BRICS JOURNAL OF ECONOMICS
DOI 10.3897/brics-econ.7.e181751
2026 Volume 7 Number 3

India's Foreign Trade within BRICS and its Implications

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Academic editor: Sheresheva M. | Received 8 December 2025 | Accepted 31 May 2026 | Published 30 October 2026

Citation: Bhowmick, R., & De, U. K. (2026). India's Foreign Trade within BRICS and its Implications. *BRICS Journal of Economics, 7*(3), 281–307. https://doi.org/10.3897/brics-econ.7.e181751

Abstract

The BRICS group is an important coalition of five countries that play a significant role in global economic cooperation and various political matters. The group's strategic trade and investment policies, along with its collaborative efforts, contribute to stable economic growth and a competitive standing in the global economy. This paper focuses on India's intra-trade relationships with the other BRICS countries (*Brazil, Russia, China and South Africa, shortly BRCS*), investigating trade sensitivity. Using three key trade indices — the Symmetric Revealed Comparative Advantage (SRCA), Trade Intensity (TII) and Trade Complementarity (TCI) indices — we identified a significant positive trade relationship between India and the other BRICS countries. Despite India's uncompetitive position in certain products in the global market, it enjoys a comparative advantage in these products within the BRICS group. Both the TII and TCI indices demonstrate the significant importance of Indian exports to the other BRICS countries (BRCS).

Keywords

BRICS, Other BRICS Countries (BRCS), Revealed Comparative Advantage, Trade Intensity Index, Trade Complementarity Index.

JEL: F10, F13, F14.

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1. Introduction

The five major economies of Brazil, Russia, India, China and South Africa form a coalition called BRICS. The acronym BRIC was initially introduced by Jim O'Neill in 2001 to describe a group of countries that were experiencing significant economic growth at the beginning of the 21st century - Brazil, Russia, India, China. In 2011, the group was renamed BRICS following the inclusion of South Africa. In the early years of the organization, there was some doubt about the extent of collaboration between the BRICS countries. As Dhar (2023) pointed out, there has been a lack of institutional decision-making and cooperation between BRICS, reflecting their internal disparities. Nevertheless, the group has been regarded as a means of challenging the prevailing multilateral system of the Western countries. In the 2024 study, Benlaria (2024) proposed that political stability within the BRICS would serve to reduce transactional uncertainties and thereby foster trade partnerships. Therefore, the formation of the BRICS institution and collaborative efforts were expected to support greater trade flows among member countries. At the same time, questions were raised about global governance and its effectiveness as a collective reformist force.

The BRICS organization periodically convenes annual summits to facilitate multilateral dialogue and cooperation among its member states. The inaugural BRICS summit was hosted in Yekaterinburg in 2009. Subsequently, the inclusion of South Africa in the bloc led to the relocation of the summit to Sanya in 2011. The XVII BRICS summit was held in July 2025 in Brazil. These high-level gatherings serve as platforms for the member countries to engage in collaborative discourse on critical issues including environmental sustainability, economic development, trade liberalization and political coordination. Scholars such as Lowe (2016), Raghutla and Chittedi (2019), Gusarova (2019), and Rahman et al. (2020) have recognised the potential of the BRICS alliance. Through continuous efforts to strengthen coordination and collaboration, the alliance could become a powerful alternative in the global arena. Intra-bloc trade within BRICS could be enhanced by reducing trade barriers, harmonising trade policies, and fostering cooperation (Rahman et al., 2020). The BRICS information portal claimed that this association could surpass the European Union economically. In 2015, the BRICS countries set up the New Development Bank (NDB) to fund inclusive, resilient and sustainable development projects. In 2024, Chenoy explored the BRICS' efforts to establish an alternative financial structure that supports multipolarity and reduces dependency on Western institutions. The article highlights key developments, including strengthening the New Development Bank (NDB), promoting trade in national currencies, launching a digital payment system and proposing independent financial management. The Kazan Declaration of the BRICS association (at the 16th Summit in 2024) demonstrated a commitment to reforming, rather than replacing, global governance. Overall, the BRICS presented themselves as a flexible, sovereign-driven coalition with a focus on financial autonomy, inclusive development and balanced global power.

Table 1. Basic Profiles of the BRICS Countries in 2024

Items	Brazil	Russia	India	China	South Africa
Population (Million)	211.999	144.820	1450.936	1419.321	64.007
Land Area (Sq. km)	8358140	16376870	2973190	9388210	1213090
GDP (at Current Prices) (Mn. USD)	2179068	2091563	3891743	18255278	397157
GDP Growth (2024) (%)	3.40	3.90	6.90	5.00	0.60
Global GDP Rank	10	11	5	2	41
Per Capita Export (Mn. USD)	1589.85	2990.55	305.16	2519.97	1719.75
Per Capita Import (Mn. USD)	1311.11	2072.39	495.03	1821.23	1928.99
Major Export Partners	CHN, USA ARG, NL, ESP	CHN, IND, TUR, BLR, NLD	USA,UAE, NLD,SGP, CHN	USA ,HKG, VNM,JPN, ROK	CHN, USA, DEU, MOZ, UK

Source: According to UNCTAD Statistics, Year 2024. [China (CHN), United State of America (USA), Argentina (ARG), Netherlands (NLD), Spain (ESP), India (IND), Turkey (TUR), Belarus (BLR), United Arab Emirates (UAE), Singapore (SGP), Hong Kong (HKG), Vietnam (VNM), Republic of Korea (ROK), Japan (JPN), Germany (DEU), Mozambique (MOZ), United Kingdom (UK)]

These five major economies were projected to account for one-third of the global economy, contributing approximately 33 per cent to global GDP growth in 2015 and almost 49 per cent in 2022. The BRICS countries have significant economic potential, supported by a productive workforce accounting for around 45 percent of the global total. In 2022-23, together they accounted for over 30 % of the world's landmass, 40 % of the global population, 27 % of global GDP, and approximately 40 % of global foreign currency reserves. A brief profile of the BRICS countries has been displayed in Table 1.

