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Bilateral Economic Dynamics: Exploring the Emerging Trade Relationship Between Serbia and Israel (2021-2024)

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Abstract: In the context of geopolitical fragmentation and shifting global trade architectures, bilateral partnerships between asymmetric economies — particularly those operating outside formal multilateral frameworks — are gaining renewed strategic relevance. This study examines the evolving trade dynamics between Serbia and Israel from 2021 to 2024, with particular attention to sectoral convergence, institutional facilitation mechanisms, and macroeconomic alignment between an EU-candidate transition economy and an innovation-driven advanced economy operating without a formal free trade agreement. The research employs a mixed-methods approach combining quantitative trade data from UN Comtrade, World Bank, and national statistical offices with comparative institutional analysis of bilateral agreements and policy frameworks. Analytical instruments include Pearson correlation analysis, logistic growth modelling, and a multidimensional structural convergence index covering eight sectors. The findings reveal a rapid intensification of bilateral trade, with total trade volume growing from $107.7 million (2021) to $141.7 million (September 2024), accompanied by a 63.5% increase in Serbian exports and a 72.8% increase in imports in 2024. A persistent trade surplus of $54.9 million and export coverage exceeding 200% indicate Serbia's competitive positioning despite economic asymmetry (Israel's $509.9 billion GDP versus Serbia's $75.2 billion in 2023). Macroeconomic indicators demonstrate a strong positive

correlation (r = 0.76), while bilateral export-import flows show a moderate negative correlation (r = -0.34), suggesting structurally complementary rather than substitutive trade patterns. The logistic growth model (L = 140.22; k = 0.36) projects that Serbian exports will approach saturation by 2025, signalling the need for product diversification. The structural convergence index of 0.71 confirms increasing sectoral alignment, particularly in agritech, ICT, and renewable energy. The 2020 Washington Agreement emerges as a critical institutional catalyst enabling deeper economic integration absent a formal FTA. The originality of this research lies in proposing a replicable analytical framework for asymmetric, innovation-based trade partnerships emerging without multilateral treaty foundations. The findings have direct policy implications for trade diplomacy, suggesting that targeted bilateral agreements, sectoral cooperation mechanisms, and Serbia's EU accession dynamics can foster trade-based convergence between structurally dissimilar economies, offering a transferable model for similar emerging trade corridors in the post-globalisation era.

Keywords: Bilateral Trade, Economic Complementarity, Serbia-Israel Relations, Trade Dynamics, Emerging Markets, U.S. interests

Introduction

Foreign trade is a vital driver of economic development and structural transformation for both emerging and advanced economies. For Serbia and Israel, it serves as a strategic mechanism to promote competitiveness, expand market access, and strengthen economic resilience. According to the latest available data from the CIA (Central Intelligence Agency, 2024a), Serbia recorded total exports of approximately USD 44.3 billion in 2023 est., and imports of USD 39.9 billion in 2022 est., while Israel reported exports of USD 156.3 billion in 2023 est., and imports of USD 137.48 billion in 2023 est., (Central Intelligence Agency, 2024b). These figures translate into overall foreign trade volumes of around USD 84 billion for Serbia and USD 293.8 billion for Israel.

In comparison, bilateral trade between the two countries constitutes only around 0.2% of each country's total trade volume. Despite this modest share, recent years have witnessed a marked acceleration in trade flows: between 2021 and 2024, Serbian exports to Israel increased by 63.5%, while imports from Israel grew by 72.8%. This growth trajectory points to an emerging trade corridor with high potential for further development, particularly in sectors where structural complementarities exist.

The relevance of this research lies in addressing the lack of a comprehensive academic analysis of Serbia-Israel trade relations. While both countries maintain diverse economic partnerships globally, their mutual trade interactions remain relatively underexplored in the literature. At the same time, empirical indicators suggest a growing economic alignment that merits closer investigation.

The central research problem addressed in this paper concerns the limited understanding of the structural and dynamic aspects of Serbia-Israel economic exchange. The existing gap in scholarly and policy-oriented work risks overlooking important opportunities for bilateral cooperation in trade, investment, and technology transfer.

The main objective of this study is to examine the evolving bilateral economic dynamics between Serbia and Israel from 2021 to 2024. The research aims to accomplish the following:

1. Analyse the structure and growth trends of bilateral trade flows.
2. Identify economic complementarities, sectoral asymmetries, and possible convergence;
3. Assess potential influence of policy frameworks and external agreements on trade;
4. Based on the developed logistic model, propose forward-looking recommendations for enhancing bilateral economic cooperation.

These goals are addressed through a mixed-methods approach that combines quantitative trade data with visual and comparative analysis, including correlation analysis and logistic modelling (Figures 2, 3, and 4), to highlight the strategic potential of this bilateral partnership.

Literature Review

The study of international trade has undergone significant theoretical evolution—from classical and neoclassical models toward frameworks that increasingly emphasise structural differences, technological capacity, and institutional quality. While traditional models such as Ricardian theory and the Heckscher–Ohlin framework focused on comparative advantage based on factor endowments, more recent developments in trade theory point to the limitations of such explanations when applied to asymmetrical trade partnerships (Rodrik & Stiglitz, 2024; Krugman et. al., 2018; Fordham, 2010).

The gravity model, which remains one of the most empirically robust frameworks for predicting trade flows, highlights the importance of market size and distance. However, it does not sufficiently explain trade patterns between structurally dissimilar economies, particularly those with divergent innovation ecosystems and geopolitical alignments. In the case of Serbia and Israel, the absence of geographic proximity and formal trade agreements is counterbalanced by sectoral complementarities, which suggest the presence of latent synergies not captured by standard models.

A growing body of literature explores these complementarities through the lens of New Structural Economics (Lin, 2012), which advocates for aligning a country's development strategy with its evolving comparative advantages and institutional capabilities. This perspective is particularly relevant for transition economies such as Serbia, which seek to modernise and diversify their export structures. The concept of economic complexity (Hausmann & Hidalgo, 2009) further elaborates on this, emphasising the sophistication of exported products as a proxy for long-term growth potential. In this context, Serbia's industrial and agricultural exports could benefit from integration with Israel's advanced innovation sectors, particularly in high-tech and agritech.

Studies addressing bilateral trade between small and medium-sized countries outside institutionalised blocs remain scarce. The prevailing focus in trade literature is on large-scale partnerships—NAFTA, EU, ASEAN—or bilateral agreements involving major economies. As a result, there is a scientific gap in the analysis of asymmetric, innovation-based trade partnerships that emerge without formal treaties. The Serbia–Israel case offers an important opportunity to examine this neglected configuration.

