conduct the comprehensive analysis.

1. Several factors were used as criteria in the multi-criteria decision analysis. One of the fundamental techniques for multi-criteria decision making is the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), which is primarily applied to solve various decision-making problems. In addition to alternatives, such as the Analytic Hierarchy Process (AHP), Analytic Network Process (ANT), or Preference Ranking Organization Method for Enrichment Evaluations (PROMETHEE), Chen (2021) argues that the TOPSIS method is among the most frequently used due to its simplicity, rationality, comprehensibility, computational efficiency, and ability to measure the relative performance for each alternative through a straightforward mathematical model. For instance, an overview of its application is provided by Tramarico et al. (2015), who observed an annual increase in research papers utilizing TOPSIS and similar approaches. Given its proven effectiveness in dealing with similar decision-making problems, the TOPSIS method was selected for this study. The fundamental principle of the TOPSIS method is to select the variant that, while remaining as distant as possible from the least suitable solution, is as close as possible to the ideal solution (representing a pro-business environment). The combination of the worst possible criteria among all the analysed variants is the least suitable solution. Depending on the criteria, maximization or minimization aspects may be applied, and minimization criteria (in this case, I, U, and IM) should be converted to maximization since maximization

criteria form the basis of the final evaluation (Rezaei 2015). The TOPSIS method was applied in the following steps.

The weights for the criteria (macroeconomic factors) were determined by calculating their relative importance using Saaty's matrix (Table 2). To confirm the validity of these weights, the consistency ratio was calculated as 0.00538. According to Li et al. (2022), a consistency ratio of less than 0.1 indicates an acceptable level of inconsistency.

Table 2. Weights of individual criteria.

Indicator	GDP	FDI	I	U	EX	IM
w_i	0.373	0.192	0.149	0.121	0.099	0.065

Source: own elaboration.

A matrix for evaluation, encompassing all examined nations and macroeconomic factors, was developed, and the points where each alternative intersected the criteria were indicated as x_{ij} . The computed weights were subsequently applied in the TOPSIS technique for each of the examined periods. By converting all criteria to maximization, normalized values $R = r_{ij}$ and weighted normalized decision matrices $W = w_{ij}$ were computed, which formed the foundation for estimating the ideal $H = (H_1, H_2, \dots, H_k)$ and the basal $D = (D_1, D_2, \dots, D_k)$ alternatives, where:

$$\begin{aligned} H_j &= \max_i w_{ij} \quad j = 1, 2, 3, \dots, k \\ D_j &= \min_i w_{ij} \quad j = 1, 2, 3, \dots, k \end{aligned} \quad (1)$$

Following that, it was determined how far the variants were from the ideal and basal alternatives:

$$\begin{aligned} d_i^+ &= \left(\sum_{j=1}^k (w_{ij} - H_j)^2 \right)^{1/2} \quad i = 1, 2, 3, \dots, p \\ d_i^- &= \left(\sum_{j=1}^k (w_{ij} - D_j)^2 \right)^{1/2} \quad i = 1, 2, 3, \dots, p \end{aligned} \quad (2)$$

The parameter c_i (0;1), which expresses the relative distance of the variants from the basal alternative and has higher values demonstrating a closer approach to the ideal solution, was computed as the last step:

$$c_i = \frac{d_i^-}{d_i^- + d_i^+} \quad (3)$$

Comparing conditions between countries during each analysed period is facilitated by the results gained from the TOPSIS method. As a result, identifying the most advantageous business climates is made feasible.

2. The global multi-criteria indices, the CPI and GCI, were also evaluated to confirm the results of the TOPSIS method. A 5% significance level was used to test the correlation between these indices and c_i . Similarity scores are based on comparing one data object with another, attribute by attribute, commonly adding the squares of the differences in magnitude for each attribute and utilizing the computation to produce a conclusion, known as the correlation score. One of the most popular correlation approaches is Pearson's correlation, which generates a score that can vary from -1 to $+1$. A high score (near $+1$) indicates that two objects are highly similar, while two uncorrelated objects would have a Pearson score that is nearly zero. Two objects that correlated negatively (i.e., one decreases

while the other rises) would have a Pearson score near -1 . The Pearson correlation for two objects with paired attributes is computed using the following formula

$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2} \sqrt{\sum_{i=1}^n (y_i - \bar{y})^2}} \quad (4)$$

and provides the product of their differences from their object means, dividing the sum by the product of the squared differences from the object means (Berman 2016).

3. To confirm the statistically significant variations in the quality of the business environment among the countries, a one-way analysis of variance (ANOVA) was used. ANOVA is a statistical method used to compare sample means, which can be compared to a t -test for more than two groups that is extended from the comparison of two independent samples. The purpose of analysing the variances is to determine whether there are any noteworthy differences between class means (Zhang et al. 2021). The following presumptions must be met to conduct an ANOVA procedure: (i) the observations are independent of one another; (ii) the observations in each group come from a normal distribution; and (iii) the population variances in each group are homogeneous (Thongmual and Nitisuk 2021).

When there is just one factor used to split the data into groups, the simplest case is a one-way ANOVA. Assume that X_{ij} , $i = 1, 2, \dots, k$ and $j = 1, 2, \dots, n_i$ are independent normal random variables with mean μ_i and constant standard deviation σ , $X_{ij} \sim N(\mu_i, \sigma)$. As an alternative, let $X_{ij} = \mu_i + \varepsilon_{ij}$, where ε_{ij} are independent random errors with a normal distribution, $\varepsilon_{ij} \sim N(0, \sigma)$. The total number of observations (the overall sample size across all groups) is denoted by $N = n_1 + n_2 + \dots + n_k$, where n_i is the sample size for the i th group (Sangthong 2020).