The profile of BRICS is indicative of their potential and economic positions. Presently, India is home to the largest population in the world, with China ranking second among the BRICS members. In terms of land size, Russia has the highest geographical area in the world, with China in third position, Brazil in fifth, India in seventh and South Africa in twenty-fifth. From an economic perspective, the Chinese economy has the highest real GDP among BRICS, followed by Russia, India, Brazil and South Africa, but in 2024 India was observed to have demonstrated the highest GDP growth among the BRICS member countries.

According to the Global GDP Rank of 2024, the countries were placed in the following order: Brazil in 10th place, Russia in 11th place, India in 5th place, China in 2nd place and South Africa in 41st place. With the exception of South Africa, all the BRICS partners exhibited favourable global GDP rankings in 2024. Raghutla and Chittedi's (2020) study confirmed the correlation between economic growth and foreign trade of the BRICS countries. Recent studies have indicated that the economic growth of India, South Africa and China has resulted in an acceleration of exports and imports between India, Brazil, China and South Africa. However, only Russia among the BRICS nations experienced economic growth as a result of imports.

The trade profile of the BRICS countries shows that Russia has the highest per capita exports, followed by China, South Africa, Brazil and India. In terms of per capita imports, Russia occupies the first place among the BRICS countries, followed by South Africa, China, Brazil and India. The most important aspect of the BRICS countries' foreign trade is that China is the main export partner of all the member countries, while Russia is China's main import partner. China is also the top export partner of Brazil, Russia and South Africa. Consequently, China plays a leading role in trade within the BRICS group. However, China not only maintains a dominant trade position within the association, but also with the rest of the world (Gusarova, 2019). With the exception of Russia, the USA is the primary export partner of all BRICS member countries. The exporters from Brazil, India, China and South Africa primarily target the US market. This means that the USA depends on imports from the BRICS member countries. Evidently, China is the primary export partner of India among the BRICS countries, and the Russian Federation's primary export destinations within the BRICS group are China and India.

The terms of trade (ToT) are widely recognized as a reliable indicator of a country's economic health. An improvement in the ToT leads to increased exchange power of an economy. Consequently, the trade potential of the BRICS countries can be effectively measured by their ToT performance. In 2012, the average ToT for the BRICS group was 83.42; by 2022, this figure had risen to 123.35. From 2012 to 2022, the annual average growth rate of BRICS's ToT relative to the global average was 4.4%. This substantial increase in the ToT can be attributed to the expansion of export volumes to these countries since 1990. The export demand of the BRICS countries has become significant on a global scale. For example, China dominates the world market for manufactured goods, while India's exports are dominated by agricultural products. However, following the liberalisation of foreign trade, India's export pattern shifted towards skilled products such as manufactured goods and software. Demand for Russia's export items, such as oil, energy, metals and machinery, is high worldwide. Brazil exports raw agricultural materials, soybeans, oil and iron, while South Africa exports skilled and unskilled manufacturing products, with its exports increasing significantly. Kocourek (2015) reveals that the BRICS countries' foreign trade has shifted from producing low-value goods to manufacturing more sophisticated products. This gives BRICS the potential to emerge as a unified voice for the Global South.

This study of the status and implications of India's trade with other BRICS countries is divided into six sections. The second section provides a review of the available literature. The third section outlines the study's methodology and the data used. This is followed by an analysis of India's intra-trade relations with the other BRICS countries using the SRCA, TII and TCI indices. Section five discusses the findings, and section six concludes. In this study, India is the reporting country and the other BRICS countries are its trade partners.

2. Literature Review

Following the identification of the BRICS countries' potential, their foreign trade became significant on a global scale. It was widely expected that they would become powerful geopolitical players in the future (Lowe, 2016). In 2024, Lohani reported that intra-industry trade had strengthened among the BRICS countries in recent years, suggesting robust trade relationships. However, Raghuramapatruni (2015) found that the international trade of the BRICS countries was not competitive; rather, it was complementary. Meanwhile, Upadhya and Saha (2023) highlighted the potential implications of the BRICS expansion in strengthening South–South cooperation, while also warning of the risk of its reformist identity being diluted.

Strong cooperation among the BRICS countries could exploit their comparative advantages to increase trade-related welfare (Singh, 2016). Several studies (Bharali & Chakraborty, 2016; Rani & Kaur, 2018; Maryam et al., 2018; Gusarova, 2019; Raghutla & Chitted, 2020) have argued that the liberalisation of foreign trade and economic cooperation among the BRICS countries would lead to higher growth and development. Bharali and Chakraborty (2016) found that a 1% increase in trade openness among the BRICS countries yields a 28% increase in economic growth. Rani and Kaur (2018) came to the same conclusion: trade liberalization positively impacts the economic growth in BRICS. The openness to trade of all BRICS nations and the expansion of intra-BRICS cooperation in trade and investment have a positive effect on the growth and development in the BRICS economies (Maryam et. al., 2018; Gusarova, 2019). Raghutla and Chitted (2020) reported positive effects of exports and imports on the economic growth and employment opportunities of the BRICS. Therefore, the integration of the BRICS countries could lead to robust economic growth and development, and the liberalisation of trade would be a fruitful policy.

