MTÜ Sosyal ve Beşeri Bilimler Dergisi
Yıl: 2025, Cilt:5, Sayı:1, Sayfa:119-136

Analysis of Competition, Specialization and Intra-Industry Trade in the Perspective of Globalization According to Net Trade Index of Türkiye and BRICS Economies

Türkiye ve BRICS Ekonomilerinin Net Ticaret İndeksine Göre Küreselleşme Perspektifinde Rekabet, Uzmanlaşma ve Endüstri İçi Ticaret Analizi

Emre BARUTÇU
Öğr. Gör., Hatay Mustafa Kemal Üniversitesi
Dış Ticaret Bölümü
emrebarutcu@mku.edu.tr
0000-0001-7972-6434

Makale Başvuru Tarihi: 27.04.2025
Makale Kabul Tarihi:16.06.2025
Makale Türü/Article Type: Araştırma Makalesi

Abdullah YILDIZ
Öğr. Gör. İskenderun Teknik Üniversitesi
Ekonomi-Finans Bölümü
yidizabdullah655@gmail.com
0000-0003-3001-9477

ÖZET

Bu çalışma, küreselleşmenin dış ticarette yarattığı katma değerli sektörlerdeki farklılıkları ve bunların Türkiye ve BRICS ülkelerinin rekabet gücü üzerindeki etkilerini incelemektedir. 2017-2022 yılları arasındaki dış ticaret verileri kullanılarak açıklanmış karşılaştırmalı üstünlük indekslerinden Net Ticaret İndeksi (NTI) hesaplanmakta ve ülkelerin endüstri içi ticaret seviyeleri analiz edilmektedir. Çalışma, dış ticarette yüksek katma değerli ve teknoloji yoğun ürünlerdeki artışın ülkelerin küresel rekabet avantajlarını ve sürdürülebilir üstünlük elde etme kapasitelerini nasıl etkilediğini değerlendirmektedir. BRICS ülkeleri arasında Brezilya doğal kaynaklar ve tarımsal ihracat, Rusya enerji üretimi ve hammadde, Hindistan bilgi teknolojileri ve insan kaynakları, Çin imalat ve teknolojik yenilik, Güney Afrika ise maden kaynakları ile öne çıkmaktadır. Türkiye'nin dış ticaret yapısı da bu çerçevede analiz edilmekte ve ISIC Rev. 3 sınıflandırması kullanılarak küresel pazarlardaki sektörel rekabet gücüne odaklanılmaktadır. Çalışma, küreselleşmenin ülkelerin mevcut ekonomik yapıları üzerindeki dönüştürücü etkilerini vurgulamaktadır. Bu bağlamda yüksek katma değerli ürünlerin küreselleşme perspektifinde dış ticaretteki önemini ortaya koymakta ve özellikle Türkiye ve BRICS ülkelerinin dış ticaret performansı analiz edilmiştir. Söz konusu ülkeler, küreselleşme sürecinde açıklanmış karşılaştırmalı üstünlük ve rekabetçilik bağlamında detaylı olarak incelenmektedir. Araştırmadan elde edilen bulgular, dış ticaret politikalarının yalnızca hacimsel büyümeye değil, aynı zamanda yüksek teknoloji ve katma değerli ürünlere odaklanan bir dönüşüme sahip olması gerektiğini ortaya koymaktadır. Türkiye ve BRICS ülkeleri için politika yapıcıların sürdürülebilir rekabet avantajı elde etmek amacıyla sektörel çeşitlendirmeyi artırmaları, Ar-Ge yatırımlarını güçlendirmeleri ve küresel değer zincirlerine daha etkin bir şekilde entegre olmaları kritik önem taşımaktadır.

Anahtar Kelimeler: *Küreselleşme, BRICS, Net Ticaret İndeksi, Dış Ticaret, Rekabetçilik*

ABSTRACT

This study examines the differences in value-added sectors created by globalisation in foreign trade and their effects on the competitiveness of Turkey and BRICS countries. Using foreign trade data for 2017-2022, the Net Trade Index (NTI), one of the indices of revealed comparative advantage, is calculated and the intra-industry trade levels of countries are examined. The study evaluates how the increase in high value-added and technology-intensive products in foreign trade affects countries' global competitive advantages and their capacity to achieve sustainable advantage. Among the BRICS countries, Brazil stands out with natural resources and agricultural exports, Russia with energy production and raw materials, India with information technologies and human resources, China with manufacturing and technological innovation, and South Africa with mining resources. Turkey's foreign trade structure is also analysed within this framework and sectoral competitiveness in global markets is focused on using the ISIC Rev. 3 classification. The study highlights the transformative effects of globalisation on the current economic structures of countries in foreign trade. In this context, it reveals the importance of high value-added products in foreign trade in the perspective of globalisation and analyses the foreign trade performance of Turkey and BRICS countries in particular. These countries are analysed in detail in the context of explained comparative advantage and competitiveness in the globalisation process. The findings of the study reveal that foreign trade policies should have a transformation that focuses not only on volume growth but also on high technology and value-added products. For Turkey and BRICS countries, it is critical for policymakers to increase sectoral diversification, strengthen R&D investments and integrate more effectively into global value chains in order to achieve sustainable competitive advantage.

Keywords: *Globalisation, BRICS, Net Trade Index, Foreign Trade, Competitiveness*

1. INTRODUCTION

The impact of globalisation on economies is gradually increasing, and thus we see that foreign trade, one of the milestones of globalisation, is gradually transforming into a high value-added structure. Globalisation has become the cornerstone of modern economic development by promoting interdependence and interconnectedness among nations (Krugman, 1991). By eliminating trade barriers and enhancing international cooperation, globalisation has enabled the efficient allocation of resources, the expansion of markets, and the acceleration of technological diffusion (Grossman & Helpman, 1991; Balassa, 1965). Developing countries have benefited from increased foreign direct investment, access to advanced technologies, and integration into global value chains, which has contributed to productivity gains and structural transformation (Fagerberg, 1987). However, globalisation also presents significant challenges, such as income inequality, labour displacement, and environmental degradation (Rodrik, 1997). As economies become more integrated, addressing these inequalities requires sound public policies that balance the benefits of globalisation with sustainable and equitable growth.

The impact of globalisation on economies is gradually increasing, and thus we see that foreign trade, one of the milestones of globalisation, is gradually transforming into a high value-added structure. Globalisation has become the cornerstone of modern economic development by promoting interdependence and interconnectedness among nations (Krugman, 1991). By eliminating trade barriers and enhancing international cooperation, globalisation has enabled the efficient allocation of resources, the expansion of markets, and the acceleration of technological diffusion (Grossman & Helpman, 1991; Balassa, 1965). In this context, trade patterns and comparative advantages have undergone significant transformations. Developing countries have benefited from increased foreign direct investment, access to advanced technologies, and integration into global value chains (Fagerberg, 1987). However, globalisation also presents significant challenges, such as income inequality, labour displacement, and environmental degradation (Rodrik, 1997). As economies become more integrated, addressing these inequalities requires sound public policies that balance the benefits of globalisation with sustainable and equitable growth.