Let \bar{x}_i represent the mean sample, \bar{x} indicate the mean of all the data points, s_i^2 denote the sample variance, and $s^2 = MSE$ is an estimate of the variance σ^2 shared by all k populations. Guven (2022) states that the objective of an ANOVA is to compare, using variance analysis, the variation within samples and the variation between groups (levels). The total sum of squares SST , the sum of squares for errors (or within groups) SSE , and the sum of squares for treatments (or between groups) SSC should all be defined

$$\begin{aligned} SST &= \sum_{i=1}^k \sum_{j=1}^{n_i} (x_{ij} - \bar{x})^2, \\ SSE &= \sum_{i=1}^k (n_i - 1) \cdot s_i^2, \\ SSC &= \sum_{i=1}^k n_i \cdot (\bar{x}_i - \bar{x})^2, \end{aligned} \quad (5)$$

and the deviation from observation is considered to the mean of all the data points written as

$$x_{ij} - \bar{x} = (x_{ij} - \bar{x}_i) + (\bar{x}_i - \bar{x}). \quad (6)$$

Assuming the test conditions are fulfilled, the one-way ANOVA applies the following test statistic

$$F = \frac{MSC}{MSE} \quad (7)$$

where MSC indicates the mean sums of squares for treatment and MSE is the mean sums of squares for error. Fisher's distribution $F(k-1, N-k)$ is the value of this statistic under H_0 . If the test criteria are satisfied

$$F > F_{1-\alpha, k-1, N-k}, \quad (8)$$

where $F_{1-\alpha, k-1, N-k}$ represents the $(1-\alpha)$ -quantile of F -distribution with $k-1$ and $N-k$ degrees of freedom, hypothesis H_0 is rejected at significance level α (Sangthong 2020).

This study used a one-way ANOVA to verify established hypotheses and confirm the statistically significant differences in the quality of the business environment among countries:

H0: *There is no significant difference in the average values of indices measuring the business environment between the countries analysed, which suggests that the business climate in the region is homogeneous.*

H1: *The countries analysed show significant differences in the average values of indices measuring the business environment, which points to diversity in business conditions and climatic aspects within the studied group.*

4. A significant result from an ANOVA indicates that at least one group differs from the others. However, the omnibus test does not reveal a pattern of mean differences. When analysing categorical or factor data, the ANOVA is a general linear model that has been in use for over 100 years (Fisher 1919). However, an ANOVA will only generate an F-statistic (and associated p -value) for the whole model. In contrast, an ANOVA only indicates the presence of one or more significant differences between group levels, as it does not reveal the relative means of any individual group. The ANOVA is frequently followed by specific comparisons to examine the pattern of difference between means, and the most frequent comparison is between two means. Tukey devised the most often used method, known as the honestly significant difference (HSD) test, for these kinds of pairwise comparison tests, which are also known as multiple comparison techniques (Alver and Zhang 2023). Using a statistical method, the honestly significant difference between the two means is computed, which is the fundamental premise behind the HSD. The procedure provides precise information and indicates the significant difference between the means of a set of groups and the population under consideration. Control of the Type I error rate becomes a concern for researchers who require assessing more than two comparisons. While the ANOVA undoubtedly helps in the identification of significant effects, it offers challenges in controlling the type I error while dealing with numerous t -tests involving several groups (Midway et al. 2020). Tukey's HSD is the most often used procedure among several recognized techniques for comparing means between pairs or groups within a population. The significance level (alpha value) is a critical factor in multiple comparison tests, as this is abundantly evident. When realizing several pairwise comparisons, Tukey's HSD is likely the method that is most frequently used and advised for controlling the Type I error rate (Walubita et al. 2021). The HSD for each pair of means was computed using the formula for measurement or analysis

$$q = \frac{\bar{x}_i - \bar{x}_j}{\sqrt{\frac{s_w^2}{n}}} \quad (9)$$

where \bar{x}_i and \bar{x}_j are the means of the samples being compared, s_w^2 is the within group variance, and the size of the sample is n (Goeman and Solari 2022). To determine the statistically significant differences between the countries and to identify homogeneous subsets of countries, sections containing economies with similar business environments within the subsets and those with different business conditions between the subsets, Tukey's HSD was computed, to declare the differences in the level of the multi-criteria indices across the countries.

4. Results and Discussion

The relative distance of the individual variants from the basal alternative (c_i) was determined for each year using the macroeconomic variables that were chosen as input criteria for the TOPSIS method. Table 3 provides an overview of the computed values.

Table 3. Values of c_i in each analysed period across the analysed European countries.

	2020	2021	2022	2023
Austria	0.12448	0.12940	0.41627	0.41840
Bulgaria	0.08332	0.09022	0.38526	0.39114
Croatia	0.10166	0.09055	0.38495	0.38898
Czech Republic	0.10035	0.11086	0.40329	0.40634
Estonia	0.11249	0.07183	0.38011	0.38661
France	0.49466	0.50090	0.72797	0.72734
Germany	0.61814	0.61813	0.90722	0.91083
Hungary	0.39050	0.39121	0.09017	0.08683
Italy	0.38287	0.39213	0.60684	0.61162
Latvia	0.09858	0.08077	0.38007	0.38642
Lithuania	0.08427	0.06775	0.38186	0.38860
Poland	0.14834	0.15165	0.43558	0.44283
Romania	0.09196	0.09358	0.40030	0.40485
Slovak Republic	0.08195	0.09565	0.38795	0.39142
Slovenia	0.11402	0.11410	0.38738	0.39083

Source: own elaboration.

In particular, the change in macroeconomic developments of individual economies had a significant impact on the business environment during the COVID-19 pandemic. As gross domestic product, unemployment, and sovereign debt are among the most important macroeconomic indicators, their negative developments also have a significant impact on the economic situation and competitiveness of enterprises. Throughout the monitored period, the c_i values increased in almost all the analysed countries. When the national economies were released from lockdown in 2022 due to the COVID-19 pandemic, significant economic shocks that affected millions of households and disrupted business operations led to the first apparent increase. Not only will the disconnection between national economic systems and social resilience be emphasized, but there may be some beneficial effects of the pandemic in the upcoming period, such as an accelerated industrial revolution or greater digitization (Hajduova et al. 2021). While the economies of Germany, France, and Italy peaked in all monitored periods, these top-ranked countries also experienced a notable improvement in their scores during the COVID-19 pandemic. In 2022, Hungary and the Baltic countries ranked at the bottom of the table, in the order of Estonia and Latvia, and the last place is occupied by Lithuania. Comparably, Bulgaria, Croatia, Slovenia, and the Slovak Republic are placed in the second half of the rankings and below on key metrics.