Several authors (Misra et al., 2015; Kaur, 2018; Maryam & Mittal, 2019; Rahman et al., 2020; and Lohani, 2020) have focused on the India-BRICS foreign trade relationship in their studies on the foreign trade of the BRICS countries. Mishra et al. (2015) found that India's foreign trade relations with other BRICS countries were positively correlated with India's GDP per capita, whereas trade among BRICS countries was inversely affected by transportation costs. According to Kaur (2018), India is the most competitive in exporting chemicals and manufactured goods to other BRICS countries, while China, Russia and South Africa have respective competitive positions in exporting other products among the BRICS. According to Maryam and Mittal (2019), India has a comparative advantage in exporting agricultural products, followed by manufactured goods and handicrafts. Rahman et al. (2020) used an augmented gravity model that incorporated economic indicators such as GDP, market size, geographical distance and trade policies. They observed that economic size is a crucial factor in shaping trade flows. Larger economies and populations generate higher trade volumes, though geographical distance poses some challenges. The authors also argue that trade costs, including tariffs and taxes, can be managed, enabling potential economic ties among member countries. Lohani (2020) reported

that the gravity trade model applies to India's foreign trade with the BRICS countries and to foreign trade within the BRICS group. They also observed that, of the BRICS countries, China and Russia have a greater advantage in foreign trade than Brazil, India and South Africa. Although India's foreign trade with other BRICS countries has improved over the years, it has not increased as much as expected (Lohani, 2020). Nevertheless, India's share of exports to the other BRICS has been increasing since 2015.

Ekor et al. (2015) reported that South Africa's trade intensity with the other BRICS countries was significant, indicating a positive outlook for sustainable trade. They also noted that South Africa's trade intensity with India was the highest. Madikizela et al. (2019) revealed South Africa's prosperous trade relations with both India and China, finding that exports of South Africa's eight products characterised by a comparative advantage were increasing to the BRICS countries. Ishloke (2024) developed the South Africa-BRICS mineral beneficiation model (SABM) to demonstrate upstream and downstream mineral beneficiation in South Africa for the purpose of BRICS integration. The study focused on public-private partnerships and BRICS involvement in setting mineral mining policies to foster economic growth in South Africa. Bhowmick and De (2025) observed that India gained an additional advantage in exporting footwear and transportation products to South Africa. On average, Indian exports to South Africa were less advantageous than those of China and Russia, but more so than those of Brazil. Thus, existing studies reveal that South Africa is an important trade partner for all BRICS countries.

Several authors have observed China's dominant role in intra-BRICS trade (Gusarova, 2019; Trivedi & Khatun, 2023). Gusarova (2019) highlights China as the principal trading partner within the BRICS group. Trivedi and Khatun (2023) devised and applied a composite index to rank the BRICS economies. According to this index, China stands out as the most developed country among the BRICS members, followed by Brazil, Russia, India, and South Africa. Xin et al. (2024) and Liu (2025) argue that China's trade facilitation with the BRICS countries is rather low. A study by Xin et al. (2024) revealed that China's agricultural trade with the BRICS countries was moderate, at 28.6%. The study ranked the level of agricultural trade between China and the BRICS countries, finding that Chinese agricultural trade is most prevalent with the United Arab Emirates, Saudi Arabia and Russia. Brazil, India and Ethiopia, however, have comparatively low facilitation capacities, reflecting significant heterogeneity in institutional effectiveness, infrastructure and technological readiness within the group. Liu (2025) identified untapped trade facilitation opportunities with most BRICS member countries (excluding Russia) and recommended increased trade cooperation with India, Brazil and South Africa. The present study also found that India's TII with South Africa and Brazil is higher than with China and Russia, even though the latter two countries are closer to India.

However, existing studies have failed to identify important Indian products for trade with the BRICS countries. Although Bhowmick and De (2025) attempted to determine India's comparative advantage in exporting to BRICS economies using the

RCA index, this index itself suffers from an asymmetric range of values. Furthermore, their study only focused on the more aggregated BEC product group. Hence, we use the 'symmetric RCA (SRCA) index' to identify India's comparative advantages by considering both the BEC product group and the HS two-digit product group (based on the 2022 HS classification) in the present study.

Furthermore, the existing literature has not revealed which of the BRICS countries have good foreign trade relationships with India. More importantly, the effect of the BRICS formation on the intra-trade relationship between India and the BRICS countries has not been studied. It is unclear whether the formation of BRICS in 2011 has improved India's intra-trade relations with the BRICS countries. In light of these gaps, the present study examines the foreign trade relationship between India and the BRICS countries using trade indices (TII and TCI) from 1997 to 2010 and from 2011 to 2024.

However, the present study is somewhat similar to those of Raghuramapatruni (2015) and Maryam et al. (2018), but here we use different trade indices to examine the importance of the BRICS countries in India's foreign trade over two time periods. The first period is before the formation of BRICS (1997–2011), and the second is after the formation of BRICS (2011–24).

3. Materials and methods

This study examines the importance of the BRICS countries for India's foreign trade. The period between 1997 and 2024 is considered, divided into two stages: before the formation of the group (1997–2010) and after its formation (2011–2024). Two main hypotheses are examined: whether BRICS is significant for India's international trade and whether its formation strengthened India's trading relations from 2011 to 2024. Data were collected from UNCTADSTAT, the World Bank, and the World Development Reports.

Various methodologies are available for examining trading relations between countries in this kind of study. Here, the 'symmetric revealed comparative advantage' (SRCA), 'trade intensity' (TII) and 'trade complementarities' (TCI) indices are used. These trade indices are also used by several authors to analyse the comparative trading relationship between countries (Kocourek, 2015; Raghuramapatruni, 2015; Maryam. et. al, 2018; Madikizela et al., 2019; Islam & Nath, 2023).

The 'SRCA index' identifies Broad Economic Categories (BECs) and two-digit HS products (based on the 2022 HS classification) for which India has a comparative advantage in exporting to other BRICS nations and the rest of the world. Furthermore, the estimated SRCA index allows India's trade competitiveness to be evaluated in comparison to other BRICS member countries and on a global scale.

The TII reveals the strength of a particular country's trade sectors. This index is used to show which BRICS country is the most preferable partner for India's foreign trade. Furthermore, the TCI is used to evaluate the alignment between India's export

structure and the import demand of the BRICS countries. To ensure consistency in the TII and TCI time series for the period 1997–2024, the 1996 HS classification is used.