Another underexamined dimension is economic convergence between structurally divergent economies. Most convergence literature emphasises macroeconomic indicators such as GDP per capita or labour productivity, but fails to incorporate the evolving structure of trade itself. This study adopts a broader definition of convergence that includes sectoral alignment, product sophistication, and trade diversification as indicators of mutual adaptation over time.

The role of the state in driving such transformations is gaining renewed relevance, especially within the framework of Mazzucato's (2014) concept of the entrepreneurial state. In the case of Serbia and Israel, political agreements such as the 2020 Washington Agreement have catalysed trade and investment flows, supporting the argument that state-led initiatives can facilitate deep structural trade relationships even in the absence of formalised economic partnerships.

Finally, global trade governance literature (Baldwin, 2016) suggests that unconventional alliances—those based on specialisation rather than geography—may become increasingly important in the face of geopolitical fragmentation. The Serbia–Israel partnership fits within this trend, and its analysis provides valuable insights into how countries can leverage strategic complementarities to mitigate their structural disadvantages.

This study contributes to the existing body of knowledge by integrating these diverse theoretical strands into a coherent framework for analysing emerging trade corridors. By combining macroeconomic indicators, logistic growth models, and trade structure analysis, it offers a multidimensional view of the Serbia–Israel trade relationship. In doing so, it addresses a concrete gap.

in the literature while proposing a replicable methodology for examining similar asymmetric trade partnerships.

Table 1 provides an overview of specific gaps identified in the literature and clarifies how this study contributes to each area**.**

Table 1

A Review of Gaps in Literature and the Contribution of Authors

Gap in Literature	**Contribution of the Authors**
Asymmetric Trade Dynamics	Prior studies focus on symmetric partnerships (e.g., EU-US). Our analysis of Israel-Serbia—a high-tech/industrial pairing—offers a novel case of asymmetric synergy.
Policy-Entrepreneurship Nexus	While Mazzucato (2014) discusses state roles, our study links Serbia's EU accession policies to its bilateral trade innovations with Israel (a non-EU state).
Methodological Integration	Combining logistic modeling (quantitative) with policy feedback analysis (qualitative) to predict trade trajectories—a gap noted in WTO (2024).
Geopolitical Flexibility	Explores how Serbia balances EU conditionalities with independent trade diplomacy, a tension overlooked in Curdy (2025) and Jovičić and Marjanović (2024)
Institutional asymmetries	How do institutional asymmetries (e.g., Israel's agile tech policies vs. Serbia's EU harmonization) shape bilateral trade (Fordham, 2010)?
Complementarities	Can Serbia-Israel's sectoral complementarities model be replicated in other emerging corridors (e.g., Vietnam-Israel free trade pact)? (Chu Minh Thao, 2019)

Source: Compiled by the authors

Materials and Methods

The methodology of this study will be designed to align with the specific characteristics of asymmetric bilateral trade relations between Serbia and Israel. A mixed-methods approach would be adopted, combining quantitative modelling with comparative structural analysis. The research will rely on macroeconomic and trade data obtained from the World Bank (2024), national statistical offices of Serbia and Israel, and international trade databases such as UN Comtrade (United Nations, n.d.) and the CIA World Factbook (Central Intelligence Agency, 2024a). These sources provide complementary and up-to-date indicators relevant for tracking bilateral trade developments.

Correlation analysis would be conducted to identify statistical associations between key trade variables, such as total export/import values, GDP, and sectoral trade composition. The Pearson correlation coefficient would be used to measure linear relationships between indicators in the two economies. The results would be visualised in Figure 1, providing empirical support for the presence of sectoral complementarities.

In parallel, a logistic growth model would be applied to analyse and project the expansion of Serbian exports to Israel. Given the observed nonlinear trend of increasing trade volume (Figure 2), the logistic function is particularly suited for modelling such S-curve growth. It allows the authors to estimate potential saturation points and growth limits under current trade conditions.

Furthermore, the study would include an evaluation of economic convergence between the two countries. The structural convergence model would examine the similarity of trade structures across

major sectors, supported by correlation matrices and cluster analysis. The degree of convergence would be illustrated in Figure 3, while growth rate alignment would be examined through trend comparison in Figure 4.

To achieve these goals, the authors intend to undertake the following analytical steps:

1. Compile and harmonise trade and macroeconomic datasets from national and international sources (World Bank, n. d.; WTO, 2024; OECD, 2023).
2. Perform Pearson correlation analysis to evaluate bilateral sectoral trade alignment (Figure 1, Table 10);
3. Model export growth using a logistic function to project trade potential (Figure 2);
4. Assess economic convergence by analysing structural similarities in trade (Figure 3);
5. Compare dynamic growth trends to determine convergence in trade development (Figure 4).

Research Design - Methodological Framework and Study Design

This study employs a mixed-methods research design that integrates both quantitative and qualitative approaches to provide a comprehensive analysis of Serbia-Israel trade relations. The quantitative component uses descriptive statistics, correlation analysis, and logistic modelling to examine trade flows, sectoral composition, and economic convergence. This enables a data-driven assessment of trade patterns and economic interactions over time. The qualitative component incorporates policy analysis and case study evaluation, offering a deeper understanding of the strategic motivations and implications of trade agreements, investments, and sectoral synergies.

The study design is justified by the complexity of the bilateral trade relationship, which involves both economic interdependencies and policy-driven interactions. A purely quantitative approach would fail to capture the geopolitical and strategic dimensions of economic cooperation, while a solely qualitative analysis would lack empirical validation. By combining both methodologies, this study provides a holistic perspective that informs policymakers, businesses, and researchers on the evolving trade dynamics between Serbia and Israel.

Data collection

The data utilised in this study were collected from multiple primary and secondary sources to ensure a comprehensive analysis of Serbian-Israeli trade relations. Primary data were gathered from official trade reports published, for example, by the Central Bureau of Statistics, Israel (2024). These reports provided detailed insights into trade volumes, sectoral distributions, and key commodity exchanges. Additionally, government policy documents, investment reports, and economic development plans from both nations were reviewed to understand regulatory frameworks and trade agreements. Secondary data were obtained from international organisations such as the OECD (2023) and the European Commission (2023), which offer macroeconomic indicators, regional trade comparisons, and long-term economic projections. These diverse data sources enhance the reliability and depth of the study's findings.

Data Analysis

The study employs a multi-layered approach to data analysis, combining both quantitative and qualitative techniques. Descriptive statistical analysis was used to assess trade patterns, identify trends, and evaluate fluctuations in export-import dynamics over the study period. Correlation analysis was conducted to explore potential relationships between economic indicators, such as GDP growth, trade volume, and sectoral shifts. Additionally, logistic modelling was applied to project future trade trends and assess the impact of policy interventions on bilateral trade flows. The qualitative component of the analysis involved policy evaluation and sectoral case studies, which provided contextual understanding and deeper insights into the strategic drivers of trade relations. This combined methodology ensures a

robust and holistic examination of Serbia-Israel trade interactions, contributing to informed policymaking and investment decision-making.