Entrepreneurs in European economies noticed different changes in their financial performance as a result of the business environment in which they operated. Initially, the COVID-19 pandemic discouraged and demotivated potential entrepreneurs from establishing businesses in such dangerous circumstances. Due to temporary or permanent closure of facilities, entrepreneurs were compelled to fire or send workers on unpaid leave. Nicola et al. (2020) stated that even a slight decrease in the workforce led to significant corporate problems and reduced efficiency. During this particular period, a variety of professional and personal pressures contributed to the mental stress experienced by staff members, which had a detrimental impact on their productivity (Ozili 2021). Additionally, a significant disruption in the distribution of goods was caused by the partial or complete closure of borders, especially in countries where the incidence of cases was high. As significant cash flow problems developed, this disruption in logistical operations substantially impacted corporate turnover and liquidity. To identify how the COVID-19 pandemic affected the development of entrepreneurship, Figure 1 compares some of the most important indicators of entrepreneurship development in selected European countries during the pandemic period (2020–2021) and the period following the outbreak of the pandemic (2022–2023).

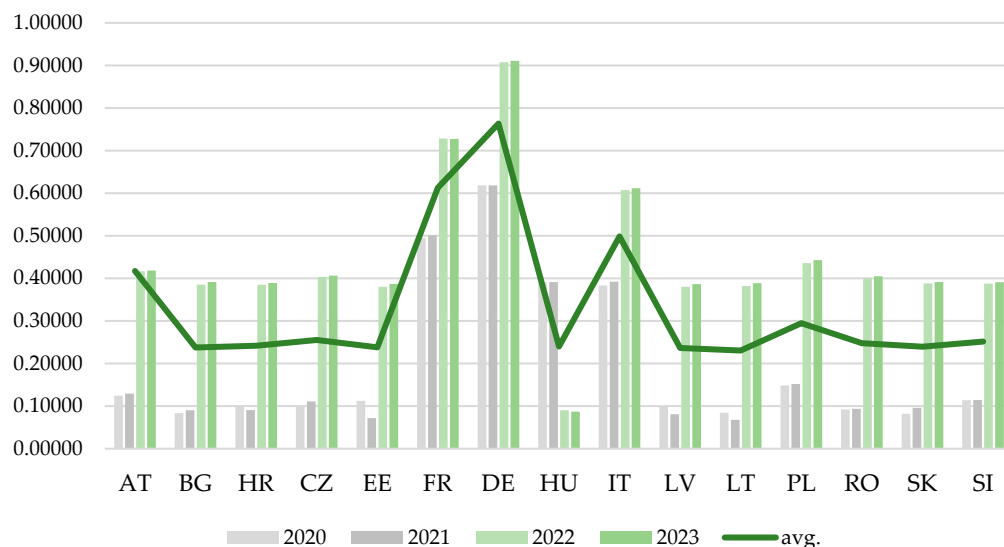


Figure 1. Development of c_i values across the analysed European countries. Source: own elaboration.

While certain countries had notable rises in their values in 2022, others experienced more steady levels, according to the data. Average values increased in 2022 but appear to have stabilized in 2023. These trends suggest that countries with highly developed social market economies maintained high values, while countries in the least developed regions still faced challenges that affected their business environment. Individual country activities originate from the development of macroeconomic indicators within economies. Macroeconomic indicators evolved differently in each nation throughout the analysed period. Selected European Union countries have been placed based on the results of the multi-criteria TOPSIS method. Germany appears to have the best business environment according to the TOPSIS method, which may be attributed to a constant reduction in regulatory burdens and the promotion of innovations that improve the competitiveness of the European Union countries. Furthermore, this national market is typically due for its Central European position, high levels of productivity, skilled labour force, high-quality engineering, and transport infrastructure (Hajduova et al. 2021). According to Valaskova et al. (2022), France is the second most pro-business country, and its high productivity levels, highly trained labour force, superior engineering, well-developed transport infrastructure, and location in the centre of Europe are typical of this national market. The business environment in France is highly competitive, and many firms are looking for experienced entrepreneurs with successful management skills (Valaskova and Nagy 2023). Generally, the business climate in France is very encouraging because companies may readily succeed in an environment with a well-developed legal framework and generous government support schemes. Sira et al. (2020) indicate that, among the countries assessed, Italy has the third position in the business environment evaluation using the TOPSIS method. According to Meyer et al. (2023), one of the most crucial factors that determine whether a business can succeed in Italy is the availability of capital, which is due to the high cost of living and a lack of funding for enterprises. Alessi et al. (2020) mentioned that the level of competition is an additional important factor. Numerous sizable, well-funded corporations exist in Italy and are prepared to outbid smaller enterprises while investing in new technology and products.

However, in addition to macroeconomic indicators (as provided in this study using the TOPSIS method), the evaluation of the business climate of each country is also conducted using indices that roughly represent the internal conditions of those countries and their economies. Thus, the findings of our study are discussed and analysed in the context of microeconomic, financial, and non-financial elements in countries that have a significant impact on the formation of a business-supporting climate. For small- and medium-sized enterprises, these attributes are essential for both starting and developing a successful

firm. Since the multi-criteria global indices (CPI and GCI) are crucial to the process of competitive, sustainable economic growth, they were additionally investigated during the given period (Podobnik et al. 2012; Vevere et al. 2017; Kalansuriya et al. 2023).

4.1. CPI

The CPI has significance because it measures corruption caused by the abuse of entrusted power for private profit. Countries are ranked on a scale from 0 (highly corrupt) to 100, and those countries with a CPI level from 50 to 100 are considered less corrupt, while those from 0 to 49 are thought to be more corrupt (Ruzekova et al. 2020). Business units consider this element when making investment decisions. Figure 2 depicts the current state of the countries that were examined.