The share of products and services subject to foreign trade, and particularly the share of high value-added products, is increasing with globalisation. In this context, the share of high-tech products in foreign trade earnings is consistently increasing. The basis of this situation is the increase in competition between countries in Research and Development (R&D) oriented technology knowledge intensive products. Especially in recent years, R&D, which has become one of the dynamics of globalisation in the competitive environment that has increased with globalisation in recent years, contributes to the economies of countries to obtain competitive advantage in foreign trade, to specialise, to obtain comparative advantage and to achieve competitiveness. With the impact of globalisation, the ability of countries to compete against their competitors is important for their economic survival.

This study examines the competitiveness achieved in foreign trade with globalisation in terms of revealed comparative advantage (RCA). In this context, countries that gain advantage in foreign trade with globalisation, especially in technology and knowledge-intensive products, gain a more sustainable advantage in foreign trade. This development leads to the emergence and development of the information society, which is the paradigm of the 21st century.

Nowadays, goods and capital movements have gained more momentum in parallel with globalisation and this situation has led to the rise of new opportunities and challenges for countries in foreign trade. Countries that take advantage of these opportunities and eliminate the threats, gain a competitive

advantage and comparative advantage in the relevant product sectors in foreign trade and draw a more successful graphic in the globalisation process compared to other countries.

BRICS, consisting of Brazil, Russia, India, China, South Africa and South Africa, constitute a group of various emerging economies that utilise their comparative advantages to increase their competitiveness on the global stage. Brazil benefits from its vast natural resources and agricultural exports, while Russia's strength lies in energy production and raw materials. India is characterised by its advanced information technology sector and human capital, while China has a greater emphasis on manufacturing and technology innovation. South Africa, although smaller, serves as a gateway to African markets with its rich mineral resources. It is thought that these countries aim to be economically strong by developing trade together, fostering innovation and by defending global economic governance.

This study aims to reveal the return provided by foreign trade by addressing the sectoral value-added differences in the products in question in the foreign trade of Turkey and BRICS countries with the dimension of globalisation. In this context, sectoral foreign trade data between 2017-2022 and NTI (Net Trade Index), one of the indices used to measure competitiveness in foreign trade, were used. According to the NTI scores obtained, the situation of Turkey and BRICS (Brazil, Russia, India, China, South Africa) countries within the scope of intra-industry trade was analysed. Within the framework of this analysis, it also aims to reveal the level of intra-industry trade by revealing the sectoral competitiveness in the whole world market in foreign trade and the gain from the global market according to ISIC Rev. 3 classification Furthermore, this analysis categorises the products subject to foreign trade according to their technology intensity and reveals the return provided by foreign trade by considering sectoral value-added differences through the lens of globalisation, thus contributing to the literature by offering a more nuanced understanding of trade performance and competitiveness across sectors.. This study categorises the products subject to foreign trade according to their technology intensities and analyses the returns from foreign trade of these products through sectoral value added differences, taking into account the globalisation dimension. This approach adds a new dimension to the Net Trade Index (NTI)-based analyses; it reveals not only the competitiveness but also the level of technology and value-added at which this competition emerges. In this respect, the study differs from the existing studies in the literature by integrating the NTI with technology intensity classification and contributes to a more holistic assessment of global trade performance at the sectoral level.

Furthermore, this analysis categorises the products subject to foreign trade according to their technology intensity and reveals the return provided by foreign trade by considering sectoral value-added differences through the lens of globalisation, thus contributing to the literature by offering a more nuanced understanding of trade performance and competitiveness across sectors.

2. COMPETITIVENESS ANALYSIS THROUGH THE REVEALED COMPARATIVE ADVANTAGE APPROACH: FINDINGS FROM THE LITERATURE

A review of the literature reveals that although a large number of studies have used indices such as NTI and Balassa to measure foreign trade performance in terms of revealed comparative advantage, most of these studies focus either on individual country cases or on comprehensive regional aggregates. Moreover, there are very few studies that integrate sectoral value added data with technology intensity classifications to measure the structural returns to trade in the globalisation process. This study differentiates itself by combining the Net Trade Index analysis with sector-specific technological classification and applying it comparatively to Turkey and BRICS countries over the last six years. In doing so, it attempts to fill the gap in the literature by providing a

multidimensional and globally comparative perspective on trade competitiveness and structural change.

In this section, there are some examples of literature studies that aim to measure competitiveness with net trade index and/or other indices.

Bashimov (2016) analysed the competitiveness of the Turkish economy in apple exports between 1990 and 2014 with Balassa and Vollrath indices. According to the index scores obtained, it is seen that Turkey specialised in apple exports between 1990-1998 and gained competitiveness, but Turkey lost its level of specialisation and competitiveness in apple exports in the following years.

Şahinli (2011) evaluated the competitiveness of cotton sector exports of the Turkish economy in the period 2001-2009 with the Balassa index. According to the analysis of the Balassa index scores obtained, Turkey has export competitiveness and high specialisation level in the foreign trade of cotton and some cotton products, but not in others.

Kök and Çoban (2005) measured the specialisation level and competitiveness of the Turkish textile and clothing sector in the 1989-2001 period by using the Balassa index. According to the analysis scores, it was concluded that the specialisation level and export competitiveness of the Turkish textile and clothing sector against the EU countries is quite high. In addition, it has been also determined that this competitiveness has been decreasing in recent years.

Çestepe (2012) evaluated the export competitiveness of the Turkish economy to the Middle East in the period 1999-2009 with Balassa index analysis. According to the Balassa index analysis scores obtained, it is determined that the foreign trade with the selected 5 countries in the Middle East, with which we do the most foreign trade during the period analysed, has a high degree of specialisation and competitiveness in labour-intensive sectors, and it is concluded that some of the technology-intensive sectors have gained a high degree of specialisation and competitiveness. In addition, from the beginning to the end of the period analysed, the number of products with export competitiveness has increased.

Bashimov (2019) analysed the level of specialisation and export competitiveness of the copper sector of the Uzbekistan economy in the period 2001-2017 with Balassa and Lafay index scores. According to the index scores analysis obtained for the period examined, it was determined that Uzbekistan has a strong competitiveness and specialisation level in copper exports.

Sarıçoban and Kaya (2021) aim to measure the competitiveness and specialisation levels of these countries with the NTI and Vollrath index analysis scores obtained with the data of ten countries exporting wood and wood products for the period 2010-2019. According to the analysis scores obtained, it is concluded that Poland, Malaysia, Austria, Vietnam, Canada, Indonesia, Germany, and the USA have competitiveness in wood and wood products and have a high level of specialisation.

Sarıçoban and Yalçın (2020), in a study to determine Turkey's export competitiveness in the carpet sector and a comparison of export specialisation levels with countries with a relatively high share in carpet exports. The rate of export and import data of the countries for the years 2008-2017 were categorised according to the SITC Rev. 3 classification and NTI analysis scores were obtained. According to the NTI analysis scores, it was concluded that Turkey and China specialise in the exports of all carpet product groups (have competitive advantage), while according to the Vollrath index analysis scores, Turkey specialises in the exports of 4, China 2 and India 5 carpet product groups (have competitive advantage).