Results

The results of this study provide a detailed overview of the Serbia-Israel trade relationship, focusing on trade volume growth, sectoral contributions, and key commodity exchanges. By analysing the evolution of trade patterns between 2021 and 2024, this section identifies major trends, fluctuations, and emerging opportunities within bilateral trade. The findings highlight the increasing economic interdependence between the two nations, showcasing how complementary trade structures contribute to mutual growth.

A review of comparative macroeconomic indicators for Israel and Serbia

The following data contains macroeconomic indicators for Israel and Serbia for 2015 and 2023.

Table 2

Structured Macroeconomic Data Overview

Indicator	Israel 2015	Israel 2023	Serbia 2015	Serbia 2023
GDP ($ billions)	303.4	509.9	39.7	75.2
Agriculture (% of GDP)	1.4	1.3	6.7	5.2
Industry (% of GDP)	19.8	17.2	25.8	26.4
Manufacturing (% of GDP)	12.8	10.2	14.8	13.5
Services (% of GDP)	68.5	72.4	50.9	51.2

Source: World Bank national accounts data, and OECD National Accounts data files (World Bank, 2023)

Authors develop a brief profile and comparison of the two economies based on the World Bank data:

Economic Profile of Israel (2015–2023)

Between 2015 and 2023, Israel's economy exhibited significant growth, driven by advancements in technology and a shift toward high-value industries (Gereffi & Fernandez-Stark, 2016; Gereffi & Lee, 2016), showing a pathway from production to end use (Gibbon, Bair, & Ponte, 2008). The country's GDP increased from $303.4 billion in 2015 to $509.9 billion in 2023, reflecting a robust economic expansion (Central Bureau of Statistics Israel, 2024). Sectorally, agriculture's contribution to GDP remained minimal, declining from 1.4% to 1.3%, while the industrial sector also saw a decrease, from 19.8% in 2015 to 17.2% in 2023, signalling a trend toward deindustrialisation or a focus on higher-value manufacturing. Notably, the manufacturing sector saw a drop from 12.8% to 10.2%, reinforcing this shift. In contrast, the services sector became the dominant force in the economy, growing from 68.5% to 72.4%, underscoring Israel's increasing reliance on high-tech and service industries (Avnimelech & Teubal, 2006). Overall, Israel's economic transformation is marked by a growing emphasis on services and technological innovation, with a declining role for traditional industries like agriculture and manufacturing.

Economic Profile of Serbia (2015–2023)

Between 2015 and 2023, Serbia's economy experienced steady growth, with its GDP rising from $39.7 billion to $75.2 billion, highlighting significant developmental progress for a smaller economy (European Bank for Reconstruction and Development, 2023; Ministry of Finance of Serbia, 2024). Sectorally, agriculture's contribution decreased from 6.7% in 2015 to 5.2% in 2023, although it still plays a larger role than in Israel. The industrial sector saw a slight increase, from 25.8% to 26.4%, reflecting Serbia's continued reliance on industrial growth. Manufacturing, however, experienced a minor decline from 14.8% to 13.5%, yet it remains an important contributor to the economy. Services, the largest sector, saw a small increase from 50.9% to 51.2%, indicating modest growth in this area (OECD, 2024). Overall, Serbia's economic development has been marked by stable industrial growth aligning with the unified growth theory (Galor, 2011) and a gradual shift towards a more service-oriented economy, with agriculture maintaining a larger share than in many other advanced economies.

Comparison and Key Economic Development Observations

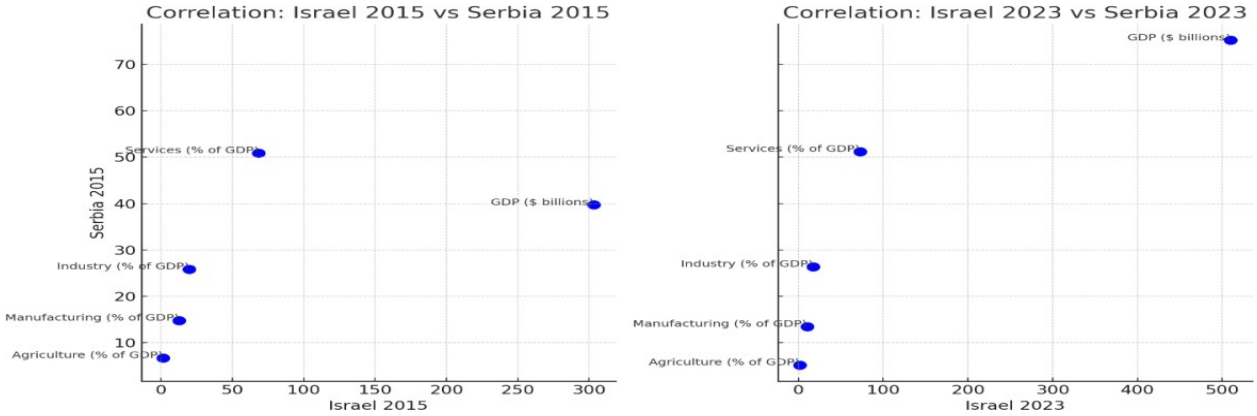
The comparison of Israel's and Serbia's economies between 2015 and 2023 reveals key similarities and differences, shedding light on their respective developmental trajectories. While Israel's economy is significantly larger than Serbia's, both countries have experienced notable GDP growth, reflecting their developmental priorities (Central Bureau of Statistics Israel, 2024; Ministry of Finance of Serbia, 2024). In terms of sectoral shifts, both nations saw a decline in the agricultural sector, signalling structural transitions towards industrial and service-based economies. However, Serbia's industrial and manufacturing sectors remain a larger part of its economy compared to Israel, suggesting a stronger reliance on production-based sectors (European Bank for Reconstruction and Development, 2023). Israel's economy, by contrast, is overwhelmingly service-driven, with services accounting for 72.4% of GDP in 2023, compared to Serbia's 51.2% (Avnimelech & Teubal, 2006; OECD, 2024). Israel's economic structure is heavily oriented towards high-tech and service industries, while Serbia maintains a more balanced economy, with significant contributions from both industry and agriculture (Feldman & Kogler, 2010). Key observations show that Israel's growth reflects its high-income status and a strong emphasis on technology-driven services (Vemić, 2024), while Serbia's development suggests an emerging market economy with industrial growth, still playing a pivotal role. A potential correlation between GDP size and the share of agriculture in GDP is evident in both countries, where Israel, with a larger economy, has a smaller agricultural share. Furthermore, the positive growth in services in both nations, particularly in Israel, may highlight a broader global trend towards service-oriented economic development the significance of which was noticed by Aghion & Howitt (2009).