4. Empirical results

4.1. Comparative advantages of Indian products

The 'revealed comparative advantage (RCA) index' is based on the Ricardian concept of comparative advantage, a fundamental principle of international trade theory. According to this theory, a country exports products for which it has a comparative advantage and imports products for which it has a comparative disadvantage. Madikizela et al. (2019) found that exports of eight of the twenty products with the greatest comparative advantage for South Africa are increasing towards BRICS, indicating the mutual importance of these countries. Similarly, this study uses the concept of comparative advantage to highlight the significance of BRICS for India. The RCA index was developed by Bela Balassa (1965). It is a trade indicator that measures relative advantage or disadvantage of a product for a particular country (Balassa, 1965; Kocourek, 2015; Bhowmick & De, 2025). Here, Balassa's relative comparative advantage (RCA) index measures the comparative advantage of Indian exports to the BRICS countries. It is defined as 'the ratio of the share of a particular j^{th} commodity exported by India to the total value of that commodity exported worldwide'. The index for country i and commodity j is computed as follows:

$$RCA^{j}_{India-BRCS} = \frac{X^{j}_{India-BRCS} \Big/ X_{India}}{X^{j}_{World-BRCS} \Big/ X_{World}} \tag{1}$$

Here, $X^{j}_{India-BRCS} / X_{India}$ is the ratio of export of j^{th} commodity from India to other BRICS countries to the total export of India. This ratio indicates the export share of j^{th} commodity of India to particular BRCS countries. $X^{j}_{World-BRCS} / X_{World}$ is the ratio of export of j^{th} commodity from the rest of the world to the BRCS countries. This ratio indicates the global share of j^{th} commodity exported to the BRCS countries. The value of the RCA index lies between zero and infinity. If the RCA index value for India's of j^{th} commodity is greater than one, then India has a 'comparative advantage' in that product. Conversely, if the RCA index is less than one, then India has a 'comparative disadvantage' in the j^{th} product.

Many studies have used the 'RCA index' and derived significant results (Deb & Sengupta, 2017; Maryam et al., 2018; Islam & Nath, 2023; Bhowmick & De, 2025). Using the RCA index, Maryam et al. (2018) reported that Brazil and Russia had a comparative advantage in natural resource-based products in 2015, whereas India and China had a comparative advantage in manufactured products. Deb and Sengupta (2017)

found the RCA index to be more reliable than any other measure of 'comparative advantage'. Although Balassa's (1965) index provides valuable trade information, it has an asymmetry problem. If the RCA index value of a product ranges from one to infinity, it is considered relatively advantageous. Conversely, if the RCA value ranges from zero to one, it is considered comparatively disadvantageous, indicating that the average export share of a product in a country is lower than its global average. Thus, the RCA index is more skewed towards comparatively advantageous products and less so towards disadvantaged ones. Therefore, Grupp (1994) and Dalum et al. (1998) proposed a 'symmetric revealed comparative advantage index' (SRCA) to address the issue with the asymmetric Balassa (1965) RCA index. The revised index is written as follows:

$$SRCA^{j}_{India-BRCS} = \frac{RCA_{ij} - 1}{RCA_{ij} + 1} \tag{2}$$

The value of the SRCA index lies between minus one and plus one. If the SRCA index value of an Indian product is plus one, it means India has a comparative advantage in that product. Conversely, if the SRCA index value is minus one, India has a comparative disadvantage in that product. Hence, SRCA index shows all those products of India which are comparatively advantageous or disadvantageous when India exports to the other BRICS member countries and the rest of the world. Using this SRCA index, BEC and HS two-digit product groups of India are identified as comparatively advantageous and disadvantageous. Estimated index values are presented in Tables 2 and 3 respectively.

The SRCA index is calculated for the years 2022 and 2024. Table 2 shows that some of India's BEC products are comparatively advantageous, while others are not. The results also indicate marginal changes in index values between these two years. This suggests that India's trade patterns and comparative advantage are unstable and inconsistent. To inform the discussion further, the analysis focuses primarily on the SRCA estimates for 2024.

When it trades with Brazil, India gains a comparative advantage in five products. These are fuels (0.26), chemicals (0.36), textile cloth (0.38), stone glass (0.02) and metals (0.01). India enjoys comparative advantage in animal products (0.41), vegetables (0.27), chemicals (0.28), stone glass (0.45), metals (0.08), machine and electronic (0.06) with Russia. With China, India has a comparative advantage in animal products (0.53), vegetables (0.41), minerals (0.37), fuels (0.08), chemicals (0.25), text cloth (0.59), foot wear (0.89), metals (0.12). India's comparative advantage with South Africa is only in fuels (0.60), chemicals (0.10), minerals (0.38) and transport (0.16). According to the estimated SRCA index, India has more comparative advantage products with China than with any other BRICS member country, followed by Russia, Brazil and South Africa. Overall, India has a comparative advantage in eight product groups in its trade with the BRICS countries, as well as with the rest of the world. Among the BEC product groups, India is most competitive in exporting Chemicals (28-38), Fuels (27-27), Textile Cloth (50-63), Metals (72-83), Vegetable (06-15).