Sarıçoban (2022) evaluated the status of Turkey's foreign trade and intra-industry trade in medical product groups published by the World Bank on COVID-19 according to NTI analysis scores in 8

different groups: Test Kits Used in Diagnostic Testing, Protective Clothing and the Like, Disinfectants and Sterilisation Products, Oxygen Therapy Equipment and Pulse Oximeters, Other Medical Devices and Equipment, Other Medical Consumables, Tools and Other Medical Products. According to the results of the analyses, there is generally no competitiveness and comparative advantage in foreign trade in medical product groups related to COVID-19. Therefore, there is a comparative disadvantage in foreign trade in these product groups. In addition, in terms of intra-industry trade, there is no intensive intra-industry trade in these product groups, that is, there is inter-industry trade.

Yalçın and Sarıçoban (2020) reveals the specialisation levels of BRICS countries and Turkey in foreign trade according to SITC Rev. 3 classification by making a comparative analysis with NTI and Vollrath index. According to the analysis scores obtained, competitiveness and comparative advantage in foreign trade of certain product groups have been determined in all of the countries examined. In certain product groups, weakness in foreign trade competitiveness, comparative disadvantage was detected. In other product groups, competitiveness in foreign trade and a comparative advantage have been detected in general. In addition, according to the scores obtained in terms of intra-industry trade, there is no intensive intra-industry trade in the product groups examined in these countries, that is, there is inter-industry trade.

Kara, Altınay and Erkan (2020) analysed foreign trade competitiveness and specialisation level for automotive companies listed in Borsa Istanbul (BIST) in Turkey by using NTI and Lafay, Balassa and Vollrath indices for the period 2007-2017. According to the results of the analysis, it was determined that the automotive companies under study have low level of competitiveness in foreign trade.

Bozduman and Erkan (2019a) measured the competitiveness of Kazakhstan in foreign trade of four product groups according to NTI and Lafay indices for the period 2000-2016. According to the analysis scores, there is full competitiveness in natural gas and full advantage in foreign trade, while in the other three product groups, there is relative competitiveness in petroleum and petroleum products, non-ferrous metals, processed leather and fur.

Bozduman and Erkan (2019b) examined the product groups in which the member countries of the Shanghai Cooperation Organisation have an advantage according to the NTI, Lafay, Balassa and Vollrath indices by classifying the product groups in which the member countries of the Shanghai Cooperation Organisation specialise in SITC Rev. 3 for the period 2000-2016. According to the results of the analysis, Russia specialises in organic and inorganic chemical products, Kazakhstan in inorganic chemical products, India in medical and pharmaceutical products and motor vehicles. China specialises in inorganic chemical products, medical and pharmaceutical products, parts of other general industrial machinery and equipment, office and automatic machinery, communication and sound recording equipment, motor vehicles, optical goods and watches. It is concluded that Pakistan and Kyrgyzstan cannot specialise in any specific product.

Erkan and Bozduman (2019) analysed the competitiveness and specialisation level in the tourism sector for the Turkish economy for the period 2003-2017 using NTI, Balassa and Import-Export Ratio indices. According to the analysis scores obtained in general, Turkey has achieved a high level of specialisation in the tourism sector and has a moderate competitive advantage.

Erkan and Bozduman (2018) measured the sectoral specialisation and competitiveness of the Indian economy in foreign trade between 2000-2016 according to SITC Rev. 3 classification and NTI and Balassa, Vollrath, Export Import Ratio indices. The obtained analysis scores show that India specialises in 31 out of 66 product groups. It shows that India specialises in labour-intensive product groups and has competitiveness in the export of these products. In other words, it is seen that a large

part of India's foreign trade is based on high value-added technology-intensive goods. However, India's competitiveness and specialisation level in foreign trade of high-tech product groups has been steadily increasing.

Erkan and Batbaylı (2018) measured the competitiveness of the Fragile Five (Brazil India, Indonesia, South Africa and Turkey) using the NTI and Export Import Ratio index with data from 2000-2014. According to the results of the analysis, it is seen that the Fragile Five have gained competitiveness and specialised in the foreign trade of raw material-intensive and labour-intensive goods, which are predominantly low value-added. On the other hand, they have partially achieved domestic specialisation in capital-intensive goods, which are technology-based goods groups. Therefore, in terms of the results of the NTI analysis, it is concluded that the competitiveness of these countries in foreign trade is mainly in raw material, labour and capital-intensive goods.

Müftüoğlu and Kayacan (2019) measured Turkey's foreign trade competitiveness for wood cork, wood and timber using NTI and Export Import Ratio indices with data for the period 1995-2009. According to the analysis scores obtained, Turkey's competitiveness in these products did not clearly emerge during the period examined. In this framework, it is stated that there is a disadvantage in foreign trade for these products in the Turkish economy.

Becuwe and Blancheton (2016) measured the level of specialisation and competitiveness of the French textile sector between 1836-1938 using the Lafay index. In the study, 15 products related to the textile sector in the French economy were evaluated in 3 groups. According to the analysis of the index scores, it was determined that in general, there is no continuous specialisation and competitiveness in these 3 product groups, but there is no competitive disadvantage.

Reyes (2014) measured the level of economic specialisation and competitiveness of 6 ASEAN member countries in the period 2007-2011 by using Lafay and Balassa indices. According to the analysis scores obtained, it is concluded that Brunei's competitiveness is in petroleum, Indonesia's and Malaysia's competitiveness is in animal and vegetable fats and oils, fats and oils and similar products, Philippines' competitiveness is in electrical and electronic equipment exports, Singapore's competitiveness is in organic chemicals, and Thailand's competitiveness is quite high in business vehicles other than railway and tramways.

3. SELECTION OF THE COMPETITIVENESS MEASUREMENT INDEX AND CONCEPTUAL FRAMEWORK

In the literature, A wide range of studies have employed various indices such as the Balassa index, the Net Trade Index (NTI), and other trade intensity measures to assess international trade specialization and revealed comparative advantage (Yeats, 1985; Vollrath, 1991; Laursen, 1998). These studies provide both theoretical and empirical frameworks for understanding sectoral competitiveness and the dynamics of international trade patterns. These indices have advantages and disadvantages at certain points against each other. One of the most well-known and frequently used indices in the literature, especially to measure the level of intra-industry trade, is the NTI. In addition to these features, since it measures competitiveness by giving equal shares to exports and imports, NTI was preferred to be used in our study.

NTI contributes to the measurement of intra-industry trade and comparative advantage by taking into account both export and import data. In this respect, NTI stands out against comparative advantage coefficients obtained only with export data. NTI is obtained by dividing the size of net exports of a particular sector by the sum of exports and imports. (Balassa and Noland, 1989). In addition, the index defined as net export ratio in some sources is calculated in the same way as NTI.

The NTI is formulated as follows.

$$\text{Net Trade Index } (NTI^{j}_{kt}) = \frac{X^{j}_{kt} - M^{j}_{kt}}{X^{j}_{kt} + M^{j}_{kt}}$$

Variable Definitions:

- $\mathbf{X^{j}_{kt}}$ → Represents the total exports (X) of country *j* in sector (or product) *k* during period *t*.
- $\mathbf{M^{j}_{kt}}$ → Represents the total imports (M) of country *j* in sector (or product) *k* during period *t*.