Correlation Analysis Result

The Pearson correlation coefficient between the average values of Israel's and Serbia's indicators is 0.76, indicating a strong positive correlation. This suggests that shifts in sectoral distribution and GDP in one country may correspond to similar trends in the other, possibly due to shared global economic influences (Fotheringham & Rogerson, 2013). Here are the scatter plots showing the correlation between Israel and Serbia for the years 2015 and 2023. Each plot illustrates how the selected indicators (GDP, Agriculture, Industry, Manufacturing, and Services) compare between the two countries. The individual indicators are labeled on the points for clarity. Figure 1 illustrates correlation data.

Figure 1

Correlation of Data on Serbia and Israel, 2015 and 2023



Source: Authors' development.

Figure 1 reveals that the GDP difference is significant, with Israel's GDP being much higher in both years. The structure of the economy shows notable contrasts, especially in the share of agriculture and services as percentages of GDP, revealing potential formulae on how different countries may choose to develop.

Development of Economic Relations between Israel and Serbia (2015–2023)

Israel and Serbia have fostered growing economic ties in recent years, with significant investments, trade, and cooperation across several sectors. The bilateral relationship has been marked by Israeli investments in Serbia, Serbian engagement in Israeli technology and agricultural innovation, and steadily growing trade. This section reviews the key aspects of economic relations, focusing on investments, trade, innovation, and tourism, while considering the political impact of these interactions.

Israeli Investments in Serbia

Israeli companies have been particularly active in Serbia's real estate sector, investing heavily in major urban centers such as Belgrade and Novi Sad. Large real estate players, including AFI Europe and Big CEE, have led high-profile projects such as shopping malls, residential complexes, and office buildings, with notable examples like the Big Fashion Mall in Belgrade. These investments reflect Israel's strategic interest in Serbia's growing urban development and real estate market. Additionally, Israeli capital has made inroads into the energy and telecommunications sectors, though the scale of investment in these areas remains smaller than real estate (Ministry of Foreign Affairs of Israel, 2023).

Serbian Investments in Israel

On the other hand, Serbia's investments in Israel remain relatively modest, reflecting the asymmetry in economic potential between the two countries. Most Serbian economic activity in Israel occurs through trade and tourism, with limited direct investment flows. This asymmetry is typical of relationships between developed and emerging market economies, where the smaller economy often finds it challenging to make large-scale investments in a more developed and technologically advanced nation. However, Serbia has benefitted from Israeli expertise in agriculture and technology through collaborative ventures rather than direct capital inflows.

Trade Relations

Trade between Israel and Serbia has shown moderate growth over the years, though it remains relatively modest compared to other international trade partnerships. Serbian exports to Israel include agricultural products like fruits, cereals, vegetables, chemicals, metals, and food products. Conversely, Serbia imports pharmaceutical products, advanced technology, IT equipment, and sophisticated.

agricultural systems from Israel (OECD, 2023). These imports highlight Israel's advanced capabilities in sectors such as healthcare, technology, and agriculture, in which Serbia seeks to enhance its infrastructure and productivity.

Several bilateral agreements have been signed between Israel and Serbia to strengthen cooperation, particularly in agriculture and innovation. These agreements have enabled Serbia to access Israeli agricultural technologies such as irrigation systems and innovative farming solutions (Ministry of Foreign Affairs of Israel, 2023). This technology transfer has helped improve agricultural productivity in Serbia, especially in regions with water scarcity and resource optimisation challenges.

Technology and Innovation

Israel's global leadership in technological innovation has significantly impacted Serbia, particularly in the IT sector. Over the years, Israel has supported Serbian IT professionals through education, training, and collaborative projects. Numerous forums, conferences, and networking events have been organised to foster cooperation in fintech, cybersecurity, and startups (Etzkowitz & Leydesdorff, 2000). Serbia, recognising the success of Israel's "Startup Nation" model, has drawn inspiration from this approach in efforts to build its burgeoning technology ecosystem (Senor & Singer, 2011), which represents a condition for convergence in the era of globalisation (Baldwin, 2016; Stiglitz, 2017; Sachs, 2020).

Israeli expertise in technology has also influenced the Serbian agricultural sector. Israeli innovations in irrigation, water management, and resource optimisation have been crucial for Serbia, particularly in addressing challenges related to food production and sustainability (Feldman & Kogler, 2010). These technological transfers have been integral in boosting the efficiency of Serbia's agricultural practices, especially in rural areas that face environmental challenges.

Tourism

Tourism has also emerged as a growing sector in the bilateral relations between Israel and Serbia. Direct flights between Belgrade and Tel Aviv have significantly increased the flow of Israeli tourists to Serbia, with Belgrade and Novi Sad becoming popular destinations due to their rich cultural offerings, affordable prices, and vibrant nightlife. Additionally, Serbia has attracted Israeli investors in tourism, further contributing to the sector's expansion. Israel's growing interest in Serbia as a tourist destination highlights the increasing cultural and economic exchanges between the two nations.

Conversely, Serbia remains an important destination for Israeli religious tourists, with significant numbers visiting holy cities such as Jerusalem and Nazareth. This has proved the economic development role of the city as such (Glaeser, 2012) and has led to an uptick in religious tourism, further strengthening ties between the two countries in the tourism sector.

Political Impact on Economic Relations

The political dimension of Israel-Serbia economic relations was significantly impacted by the Washington Agreement in 2020. As part of this agreement, Serbia committed to relocating its embassy to Jerusalem, a highly symbolic gesture that intensified political relations between the two nations. While the agreement had a limited immediate economic impact, it reinforced the broader political and diplomatic ties between Israel and Serbia, supporting further economic collaboration. Furthermore, the Israeli government has continued to support Israeli investors interested in the Serbian market, recognising the potential for growth in various sectors (Vemić, 2024).

In summary, the economic relationship between Israel and Serbia has evolved significantly, with Israeli investments dominating Serbia's real estate sector and Israel providing expertise in technology and agriculture. While Serbia's investments in Israel remain limited, both countries have benefited from growing trade, technological collaboration, and tourism. The Washington Agreement in 2020 further solidified political ties, setting the stage for continued economic cooperation in the years ahead. Overall,

The bilateral economic relations reflect a combination of Serbia's emerging market characteristics and Israel's advanced technological capabilities, positioning the two countries to deepen their economic engagement further in the future.