Table 2. SRCA of BEC products of India in 2022 and 2024

BEC Products	Brazil (BRZ)		Russia (RUS)		China (CHN)		S. Africa (SAF)		BRICS		World	
	2022	2024	2022	2024	2022	2024	2022	2024	2022	2024	2022	2024
Animal (01-05)	-1.00	-1.00	0.58	0.41	0.52	0.53	-0.65	-0.68	**0.35**	**0.38**	0.13	0.12
Vegetable (06-15)	-0.56	-0.40	0.37	0.27	0.40	0.41	-0.23	-0.16	**0.18**	**0.21**	0.28	0.28
Food Prod (16-24)	-0.69	-0.45	0.19	-0.09	0.10	-0.20	-0.60	-0.63	-0.02	-0.16	-0.01	-0.16
Minerals (25-26)	-0.50	-0.96	-0.77	-0.56	0.18	0.37	0.39	-0.79	-0.05	**0.16**	-0.23	-0.17
Fuels (27)	0.53	0.26	-0.56	-0.39	0.32	0.08	0.53	0.60	**0.51**	**0.36**	0.19	0.26
Chemicals (28-38)	0.12	0.36	0.36	0.28	0.31	0.25	-0.03	0.10	**0.29**	**0.34**	0.13	0.17
PlastiRub (39-40)	-0.34	-0.08	-0.20	-0.18	-0.30	-0.18	-0.34	-0.24	-0.27	-0.12	-0.20	-0.18
HidesSkin (41-43)	-0.75	-0.65	-0.16	-0.17	-0.01	-0.02	-0.50	-0.56	-0.20	-0.16	0.14	0.14
Wood (44-49)	-0.71	-0.48	-0.61	-0.34	-0.71	-0.72	-0.53	-0.46	-0.68	-0.61	-0.38	-0.38
TextCloth (50-63)	0.05	0.38	-0.33	-0.24	0.33	0.59	-0.16	-0.15	**0.18**	**0.40**	0.38	0.40
Footwear (64-67	-0.67	-0.25	-0.48	-0.52	0.82	0.89	-0.74	-0.72	**0.49**	**0.64**	-0.07	-0.02
StoneGlas (68-71)	-0.23	0.02	0.39	0.45	-0.74	-0.87	-0.23	-0.67	-0.61	-0.68	0.36	0.26
Metals (72-83)	-0.22	0.01	0.08	0.08	0.25	0.12	-0.32	-0.34	0.01	0.00	0.12	0.08
MachElec (84-85)	-0.54	-0.34	-0.32	0.06	-0.54	-0.49	-0.46	-0.48	-0.53	-0.41	-0.36	-0.26
Transport (86-89)	-0.26	-0.22	-0.64	-0.80	-0.61	-0.35	0.20	0.16	**0.09**	**0.09**	-0.20	-0.16
Miscellan (90-99)	-0.60	-0.44	-0.41	-0.38	-0.53	-0.46	-0.75	-0.74	0.55	-0.46	-0.57	-0.56

Source: Authors own calculation from WITS data. Note: Different colours are used to highlight India's comparatively advantageous products with different trading partners.

India has a comparative advantage in certain products when trading with the BRCS countries, but not with the rest of the world. Among the BEC product group, India's comparatively advantageous products with the whole world are animal products (0.12), vegetables (0.28), fuels (0.26), chemicals (0.17), hides and skins

(0.14), textiles (0.40), stone glass (0.26), and metals (0.08). Thus, India does not have a comparative advantage in food products when trading globally, but it does have a comparative advantage when trading with Russia. Similarly, India does not have a comparative advantage in minerals or footwear in the global market, but it does have a comparative advantage with China and the BRICS group. India does not have a comparative advantage in machine and electronic products when trading globally, but it does with Russia. In the case of transport products, India is at a disadvantage in the global market, but gains an advantage when exporting to South Africa and BRICS bloc. In this context, BRICS are important for Indian foreign trade. India can gain more by exporting products that have a comparative advantage within BRICS but not elsewhere.

Some of India's most advantageous traded product groups are within the BRICS association, but not in the whole world. These product groups include minerals (25-26) get advantage in 2024, footwear (64-67), transport (86-89). Kaur (2018) found that India is most competitive in the export of chemical products, while Maryam and Mittal (2019) found this to be the case for agricultural products and related items.

Furthermore, we disaggregated our analysis of India's comparative advantage in trade with the other BRICS countries and the rest of the world, considering the 2022 HS two-digit classification. For example, India has a comparative advantage in BEC (01–05) when trading with Russia and China. We then disaggregated these product groups into five items (01, 02, 03, 04 and 05) and estimated the SRCA index for these five products in India's trade with the other BRICS countries. The HS two-digit classification for comparative advantage analysis reveals India's advantageous position in more detailed product groups. The estimated SRCA index for HS two-digit goods is given in Table 3)[1].

[1] Name of HS two digit goods are given in Appendix table.

Table 3. HS Two-digit comparative advantage products of India in 2024

HS Two Digit Code	BRZ	RUS	CHN	SAF	WLD	HS Two Digit Code	BRZ	RUS	CHN	SAF	WLD	HS Two Digit Code	BRZ	RUS	CHN	SAF	WLD
01	*NA*	*NA*	*NA*	*NA*	-0.92	**34**	0.40	0.07	-0.20	-0.53	-0.19	**67**	-0.98	-0.61	0.98	-1.00	0.40
02	*NA*	0.26	-1.00	-1.00	0.09	**35**	-0.82	-0.18	-0.77	-0.83	-0.35	**68**	-0.16	0.27	-0.17	-0.35	0.30
03	*NA*	0.57	0.84	-0.19	0.44	**36**	-0.94	0.70	*NA*	0.60	0.44	**69**	0.42	0.72	-0.02	0.13	0.40
04	*NA*	-0.27	-1.00	-0.94	-0.49	**37**	-0.98	-0.79	-0.98	-0.98	-0.89	**70**	0.22	-0.45	-0.35	-0.45	-0.21
05	-1.00	-1.00	-0.55	-0.94	0.11	**38**	0.68	0.46	0.12	-0.34	0.13	**71**	-0.80	-0.27	-0.96	-0.87	0.28
06	-0.18	-0.98	-0.19	-0.53	-0.71	**39**	-0.42	-0.27	-0.18	-0.26	-0.27	**72**	0.13	0.33	0.03	-0.50	0.11
07	0.34	0.14	0.78	-0.10	0.04	**40**	0.35	0.00	-0.15	-0.20	0.06	**73**	-0.04	-0.05	0.17	-0.12	0.16