NTI takes values between -1 and +1. If the NTI result is greater than zero (NTI > 0), the country is export intensive in that sector. On the contrary, if the index result is less than zero (NTI < 0), it is concluded that the country is import intensive in that sector Amighini (2005). When the NTI score is equal to +1 (indicating full exporter status) or -1 (indicating full importer status), trade is characterised by inter-industry trade, as there are no simultaneous exports and imports of the same product group. In contrast, NTI values close to 0 indicate intra-industry trade, where exports and imports of the same product are relatively balanced.. Conversely, as the NTI score approaches 0, intra-industry trade increases while inter-industry trade decreases.

To summarise;

NTI^{j}_{kt}=1 If the country is a full exporter and has full comparative advantage and there is not intra-industry trade but inter-industry trade

$0 < NTI^{j}_{kt} < 1$, If the country is an intensive exporter, i.e. has a partial comparative advantage and intra-industry trade and inter-industry trade are relatively

NTI^{j}_{kt}= 0, If the country is in an importer position as well as an exporter, there is no comparative disadvantage or advantage and there is exactly intra-industry trade but not inter-industry trade

$0 > NTI^{j}_{kt} > -1$ If , the country is an intensive importer, i.e. it has a partial comparative disadvantage and intra-industry trade and inter-industry trade are relatively in question

NTI^{j}_{kt}=-1 If the country is a full importer, it has a full comparative disadvantage and intra-industry trade is not in question, but inter-industry trade is in question

3.1. Methodology

In the study, annual foreign trade data for the years 2017-2022, divided into four technological levels as low, medium-low, medium-high and high according to ISIC Rev3 classification, are used. The analysis focuses on assessing the competitiveness and comparative advantage of Turkey and BRICS countries in foreign trade by sector through the calculation of the NTI. Moreover, the calculated index scores are used to examine the stages of intra-industry and inter-industry trade in the analysed sectors and provide a comprehensive assessment of trade dynamics and industrial competitiveness.

Net exports and total foreign trade data of BRICS countries and Turkey, which are considered as key players in building a strong and balanced global economic structure in a globalised world, were obtained from the World Bank database (https://wits.worldbank.org/), subject to data availability. Using these foreign trade figures, NTI scores are calculated and presented graphically by country. The study aims to determine which countries have a competitive advantage in foreign trade in certain technology sectors in line with globalisation trends. The analysis also investigates which countries have achieved comparative advantage and assesses their position in terms of intra-industry trade dynamics..

In addition, there are many indices in the literature for measuring sectoral competitiveness. Among these indices, NTI is one of the widely used methods in the literature since it gives equal weight to imports and exports in the measurement of competitiveness and provides a comprehensive framework for the evaluation of intra-industry trade. In this respect, NTI was preferred as the index most compatible with the purpose and data structure of our study. However, the limitations of this method should also be taken into consideration. Since NTI is based only on foreign trade data, it cannot directly reflect other determinants of competitiveness such as production structure, technology transfer and value added ratio. In addition, since the most recent data on the sectoral foreign trade of the countries analysed in the period when the study was conducted belonged to 2022, data for the years 2023 and 2024 could not be included in the evaluation since they have not yet been published.

4. SPECIALISATION AND COMPETITIVENESS ANALYSIS

Countries' advantages or disadvantages in foreign trade are categorised by commodity groups and analysed separately within the NTI framework, together with intra-industry and inter-industry trade dynamics. Following this analysis, a comprehensive comparative assessment will be made to evaluate the current specialisation and competitiveness of countries.

NTI Scores by Country and Technology Level (2018–2022)

Country	Tech Level	2018	2019	2020	2021	2022
Brazil	*LowTech*	0.51945	0.52104	0.57762	0.58165	0.62161
Brazil	*MedLowTech*	-0.11391	-0.08894	-0.03243	-0.05346	-0.06478
Brazil	*MedHighTech*	-0.38894	-0.46370	-0.49741	-0.53305	-0.54909
Brazil	*HighTech*	-0.56326	-0.62754	-0.72412	-0.77404	-0.76065
Russia	*LowTech*	-0.19064	-0.16008	-0.11478	-0.06508	---------
Russia	*MedLowTech*	0.59652	0.55583	0.57031	0.57428	---------
Russia	*MedHighTech*	-0.29349	-0.28147	-0.33288	-0.30011	---------
Russia	*HighTech*	-0.69691	-0.67240	-0.75180	-0.68435	---------
India	*LowTech*	0.35599	0.44828	0.45135	0.43421	0.37041
India	*MedLowTech*	-0.12189	-0.01819	-0.00270	-0.01773	0.09062
India	*MedHighTech*	-0.23425	-0.11846	-0.12475	-0.19365	-0.23914
India	*HighTech*	-0.45133	-0.32761	-0.24804	-0.31006	-0.28830
China	*LowTech*	0.57769	0.55018	0.54035	0.53170	0.55581

China	*MedLowTech*	0.25454	0.32273	0.32560	0.28980	0.30899
China	*MedHighTech*	0.07907	0.10535	0.12334	0.21735	0.32727
China	*HighTech*	0.16272	0.16539	0.15557	0.16660	0.18627
SouthAfrica	*LowTech*	-0.15102	-0.17142	-0.15247	-0.15397	-0.15903
SouthAfrica	*MedLowTech*	0.34015	0.33156	0.43924	0.40157	0.12012
SouthAfrica	*MedHighTech*	-0.00987	0.01593	0.03990	0.01857	-0.07569
SouthAfrica	*HighTech*	-0.75172	-0.75143	-0.67726	-0.67860	-0.67647
Turkey	*LowTech*	0.42859	0.45434	0.47423	0.52124	0.43390
Turkey	*MedLowTech*	-0.13681	-0.05102	-0.18149	0.02145	-0.13057
Turkey	*MedHighTech*	-0.13396	-0.06435	-0.16129	-0.18680	-0.17727
Turkey	*HighTech*	-0.59202	-0.56730	-0.60264	-0.58484	-0.58384

Source: *Calculated using data retrieved from https://wits.worldbank.org/, 2024*

4.1.Brazil

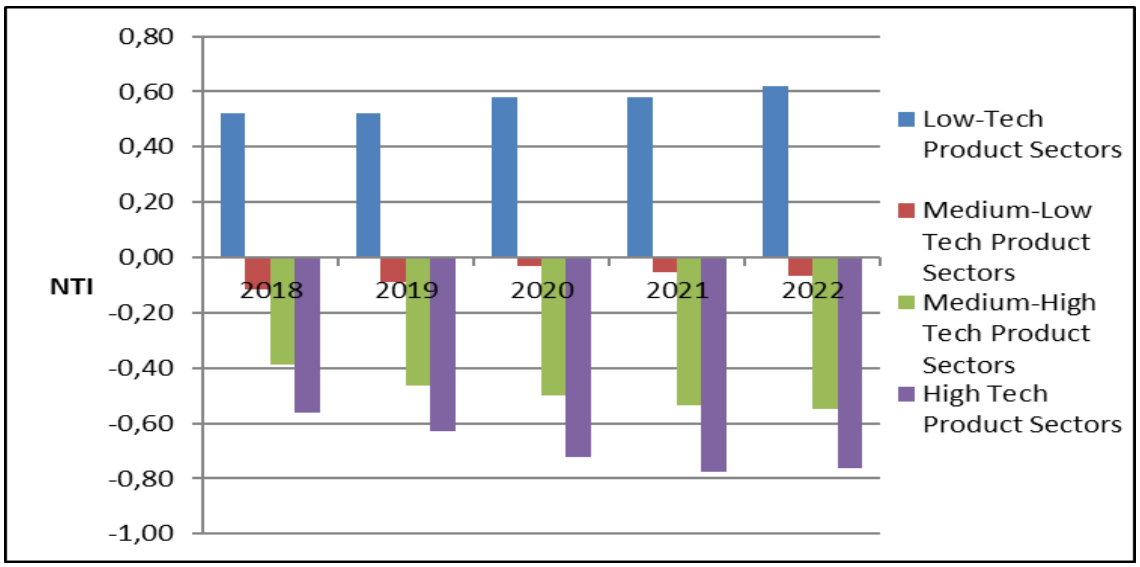
According to the NTI analysis scores, which provide insight into intra-industry trade and competitive advantage in foreign trade, Brazil exhibits specialization, comparative advantage and competitiveness in only one of the four product sectors. In particular, Brazil shows an increasing advantage and competitiveness as an exporter in low-tech product sectors over the analyzed period.