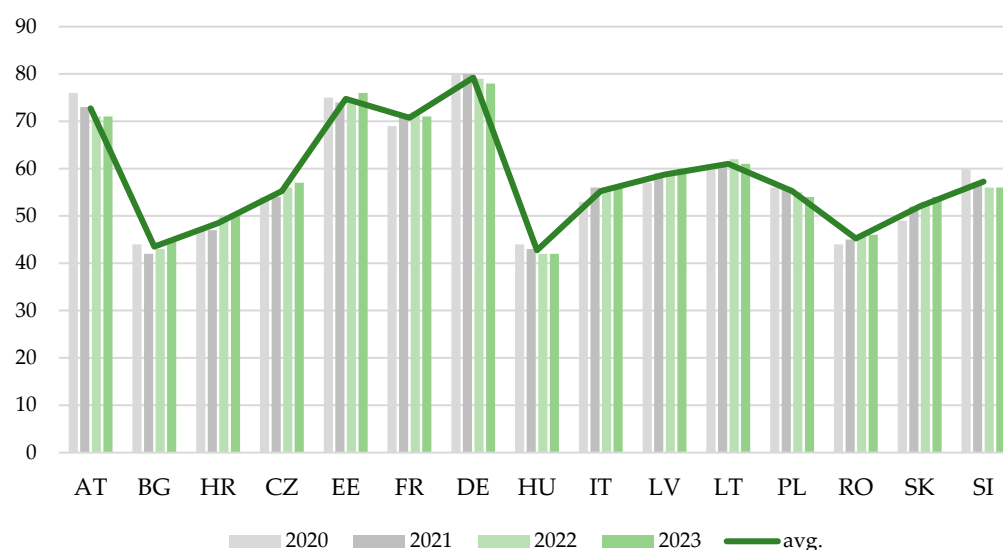


Figure 2. Development of CPI in the analysed European countries. Source: own elaboration according to the data available at <https://www.transparency.org/en/cpi/2023> (accessed on 30 May 2024).

The figure illustrates how the business climate has changed over time in different European nations, with Germany remaining at the highest level. Following the pandemic crisis, values changed slightly, indicating that countries are attempting to stabilize their economies and adapt to new challenges. The impact of the COVID-19 pandemic on the CPI in the European countries surveyed was quite significant, although it varied from country to country as it depended on several factors, including the rate of virus spread, policy measures, and the response of the economies to this unusual situation. In most countries, the worst business environment occurred during the pandemic era, and since then, the index has been trending toward the corruption environment, reaching a peak in 2023. Germany, Estonia, Austria, and France are the countries with the highest levels of the monitored index over the period, indicating the cleanest climate, while the average value of the indicator exceeds 70 points. The significant long-term economic growth in these nations is indicative of an anti-corruption climate, despite the CPI demonstrating almost stable development with just slight fluctuations (Kozlova et al. 2020). Lithuania, Latvia, Slovenia, the Czech Republic, Italy, Poland, and Slovakia, very similarly, are ranked below the average value of 60 points, which clarifies that the business environment is more corrupt. A discernible improvement is apparent during the 4-year period in the Baltic and Visegrad Group countries, reflecting a reduction in corruption problems, with Estonia and Hungary standing out in particular. Hungary and Soviet-influenced Eastern Bloc countries, namely Croatia, Romania, and Bulgaria, are ranked in the second half of the rankings and at the bottom of the table, below the average values.

Thus, it is possible to provide a clear overview of the overall comparison of the business environment, as determined by these two indicators. The CPI is less volatile in

comparison to the examination of macroeconomic indicators based on the TOPSIS method in individual years. Germany is among the top-ranked nations in the TOPSIS method, and it also has the highest number of points in the CPI. Consequently, the evaluated sample of European countries exhibited the lowest level of corruption. France was in a highly advantageous position within the TOPSIS method since it consistently placed second and was among the least corrupt nations according to the CPI. In the analysed period, Estonia had a different position in the analysis, so the corruption index for these years was always in the highest position, which indicates the cleanest business environment, but with the use of the TOPSIS method, Estonia was not in the optimal position, being on average in the 12th position. The rest of the Baltic countries similarly achieve an optimally positioned average CPI, signifying that these nations are an area characterized by a medium level of corruption. Nevertheless, Latvia and Lithuania were ranked worse when utilizing the TOPSIS method. The comparative analysis in the Visegrad Group countries indicated that Slovakia reached the 11th position, but the remaining countries in this grouping achieved a better location through the TOPSIS method than when assessing the CPI. During the analysed period, the Czech Republic was in a favourable position, while Poland and Hungary were ranked in average positions within multi-criteria decision analysis, and when considering the CPI, the ranking of the countries was not as ideal, with Hungary having the worst CPI. Soviet-influenced Eastern Bloc countries, namely Bulgaria, Croatia, Romania, and Slovenia, are ranked below average values and in the second half of the rankings within the TOPSIS method, while their CPI remains weak. The correlation coefficient, presented in Table 4, was computed to demonstrate the mutual dependence between the business environment development as determined by the TOPSIS method and the CPI, which revealed some similarities.

Table 4. Correlation between the TOPSIS and CPI.

TOPSIS-CPI	Pearson Correlation	0.643
	Sig. (2-tailed)	0.010

Source: own elaboration.

