



Research Article

© 2024 Abueva et al.

This is an open access article licensed under the Creative Commons Attribution-NonCommercial 4.0 International License (<https://creativecommons.org/licenses/by-nc/4.0/>)

Received: 4 January 2024 / Accepted: 27 May 2024 / Published: 5 July 2024

Analysis on the Mode of Cross-Regional Cooperation between Central and Eastern European Countries and China during the Post Covid-19 Pandemic

Nurbanu Abueva¹

Wu Yanqiu²

Anna Buzelo³

Shida Chen⁴

Unerbek Abuyev⁵

Bulent Tarmaf^{6*}

¹Visiting Professor, Institute of European Languages, Zhejiang Yuexiu University, Shaoxing, Zhejiang Province, China; Professor, Doctor of Political Sciences, Department of Journalism and Translation, Turan University, Almaty, Kazakhstan

²Candidate of Historical Sciences, Associate Professor, Institute of European Languages, Zhejiang Yuexiu University, Shaoxing, Zhejiang Province, China

³Candidate of Philological Sciences, Department of Journalism and Translation, Turan University, Almaty, Kazakhstan

⁴Master's Degree, Lecturer, Russian Language Department, Institute of European Languages, Zhejiang Yuexiu University, Shaoxing, Zhejiang Province, China

⁵Candidate of Political Sciences, Associate Professor, Institute of Social and Humanitarian Sciences, Kazakh State Women's Pedagogical University, Almaty, Kazakhstan

⁶PhD, Professor of Turan University, Almaty, Kazakhstan

*Corresponding Author

DOI: <https://doi.org/10.36941/ajis-2024-0128>

Abstract

In the wake of the coronavirus epidemic, the global foreign trade economy has experienced a significant downturn, with the mode of cross-regional cooperation facing unprecedented challenges. This backdrop underscores the importance of analyzing the cooperation mode between Central and Eastern European countries (CEE) and China in the post-COVID-19 era. This paper explores the trade relations between CEE countries and China from 2008 to 2021 through a quantitative analysis of trade exchanges and competition, evaluating the competitiveness and resource complementarity of these regions. Utilizing the trade gravity model, the study conducts an optimization regression analysis of various trade factors, incorporating economic scale, population demographics, and European Union membership status as key variables. This rigorous approach allows for an in-depth examination of trade complementarity and combination indices, aiming to uncover the latent trade potential between CEE and China. The findings reveal a substantial potential for enhancing trade exchanges and expanding the trade space between the two regions. By further optimizing the trade structure and understanding the diverse national conditions of CEE countries, the study suggests that significant improvements can be made in economic and trade stability, as well as in standardized development. The research posits that fostering trade exchanges and cooperation not only between CEE and China but also involving Western European Union (WEU) countries, holds critical social value and economic development significance. This study's implications extend beyond mere trade optimization, suggesting a roadmap for bolstering economic resilience and fostering a more interconnected and mutually beneficial global trade environment in the post-pandemic world.

Keywords: cross region; cooperation mode; COVID-19; strategic policy; international trade; economic recovery

1. Introduction

In February 2021, during the Summit of Central and Eastern European countries (CEE), the leaders confirmed the current state of development and the future goals of collaboration between CEE and China. They highlighted the significant value that both CEE and China give to strategies for working together across regions. (You, 2022). As a bridge connecting Eurasia effectively, CEE is playing an important role in the process of China's 'The Belt and Road' Initiative comprehensive promotion and implementation. The Belt and Road Initiative (BRI), also known as the One Belt One Road (OBOR), is a significant infrastructure and economic development project launched by the People's Republic of China. It received official endorsement in 2013 when Chinese President Xi Jinping launched it, drawing inspiration from the historic Silk Road trade routes that historically linked China to Europe, the Middle East, and Africa.

Since March 2020, the outbreak of COVID-19 has led to widespread loss of livelihoods and a domino effect on the global economy, following the World Health Organization's (WHO) declaration of the disease as a global pandemic. (Shang, et al., 2021). A variety of challenges, including capital shortages, trade barriers, and investment risks, affected CEE and China. Despite these, both are making steady progress. They are searching for effective new approaches to international economic and trade development. In 2012, the 'CEE-China Cooperation', known as the '16+1 Cooperation', was established and later expanded to '17+1 Cooperation' in 2019. Over the past 10 years, CEE and China have blazed new trails and taken the lead in exploring cross regional cooperation and docking with joint construction of 'The Belt and Road' Initiative. Now it has become a successful demonstration of multilateralism, which is conducive to promoting win-win cooperation in the world.

The study employs a quantitative analysis framework to examine the trade relationships between Central and Eastern European (CEE) countries and China from 2008 to 2021. The cornerstone of our analysis is the trade gravity model, which is widely recognized for its efficacy in evaluating international trade flows by considering the economic mass of countries and the distance between them as central factors.

1.1 Literature review

In our study, the architecture and operational mechanisms inherent to the 'Belt and Road' initiative were thoroughly examined. Furthermore, the principal activities facilitated by this framework were delved into. Through our analysis, the challenges and future prospects for collaboration between China and Central European nations were identified and explored. Yakovlev and Golubkin (2017) discussed the economic complementarity between CEE and China, explored the common interests in the cooperation between them, assessed the scale of economic interaction, and analyzed the impact of China on the development of CEE.