In medium-low technology product sectors, Brazil operates predominantly as an importer, facing a consistent level of disadvantage throughout the period under review, and no notable specialization and competitiveness is observed. Similarly, in medium-high-tech product sectors, there is a greater disadvantage compared to medium-low-tech sectors and a lack of competitiveness over the same period.

In high-tech product sectors, Brazil faces a high degree of disadvantage as an importer. NTI scores indicate a trend of increasing disadvantage from year to year over the period under review. The lack of competitiveness in this category highlights the difficulties Brazil faces in foreign trade in high-tech products. Moreover, among the analyzed sectors, the medium-low and medium-high technology sectors exhibit the highest levels of intra-industry trade, while the low- and high-tech product sectors show the lowest levels of intra-industry trade, indicating that inter-industry trade is dominant in these categories.

Brazil could not achieve competitiveness in high value-added products in foreign trade during the period analysed. In general, we can state that Brazil can gain competitiveness in foreign trade by increasing R&D and information communication investments in order to gain competitiveness in these products.

Table 1. Brazil's Net Trade Index Analysis Scores (2018–2022)



Source: *Calculated using data retrieved from https://wits.worldbank.org/, 2024*

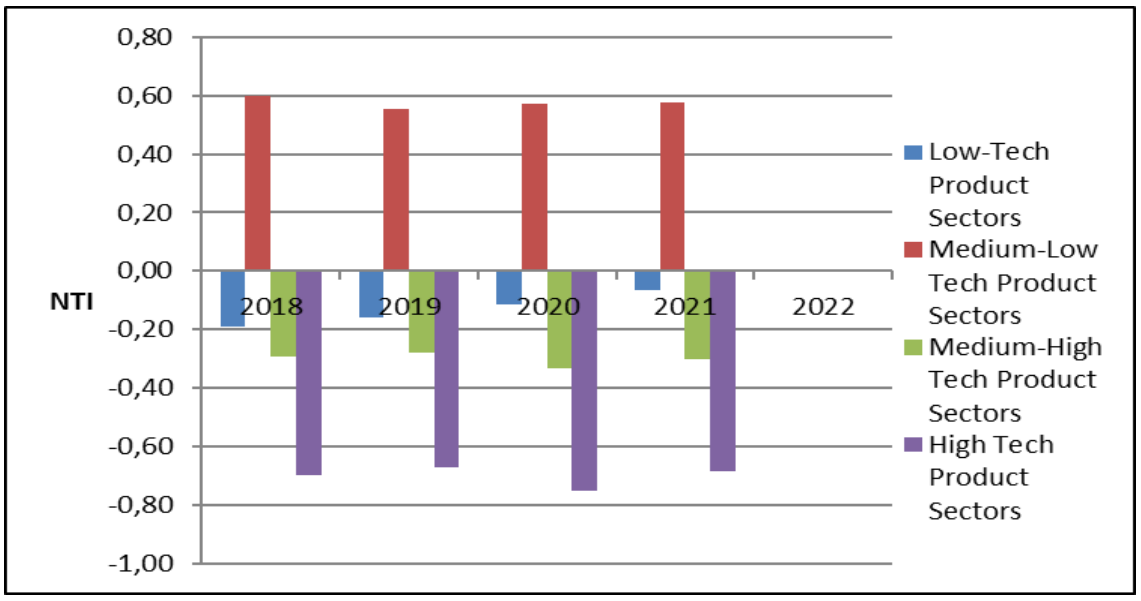
4.2. Russia Analysis

According to the NTI analysis scores, which are indicators of intra-industry trade and competitive advantage in foreign trade, Russia exhibits specialization, comparative advantage and competitiveness in only one of the four product sectors. Russia exhibits a certain level of advantage and competitiveness as an exporter in medium-low technology product sectors throughout the analysed period.

In contrast, Russia faces a constant disadvantage and lacks competitiveness as an importer in low-tech product sectors throughout the analysed period. Similarly, in medium-high-tech product sectors, Russia suffers slightly more disadvantage as an importer and maintains its lack of competitiveness over the analysed time period.

In high-tech product sectors, as the NTI analysis scores show, Russia is significantly disadvantaged as an importer in foreign trade and has no observable competitiveness over the period under review. Moreover, among the analysed sectors, low- and medium-high-tech product sectors exhibit the highest levels of intra-industry trade, while medium-low and high-tech product sectors exhibit the lowest levels of intra-industry trade, indicating the dominance of inter-industry trade in these categories.

Table 2. Russia's Net Trade Index Analysis Scores (2018–2022)



Source: *Calculated using data retrieved from https://wits.worldbank.org/, 2024.*

According to the calculated NTI scores, there is no evidence that Russia's competitiveness has increased in high-tech product sectors or decreased in low-tech product sectors in line with globalization trends. This suggests that Russia's overall foreign trade volume did not undergo a significant transformation or development during the period under review. It should be noted that the analysis for Russia is limited to a four-year period due to data availability, whereas for other countries a five-year assessment was made.

Russia has not been able to achieve competitiveness in high value-added products in foreign trade in the analysed period. Although Russia has achieved competitiveness in medium-low technology sectors, it can increase its competitiveness in high technology product sectors by increasing innovation and R&D investments in foreign trade.