The level of perceived corruption is influenced by the macroeconomic development of a country, as indicated by the p -value (Sig.) of the Pearson correlation coefficient, which reveals a moderately positive and significant correlation between these two variables. The correlation between the CPI and the quality of the business environment may, according to Zhang et al. (2022), be blurred by the legal framework and the enforceability of law, as in countries with a higher level of corruption, there may be weaker enforceability of law, which creates uncertainty for businesses and reduces their confidence in the legal system. Chandan (2015) adds that countries with lower CPI often suffer from low transparency in public procurement and public finance reports, leading to inefficiencies and increased costs for businesses. On the contrary, high corruption is often associated with complicated bureaucracy, and Wawrosz and Lansky (2021) state that firms must face excessive regulatory obstacles to their growth and innovation. According to Mottinger (2024), countries with high levels of corruption tend to have an unsustainable macroeconomic environment, which reduces the attractiveness of foreign investment and limits business opportunities. An et al. (2024) adds that these countries often suffer from a lack of trust in institutions, which can lead to social instability, negatively affecting the business environment. For a sample of EU 28 and candidate states during 2006 and 2016, Mihaela (2018) examined the level of economic convergence within the framework of the European Union, as demonstrated by the movement of GDP, as well as the level of corruption, as evaluated by the CPI. The research findings highlight a strong causal relationship between corruption and European real convergence. However, a limitation of this study is that, while the CPI is the most effective method for measuring corruption across all sample countries, it does not measure corruption per se. Furthermore, the CPI has been found to positively affect GDP per capita in post-transition countries, as noted by Buterin et al. (2017) and

Ivanova and Masarova (2018). Many authors have established the impact of corruption on competitiveness and economic performance, as it is a key factor influencing these outcomes. Ulman (2014), Domareski-Ruiz et al. (2020), and Dumitrescu et al. (2020) revealed the influence of the CPI on the competitiveness of economies, validating its function through regression analysis. The impact of the business environment, which is represented by the quality of governmental and regulatory measures as well as the CPI, was determined and classified by Ruzekova et al. (2020) using econometric equations. Conversely, Soukupova (2016) concluded that it is impossible to conclusively prove a causal relationship between the level of corruption and competitiveness because the CPI only provides statistical relationships and intercomparisons, failing to demonstrate a direct cause-and-effect relationship. As a result, the results of CPI can be interpreted in a variety of ways and cannot give a comprehensive view of corruption or competitiveness issues in particular nations.

For countries facing challenges with competitiveness, focusing on measures that promote innovation, lower regulations, and increase labour market flexibility is crucial. Policymakers should prioritize lowering the major challenges to conducting business in a regulated environment, reducing the tax systems, and fostering an environment that encourages entrepreneurship. Enhancing education and skills, particularly in digitalization or technology, can boost workforce resilience to today's economic fluctuations and enhance productivity. Furthermore, the expansion of corporate financing and the growth of selected R&D will contribute to higher levels of competitiveness. The economic potential and global integration of these countries may also be greatly enhanced by enhanced infrastructure, regional trade partnerships, and international trade agreements.

4.2. GCI

In contrast to the CPI, the GCI focuses on assessing the global competitiveness of countries and includes several factors, including the economic environment, innovation, infrastructure, education, and others. The GCI enables countries to identify relevant policies and practices, map economic growth, and evaluate economies by integrating macroeconomic and microeconomic aspects of competitiveness into a single index (Ginevicius et al. 2023). Higher percentage ratings correspond to higher levels of productivity, growth, and human development in a country. Figure 3 summarizes the GCI values for the analysed period.

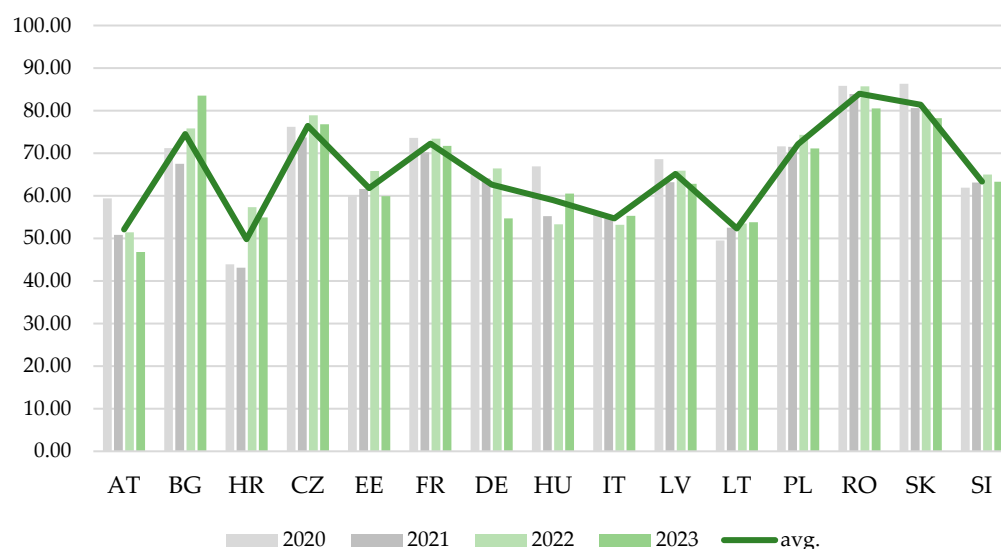


Figure 3. Development of GCI in the analysed European countries. Source: own elaboration according to the data available at <https://www.weforum.org> (accessed on 30 May 2024).

The impact of the pandemic on the GCI depended mainly on how individual countries managed to adapt to the new conditions and how they successfully addressed the

challenges posed by the pandemic to their competitiveness. Compared to the CPI, when monitoring the GCI in the analysed countries, Romania, the Slovak Republic, and the Czech Republic achieve their best values, indicating these countries have a very competitive position. However, within the Visegrad Group countries, a slight decrease is apparent during the 4-year period, indicating that a certain country lost competitiveness compared to other countries in the previous period, with Hungary standing out in particular. Countries such as Bulgaria and France have achieved a high level of competitiveness, while Poland is also approaching France in terms of competitiveness, suggesting that these countries can be considered relatively competitive. Latvia, Slovenia, Germany, and Estonia similarly rank below the average value of 70%. Hungary appears to be one of the least competitive, as the average value of the index does not exceed 60%, and Italy, Lithuania, and Austria also show a lower level of competitiveness than other countries. Croatia is at the bottom of the ranking, indicating that this country is facing various challenges that it should address to improve its competitiveness and achieve sustainable economic growth and prosperity.