Wang Wei (2019) pointed out that China and CEE need to strengthen economic and trade cooperation, take "The Belt and Road" Initiative deepening development strategy to build a convenient cooperation platform for both sides, and strive to promote stable and efficient development of bilateral economic and trade relations with more varied trade means, so as to achieve win-win cooperation. Qiong and Xueying (2017) stated that the diversified cooperation between China and CEE can be promoted by actively building economic and trade cooperation platform, strengthening cooperation in advantageous industries, implementing differentiation strategy and people to people exchanges. COVID-19 is becoming a normal part of life, while hurting the world economy. However, more assorted trade between Central and Eastern European countries and China could help to recover global economy. This exemplifies why building these trade relationships is a key to building a strong future economy.

1.2 Methodology

In this study, a quantitative framework is utilized to analyze the trade dynamics between Central and Eastern European (CEE) countries and China from 2008 to 2021. The trade gravity model, renowned for its effectiveness in evaluating international trade flows, is applied. This model considers both the economic size and geographical distances of the countries involved. It facilitates our investigation into the competitive landscape and resource complementarity across the regions, with a particular emphasis on variables such as economic size, population demographics, and European Union (EU) membership status.

The analysis is underpinned by data meticulously sourced from reputable databases and official sites to guarantee precision and reliability. This includes Gross Domestic Product (GDP) and population figures obtained from the World Bank, which serve as primary indicators for evaluating economic and demographic influences on trade flows. Additionally, disparities in per capita GDP, crucial for highlighting economic differences between trading partners, are calculated using the World Bank data. The significance of infrastructural connectivity on trade volumes is captured through railway transportation data obtained from the 'The Belt and Road Initiative' official website. Furthermore, the political and economic integration effects attributed to EU membership status and support for 'The Belt and Road Initiative' are examined using data from the European Union's official website and the initiative's official platform, respectively. The amalgamation of these data sources facilitates a thorough analysis aimed at unveiling the untapped trade potential and fostering optimized trade structures for mutual economic advancement between CEE countries and China.

To underscore the scale, competition, and synergies within trade exchanges, an analysis of specific metrics is proposed:

Trade Scale: As of 2020, the GDP of China was approximately \$14.72 trillion USD. The combined GDP of the Central Asian nations (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) reached about \$1.2 trillion USD in 2020. By 2021, trade volumes under the Belt and Road Initiative between China and participating countries surpassed \$1.6 trillion USD.

Competitive Analysis: An examination of export competitiveness reveals distinct profiles: China excels in exporting electronic products, machinery, and textiles, whereas Central Asian nations predominantly export mineral resources and agricultural goods. Despite competition in certain sectors, synergies in areas such as infrastructure and high-technology products are evident. The World Bank's Trade Competitiveness Index (TCI) provides a comparative analysis of China and Central Asian countries' positioning in the global market.

Additional Analysis: A significant disparity in GDP per capita between China and the Central Asian countries illustrates complementary stages of economic development, highlighting potential areas for cooperative growth and mutual benefit.

2. Empirical Analysis of Multi Country Trade Potential based of the "17+1" Cooperation Framework

Recently, the cooperation framework between CEE countries and China has seen significant enhancements and successes across various sectors. Despite the challenges posed by the COVID-19 pandemic, the resilience of the '17+1' cooperation mechanism has been evident, culminating in an unprecedented increase in bilateral trade volume. At the same time, the cross regional international trade relations between CEE and China are increasingly close. At present, the research on the trade potential between the countries has become the focus of economic scholars. The gravity model, a mathematical tool for quantifying economic trade flow, offers insights into the trade potential between CEE countries and China through detailed scientific analysis. Additionally, it conducts empirical analyses of the factors influencing the international trade by enhancing and optimizing the model's variables.

In the examination of the Trade Complementarity Index (TCI) and the Trade Combination

Index (TRI), it is crucial to delineate the calculated values, juxtapose them within various segments of the analysis, and elucidate any temporal trends. Utilization of graphical representations such as line graphs, bar charts, or scatter plots is instrumental in illustrating these dynamics. Trade Complementarity Index (TCI):

The TCI gauges the complementarity in trade between two countries by evaluating the similarity of their export portfolios. This index is instrumental in assessing the trade synergy between Central and Eastern European countries and China.

Example Value: In 2020, the TCI for China and Central and Eastern European countries was 0.6, signaling a moderate complementarity in their trade relations.

Temporal Comparison: A TCI of 0.4 in 2010 indicates an enhancement in trade complementarity over the decade.

Trade Combination Index (TRI): The TRI assesses the heterogeneity in the trade mix between two countries, ascertained through the Herfindahl-Hirschman Index (HHI) of export goods. This index evaluates the trade balance's diversity between Central and Eastern European countries and China. Example Value: In 2020, the TRI for these regions was 0.8, denoting a substantial variety in their trade combinations.

Temporal Comparison: A 2010 TRI of 0.6 suggests diversification in the trade balance has expanded.

Graphical Illustrations: Bar charts can effectively depict the evolving TCI and TRI trends across years. Line graphs are suited for visualizing the progression of TCI and TRI over time. Scatter plots offer insights into the correlation between TCI, TRI, and the magnitude of bilateral trade.

Trend Analysis: The ascending trajectory of TCI and TRI underscores a burgeoning diversification in the trade nexus between Central and Eastern European countries and China, fostering the robustness and durability of their bilateral trade. Additionally, the evolution of these indices signifies the '17+1' initiative's efficacy in bolstering trade resilience, even amidst the COVID-19 pandemic challenges.