HS Two Digit Code	BRZ	RUS	CHN	SAF	WLD	HS Two Digit Code	BRZ	RUS	CHN	SAF	WLD	HS Two Digit Code	BRZ	RUS	CHN	SAF	WLD
08	-0.87	-0.46	-0.90	-0.92	-0.27	**41**	-0.77	0.81	0.36	-0.16	0.19	**74**	-0.94	-0.26	0.09	-0.57	-0.29
09	0.75	0.59	0.96	0.28	0.61	**42**	-0.64	-0.31	-0.41	-0.63	0.15	**75**	-0.14	-0.45	-0.72	-0.98	-0.61
10	-1.00	0.90	-0.15	0.07	0.63	**43**	*NA*	-1.00	-0.98	-0.74	-0.79	**76**	0.46	0.44	0.58	-0.08	0.23
11	-0.92	-0.67	-0.98	-0.75	0.21	**44**	-0.52	-0.72	-0.69	-0.79	-0.64	**77**	*NA*	*NA*	*NA*	*NA*	*NA*
12	-0.31	0.34	-0.85	-0.42	-0.09	**45**	-0.87	-0.44	-0.63	-0.82	-0.79	**78**	-0.75	-0.35	0.06	-0.96	0.67
13	0.57	0.84	0.90	0.35	0.71	**46**	-0.53	-0.90	-0.17	-0.11	0.19	**79**	-0.12	-0.55	-0.23	-0.41	0.36
14	-0.67	-0.72	0.86	0.61	0.17	**47**	*NA*	*NA*	-0.94	*NA*	-0.98	**80**	-0.83	-0.96	-0.94	-0.89	-0.72
15	-0.71	0.09	0.83	-0.82	-0.17	**48**	-0.68	-0.25	-0.22	-0.34	-0.16	**81**	-0.40	-0.90	-0.27	-0.49	-0.55
16	-1.00	-0.25	-0.41	-0.92	-0.24	**49**	0.27	-0.85	-0.82	-0.41	-0.23	**82**	-0.15	-0.01	-0.36	-0.20	-0.12
17	-0.92	-0.59	0.12	-0.61	0.33	**50**	-0.35	-0.44	0.96	-0.61	0.67	**83**	-0.22	-0.48	-0.45	-0.31	-0.28
18	-0.14	-1.00	-0.92	-0.94	-0.75	**51**	-0.75	0.23	-0.83	-0.98	-0.14	**84**	-0.17	0.12	-0.19	-0.54	-0.25
19	-0.85	-0.92	-0.87	-0.16	-0.42	**52**	0.75	-0.65	0.79	0.30	0.74	**85**	-0.63	-0.07	-0.67	-0.42	-0.27
20	-0.85	0.22	-0.10	-0.42	-0.18	**53**	0.56	0.84	0.83	0.37	0.63	**86**	-0.41	-0.85	0.12	-0.89	-0.50
21	-0.31	0.41	-0.71	-0.42	-0.14	**54**	0.53	0.19	0.26	-0.40	0.26	**87**	0.01	-0.89	-0.50	0.19	-0.25
22	-1.00	-0.80	-0.96	-0.94	-0.72	**55**	0.43	-0.20	0.14	0.07	0.40	**88**	-1.00	0.63	-0.08	-0.96	0.05
23	-0.20	-0.74	0.37	-0.96	0.07	**56**	-0.23	-0.45	-0.52	-0.25	0.05	**89**	-1.00	-1.00	-1.00	-1.00	0.21
24	0.69	0.24	-0.96	-0.49	0.24	**57**	0.62	0.41	0.94	0.32	0.72	**90**	-0.30	-0.12	-0.38	-0.64	-0.46
25	-0.92	-0.03	0.86	-0.27	0.36	**58**	0.18	-0.82	0.04	-0.61	0.18	**91**	-1.00	-0.90	-1.00	-0.98	-0.89
26	-1.00	-1.00	0.26	-0.98	-0.34	**59**	-0.33	-0.63	0.47	-0.18	-0.05	**92**	-0.40	-0.89	0.28	-0.89	-0.55
27	0.26	-0.39	0.08	0.60	0.26	**60**	-0.96	-1.00	-0.87	-0.65	-0.16	**93**	-0.94	0.53	*NA*	-1.00	-0.12
28	-0.12	0.29	-0.13	-0.29	0.03	**61**	-0.55	-0.56	0.10	-0.28	0.25	**94**	-0.38	-0.87	-0.21	-0.79	-0.39
29	0.40	0.50	0.61	-0.12	0.38	**62**	0.55	0.02	-0.01	-0.30	0.33	**95**	-0.87	-0.77	-0.59	-0.59	-0.68
30	0.26	0.19	-0.57	0.53	0.15	**63**	0.45	-0.40	0.74	0.19	0.60	**96**	0.21	-0.43	-0.04	-0.67	-0.28
31	-0.77	-0.65	-0.49	-0.96	-0.79	**64**	0.15	-0.49	0.48	-0.61	-0.04	**97**	-1.00	-0.82	-0.98	-0.89	-0.30
32	0.55	0.51	0.63	0.02	0.43	**65**	-0.55	-0.89	-0.80	-0.85	-0.47	**98**	*NA*	*NA*	*NA*	*NA*	*NA*
33	-0.09	-0.55	-0.06	-0.12	-0.16	**66**	-1.00	-0.98	-0.96	-0.96	-0.89	**99**	-1.00	-0.85	-0.98	-1.00	-1.00

Source: Author's own calculation from WITS data. Note: NA stands for 'data not available'. Different colours are used to highlight India's comparatively advantageous products with different trading countries.