When considering the comparative analysis of multi-criteria decision analysis and the GCI, Germany and France are the best-ranked countries according to the TOPSIS method, but within the index, these countries lost competitiveness with other countries compared to the previous period and were ranked in average positions. Italy and Austria, which are considered top-ranked countries in the multi-criteria decision analysis even after the COVID-19 pandemic, have a lower CPI. The Baltic countries ranked extremely low in the TOPSIS method, placing their business environments among the least attractive of all analysed countries, while Latvia was in the best position within the GCI. Estonia reached the 10th position on average in the GCI evaluation, indicating that this country did not have a favourable competitive advantage, and similar results can be observed in Lithuania. Subsequently, even with their middle positions, the Visegrad Group countries may be evaluated using the TOPSIS method to determine their overall optimal competitive advantage, and they were found to be among the average countries. The Czech Republic, where individual pillars examined in this index exceed the European average, also achieves acceptable values, with the Slovak Republic ranking at the peak of these macroeconomic indicator average values according to the GCI. Hungary obtained extremely low ratings using the multi-criteria decision analysis and GCI, ranking the Hungarian business climate among the least favourable in the Visegrad Group countries. Poland had a comparable summary with a variable development utilizing the TOPSIS method while having a GCI that was closer to a medium level of quality and not as low as Hungary's. A comparison of the business environment measured using the TOPSIS method and the GCI in the Soviet-influenced Eastern Bloc countries had variable results. Although Bulgaria and Romania achieved below-average values in assessing the quality of the business environment using the TOPSIS method, while considering macroeconomic stability assessed within the GCI, these countries are ranked the best in 2023 among the Central European countries. Slovenia was ranked as an average country by both the multi-criteria decision analysis and the GCI, and Croatia achieved extremely low levels of the index, which placed the Croatian competitive advantage among the least attractive countries. The Pearson correlation coefficient (Table 5) statistically confirmed the mutual dependence of these two indicators on the quality of the business environment, which are macroeconomic factors, as measured by TOPSIS and the GCI.

Table 5. Correlation between the TOPSIS and GCI.

TOPSIS-GCI	Pearson Correlation	0.559
	Sig. (2-tailed)	0.030

Source: own elaboration.

The macroeconomic development of a country and its level of global competitiveness are correlated in a moderately positive and significant way, as indicated by the *p*-value (Sig.) of the Pearson correlation coefficient (similar to [Majerova and Horuckova 2014](#)).

There have been several attempts to compare the competitiveness of various countries and demonstrate that, especially during recessions, the levels of competitiveness have a significant impact on the growth of GDP per capita as a measure of wealth. The GCI, according to [Jovan and Bradic-Martinovic \(2014\)](#), is the most suitable measurement for evaluating countries. However, because it is composed of numerous variables, it is not possible to identify the distinctive characteristics of individual countries. According to [Dima et al. \(2018\)](#), in addition to being a microeconomic problem for business management, economic competitiveness is a key indicator for comparing sustainability, growth, and other national economic developments. To assess the impact of significant variables that affect the competitive position and sustainable growth of Slovakia and to determine whether its position is improving or worsening, [Kiselakova et al. \(2018a\)](#) concentrated on analysing the position of Slovakia using correlation and multiple regression analysis, identifying the interrelationships between individual pillars and the GCI. The relationship between the GCI and individual pillars was also demonstrated by [Ivanova and Cepel \(2018\)](#) in the Visegrad Group countries, by [Koraus et al. \(2018\)](#) in the Benelux countries, and by [Kiselakova et al. \(2018b\)](#) in the Central and Eastern European countries. By using multiple linear regression analysis, [Kiselakova et al. \(2019\)](#) focused on clarifying the relationships between the GCI and other chosen multi-criteria indices that were used to evaluate the competitive position within EU member states. The competitive position has a considerable favourable impact on increasing the competitiveness of EU member states, as confirmed by the authors. A steady rise in the GCI average score was also noted considering their findings, indicating that the level of global competitiveness of monitored countries was rising. [Marceta and Bojnec \(2020\)](#) conducted a similar study on the global competitiveness of EU countries using the GCI and concluded that there was a significant positive relationship between the GCI and innovation and business sophistication, based on both correlation and regression analysis.

For countries facing challenges with high corruption levels, governments must enact and implement stricter laws, closely monitor public spending, and maintain the independence and effectiveness of judicial systems when considering corruption cases. Increased transparency in data access, e-government technologies, and public procurement procedures can all significantly lower the probability of corruption. Additionally, there is business ethics, while incentives should be offered to firms that avoid corruption and operate properly. Reducing corruption helps countries rebuild the credibility of public institutions, attract more foreign direct investment, and determine the business environment needed to support long-term economic growth.

4.3. Overall Assessment

An analysis of variance (ANOVA) was used to verify the comparison of inner-country business environments. The statistical test determines if there are statistically significant differences between two or more analysed countries or if they are equal. By computing Tukey's HSD post hoc test, which examines all possible pairs of group means to ascertain if their differences are statistically significant, the differences between countries were represented, and homogeneous subgroups of countries emerged (Table 6).

The results of Tukey's HSD post hoc test summarized in Table 6 reveal statistically significant differences between subsets 1 and 2. The quality of the business environment measured by the TOPSIS method divides the selected European Union countries into two subsets, each containing countries that are homogeneous among themselves. Countries in subset 1 have similar average values based on the results of the multi-criteria TOPSIS method, meaning there are no statistically significant differences within this subset. Subset 2 includes leading countries, notably Germany, France, and Italy, which are considered top-ranked countries in the evaluation of the business climate of the European countries based on macroeconomic factors.

Table 6. ANOVA and Tukey’s HSD post hoc test of the quality of the business environment.