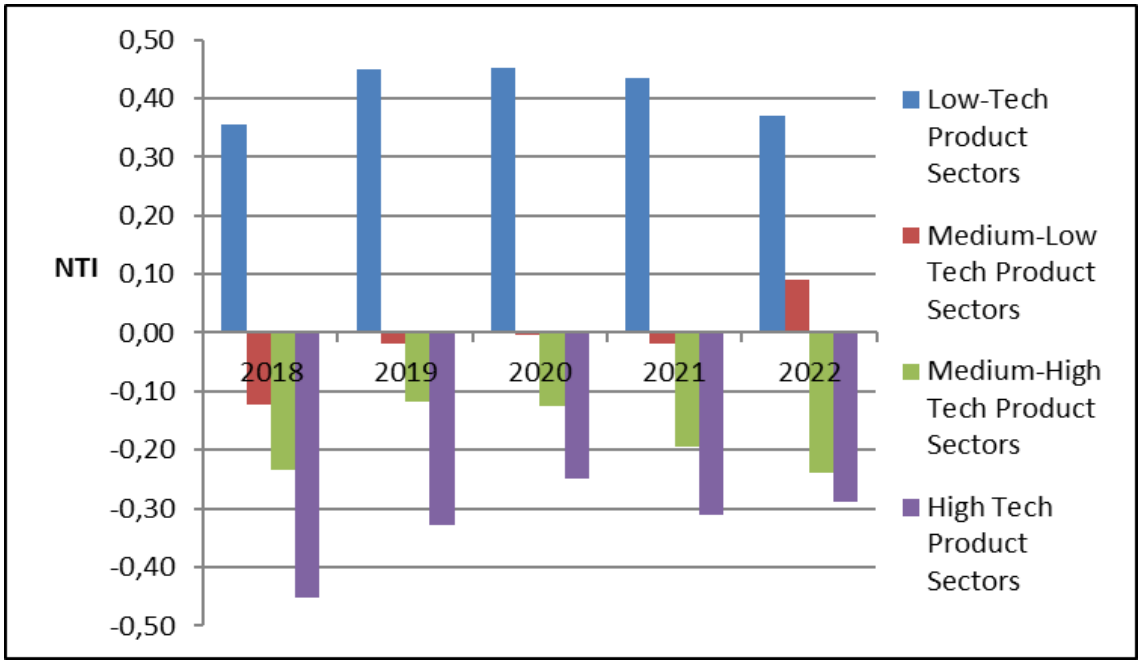
4.3. India Analysis

According to the NTI analysis scores, which are indicators of intra-industry trade and competitive advantage in foreign trade, India exhibits specialization comparative advantage and competitiveness in only one of the four product sectors. In low-technology product sectors, India exhibits a significant advantage and competitiveness as an exporter over the period under review, with this advantage initially increasing but then declining.

In the medium-low technology product sectors, India starts the period at a disadvantage as an importer, with no observable competitiveness. However, this disadvantage diminishes over time and turns into a competitive advantage in the later years of the period under review. In medium-high-tech product sectors, India faces a persistent disadvantage as an importer, with no evidence of competitiveness. Moreover, this disadvantage continues to increase over the period under review, indicating ongoing challenges in these sectors.

In high-tech product sectors, India faces a significant disadvantage as an importer in foreign trade, as indicated by the NTI analysis scores. While this disadvantage has generally declined over the period under review, there is no evidence of competitiveness in these sectors. Moreover, among the sectors examined, the medium-low and medium-high technology sectors exhibit the highest levels of intra-industry trade, while the low- and high-tech product sectors exhibit the lowest levels of intra-industry trade, suggesting that inter-industry trade is dominant in these categories.

Table 3. India's Net Trade Index Analysis Scores (2018–2022)



Source: *Calculated using data retrieved from https://wits.worldbank.org/, 2024.*

According to the calculated NTI scores, there is no observable evidence that India's competitiveness has increased in high-tech product sectors or decreased in low-tech product sectors in line with globalization trends. In other words, the period under review does not reflect any significant change or improvement in India's overall foreign trade volume or its competitive position in these sectors.

In the period we have analysed, it is seen that India could not gain competitiveness in high value-added products in foreign trade. In general, we can say that India can gain competitiveness in foreign trade by increasing its high value-added sector investments in order to gain competitiveness in these products.

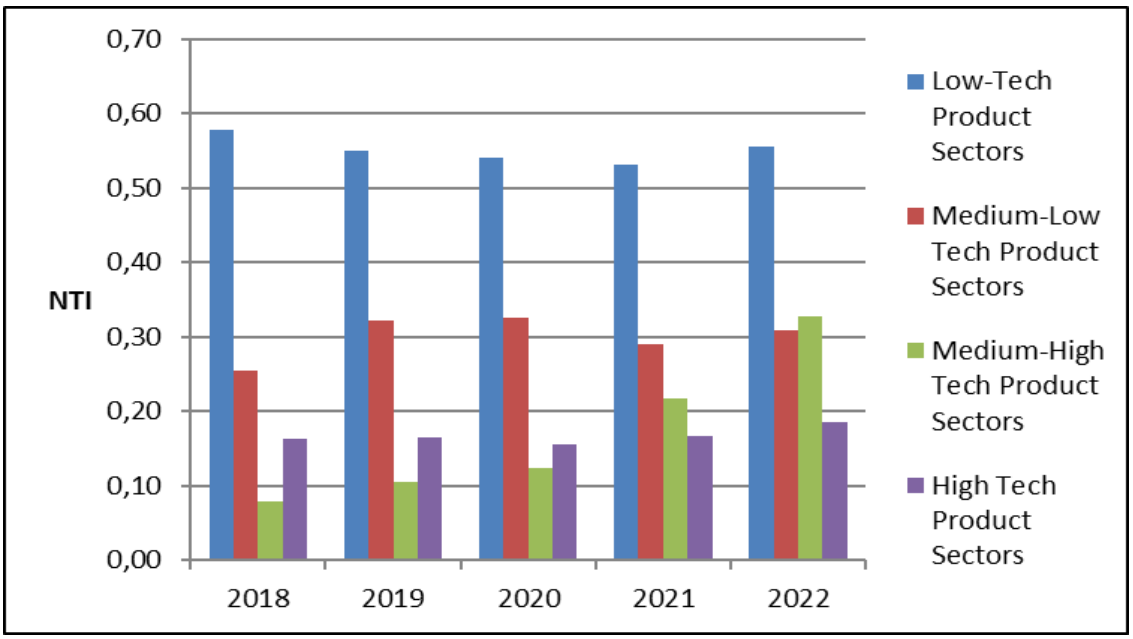
4.4. China Analysis

According to the NTI analysis scores, which are indicators of intra-industry trade and competitive advantage in foreign trade, China exhibits specialization, comparative advantage and competitiveness in all four product sectors. In low-tech product sectors, China exhibits the highest level of advantage and competitiveness as an exporter compared to other sectors and maintains its strong position above a certain threshold throughout the analyzed period.

In medium-low-tech product sectors, China also exhibits advantage and competitiveness as an exporter, albeit at about half the advantage observed in low-tech sectors. In medium-high-tech product sectors, China continues to have an advantage and competitiveness as an exporter, and this advantage has been growing steadily from year to year over the period under review.

In high-tech product sectors, China shows a significant advantage and competitiveness as an exporter in foreign trade, as reflected by its NTI scores. This underlines China's strong position in all sectors analyzed. Among them, high and medium-high technology sectors exhibit the highest levels of intra-industry trade, while low and medium-low technology sectors are characterized by the least intra-industry trade and the most inter-industry trade.

Table 4. China's Net Trade Index Analysis Scores (2018–2022)



Source: *Calculated using data retrieved from https://wits.worldbank.org/, 2024.*

According to the calculated NTI scores, there is no clear overall transformation in China's foreign trade volume, such as increased competitiveness in high-tech sectors or decreased competitiveness in low-tech sectors in line with globalization trends over the period under review. However, China has effectively aligned its foreign trade structure with globalization and has achieved the most parallel integration with global trade dynamics among the countries studied.

Among the countries analysed, only China has achieved a good advantage and competitiveness in foreign trade. As a suggestion, it can be recommended to increase its R&D and information communication investments in order to maintain and increase this advantage.