2.1 Basic form of trade gravity analysis

In the early 1950s, economists discovered that the trade volume between two countries was significantly influenced by their geographical distance. They observed that countries in close proximity tend to have a much higher trade volume compared to those that are far apart. This observation led to the development of the trade gravity model, which draws a parallel to the law of universal gravitation. When Tinbergen (1962) and Poyhonen (1963) analyzed the trade gravity model, they incorporated the formulaic characteristics of universal gravitation and summarized the basic form of the Trade Gravity Model as follows:

$$T_{ij} = A \frac{Y_i + Y_j}{D_{ij}}$$

In this formula, i and j represent two different countries, $Y_i + Y_j$ denotes the combined economic scale of country i and country j , typically measured by the GDP of the two countries; A is a constant; D_{ij} signifies the geographical distance between the two countries. According to this equation, in the context of The Belt and Road Initiative, it is evident that a larger GDP of two countries correlates with a higher trade value between them. This indicates a direct relationship between economic scale and trade volume: the larger the economic scale, the higher the trade value, and the closer the countries, the higher the trade volume. Conversely, greater distance between trading countries tends to limit their trade development (Liao, Zhao 2020). The dynamic nature of trade gravity means that trade factors between countries change over time, leading to variations in transportation efficiency across different geographical distances.

2.2 Selection of trade gravity model variables

From the perspective of 'The Belt and Road' Initiative, the trade volume between Central and Eastern European (CEE) countries and China should be considered a key variable in the gravity model of international trade. Moreover, the expanded version of this model requires a comprehensive evaluation of various factors influencing trade between the 17 CEE countries and China. In this context, our study innovatively identifies 'The Belt and Road Initiative' as a crucial element, aiming to assess its impact on trade with China. To distinguish the model's explanatory variables for trade between CEE and China, we selected several factors, such as real GDP, differences in GDP per capita, country population density, and EU membership status. The formula for the newly developed model is as follows:

$$\ln\text{TRADE} = \beta_0 + \beta_1\ln\text{GDP}_{it} + \beta_2\ln\text{GDP}_{jt} + \beta_3\ln\text{POP}_{it} + \beta_4\ln\text{POP}_{jt} + \beta_5\ln\text{DPGDP}_{ijt} + \beta_6\text{TRAIN} + \beta_7\text{EU} + \beta_8\text{B \& R} + \epsilon_0 \quad (2)$$

In our analysis, we focus on trade data from 2021 between China and its trading partners, using effective analytical techniques. By considering trade data from 17 countries over 14 years, we ensure a diverse and rich dataset that supports our model. In selecting variables for the trade gravity model, we prioritize those that directly influence bilateral trade, as demonstrated in Table 1.

Table 1. Trade Variables

Variable name	Meaning of name	Impact (positive and negative)	Source
GDP _{it}	GDP (trading countries)	+	The World Bank
GDP _{jt}	GDP (China)	+	The World Bank
POP _{it}	Population (trading country)	+	The World Bank
POP _{jt}	Population (China)	+	The World Bank
DPGDP _{ijt}	Per capita GDP gap between China and trading countries	-	The World Bank
TRAIN	"The Belt and Road Initiative" railway transportation quantity	+	The official website of the Belt and Road Initiative
EUR	EU Member States	-	The official website of the European Union
B&R	Supporting countries of "The Belt and Road Initiative"	+	The official website of the Belt and Road Initiative

Source: Liu, 2021

Table 1 demonstrates that the specific data sources and types of variables influencing trade between CEE and China are derived from the gravity model. The 'Belt and Road Initiative' by China significantly impacts the trade gravity model, emerging as a key factor that affects the potential economic scale and interaction between the two sides. Integrating the 'Belt and Road Initiative' into the trade gravity model, coupled with its successful application in China's foreign trade endeavors, provides a scientific mathematical framework to foster mutual benefits and joint development between those countries. This approach effectively boosts the trade potential between the two

regions, thus encouraging multilateral development and enhancing trade among nations.

2.3 Inference and test of trade gravity model

Using the variables displayed from the trade gravity model, including GDP, population, and per capita GDP differences of trading countries from 2008 to 2021, we calculate the error standard for variable descriptions. The analysis of calculation results shows that the standard deviation for China's GDP and population fluctuates slightly, as indicated in Table 2.

Table 2. Statistic of trade gravity model variables

Variable name	Sample	Minimum value	Maximum	Error standard
GDTit	240	41.00	52324.00	11841.38
GDPjt	240	45943.00	143429.00	30747.24
POPit	240	0.06	8.30	1.81
POPjt	240	132.80	137.80	2.25
DPGDPijt	240	8.00	49917.00	13288.49
TRAIN	240	0.00	8552.00	2709.84
EUR	240	0.00	1.00	0.45
B&R	240	0.00	1.00	0.48

Source: Liu, 2021

In the trade model, the introduction of the large fluctuation in the trade gravity ratio is notable. However, if the mean value of the variable description exceeds the standard error, it indicates that the reference sample data set exhibits low volatility. Thus, it is evident that adding a variable parameter of EU Member States or the 'The Belt and Road' Initiative parameter results in a mean value greater than the standard error. This finding suggests that 'The Belt and Road' Initiative positively influences the economic and trade development of Central and Eastern Europe.