The estimated SRCA index of HS two-digit products shows that India has comparative advantage in 27 products (07, 09, 13, 24, 27, 29, 30, 32, 34, 38, 40, 49, 52, 53, 54, 55, 57, 58, 62, 63, 64, 69, 70, 72, 76, 87, 96) out of 99 product categories in its trade with Brazil. Then under same product categorization, India has comparative advantage in 32 products (02, 03, 07, 09, 10, 12, 13, 15, 20, 21, 24, 28, 29, 30, 32, 34, 36,

38, 40, 41, 51, 53, 54, 57, 62, 68, 69, 72, 76, 84, 88, 93) in its trade with Russia. Trading with China, India enjoys comparative advantage in 33 products (03, 07, 09, 13, 14, 15, 17, 23, 25, 26, 27, 32, 38, 41, 50, 52, 53, 54, 55, 57, 58, 59, 61, 63, 64, 67, 72, 73, 74, 76, 78, 86, 92). But India has comparative advantage in only a few products with South Africa (09, 10, 13, 14, 27, 30, 32, 36, 52, 53, 55, 57, 63, 69, 87). In contrast, India has comparative advantage in 46 products (02, 03, 05, 07, 09, 10, 11, 13, 14, 17, 23, 24, 25, 27, 28, 29, 30, 32, 36, 38, 40, 41, 42, 46, 50, 52, 53, 54, 55, 56, 57, 58, 61, 62, 63, 67, 68, 69, 71, 72, 73, 76, 78, 79, 88, 89) with the rest of the of the world. It is not surprising that India has a larger number of comparatively advantageous products in global trade. This is because the rest of the world offers a larger market size and a greater diversity of trading partners than the BRICS economies.

Importantly, the results also identify a subset of products for which India has a comparative advantage within the BRICS group, but not in the global market. For example, India has a disadvantage in products (49, 64, 70, 87 and 96) in the global market, but an advantage with Brazil. Similarly, India is at a disadvantage in the global market for products (12, 15, 20, 21, 34, 51, 84 and 93), but has an advantage with Russia. India also has a disadvantage in products 15, 26, 59, 64, 74, 86 and 92 in the global market, but has advantage in such products with China. There is only one product (87), where India enjoys a comparative advantage with South Africa, while has a disadvantage in the world market. These findings indicate that India has a comparative advantage in an additional five product groups when trading with Brazil, eight with Russia, seven with China, and one with South Africa. However, these products do not exhibit a comparative advantage in the global market. This suggests that the BRICS markets provide India with additional trade opportunities beyond its overall global competitiveness, and that these economies are India's main trading partners.

Furthermore, we found that India has comparative advantage in 37 HS two-digit products in both BRICS economies and rest of the world. These (03, 07, 09, 10, 13, 14, 17, 23, 24, 25, 27, 28, 29, 30, 32, 36, 38, 40, 41, 42, 50, 52, 53, 54, 55, 57, 58, 61, 62, 67, 68, 69, 72, 73, 76, 78, 88) are the most comparatively advantageous products of India, which show India's potential for trade with BRICS as well as with the rest of the world.

4.2. Analysis of India's trade intensity in relation to BRICS

Trade intensity is a measure of the strength of trade relations between two countries that engage in trade, and it reflects the significance of a trade partner in relation to the total trade activities. It can be estimated using the trade intensity index (TII), which quantifies the significance of a country's trade with another country relative to global trade patterns. The TII index is calculated by dividing a nation's aggregate export share with a given partner country by the global export share with that same partner country. In short, TII compares a country's exports to a specific partner country with the global total of exports to that country. In this study, TII is used to evaluate the significance of India's exports to the BRICS countries. This helps to identify the most

significant trade partner for Indian exports among the BRICS countries. The TII for India and other BRICS is calculated as follows:

$$TII_{India-BRICS} = \frac{X_{India-BRCS} / X_{India}}{X_{World-BRCS} / X_{World}} \quad (3)$$

Where, $X_{India-BRCS} / X_{India}$ represents the share of India's exports to the BRCS countries and $X_{World-BRCS} / X_{World}$ represents the share of global exports to the BRCS countries. TII is the ratio of India's export share to the BRCS countries to the world's export share to the BRCS countries. The value of TII ranges from zero to positive infinity. A TII value greater than one indicates relatively strong exports from India to the BRCS countries. Conversely, a TII value of zero suggests that India's exports to the BRCS countries are insignificant and hold little importance in their trade relations. Recently, Islam and Nath (2023) used TII to analyse India–Bangladesh trade, finding that it declined in the post-SAFTA period. This suggests that SAFTA failed to enhance trade relations between the two countries. Similarly, the present study uses TII to examine the impact of BRICS integration on India's export performance.

Table 4. Total TII of India with rest of the BRICS countries

Year	Brazil	Russia	China	S. Africa	Year	Brazil	Russia	China	S. Africa
1997	35.94	271.09	66.01	258.83	**2011**	140.52	37.69	69.55	236.76
1998	36.11	224.44	44.02	257.80	**2012**	165.47	42.27	63.08	273.14
1999	41.58	449.31	50.86	199.61	**2013**	146.52	42.03	58.29	295.50
2000	50.39	323.05	53.20	178.68	**2014**	189.77	44.72	51.23	331.97
2001	56.67	220.49	59.13	182.80	**2015**	118.31	55.42	43.31	262.36
2002	94.16	163.47	74.38	235.86	**2016**	99.55	62.63	40.15	241.39
2003	100.79	115.95	88.85	184.58	**2017**	103.68	59.26	46.82	266.29
2004	106.59	73.63	102.05	246.20	**2018**	118.39	61.05	55.36	233.83
2005	135.66	56.34	129.73	276.15	**2019**	130.95	71.51	58.14	250.91
2006	160.15	51.02	113.03	320.01	**2020**	146.48	74.19	68.74	300.05
2007	147.90	37.95	108.50	264.06	**2021**	156.05	68.95	57.96	338.65
2008	164.48	32.88	94.09	252.87	**2022**	205.28	76.65	38.59	393.11
2009	97.49	41.20	82.72	213.67	**2023**	154.85	97.65	43.71	386.60
2010	135.61	42.59	99.65	295.86	**2024**	130.91	119.48	40.53	455.77
Avg.	97.39	150.24	83.30	240.40	**Avg.**	143.34	65.25	52.54	304.74

Source: World Integrated Trade Solution (WITS).