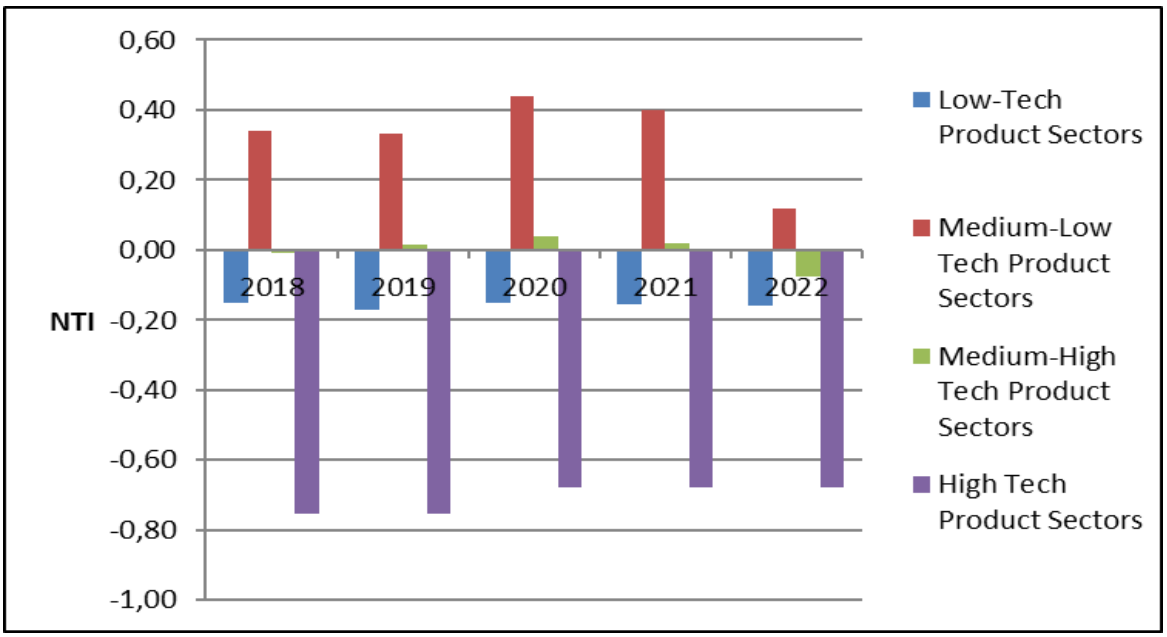
4.5. South Africa Analysis

According to the NTI analysis scores, which serve as indicators of intra-industry trade and competitive advantage in foreign trade, South Africa shows comparative advantage and competitiveness in only one of the four product sectors.

In particular, South Africa exhibits an advantage and competitiveness as an exporter in medium-low technology product sectors, where competitiveness initially increases but then declines over the analyzed period. In low-tech product sectors, South Africa operates predominantly as an importer. It consistently faces a certain level of disadvantage and lacks competitiveness over the period under review.

In medium-high-tech product sectors, South Africa neither has a significant advantage nor experiences a notable disadvantage, suggesting a neutral position in terms of competitiveness.In high-tech product sectors, South Africa faces a significant disadvantage as an importer without evidence of competitiveness in the analysed period, as indicated by the NTI scores. Among the analysed sectors, the low- and medium-high-tech product sectors exhibit the highest level of intra-industry trade, while the medium-low and high-tech product sectors exhibit the least intra-industry trade and are instead dominated by inter-industry trade.

Table 5. South Africa's Net Trade Index Analysis Scores (2018–2022)



Source: *Calculated using data retrieved from https://wits.worldbank.org/, 2024.*

According to the calculated index scores, there is no observable evidence of South Africa's increasing competitiveness in high-tech product sectors or decreasing competitiveness in low-tech product sectors in line with globalization trends. In other words, the analyzed period does not reflect any significant transformation or improvement in South Africa's overall foreign trade volume or its alignment with global trade dynamics.

Like Russia, South Africa has not been able to achieve competitiveness in high value-added products in foreign trade in the analysed period. Although South Africa has gained competitiveness in medium-low technology sectors, it can increase its competitiveness in high technology product sectors by increasing innovation and R&D investments in foreign trade.

4.6.Türkiye

According to the NTI analysis scores, which are indicators of intra-industry trade and competitive advantage in foreign trade, Türkiye shows specialisation, comparative advantage and competitiveness in only one of the four product sectors in foreign trade.

Türkiye has shown an increasing advantage as an exporter and increasing competitiveness in low-tech product sectors over the analysed period. However, in medium-low and medium-high technology product sectors, Turkey operates predominantly as an importer and faces a continuous disadvantage and lack of competitiveness throughout the review period.

In high-tech product sectors, Türkiye is at a significant disadvantage as an importer and the NTI scores indicate that there has been no significant year-on-year improvement in competitiveness over the period under review.

Moreover, the analysis reveals that medium-low and medium-high technology sectors exhibit the highest levels of intra-industry trade, while low and high technology product sectors are characterised by the least intra-industry trade, indicating predominantly inter-industry trade.

Table 6. Türkiye's Net Trade Index Analysis Scores (2018–2022)

Source: *Calculated using data retrieved from https://wits.worldbank.org/, 2024.*

According to the calculated NTI scores, there is no observable evidence that Türkiye's competitiveness has increased in high-tech product sectors or decreased in low-tech product sectors in line with globalization trends. In other words, there are no significant changes or improvements in Türkiye's overall foreign trade volume or its competitive position in these sectors over the period under review.

In the period we analysed, it is seen that Turkey could not gain competitiveness in high value-added products in foreign trade. In order to gain competitiveness in these products, we can state that Turkey can gain competitiveness in foreign trade by increasing investments in high value-added sectors.

4.7.General Evaluation of NTI Analysis Results

According to the NTI analysis results obtained, it is concluded that the countries under study, except China, have generally gained an advantage and competitiveness as exporters in foreign trade in low or medium low technology product sectors between 2018-2022. However, in the medium-high or high-tech product sectors, they have achieved a disadvantage as importers in foreign trade and have no competitiveness. Unlike other countries, China has gained an advantage in all sectors in foreign trade in parallel with globalization and is in a strong position in terms of competitiveness. In terms of intra-industry trade, most intra-industry trade in Russia and South Africa is in the low- and medium-high technology product sectors. In other countries, intra-industry trade is observed in medium-low and medium-high technology sectors.

5. CONCLUSION AND RECOMMENDATIONS

The objective of this study is to assess the levels of foreign trade specialization, competitiveness and intra-industry trade in low, medium-low, medium-high and high technology product sectors for Turkey and BRICS countries in the period 2018-2022. This assessment was conducted using coefficients of revealed comparative advantage based on the ISIC Rev. 3 classification in the broader context of globalization. The NTI is used as the primary analytical tool to measure these countries' levels of foreign trade specialization.

In today's increasingly competitive global market, identifying the product groups in which countries have a comparative advantage and understanding the main factors that enhance their international competitiveness are crucial for formulating effective foreign trade strategies. In this context, the most important thing is not only the quantity of exports and imports, but also the value-added nature of the products traded. Countries that specialize in exporting high value-added products while importing low value-added goods are better positioned to strengthen their international competitiveness. An analysis of developed countries with high competitiveness in global markets clearly shows that a significant share of their exports is composed of knowledge and technology-intensive, innovative and R&D based products.