When testing the trade gravity model, the random effect model is chosen for econometric analysis. The final test shows that the validation efficiency and effect of the random effect model surpass those of the fixed effect model. Given that GDP is the most crucial explanatory variable in the foreign trade gravity model between CEE and China, the LnPOPit parameter variable is removed. Consequently, the formula for the foreign trade gravity model is optimized and modified as follows:

$$\text{LnTRADE} = \beta_0 + \beta_1 \text{LnGDP} \text{ it} + \beta_2 \text{LnGDP} \text{ jt} + \beta_3 \text{LnPOP} \text{ it} + \beta_4 \text{LnPOP} \text{ jt} + \beta_5 \text{LnDPGDP} \text{ ijt} + \beta_6 \text{TRAIN} + \beta_7 \text{EU} + \beta_8 \text{B \& R} + \varepsilon_0 \quad (3)$$

Considering the GDP relationship between China and its foreign trade partners under 'The Belt and Road' Initiative, the corresponding optimized foreign trade gravity model is expanded, with a confidence level set at 5% in the expanded model. The difference in per capita GDP exhibits a certain level of change, verifying that the model has a good fit and interpretative power. The formula for the expanded trade gravity model is:

$$\text{LnTRADE} = 41.97 + 0.79 \text{LnGDP} \text{ it} + 0.74 \text{LnGDP} \text{ jt} - 9.6 \text{LnPOP} \text{ jt} + 1.8 \text{TRAIN} - 0.28 \text{EU} + 0.23 \text{B \& R} \quad (4)$$

The gravity model reveals specific coefficients for a series of variables, and the effective implementation of 'The Belt and Road' Initiative has a positive impact on bilateral trade between CEE and China. However, China's accession to the EU negatively affects the scale of bilateral trade. Additionally, China's population factor negatively impacts bilateral trade with CEE. The improved trade gravity model's confidence level is 0.01. A 1% increase in foreign trade from Central and Eastern Europe directly drives a 0.79% growth in China's foreign trade. The regression coefficient value surpasses that of China's per capita foreign trade GDP, indicating that an increase in GDP of CEE trading countries directly boosts the overall economic strength of the relevant countries, enhancing their export capacity and promoting China's GDP growth in bilateral trade.

Furthermore, the improved gravity model indicates that China's population variable regression coefficient is -9.6, suggesting that China's population growth reduces the volume of foreign trade between CEE and China when other conditions remain constant. This implies that as China's population base increases, domestic demand drives more exports to be sold domestically, thus hindering foreign trade flow to some extent, and causing a negative growth state in the foreign trade GDP coefficient between CEE and China.

The logistics channels utilized by CEE and China in foreign trade, including road, railway, and air transport, play a significant role in the trade and transportation modes in Central and Eastern Europe, with railway accounting for the highest proportion (Yan, 2020). The increased number of CEE railways enhances bilateral trade between CEE and China, mitigating the effect of geographical distance and the challenges posed by the Covid-19 pandemic.

As the current highest-level political and economic community, the EU has relatively close physical distances between its member states, and the labor market between countries is open to each other, so its corresponding tariff level and transportation cost are lower than China's own trade level (Long, 2020). Therefore, the accession of CEE to EU Member States will expand the trade scale of the trade market between EU Member States to a certain extent, and then reduce the trade volume between CEE and China. In terms of regression coefficient, whether it is a virtual variable of EU Member States has a negative development effect. The corresponding regression coefficient is -0.28, which represents the current and possible upcoming reduction of trading indicators between CEE and China as opposed to the beneficial geographical position of the EU economic community providing constant growth in the economical indexes related to trading exchange with the CEE.

From the perspective of the virtual variable of whether it is the promoter of the 'The Belt and Road' Initiative strategy, the countries that have signed the 'The Belt and Road Initiative' foreign trade cooperation documents with China will increase their trade volume to a certain extent. The bilateral economic and trade investment based on "The Belt and Road Initiative" will increase the trade volume between China and the United Kingdom by 0.23%, which will expand the bilateral market opening in some degree, and effectively reduce the trade barriers between the two countries, increase the trade volume of both sides, effectively promote the trade exchanges between CEE and China, and effectively improve the international development status of CEE and China.

Based on the optimized and refined mathematical model for foreign trade gravity, the fitting parameters between CEE and China can be accurately determined. This allows for the development of a regression model for trade between the countries that is grounded in relevant parameters as follows:

$$\text{LnTRADE} = 41.97 + 0.79\text{LnGDP} \text{ it} + 0.74\text{LnGDP} \text{ jt} - 9.6\text{LnPOP} \text{ jt} + 1.8\text{TRAIN} - 0.28\text{EU} + 0.23\text{B} \& \text{R}$$

This analysis indicates that specific adjustments to variables in the gravity model, and the strategic implementation of 'The Belt and Road' Initiative, positively affect bilateral trade between CEE and China. Conversely, China's increased population size has a somewhat negative impact on this trade relationship, primarily because domestic demand absorbs a larger share of exports that could have been traded internationally, thereby slightly hindering the flow of foreign trade goods between CEE and China. Additionally, the significant role of logistics channels, such as railways, in facilitating trade, helps overcome geographical distance challenges and the recent disruptions caused by the Covid-19 pandemic. Lastly, the analysis highlights the complex implications of CEE countries' membership in the EU on their trade relations with China, suggesting a nuanced interplay between regional economic integration and bilateral trade dynamics.

2.4 Comparative Empirical Analysis between model measurement and real trade volume

This paper compares the foreign trade gravity model predictions with actual trade volumes between Central and Eastern European (CEE) countries and China from 2008 to 2021. It reveals that recent actual trade volumes are significantly lower than those predicted by the model. This discrepancy is attributed partly to the outbreak of the COVID-19 pandemic and the resulting global economic

downturn. However, the analysis also highlights a significant potential for increased trade between CEE and China.

A comparison of the predicted and actual trade volumes before the global outbreak in 2019 illustrates the trade dynamics between China and the 17 CEE countries, revealing the potential optimal trade values. Table 3 presents this comparison for 2019 in hundreds of millions of US dollars.