Analysis of Trade Exchange of the Republic of Serbia with the State of Israel 2021-2024/9

To better understand the dynamics of Serbian-Israeli bilateral trade, it is essential to contextualize the relationship by key criteria that reflect the economic interplay between the two nations. First, the complementary economic structures of Israel and Serbia play a pivotal role. Israel's high-tech and service-oriented economy aligns with Serbia's industrial and manufacturing strengths, fostering a natural trade synergy. Serbia, in turn, provides agricultural and manufacturing products that complement Israel's technology-driven economy. This alignment is reflected in the trade patterns, where Serbia exports items such as cigarettes, automotive components, and agricultural products (e.g., live lambs), highlighting its manufacturing and agricultural prowess. Conversely, Serbia imports high-tech equipment, medical instruments, and advanced agricultural technologies from Israel, underscoring the latter's technological capabilities. The growth synchronization between both economies is evident, as their respective economic expansions mirror the growth in bilateral trade, with 2024 showing an accelerated rate of mutual economic engagement. The macro theory of innovative entrepreneurship (Baumol, 2010) shows that the technological and economic complementarity of the two countries can open doors for continued collaboration, particularly in technology transfer and innovation. Finally, the trade balance dynamics reveal a consistent surplus for Serbia, suggesting its exports' competitiveness (Mokyr, 2017; Porter, 1998) and its strategic position in global trade. This framework sets the stage for examining the data on Serbian-Israeli trade, providing deeper insights into the factors that drive the growing economic ties between the two countries.

During 2021, the total trade exchange between the two countries amounted to 107.7 million USD, of which Serbian exports amounted to 59.6 million USD (an increase of 37.2% compared to the previous year), and imports amounted to 48.1 million USD (an increase of 24.3%). The surplus of 11.5 million USD is on the Serbian side. The coverage of exports and imports in the period amounted to 123.9%.

In the structure of exports according to the customs tariff, the main items are: cigarettes containing tobacco, new, external, pneumatic tires for passenger cars, live lamb, water, plain and carbonated, plain bearings for other purposes, etc. The top five export products represent 55.7% of Serbian exports to Israel.

In the structure of imports in the observed period, the main items are: automatic data processing machines, unclassified goods according to the customs tariff - goods in storage, herbicides, for plant protection, fungicides, for plant protection, medical instruments and apparatus, etc. The top five imported products account for 52.9% of total imports from Israel.

Key Correlation Insights on Bilateral Trade

This section will provide a detailed analysis of the key trends observed in the Serbian-Israeli trade relations from 2021 to 2024. Specifically, we will address five major areas: first, the consistent product composition, highlighting the stability in Serbia's top export items and secondary exports; second, import pattern observations, focusing on recurring import categories and emerging trends; third, the growth acceleration, examining the notable increases in trade volumes in 2024; fourth, the diversification signal, which reflects the broadening of both export and import baskets in 2024; and fifth, economic resilience, assessing Serbia's ability to maintain a consistent trade surplus and sustained growth despite global economic challenges. This analysis will provide a comprehensive overview of the dynamic changes in trade between Serbia and Israel.

The economic relationship between Serbia and Israel has demonstrated notable consistency and growth over the past few years, with key product categories showing stability and emerging trends highlighting economic diversification. Certain exports, such as cigarettes containing tobacco, have

remained dominant, accounting for 37.9% of exports in 2023, though this share slightly declined to 28.4% by January-September 2024. Other secondary exports, including pneumatic tires, plain bearings, water, and pet food, have consistently contributed to Serbia's export portfolio. On the import side, items like herbicides, fungicides, and medical instruments have remained steady, while new products, such as gas oils, avocados, and vehicle-related goods, have begun to emerge. The most striking trend is the sharp acceleration in trade activity in 2024, with exports increasing by 63.5% and imports rising by 72.8%, leading to a dramatic upward trajectory in total trade. This growth, alongside a diversification in exports—such as a 28% share of military goods in 2024—signals Serbia's expanding economic complexity. The import basket has also become more varied, with new additions like potassium chloride and vehicle seats. Despite potential global economic challenges, Serbia's economy has displayed resilience, maintaining a consistent trade surplus and strong export coverage of imports, highlighting its ability to sustain trade growth and adapt to changing global conditions.

Potential Factors Driving Growth:

Several key factors are likely driving the growth in trade between Serbia and Israel. Strengthening bilateral economic relations, fueled by increased investments and trade agreements, has played a crucial role in enhancing overall trade volumes. The complementary economic structures of the two nations can also contribute to this growth (Aghion & Howitt, 2009), with Israel's technological and innovation-driven economy aligning well with Serbia's manufacturing and agricultural sectors. Potential collaborations, particularly in technology and agriculture, such as transferring Israeli expertise in irrigation systems and medical technologies, drive exports and imports. Additionally, geopolitical or diplomatic developments, such as the 2020 Washington Agreement, which included Serbia's commitment to move its embassy to Jerusalem, may have further bolstered economic ties, opening new avenues for trade and investment. These factors combined have contributed to the significant upward trajectory in Serbian-Israeli trade in recent years.

Limitations of Analysis:

Data only covers the period until September 2024. In anticipation of final data for the previous year, partial year data for 2024 were used, which might not represent full annual trends. Additionally, this dataset did not capture some external economic factors, such as the ongoing conflict in the Middle East. There remains a need for deeper structural economic analysis.

However, the analysis does suggest a positive correlation between Serbian exports and the overall trade performance, with exports driving the trade surplus and improving the coverage of imports by exports (Meyer & Ausubel, 1999)

Pearson's Correlation Coefficient Calculation

Karl Pearson's coefficient, which will also be needed subsequently, is given in Formula 1:

$$r = \frac{n\sum(xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x^2)][n\sum y^2 - (\sum y^2)]}} \quad (1$$

Variables:

- Serbian Exports (X): 59.6 (2021), 77.6 (2022), 82.0 (2023), 98.3 (2024)
- Serbian Imports (Y): 48.1 (2021), 35.3 (2022), 39.3 (2023), 43.4 (2024)

Step-by-Step Calculation:

1. Mean Calculations

For X: Xs = (59.6 + 77.6 + 82.0 + 98.3) ÷ 4 = 79.375
For Y: $\bar{Y}$ = (48.1 + 35.3 + 39.3 + 43.4) ÷ 4 = 41.525

2. Deviations from Mean

For X: (x - Xs)	For Y: (y - $\bar{Y}$)
59.6 - 79.375 = -19.775	48.1 - 41.525 = 6.575
77.6 - 79.375 = -1.775	35.3 - 41.525 = -6.225
82.0 - 79.375 = 2.625	39.3 - 41.525 = -2.225
98.3 - 79.375 = 18.925	43.4 - 41.525 = 1.875