TOPSIS				CPI					
Between groups (Sig.)		0.000		Between groups (Sig.)		0.000			
Subset 1		Subset 2		Subset 1		Subset 2		Subset 3	
Country	Mean	Country	Mean	Country	Mean	Country	Mean	Country	Mean
LT	0.23062	IT	0.48370	HU	42.75	RO	45.25	HR	48.50
LV	0.23646	FR	0.61272	BG	43.50	HR	48.50	SK	52.00
BG	0.23790	DE	0.76358	RO	45.25				
EE	0.23776			Subset 4		Subset 5		Subset 6	
SK	0.23924			Country	Mean	Country	Mean	Country	Mean
HU	0.23968			SK	52.00	CZ	55.25	SI	57.25
HR	0.24154			CZ	55.25	IT	55.25	LT	61.00
RO	0.24767					PL	55.25		
SI	0.25158			Subset 7		Subset 8		Subset 9	
CZ	0.25521			Country	Mean	Country	Mean	Country	Mean
AT	0.27214			LV	58.75	LV	58.75	FR	70.75
PL	0.29460					LT	61.00	AT	72.75
IT	0.49837							EE	74.75
FR	0.61272							DE	79.25

GCI							
Between groups (Sig.)		0.000					
Subset 1		Subset 2		Subset 3		Subset 4	
Country	Mean	Country	Mean	Country	Mean	Country	Mean
HR	49.80	BG	52.10	RO	54.68	PL	58.98
		SK	52.33				
Subset 5		Subset 6		Subset 7		Subset 8	
Country	Mean	Country	Mean	Country	Mean	Country	Mean
HU	61.80	LV	62.63	SI	65.13	FR	72.13
		IT	63.33			LT	72.23
						CZ	74.50
						EE	76.40
						AT	81.38
						DE	83.98

Source: own elaboration.

The CPI also groups countries into different subsets according to statistically significant differences and forms eight subsets. The analysis of variance proved that the business environment in the Soviet-influenced Eastern Bloc countries and Hungary, measured using the applied methods and indices, is very similar, as these countries achieve the lowest average CPI, which represents higher perceived corruption. Furthermore, Croatia is included in subset 3, indicating that its average value is at the border between two distinct subsets. The rest of the countries in the Visegrad Four, together with Italy, reach average European values, but Slovakia appears in subsets 3 and 4, indicating that its average value is close to that of both subsets. The Baltic countries achieve one of the highest average values of the observed index, together with the groups of leaders (Germany, France, and Austria), as these countries are associated with lower perceived corruption. The results show that the CPI and the TOPSIS method yield the same results with the leading countries, which are characteristic of supporting economic growth, business activities, and competitiveness.

Summarizing the results achieved, the Soviet-influenced Eastern Bloc countries have the lowest average GCI, which also indicates the lowest competitiveness among the countries mentioned and are in subsets 1 to 3. Poland and Hungary are categorized into separate subsets, while Latvia shows similar average GCI values to Italy, according to the analysis of variance results. Germany, France, and Austria, considered significant trading partners

of Central and Eastern European countries, as well as Estonia and Lithuania from the Baltic countries, and the Czech Republic within the Visegrad Group countries, have ranked alike, achieving the best results, and are included in subset 8. Germany excels in CPI and GCI indices due to its strong economy, low levels of corruption, legal and regulatory stability (Unal et al. 2024), and access to a large European market, all of which together create a business-friendly environment (Mayerhoffer 2021). Austria and Estonia are the best-ranked countries when measured by CPI and GCI indices, as they achieve high values for both indices, which are common among countries with a very good business environment. Both countries have a well-developed legal system that effectively enforces the law and ensures justice, as anti-corruption laws in both countries are strictly and consistently enforced (Karmowska 2019). According to Laboutkova (2018), Estonia actively participates in international organizations that promote transparency and combat corruption, providing it with resources and support for anti-corruption measures. Economic stability and a favourable business environment, which have attracted many foreign investments, also contribute to a high degree of competitiveness (Raftowicz-Filipkiewicz 2012). Among the Visegrad Group countries, the Czech Republic has a relatively better position in the GCI, while the remaining countries achieve average or lower scores in the categories examined. Slightly dissimilar outcomes are presented in the business environment evaluation of the countries with the lowest score in the evaluation. According to the CPI and GCI, the countries with the highest score are the Soviet-influenced Eastern Bloc countries, but the quality of the business environment assessed by the TOPSIS method is the worst in the Baltic countries. In general, regular monitoring and evaluation of the business environment are crucial not only to improve economic conditions, promote investment, increase transparency, and enhance competitiveness but also to ensure sustainable economic growth.

Remeikiene et al. (2023) focused on a comparative analysis of the business environment for business development in other European countries in 2021. Based on the 13 criteria, the TOPSIS method assesses the business environment in individual European economies. This study found that the Netherlands had the most favourable business conditions, while Belarus was placed last. Based on the calculation of the relative proximity to the ideal solution, the countries were divided into four clusters, with the first cluster comprising countries with the best business environment, such as the Netherlands, Lithuania, Norway, and Finland, while countries such as Greece, Cyprus, and the former command economies found themselves in the last cluster. The situation in the post-communist nations was analysed by Dmytrow and Bieszk-Stolorz (2021), whereas these countries belonged to two distinct groups. In one, there were two countries, Croatia and Slovakia. The rest of the post-communist nations were in a large cluster, which also included Germany, Malta, Finland, Portugal, France, and Belgium. Southern European nations, notably Spain, Portugal, and Greece, were explored by Dedu et al. (2021) in terms of how their high unemployment rates and government debt affect economic dynamics. These nations, in particular, faced a harsh economic climate during and after the European debt crisis because of high inflation and fiscal instability, which made it hard for companies to prosper. Nonetheless, there have been gains in recent policies meant to stabilize macroeconomic conditions. Holmen et al. (2024) studied how macroeconomic factors such as GDP growth, inflation, and unemployment impact the competitiveness and business climate of Southern European nations, with a particular focus on Spain, Italy, and Portugal. It highlights the main obstacles these economies must overcome to recover from financial crises and the contribution that economic reforms make to increased competitiveness. Similarly, Khyareh and Rostami (2022) demonstrate how external trade forces can help or strain local business environments depending on macroeconomic policies in Southeast European nations, including Greece.

The research results indicate a necessity for businesses to increase adaptability and flexibility in these changing business conditions, especially in countries with significant economic fluctuations. Digital transformation is increasingly key for success, while technology and sustainability investments can boost corporate competitiveness and reputation.