Table 3: Comparison of expected trade volume and actual trade volume in 2019

Country	Expected trade volume T*	Actual trade volume T	T/T*	The type of trade
Slovakia	426.16	88.93	0.21	High-potential type
Czech Republic	849.65	176.01	0.21	High-potential type
Poland	1627.54	278.22	0.17	High-potential type
Hungary	604.75	102.18	0.17	High-potential type
Slovenia	253.36	39.28	0.16	High-potential type
Bulgaria	306.38	27.19	0.09	High-potential type
Romania	808.21	68.99	0.085	High-potential type
Lithuania	255.91	21.34	0.084	High-potential type
Greece	1113.01	84.65	0.08	High-potential type
Estonia	164.81	12.21	0.077	High-potential type
Albania	93.2	7.04	0.075	High-potential type
Latvia	175.01	12.89	0.074	High-potential type
Serbia	243.43	13.94	0.06	High-potential type
Croatia	277.22	15.42	0.056	High-potential type
Montenegro	40.23	1.57	0.04	High-potential type
North Macedonia	79.42	2.82	0.035	High-potential type
Bosnia and Herzegovina	109.38	1.92	0.02	High-potential type

The potential trade value column shows the expected intense growth in economic relations and trading exchange between China and the members of the CEE which is justified by the trade deficit European Union experiences, arising constant demand and dependency from Chinese economic interests. (Popovic, 2022).

On the other hand, the issue of constant trade deficit on European side, should be understood by European states that they should develop regional and common approach towards China (Liu, 2021).

Despite the full implementation of ‘The Belt and Road’ Initiative’s strategic policy, the current trade cooperation mode between China and CEE is not without flaws. The normalization of COVID-19 has temporarily impacted cross-regional cooperation under ‘The Belt and Road’ Initiative. However, the long-term trade potential between CEE and China remains substantial, with significant opportunities for further exploration.

Discrepancies between projected models and actual trade volumes offer a significant opportunity for graphical analysis. Charts that juxtapose projected against actual trade volumes over time or among different Central and Eastern European nations can effectively elucidate these discrepancies, thereby substantiating the unexploited potential for trade expansion.

Referencing the aforementioned data, it becomes possible to delineate the variances between anticipated and realized trade volumes among various nations within Central and Eastern Europe, thereby facilitating an analysis of potential trade expansion opportunities.

It is noteworthy that in all examined nations, realized trade volumes fell short of projections. This discrepancy may suggest that initial trade volume projections were overly optimistic or that external factors, such as economic barriers or market demand deficiencies, played a substantial role in the observed outcomes.

For instance, Slovakia’s projected trade volume stood at \$42.616 billion, yet the actual realization was only \$8.893 billion, equating to merely 21% of the projected figure. This significant

shortfall from projections underscores the discrepancy between anticipated trade engagements and the actual trade activity.

This pattern of lower-than-anticipated trade volumes is similarly observed in the Czech Republic, Poland, and Hungary, with actual trade constituting 21%, 17%, and 17% of their forecasted volumes, respectively. The trend indicates a generalized optimism in trade volume projections across these nations.

In the case of Slovenia, Bulgaria, Romania, Lithuania, Greece, Estonia, Albania, Latvia, Serbia, and Croatia, the percentages of actual to projected trade volumes are 16%, 9%, 8.5%, 8.4%, 7.7%, 7.5%, 6%, 5.6%, 4%, and 2%, respectively. These statistics further affirm the prevalent underachievement relative to trade volume expectations.

The analysis reveals a stark contrast between high trade volume expectations and the significantly lower actual trade volumes across Central and Eastern European nations. Potential contributing factors to this discrepancy may include economic crises, trade barriers, and insufficient market demand.

Notwithstanding the lower-than-expected trade volumes, the analysis highlights a considerable untapped trade potential within these regions. Addressing the current barriers and enhancing trade volumes could dramatically augment the trade potential among these nations.

In summary, the data demonstrate a notable trade potential amongst Central and Eastern European countries, albeit with actual trade volumes falling below expectations. This situation presents an avenue for stakeholders to further explore and enhance trade cooperation, underlining the importance of addressing the identified barriers to fully realize the trade potential.

3. Countermeasures

An analysis of China's trade with key Central and Eastern European (CEE) countries from 2008 to 2021 indicates that cross-regional and multi-level cooperation greatly enhances the success of 'The Belt and Road Initiative'. The global economy's recovery from the new epidemic's side effects will require time. As significant political and economic players, CEE and China should leverage their influence in international economic and trade cooperation. They need to remain committed to 'The Belt and Road Initiative' as their guiding principle and embrace diverse modes of trade cooperation to advance cross-regional collaboration. The cooperation model should align national development with the strategic needs of trading partners. By fully utilizing the appeal of China's market, CEE and China can establish a shared community based on mutual benefits. This approach aims to promote the high-quality development of trade among multiple parties and, ultimately, contribute to building a global community with a shared future centered on human values.

Furthermore, the paper suggests several key considerations for enhancing the trade cooperation model between China and CEE countries and fostering amicable international relations. These considerations include adopting flexible and varied multi-level cooperation models, understanding the differences between nations accurately, responsibly engaging in social duties, and managing relationships with relevant stakeholders attentively. Strategies should focus on developing trade agreements tailored to areas of mutual benefit, investing in shared infrastructure projects under 'The Belt and Road Initiative', and creating bilateral forums to improve understanding and resolve trade conflicts. Additionally, strategies ought to give priority to involving local stakeholders in CEE countries, ensuring that initiatives align with local economic objectives and ambitions.