These characteristics highlight the importance of focusing on high value-added sectors to enhance economic resilience and global market competitiveness in an era defined by rapid globalization and technological progress.

The results of the NTI analysis scores suggest that countries should focus on specialization in specific sectors to increase their competitive advantage. In this context, prioritizing investments in product groups, especially in high-tech product groups where superiority is achieved according to NTI scores and concentrating R&D expenditures in these sectors will contribute significantly to sustaining and strengthening this superiority. By doing so, the value added generated will generate higher returns in an increasingly competitive global market driven by globalization, ultimately leading to changes and growth in foreign trade volumes in line with global trends.

Countries that have achieved comparative advantage and competitiveness in specific product sectors, according to NTI scores, can further strengthen their position by reallocating resources from disadvantaged to advantaged sectors. Alternatively, by making more appropriate and strategic investments in high-tech product sectors, they can shift from a disadvantaged importer to an advantaged exporter in these sectors.

This change will enable countries to gain more benefits from foreign trade in a globalized economic environment. In addition, directing investments from low-tech product sectors to high-tech sectors where profit margins from foreign trade are lower can further increase competitiveness. By being importers in low-tech sectors and exporters in high-tech sectors, countries can gain greater competitiveness, advantage and advantage in foreign trade, thus aligning their economic strategies with globalization and maximizing their trade advantages.

KAYNAKÇA

Amighini, A. (2005), "China in the international fragmentation of production: Evidence from the ICT industry", *The European Journal of Comparative Economics*, 2(2), 203-219.

Balassa, B. (1965), "Trade liberalisation and "revealed" comparative advantage", *The Manchester School*, 33(2), 99–123.

Balassa, B. ve Noland, M. (1989), "'Revealed' comparative advantage in Japan and the United States", *Journal of International Economic Integration*, 4(2), 8-22.

Bashimov, G. (2016), "Elma ihracatında Türkiye'nin karşılaştırmalı üstünlüğü", *Adnan Menderes Üniversitesi Ziraat Fakültesi Dergisi*, 13(2), 9 – 15.

Bashimov, G. (2019), "Özbekistan bakır sektörünün rekabet gücü: seçilmiş ülkelerle karşılaştırmalı bir analiz", *Journal of Econmics, Business & Political Studies*, 6(3), 164-179.

Becuwe, S., & Blancheton, B. (2016), "French textile specialisation in long run perspective (1836–1938): Trade policy as industrial policy", *Cahiers du GREThA*, 17, 1-30.

Bozduman, E. T. & Erkan, B., (2019a). *Sectoral competitive advantages in Kazakhstan's foreign trade as a rising star of Central Asia*. In 7th SCF International Conference on "The Future of the European Union and Turkey-European Union Relations, 160-168.

Bozduman, E. T. & Erkan, B., (2019b), "Şanghay İşbirliği Örgütü üyelerinin katma değeri yüksek ürün ihracatındaki uzmanlaşma düzeyleri", *Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi*, 6(3), 140-154.

Çeştepe, H. (2012), "Türkiye'nin seçilmiş ortadoğu ülkeleriyle ticaretinin Analizi", *Ekonomik ve Sosyal Araştırmalar Dergisi*, 8: 23-43.

Erkan, B., & Batbaylı, Ş. (2018), "Kırılgan Beşli ekonomilerin dış ticaret uzmanlaşma düzeyi: Karşılaştırmalı sektörel analiz", *Journal of Institute of Economic Development and Social Researches*, 4(9), 306-319.

Erkan, B., & Bozduman, E. T. (2018), "Sektörel uzmanlaşma ve rekabet gücü perspektifinde Hindistan ekonomisi", *The Journal of Academic Social Science*, 75(75), 84-99.

Erkan, B., & Bozduman, E. T. (2019), "Analysis of specialization and competition level in Turkey's tourism sector", *Kocaeli Üniversitesi Sosyal Bilimler Dergisi*, 2(38), 1-12.

Fagerberg, J. (1987), "A technology gap approach to why growth rates differ", *Research Policy*, 16(2–4), 87–99.

Grossman, G. M., & Helpman, E. (1991). *Innovation and Growth in the Global Economy*. MIT Press.

Kara, O., Altınay, A. T., & Erkan, B. (2020), "The relationship between efficiency, profitability, and export competitiveness: An implementation on Turkish automotive sector. *Gaziantep University Journal of Social Sciences*, 19(3), 1194-1214.

Kök, Recep & Çoban, Orhan (2005), "Türkiye tekstil endüstrisi ve rekabet gücü: AB Ülkeleriyle karşılaştırmalı bir analiz örneği, 1989-2001", *İktisat İşletme ve Finans*, 20(228): 68-81.

Krugman, P. (1991). *Geography and Trade*. MIT Press.

Laursen, K. (1998), "Revealed comparative advantage and the alternatives as measures of international specialization", Danish Research Unit for Industrial Dynamics, *DRUID Working Paper* 98, 1-24.

Müftüoğlu, G., & Kayacan, B. (2019), "Türkiye'deki ormana dayalı sektörlerin dış ticaret rekabet gücü analizi", *Turkish Journal of Forestry*, 20(1), 41-49.

Reyes, G. U. (2014), "Examining the revealed comparative advantage of the ASEAN 6 countries using the balassa index and lafay index", *Journal of Global Business and Trade*, 10(1), 1-11.

Rodrik, D. (1997). *Has globalization gone too far*. Washington, DC: Institute for International Economics.

Sarıçoban, K., & Kaya, E. (2021), "An analysis on the competitiveness and specialization levels of the countries in the export of wood and articles of wood".

Sarıçoban, K., & Yalçın, M. (2020), "Türkiye'nin halı sektörü ihracat rekabet gücünün belirlenmesi ve halı ihracatında söz sahibi ülkeler ile bir karşılaştırma," *Tekstil ve Mühendis*, 27(118), 98-110.

Sarıçoban, K. (2022). *Türkiye'nin COVID-19 medikal ürün gruplarındaki dış ticareti ve endüstri içi ticaretinin durumu: 2017-2021 dönemi üzerine bir değerlendirme*. Gazi Kitabevi 1. Baskı

Şahinli, M.A. (2011), "Açıklanmış karşılaştırmalı üstünlükler endeksi: türkiye pamuk endüstrisi üzerine bir uygulama", *SÜ İİBF Sosyal ve Ekonomik Araştırmalar Dergisi*, 227 – 240.

Yalçın, M., & Sarıçoban, K. (2020). *BRICS ülkeleri ile Türkiye'nin dış ticaretteki uzmanlaşma düzeylerinin karşılaştırmalı bir Analizi.* İktisadi Ve İdari Bilimler Teori, Güncel Araştırmalar Ve Yeni Eğilimler, Editör: Doç. Dr. Yüksel Akay Ünvan, Ivpe Yayınevi 1. Baskı.

Vollrath, T. L. (1991), "A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage", *Weltwirtschaftliches Archiv*, 127(2), 265–280.

Yeats, A. J. (1985), “On the appropriate interpretation of the revealed comparative advantage index: Implications of a methodology based on industry sector analysis”, *Weltwirtschaftliches Archiv*, 121(1), 61–73.
World Bank. (2024). World Integrated Trade Solution. Retrieved from https://wits.worldbank.org/