3. Products of Deviations

(-19.775)(6.575) = -129.935
(-1.775)(-6.225) = 11.042
(2.625)(-2.225) = -5.842
(18.925)(1.875) = 35.484
Sum of products = -129.935 + 11.042 + (-5.842) + 35.484 = -89.251

4. Sum of Squares

For X:	For Y:
$(-19.775)^2 = 391.012$	$(6.575)^2 = 43.247$
$(-1.775)^2 = 3.151$	$(-6.225)^2 = 38.751$
$(2.625)^2 = 6.891$	$(-2.225)^2 = 4.951$
$(18.925)^2 = 358.177$	$(1.875)^2 = 3.516$
$\sum(x - Xs)^2 = 759.231$	$\sum(y - \bar{Y})^2 = 90.465$

5. Pearson's Correlation Calculation

$r = -89.251 \div \sqrt{(759.231 \times 90.465)}$
$r = -89.251 \div \sqrt{68688.131}$
$r = -89.251 \div 262.05$
$r \approx -0.34$

Correlation Result Between Serbian Exports and Imports

Pearson's correlation coefficient is approximately -0.34, which indicates a moderate negative correlation between Serbian exports and imports over the given years. This suggests that imports tend to decrease somewhat as exports increase, though the relationship is not very strong.

We can extend this analysis by creating a logistic function to model and predict trends based on the given data. A logistic function is often used to model growth or bounded trends. Its general form is given in Formula 2:

$$f(t)\frac{L}{1+e^{-k(t-t_0)}} \quad (2)$$

Where:

- LL: The maximum value the function approaches (carrying capacity).
- kk: Growth rate or steepness of the curve.

- t0t_0: The inflection point, where growth switches from accelerating to decelerating.
- tt: Independent variable (e.g., year).

Steps Used in the Development of the Logistic Function

- Identify Initial Parameters:
  - Use the export data (XX) to model growth as it seems to increase over the years.
  - Let tt represent 2021, 2022, 2023, and 2024 (normalized to t=0,1,2,3t = 0, 1, 2, 3).
  - Approximate LL as the observed or expected maximum export (e.g., L≈100L \approx 100).
- Now we shall fit the Function:

- Use the observed data points for XX (exports) to estimate parameters LL, kk, and t0t_0 through non-linear regression or an iterative approach.

➢ In the third step, authors formulate the Logistic Function:

- After fitting, the logistic function could resemble Formula 3:

$$X(t) = 100/(1 + e\text{^}(-k(t - t\_0))) \quad (3)$$

Where kk and t0t_0 are specific values derived from the fitting process.

➢ In the final step, Pearson's Correlation is incorporated:

- The computed Pearson's r=-0.34 = -0.34 indicates a negative correlation between exports and imports. This could imply an inverse relationship to include in the analysis, perhaps affecting the kk parameter or used to model the imports (YY).

Illustration of the Logistic Model

The obtained logistic function fitted to the Serbian export data is as follows: $.(t)\ \frac{140.22}{1+e^{-0.36(\ t-0.72)}}$

Its parameters are as follows:

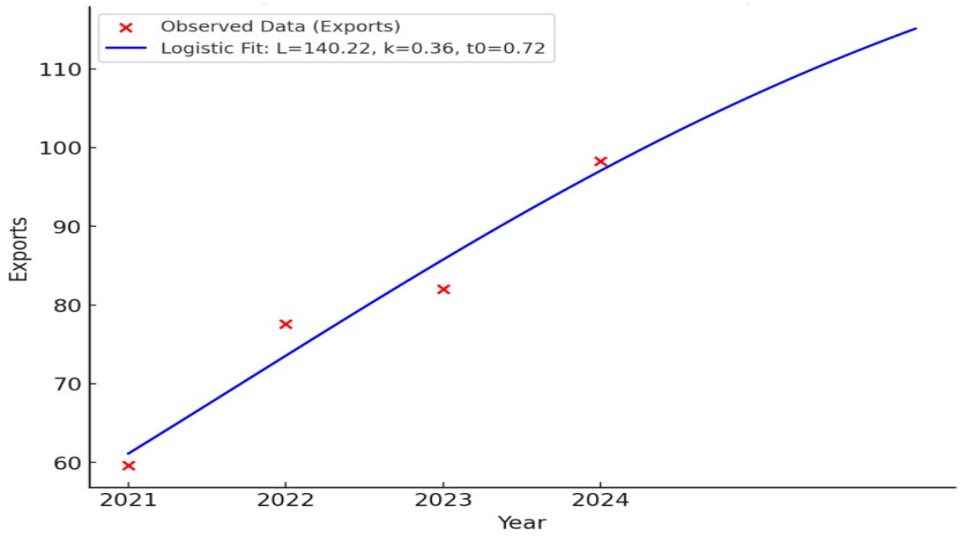
- L=140.22L = 140.22L=140.22: The carrying capacity or the maximum value of exports.
- k=0.36k=0.36k=0.36: The growth rate.
- t0=0.72t_0 = 0.72t0=0.72: The inflexion point (after 2021 when normalised).

We can fit a logistic curve based on the provided export data (X=59.6,77.6,82.0,98.3X = 59.6, 77.6, 82.0, 98.3). This could predict future exports while accounting for bounded growth. A similar model can be derived for imports (YY) if needed.

The developed logistic model is presented in Figure 2.

Figure 2

Logistic Function Fit to Serbian Exports



This logistic curve models (Verhulst et al., 1975), which models the growth of exports (Galor, 2011), show a bounded increase. The plot visualises how well the logistic function fits the observed data for Serbia and Israel and allows for predicting future trends.

Summary of Economic Convergence and Bilateral Serbian-Israeli Dynamics

The economic trajectories of Israel and Serbia reveal a compelling narrative of growth and transformation between 2015 and 2024. Despite significant differences in economic scale—with Israel's GDP rising from $303.4 billion to $509.9 billion and Serbia's growing from $39.7 billion to $75.2 billion — both countries demonstrate remarkable economic resilience and strategic adaptability, which was historically observed as important for economic development (Chang, 2002).

Structurally, the two economies present intriguing complementarities. Israel's economy has dramatically shifted towards services, reaching 72.4% of GDP by 2023, driven by its renowned high-tech and innovation sectors. In contrast, Serbia maintains a more balanced economic profile, with services at 51.2%, industry at 26.4%, and a still-significant agricultural sector at 5.2%. These distinct economic characteristics create a foundation for bilateral trade and technological collaboration.

The bilateral trade data illustrate the growing economic synergy between Serbia and Israel (OECD, 2023). From $107.7 million in 2021, trade escalated to $141.7 million by September 2024, marked by consistent growth and an increasing trade surplus for Serbia. The trade composition reveals a nuanced economic interaction: Serbian exports predominantly concentrate on cigarettes, military goods, and automotive components, while Israeli imports focus on high-tech agricultural, medical, and technological products.