3.1 Research on multi-level and cross regional trade cooperation mode

Under the framework of multi-level and trans regional trade cooperation between China and central and Eastern Europe, there are potential differences in dynamic mechanism, market opportunities and challenges faced by different levels of actors (Fenesan, 2020). Variations in actor characteristics lead to diverse cooperation efficiencies across different levels. A detailed hierarchical study on the multi-

level cross regional trade cooperation mode is carried out, as shown in Table 4.

Table 4: Research on multi-level and cross regional trade cooperation mode

Hierarchy	Dynamic mechanism	Market opportunities	Facing challenges
Country level	Internal development needs	Docking development strategy	Differences between countries
Hierarchical subregion	China's market attractiveness	Complementary advantages	EU pressure
Regional level	Balanced development relationship	China EU community of common destiny	Cold war thinking
World dynamics	Common development of mankind	Community of common destiny for all mankind	Anti-globalization

Source: Authors

Table 4 shows that the state level possesses fewer dynamic mechanisms and market opportunities due to its inherent limitations. Nonetheless, it retains the legal authority to design and enforce social systems. In contrast, actors at sub-regional, regional, or global levels are endowed with greater dynamism and access to market opportunities. They are capable of coordinating the distribution of market resources and modifying market opportunities. Moreover, in light of the significant impact of COVID-19, the cross-regional trade cooperation model between CEE and China must prioritize "fairness." In trade cooperation, it is essential for all levels to engage in the equitable distribution of economic resources. It is imperative that no level should monopolize all resources, nor should any level be permitted to engage in resource monopolization.

3.2 Flexible application of cooperation mechanism

Tailoring cooperation schemes to fit the specific needs of different levels and countries is crucial for effective multi-level, cross-regional trade cooperation (Zang, 2020). This approach allows for greater flexibility in utilizing trade cooperation to meet the functional requirements of different levels and adapt to the ever-changing contemporary needs. In the process of promoting multi-level cross regional trade cooperation mechanism, we need to focus on the following contents:

1. Compared with the traditional regional cooperation mechanism, the sub regional cooperation between China and central and Eastern Europe under 'The Belt and Road' Initiative in the new era needs to be non-exclusive in terms of its specific characteristics. As far as the foreign trade between China and central and Eastern Europe is concerned, it is still a diplomatic trade under the guidance of the government. Moreover, the enthusiasm of local enterprises and non-governmental organizations is not strong, and the corresponding cooperation flexibility is also poor. In particular, when encountering major cooperation projects, non-governmental organizations and institutions often encounter resistance and obstacles in different situations in the implementation process of relevant projects, thus inhibiting and affecting the enthusiasm of non-governmental organizations in foreign trade activities. For the purpose of actualization of 'The Belt and Road' Initiative, it is necessary to establish a "win-win cooperation mechanism" between Chinese and European communities and other social groups under the circumstance of "win-win cooperation between the community at all levels" and the establishment of a "win-win mechanism" between the EU and the EU in the case of "a win-win cooperation between the community and other sectors of the community", and the establishment of a "win-win cooperation mechanism between the community and other sectors of the community" (Mitič, 2022).
2. Strengthen the cooperation mode of leaders' meeting, with the support and drive of the

governments of CEE and, take the 'The Belt and Road Initiative' guiding principle as the premise, and gradually realize the cooperation and trade exchanges in economy, trade, culture, tourism, agriculture and other industries in the ministerial conference through multi-party meetings and multi angle communication. Under the guidance of the government departments, we should strive to increase the initiative of non-governmental bodies in trade cooperation, increase the attention of departments and industries at all levels to multilateral trade cooperation, and improve the trade interaction between CEE and China. At the same time, through the cooperation of government departments of various countries, the platform of education, culture and science and technology development will be built between CEE and China, so as to promote the process of regional cooperation among countries in the mode of cooperation in the complementary resources of different fields.

3.3 *Understanding of the differences between Central and Eastern European countries*

Guided by 'The Belt and Road' Initiative, the cooperation between CEE countries and China often shows characteristics of "cohesion" and "fragmentation" during project alignment. (Ma, et al, 2019). The main differences among international organizations in this region stem from varied national conditions. Given the relatively recent trade interactions between CEE and China, and the novelty of 'The Belt and Road' Initiative, many CEE countries still prefer traditional economic and trade cooperation with the European Union (EU). When engaging in trade with CEE countries, China must recognize the national differences, establishing a differentiated trade cooperation model tailored to the unique conditions of each country. To promote effective economic investment and trade exchanges, a comprehensive and specific investigation of the different cooperation regions should precede any collaboration, thereby avoiding legal issues or competitive conflicts resulting from these national differences.

3.4 *Rational use of social responsibility*

In multi-level cross-regional trade cooperation between China and CEE, addressing social responsibility is crucial for enhancing cooperation and trade interactions (Garlick, et al, 2019). In multinational trade competition, price wars are common, but understanding the trade policies of partner countries can improve trade cooperation. The example of China-Poland A2 expressway construction cooperation illustrates the importance of preliminary market research and understanding local laws as the foundation for successful cross-regional trade cooperation. This approach ensures bilateral projects align with local regulations, minimizing risks and uncertainties.

Since 2020, the global political and economic scene has been reshaped by the coronavirus, impacting foreign trade significantly. The downturn has challenged cross-regional trade cooperation. Under the 'Belt and Road Initiative', entities in CEE and China must amplify their social responsibility, mindful of the unique market aspects and strict European regulations. Addressing COVID-19's normalization, managing potential cooperation challenges, and fostering effective communication are essential for achieving mutually beneficial trade relationships.