Policymakers should promote a business culture, simplify administrative processes, and ensure the stability of macroeconomic conditions, which is essential for business prosperity. Finally, there is a need to strengthen the investment and foreign trade environment for economic growth. Designing policies should consider regional differences to ensure equal support for entrepreneurship activities in all regions. Overall, the joint role of the business sector and policymakers is key to maintaining and improving business dynamism in Central and Eastern Europe.

5. Conclusions

Even though economists worldwide have been striving for many years to predict the most accurate development of economies, crises typically hit unexpectedly. Small-, medium-sized, and large businesses have been particularly heavily impacted by the COVID-19 pandemic-induced economic downturn, which has exceeded the 2009 crisis. Many firms were forced to reduce or stop operating entirely as a result of various measures taken to prevent the disease from spreading, which had a significant negative impact on the economies of the affected nations. The pandemic has hurt the world economy and global society. Nonetheless, among the most susceptible and impacted groups of businesses are small- and medium-sized firms, and in some cases, life-saving interventions have had existential consequences. For many of them, the difficulties of inadequate liquidity, non-negligible fixed expenses, and insufficient demand are unacceptable. Therefore, the main aim of this study was to evaluate the variables impacting business activities, compare the business environments across the fifteen European countries using macroeconomic variables, and verify the results using appropriate statistical techniques. It was necessary to evaluate the fundamental macroeconomic parameters (gross domestic product, foreign direct investment, inflation, unemployment, export, and import) for the period 2020–2023 to determine the development of the business environment over a 4-year horizon in the fifteen European countries, the majority of which are classified as Central and Eastern European based on geographic and cultural traits. The data obtained from the TOPSIS method made it easier to compare conditions between countries during each analysis period, and the best business environment was identified. The results from the TOPSIS method allowed for a comparison of conditions between nations during each analysis period, and the best business environment can be identified. The relationship between the global multi-criteria indices, the Corruption Perception Index (CPI), the Global Competitiveness Index (GCI), and c_i was also tested to confirm the TOPSIS method's results. Subsequently, the differences in the multi-criteria indices across the countries were declared using Tukey's HSD, which was computed to identify homogeneous subsets of the countries, sections containing economies with similar business environments within the subsets, and those with different business conditions between the subsets, and to ascertain the statistically significant differences between the countries. Summarizing the results achieved, the Soviet-influenced Eastern Bloc countries have the lowest average GCI, which indicates the lowest competitiveness among the countries mentioned. Subsets of Poland and Hungary are identified independently, and Latvia has comparable average GCI values to Italy. Estonia and Lithuania, of the Baltic countries, Germany, France, and Austria, which are considered important trading partners of Central and Eastern European countries, as well as the Czech Republic of the Visegrad Group nations, have all achieved the top rankings. Due to its robust economy, low levels of corruption, stable legal and regulatory framework, and easy access to a large European market, Germany consistently scores highly on the CPI and GCI, all of which contribute to a climate that is favourable to business. The highest CPI and GCI scores are achieved by Austria and Estonia, making them the top-ranked nations, which is common for countries with solid business environments. Since anti-corruption laws are strictly and regularly enforced in both nations, they both have strong judicial systems that efficiently enforce the law and ensure justice. Additionally, Estonia actively participates in international organizations that support transparency and the fight against corruption and that provide Estonia with assistance and resources for anti-corruption initiatives. A

high level of competitiveness is also influenced by economic stability and a favourable business environment, both of which have attracted many foreign investments. The Czech Republic ranks comparatively higher on the GCI among the Visegrad Group countries, whereas the other nations receive average or lower scores in the categories examined. The results of the business environment evaluation of the countries with the lowest score are slightly different based on the CPI and GCI. While the countries with the highest score are the Soviet-influenced Eastern Bloc countries, the Baltic countries have the lowest quality of business environment, as determined by the TOPSIS method.

The research results demonstrate the importance for firms to enhance adaptation and flexibility in response to evolving market conditions, particularly in nations experiencing substantial economic volatility. For enterprises to prosper, policymakers should support corporate culture, streamline administrative procedures, and guarantee the stability of macroeconomic conditions. The conditions for foreign trade and investment must also be improved to encourage economic growth. Regional variations should be considered when designing policies to guarantee that entrepreneurship is equally supported in all regions. Overall, maintaining and improving business dynamism in Central and Eastern Europe depend on the collaboration of the business sector and policymakers.

This study uses several methods to investigate and clarify the generalized problem of how the COVID-19 pandemic influenced the development of the business environment over a 4-year horizon in fifteen European countries, including its theoretical difficulties, consequences, and financial management implications. Even if this study contributes to the existing literature, the following limitations must be highlighted. The research is limited to certain EU countries, and its results do not represent the entire European Union or other regions. Differences between member states can be large, and research may not cover all relevant aspects of the business environment in each country. Specific indices such as the CPI and GCI and selected macroeconomic indicators may be limited as they may not capture other important factors, such as social and political stability, labour rights, or environmental regulations.

The COVID-19 pandemic had immediate and visible impacts on several macroeconomic indicators, and these changes were significant and rapid. The period 2020–2023 was chosen for the implementation of the research. Although the intention was to focus on the immediate impact of the pandemic and the response of individual economies to the crisis, a broader period could include long-term trends. Thus, it would be valuable to evaluate the business environment in the selected countries over a longer timeframe than has been established for this study to increase the generalization and application of this research over a specific period, which may not reflect current trends or changes in the business environment since economic and political conditions change rapidly, which may affect the relevance of the results of this study. This study primarily utilized the TOPSIS method with CPI and GCI as the crucial measures of business environment quality. While these indices offer appropriate data, they do not detect other significant variables that can also influence economic conditions, such as social stability, labour rights, and environmental restrictions. Future research is expected to address these aspects to give a more comprehensive evaluation of the business environment. Future research could also include a comparison with alternative methods to deepen the analysis and provide further perspectives on assessing the business environment. This would allow for a more comprehensive assessment of the effectiveness of individual countries and complement the results obtained with the TOPSIS method.

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