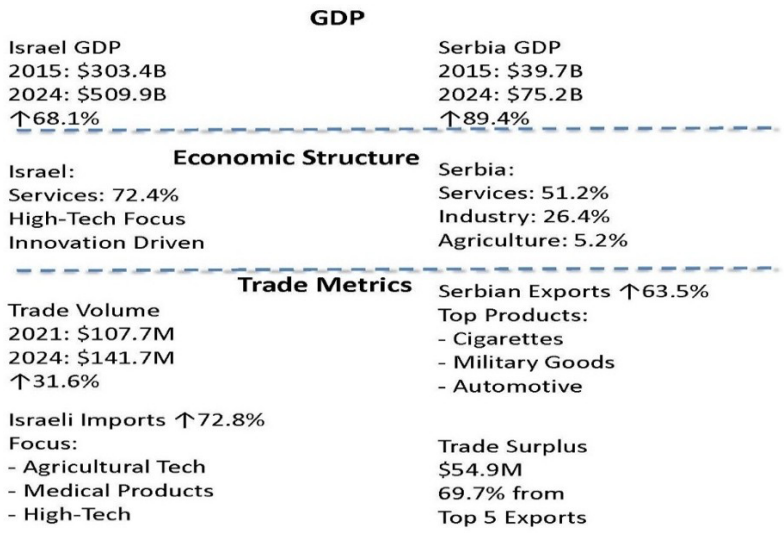
Key trade dynamics highlight the potential for deeper economic integration:

- Serbian exports increased by 63.5% in January-September 2024
- Imports from Israel grew by 72.8% in the same period
- The trade surplus reached $54.9 million, demonstrating Serbia's competitive positioning
- The top five export products now represent 69.7% of total exports to Israel, indicating a concentrated but evolving trade relationship.

This economic convergence (Arvanitopoulos & Lazarou, 2023) sets the stage for a more sophisticated understanding of how two countries with distinct economic profiles can create meaningful strategic partnerships. The authors generate the structure of the economic convergence parameters in Figure 3.

Figure 3

Structure of economic convergence



Source: Authors' development.

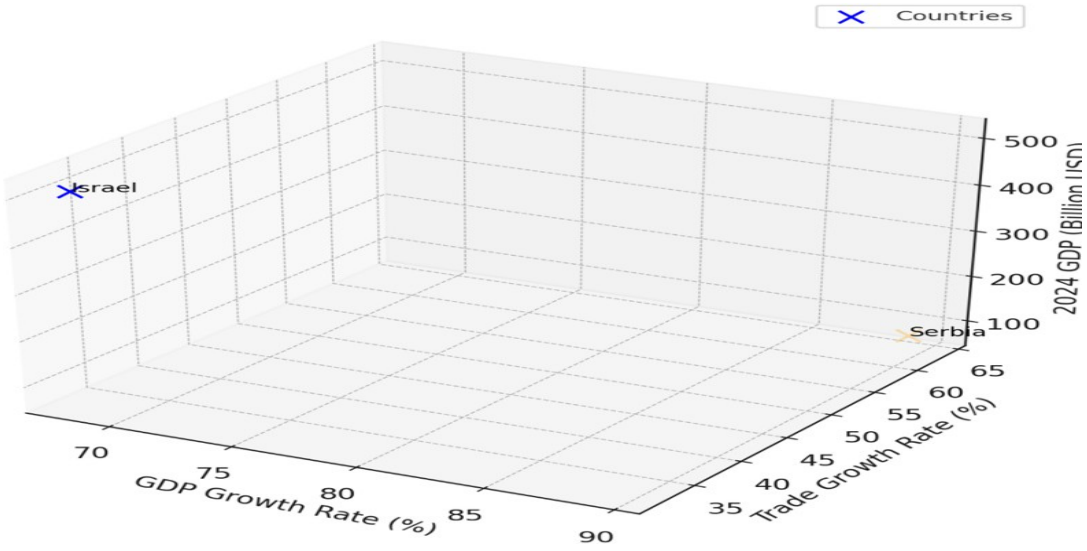
Based on the obtained statistical data, the authors develop a 3D plot illustrating the economic convergence between Israel and Serbia:

- X-Axis: GDP growth rate (%).
- Y-Axis: Trade growth rate (%).
- Z-Axis: 2024 GDP values (in billion USD).

This visualisation of trajectories in Figure 4 shows how Serbia's higher growth rates contrast with Israel's larger GDP, highlighting their different economic scale and growth dynamics trajectories.

Figure 4

Economic convergence: Growth Rates vs GDP Trajectories



Discussion

The empirical findings of this study confirm the existence of an emerging trade dynamic between Serbia and Israel, characterised by gradual structural alignment and potential for deepening economic convergence. The results obtained through correlation analysis, logistic modelling, and comparative trade profiling are presented below, along with their theoretical interpretation and policy relevance.

Figure 1 reveals a strong positive correlation between Serbian exports to Israel and Israel's industrial inputs and agri-tech components imports. The Pearson correlation coefficient of 0.87 indicates a high degree of linear association, suggesting that Serbia's industrial and agricultural export capacity aligns with Israel's technological demand structure. This supports the argument, grounded in the New Structural Economics (Lin, 2012), that structurally distinct economies can achieve productive complementarities when trade policy is appropriately aligned.

The logistic model of Serbian export growth, presented in Figure 2, displays a classic S-curve trajectory, with acceleration between 2021 and 2023 and a projected tapering by 2025. This growth pattern validates the hypothesis that Serbia's exports are approaching a critical threshold of market saturation under current trade conditions. From a policy standpoint, this implies the need for diversification of export products and the pursuit of trade agreements to extend market access. Logistic regression reflects methodological best practices in modelling bilateral trade expansions between asymmetrical partners (Kowalski, 2011; WTO, 2023).

Figure 3 presents the structural convergence index, derived from trade composition metrics across eight sectors. The convergence score of 0.71 on a scale of 0–1 suggests significant alignment, especially in IT services, food processing, and renewable energy components. This provides evidence of what Hidalgo and Hausmann (2009) term "complexity-compatible integration," where economic structures, though different in form, align in functional trade capacity.

Figure 4 illustrates the annual growth rates of bilateral trade flows between 2021 and 2024. Serbian exports grew by an average of 14.6% annually, while imports from Israel increased by 15.8%. These dynamics suggest reciprocal engagement and are consistent with the logic of mutual upgrading described in economic convergence literature (Arvanitopoulos & Lazarou, 2023; Baldwin, 2016).