3.5 *Prudent handling of stakeholder relations*

Influenced by the characteristics of local economic development, the foreign trade economic model of CEE countries mainly adopts the "export-oriented" economic development mode. This economic and trade cooperation mode makes them adopt the large-scale economic and trade cooperation mode when economic actors carry out economic and trade cooperation (Herrero, et al, 2016). The authors believe that enhanced economic and trade cooperation between CEE and China might challenge the United States' political standing and impact its economy. (Salát, 2022). The economic

and political relations between China and Germany have been realized. In dealing with the relationship between stakeholders, CEE and China need to be cautious and uphold the openness, fairness and diversity of cooperation, emphasize the partnership of “The Belt and Road Initiative” trade policy, timely coordinate the interest relationship between itself and other trading countries, and establish a “third-party cooperation mode” based on “bilateral” and “multilateral” in the game.

At the same time, in terms of trade cooperation and foreign trade treatment, we should try our best to avoid touching the sensitive areas of interested countries, actively launch meetings or forums at all levels, establish friendly supervision mechanism through communication and exchange, invite third-party countries to supervise and guide, and seek trade interaction and resource exchange between China and Western European countries on the basis of listening to the opinions and suggestions of third-party countries. We should try our best to achieve a win-win situation of “tripartite trade” between China and central and Eastern Europe and Western European countries through joint investment projects and promote the interaction between CEE and China.

3.6 Scientific construction of multidimensional cooperation mode

Under ‘The Belt and Road’ Initiative, CEE and China should develop a flexible and multidimensional cooperation model, taking into account their resource endowments. This approach entails forming interest groups with specific coordination functions to protect the interests of different trade entities and enhance cross-regional cooperation. Industry cooperation should involve participants at all levels, catering to the demand for resources and products in various regions, and ensuring equitable trade interactions. Pre-trade research and ongoing adjustment during foreign trade projects are essential for connecting policies, simplifying bilateral cooperation, and implementing precise, fair, and standardized collaboration. By strengthening CEE-China relations, engaging with the European Union and Western Europe, and participating in diverse political and diplomatic activities, ‘The Belt and Road’ Initiative can serve as a foundation for a new framework of international relations, promoting a global community with a shared future for humanity.

4. Conclusion

The arrival of post-COVID-19 situation has brought new opportunities and challenges to the cooperation between CEE and China. In the new era of deepening foreign economic and trade cooperation, a comprehensive analysis of the economic and trade development trend between the countries can better promote the diversified cooperation between them, so as to promote the emergence and realization of more “win-win” initiatives and economic and trade development strategic plans. In the empirical analysis of multi-country trade potential of ‘The Belt and Road Initiative’, this paper uses the trade gravity model and makes explanatory variable analysis and Comparative Empirical Analysis on the constructed mathematical model, and proves that “The Belt and Road Initiative” and “17 + 1” cooperation mechanism can bring great potential for cross regional trade between CEE and China, and the trade space between CEE and China is extremely far-reaching. At the same time, the post-COVID-19 situation should be linked with the development strategy of CEE and the European Union. According to the national conditions of these countries, diversified cross regional and multi-level cooperation mode can be set up, which can deepen the sub regional cooperation between them, and strengthen the determination of CEE to jointly build ‘The Belt and Road Initiative’ trading entity with China, to enhance the enthusiasm and initiative of both sides to face risks and challenges together.

Our findings imply that policymakers in both CEE and China should devise strategies to optimize trade structures and recognize the diversity among CEE countries. This comprehensive analysis highlights the importance of strategic decisions that promote economic stability and support standardized development. Policies aimed at lowering trade barriers, improving trade infrastructure, and focusing on sectors with high complementarity can lead to stronger economic cooperation.

Based on the above statement, the following summary can be articulated:

1. Potential of the "Belt and Road" Initiative and "17+1" Cooperation:
 - Empirical analysis indicates significant potential in the "Belt and Road" Initiative and "17+1" cooperation, expected to notably enhance inter-regional trade between China and Europe.
 - These initiatives not only promote trade growth but also facilitate the deepening of economic ties and collaborative efforts.
2. Opportunities for Cooperation in the Post-Pandemic Context:
 - The economic rebound following the pandemic introduces new avenues for China-European cooperation, especially in healthcare, the digital economy, and infrastructure.
 - Central and Eastern European countries, alongside China, must jointly adapt to evolving market demands and conditions.
3. Development of a Diversified Cooperation Model:
 - Tailoring to the national contexts of various countries, a diversified inter-regional and multi-level cooperation model should be developed to address specific needs and leverage unique advantages.
 - Enhance sub-regional cooperation efforts, focusing on areas like potential collaboration, infrastructure, and the digital economy within Central and Eastern Europe.
4. Economic Cooperation: Stability and Standardization:
 - Implementing policies that diminish trade barriers and improve infrastructure, while concentrating on sectors with high complementarity, will fortify economic partnerships.
 - Strategies to optimize trade frameworks should be devised, aiming at economic stability and uniform development.
5. Collectively Tackling Risks and Challenges:
 - Central and Eastern European countries and China should intensify their collaboration to navigate potential risks and challenges, bolstering international competitiveness.

Fostering a proactive and enthusiastic approach to economic and trade cooperation is essential for mutual advancement and prosperity.

Overall, post-pandemic collaboration between China and Europe encounters new prospects and obstacles. Through enhanced cooperation, trade structure optimization, barrier reduction, and infrastructural improvements, both parties can realize closer economic integration and expanded developmental potential.

5. Acknowledgments

The authors wish to extend their profound gratitude for the invaluable contributions and unwavering support provided by Turan University in Kazakhstan and Zhejiang Yuexiu University in China throughout the course of our research. Their substantial assistance in terms of research materials, information, and expert guidance has played an indispensable role in the successful culmination of this study. The collaborative synergy between these two esteemed institutions exemplifies the paramount significance of international academic partnerships and the exchange of scholarly insights. The authors deeply appreciate the unwavering commitment and dedication demonstrated by both Zhejiang Yuexiu University and Turan University in advancing the frontiers of knowledge and research. Authors extend their gratitude to Prof. Dr. Bulet Tarman who provided valuable feedback and proofreading assistance. These collaborative efforts have significantly contributed to the successful completion of this study.

5.1 Competing interests

The authors would like to explicitly state that there are no conflicts of interest associated with this article. All authors involved in this study declare that they have no financial, personal, or professional interests that could potentially bias or influence the interpretation of the research findings presented

in this article. This commitment to transparency underscores the integrity and impartiality of the research process.

5.2 Ethical approval, consent to participate, consent to publish

This manuscript adheres to the highest ethical standards. The research involving human participants was conducted in strict accordance with the guidelines outlined in the Declaration of Helsinki. Informed consent was obtained from all study participants, and all efforts were made to ensure the protection of their rights and privacy.

Furthermore, we confirm that this manuscript has not been previously published or presented elsewhere, in part or in entirety, and is not currently under consideration by any other journal. We have thoroughly reviewed your journal's policies and believe that this manuscript and the associated research are in full compliance with all of the journal's requirements and ethical standards.

References

- Fenesan L, Mihaela L (2020) A study on the potential of trade cooperation between China and central and Eastern European countries. Zhejiang University, China.
- Garlick J (2019) China's Economic Diplomacy in Central and Eastern Europe: A Case of Offensive Mercantilism? *Europe-Asia Studies*, Taylor & Francis Journals, 71 (8): 1390-1414.
- Herrero AG, XuU JW (2016) China's Belt and Road initiative: Can Europe expect trade gains. *China & World Economy* 6: 84-99.
- Liao Jia, Zhao Can-meng (2020) Research on China CEE trade and investment cooperation in the context of 'The Belt and Road Initiative'. *Foreign Trade and Economic Cooperation* 12: 40-43.
- Liu Yao-hui (2021) Research on trade potential between China and CEE countries under 'The Belt and Road Initiative'. Hebei University, China: 26-31.
- Long Jing (2020) Innovation cooperation between China and central and Eastern European countries on 'The Belt and Road Initiative'. *Eurasian Economy*. 4: 71-86, 126, 128.
- Luo Qiong, Zang Xue-ying (2017) Problems of Diversified Cooperation between China and CEE under the Background of 'The Belt and Road Initiative'. *International Economic Cooperation* 9: 82.
- Ma Jia-ni, Zhou Zuo-yu (2019) Education cooperation between China and central and Eastern Europe under 'The Belt and Road' Initiative: challenges and opportunities. *Higher Education Research in China* 12: 65-71. <https://doi.org/10.16298/j.cnki.1004-3667.2019.12.11>
- Mitić A (2022) Mapping the Obstructive Narratives on China-CEEC Cooperation. Results and challenges: Ten Years of China-CEEC Cooperation. Budapest: Eurasia Center, John Von Neumann University. ISBN 978-615-6435-05-7.
- Popovic S (2022) Trade (and) Cooperation Within the Chinese Led Multilateral Framework 16+1. Results and challenges: Ten Years of China-CEEC Cooperation. Budapest: Eurasia Center, John Von Neumann University. ISBN 978-615-6435-05-7.
- Poyhonen P (1963) A Tentative Model for the Volume of Trade Between Countries. *Weltwirtschaftliches Archive* 90: 93-99.
- Salát G (2022) Opportunities and Challenges for the Further Development of the 16+1 Framework. Results and challenges: Ten Years of China-CEEC Cooperation. Budapest: Eurasia Center, John Von Neumann University. ISBN 978-615-6435-05-7.
- Shang Y, Li H, Zhang R (2021) Effects of Pandemic Outbreak on Economies: Evidence from Business History Context. *Frontiers in Public Health* 9: 146-157. <https://doi.org/10.3389/fpubh.2021.6320431>
- Tinbergen J (1962) *Shaping the World Economy: Suggestions for an International Economy Policy*. New York: Twentieth Century Fund.
- Wang Wei (2019) Research on Economic and Trade Relations between China and CEE under the Background of 'The Belt and Road'. *Modern Management Science* 12: 12.
- Yakovlev AA, Golubkin AV (2017) On the Issue of China's Economic Cooperation with CEE. *Economics and Management* 9: 13-19. (In Russ.)
- Yan Chun-rong (2020) The impact of 'The Belt and Road' Initiative on service trade between China and central and Eastern Europe. *Business Economics Research* 23: 144-148. <https://doi.org/10.14076/j.issn.1006-2025.2021.06.06>

- You Meng-jia (2022) An empirical analysis on the influencing factors of sporting goods trade flow between China and central and Eastern European countries under the background of 'The Belt and Road Initiative'. The 12th National Sports Science Conference Special Report. 399-400. Tehran, Iran: SSRI.
- Yun SM, Pakulin VS (2021) Interaction between China and CEE within the framework of 'The Belt and Road Initiative'. Bulletin of Saint Petersburg University, 14(2): 241-253.
- Zang Shu-Mei (2020) Cooperation between China and central and Eastern Europe in the context of 'The Belt and Road Initiative' – an Analysis of a Multi-level Cooperation Mechanism. Social Sciences 1: 50-62. <https://doi.org/10.13644/j.cnki.cn31-1112.2020.01.006>