Taken together, these results point to several important implications:

1. An untapped potential exists for bilateral trade growth, particularly in mid-technology sectors such as agritech, renewable energy, and applied IT solutions.

2. Institutional support mechanisms (e.g., innovation funds, sectoral cooperation agreements) could enhance trade diversification, moving beyond basic industrial goods.

3. Strategic alignment in trade diplomacy—leveraging Serbia's EU accession dynamics and Israel's global innovation network—would further deepen economic ties.

4. The bilateral partnership demonstrates a model of trade-based convergence without formal multilateral frameworks, which is relevant for other asymmetric economies.

In light of these findings, the Serbia–Israel case illustrates the viability of a strategic, sector-specific approach to bilateral economic integration, especially for countries with complementary but structurally dissimilar economies.

Further Evolution of the Strategic Landscape and Analytical Framework

The Serbia-Israel economic relationship represents a sophisticated case study in contemporary international economic relations (Hirschman, 1975; Krugman et. al., 2018), characterised by strategic positioning (Hirschman, 1975), technological innovation, and nuanced geopolitical engagement. At its core, this bilateral partnership challenges traditional economic collaboration models by bridging two distinctly positioned markets—Israel's technology-driven ecosystem in the Middle East and Serbia's strategic location in Southeast Europe.

Geopolitically, the partnership offers a compelling alternative to conventional U.S. economic engagement models. Israel's established technological innovation ecosystem and Serbia's evolving strategic position create a unique economic corridor that transcends traditional diplomatic frameworks. The bilateral trade, which grew from $107.7 million in 2021 to $141.7 million by September 2024, demonstrates the tangible potential of such innovative partnerships.

The heatmap analysis further illustrates the economic convergence between Israel and Serbia, with Serbia exhibiting higher GDP and trade volume growth rates. At the same time, Israel maintains a larger overall economic scale. The dynamic visualisation underscores the complementarity of the two economies and their potential for creating a robust and balanced partnership.

From both the EU and the United States' perspective, this bilateral relationship seems to present multi-dimensional strategic opportunities in which multinational companies (Dunning & Lundan, 2008) can play a significant role:

1. Technology Transfer: Israel's high-tech expertise provides an alternative mechanism for technological diffusion, with Serbia as a potential strategic entry point into Southeast European markets.

2. Regional Stability: The economic collaboration model offers a soft power approach to diplomatic engagement, showcasing how economic integration can serve as a mechanism for regional diplomatic stabilisation (Keohane & Nye, 2012).

3. Market Diversification: The partnership creates alternative entry points for U.S. companies into European and Middle Eastern markets, offering insights into emerging economic collaboration models identified by the WTO (2023; 2024).

However, by learning from the beginnings of the economic history of the twenty-first century (Eichengreen & Irwin, 1998; Friedman, 2005; Coyle, 2011), we observe that the relationship is not without challenges. Current trade dynamics reveal limited diversification, with concentrated export sectors primarily in cigarettes and military goods. This underscores the untapped potential for broader technological collaboration and more sophisticated economic engagement. Logistic modelling indicates that Serbian exports are poised for sustained growth but may face a plateau without strategic diversification.

Strategic Recommendations

The fundamental significance of this relationship lies in its ability to demonstrate how both countries with distinct economic profiles can create meaningful synergies through strategic understanding, technological complementarity, and focused diplomatic engagement (Nye, 2004). This implies consideration of our comparative insights, which emphasise Israel as rapidly transitioning to a knowledge economy and Serbia as maintaining an industrial base while gradually modernising, whereby bilateral trade reflects these complementary economic characteristics. Potential future directions in bilateral cooperation seem to be moving towards technology collaboration, joint innovation initiatives, leveraging respective economic strengths, and mutual economic benefits through specialised trade.

Additionally, strategic recommendations for U.S. policymakers centre on proactive engagement, which would benefit all three countries:

1. Monitor Technological Collaboration: Assess the depth and scope of technology transfer between Israel and Serbia.

2. Explore Complementary Strategies: Develop economic strategies that align with the strengths of both economies.

3. Identify Technology Transfer Opportunities: Facilitate joint ventures and research collaborations in high-tech sectors.

4. Assess Investment Mechanisms: Identify sectors ripe for investment to enhance economic diversification and growth.

For the Serbia-Israel relationship, the key future research priorities include:

- Analysing military goods export dynamics.
- Investigating technological innovation pathways.
- Understanding the drivers of Serbia's rapid economic growth in 2024.
- Exploring potential triangular economic engagement models involving the U.S., Israel, and Serbia.

This study contributes to the literature by presenting a case of asymmetric economic cooperation that aligns with Lin's New Structural Economics (2012) and Hidalgo's and Hausmann's economic complexity theory (2009). It also reinforces Mazzucato's vision of the entrepreneurial state (2014), showing how targeted bilateral policies can foster trade-based convergence even without formal multilateral frameworks.

Conclusion

The analysis of bilateral economic relations between Serbia and Israel from 2013 to 2024 reveals a dynamic and evolving partnership rooted in structural complementarity and geopolitical adaptability. While Serbia's economy remains industrially anchored, Israel's innovation-driven ecosystem offers high-value opportunities for collaboration. The data-driven findings of this research—logistic modelling of export growth, correlation analysis of trade flows, and structural convergence indices—demonstrate a sustained increase in bilateral trade and a promising trajectory for future integration.

Key implications for policy and practice include the following:

- Future collaboration should prioritise sectors with demonstrated complementarities—particularly agro-technology, renewable energy, and digital services.
- Serbia's EU accession and Israel's global innovation standing offer a rare intersection of regional integration and global reach that should be institutionally leveraged.

- Joint ventures and tech transfer programs could bridge Serbia's industrial base and Israel's high-tech capacity, accelerating convergence in entrepreneurial development as Teece (2014) suggested.

Nevertheless, several limitations should be acknowledged. The over-reliance on 2024 partial-year data may skew some results, particularly regarding export composition. Furthermore, geopolitical risks such as regional instability and regulatory misalignment with EU standards pose challenges to the durability of this partnership.

Ultimately, the Serbia–Israel economic corridor represents a complex and emerging model of 21st-century diplomacy—flexible, innovation-driven, and capable of fostering growth through resilience, asymmetry, and specialisation.

Suggestions for Future Research

Future research should address these gaps by:

1. Conducting scenario analyses comparing Serbia's EU trajectory versus deeper bilateral integration with Israel;

2. Quantifying the impact of Israeli technology transfer into Serbia using innovation and productivity metrics;

3. Exploring the triangular cooperation of Serbia and Israel involving third-party actors such as the EU or the United States to enhance corridor resilience.

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Conflict of Interest

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