The estimates of twenty-eight-year TII of India with the BRCS countries is presented in Table 4. However, this is divided into the fourteen-year average TII of India with other BRICS countries before the formation of BRICS, and the fourteen-year average TII of India with other BRICS countries after the formation of BRICS. It shows that the average TII value of India was the highest with South Africa (240.40), followed by Russia (150.24), Brazil (97.39) and China (51.53) before the formation of BRICS and, after the formation of BRICS, South Africa's TII remains the highest (304.74), followed by Brazil (143.34), Russia (65.25) and China (52.54). Thus, TII of India was the highest with South Africa and second position was occupied by Brazil in the post-BRICS formation period (2011-24). Therefore, our findings corroborate the results of Ekor et al. (2015) and Yin (2014). Ekor et al. (2015) also found that South Africa's trade intensity with India is the highest. According to Yin (2014), India had the highest TII value within the BRICS group in 2004, but this decreased drastically from 2010 onwards and Brazil took over the lead. We also found that, except with Brazil, India's TII decreased with Russia, China and South Africa between 2010 and 2013. However, it later improved with all other BRICS countries except China.

These index values show that, between 2011 and 2024, South Africa and Brazil were India's most important export partners among the BRICS countries, while China and Russia were the least important. However, the TII value for India increased with all BRICS countries except China during this period. The decline in India-China TII values implies that China reduced its imports from India between 2012 and 2023. Conversely, a contrasting trend is evident in Chinese exports to India. Chinese electronic products have become a prominent component of the Indian market, demonstrating a significant presence and influence. This development underscores China's monopolistic dominance in the Indian market. During the period 2012 to 2024, there was a decline in the export of Indian products to China, while China's exports to India became more substantial. However, the average growth rate of the TII in India was very high, with Brazil (1.51), Russia (9.09), South Africa (5.51) and China (- 2.63). during the period 2011 - 24. It is reasonable to hypothesize that India's trade with Russia will improve further in the future.

Figure 1 illustrates the growth rates of total TII between India and the BRICS countries over the period 1997-2024. The trend lines for Brazil, Russia, China and South Africa reflect the changing dynamics of India's trade intensity with each partner country. The results indicate that the TII values have exhibited cyclical fluctuations over time. However, these fluctuations appear to be moderated in the post-BRICS formation period. It suggests relatively greater stability in India's trade engagement with the BRICS economies.

During the initial period from 1997 to 2006, the growth rate of TII between India and Brazil remained positive, indicating a strengthening bilateral trade relationship. However, between 2007 and 2016, the growth rate exhibited considerable volatility. It was alternating between negative and positive values. In the subsequent period 2017 to 2022, it returned to positive territory, suggesting a renewed expansion in trade intensity between the two countries.

The growth rate of TII of India with Russia exhibited natural fluctuations and remained positive most of the time during the study period. However, it declined during the pandemic. Later, the Russia–Ukraine war dealt a severe blow to India–Russia trade, preventing any significant recovery.

The growth rates of the India-China TII fluctuate more than those of the other BRICS countries. It remained negative for most of the study period. Prior to the onset of the pandemic, positive growth was recorded, but it began to decline sharply during the pandemic.

Similarly, the TII growth rate between India and South Africa fluctuated considerably between 1997 and 2018. However, a positive trend has emerged since 2018. The index declined during the pandemic, but has since recovered steadily. Notably, the TII growth rate between India and South Africa has been increasing rapidly, which suggests that India's exports are becoming more important in South Africa than those of Brazil, Russia and China. As Ekor et al. (2015) noted, trade between South Africa and India is the highest among the BRICS countries.

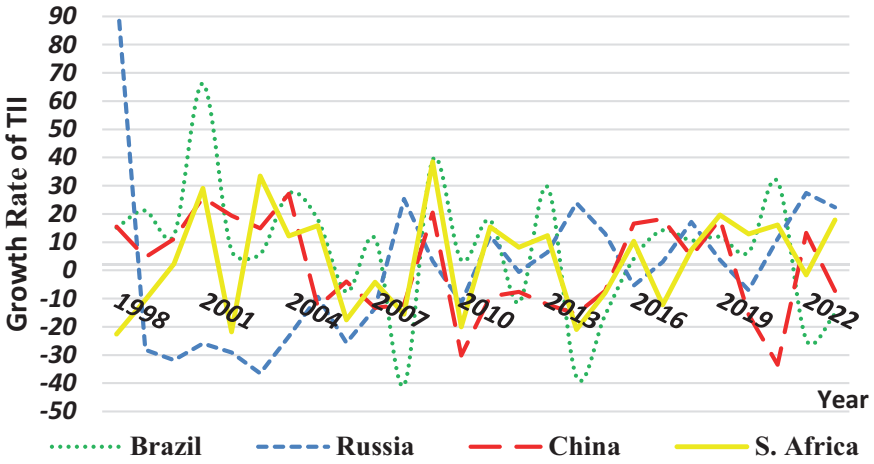

Figure 1. Growth Rate of TII

A similar positive trend has been observed in India's foreign trade with Brazil, whereas China's response to Indian imports has worsened. Russia's trade response was strong until 2019, but China's has remained relatively weak and insignificant. In short, South Africa and Brazil have emerged as the most significant export destinations for Indian products among the BRICS countries, whereas Russia and China have shown relatively lower trade intensity. Therefore, although China and Russia are India's nearest BRICS neighbours, TII is comparatively higher with South Africa and Brazil.

4.3. Trade complementary analysis of India-BRCS

Trade complementarity reflects the potential for mutually beneficial trade by measuring how well the exports of one country match the import needs of another. A country's degree of trade complementarity can be measured using the trade complementarity index (TCI). The TCI is a metric used to quantify the degree to which the export profile of one country corresponds with the import profile of another, thus providing useful information on prospects of intraregional trade. To summarise, the TCI is a metric which indicates the degree of importance of a country's exports to its partner country. According to Raghuramapatruni (2015), the "BRICS countries are complementary rather than competitive to each other with respect to the commodity trade". In the present study, the TCI helps measure the importance of Indian exports to the BRCS countries. It also helps identify the most significant country for Indian export. The TCI of India is calculated as:

$$TCI_{\text{India-BRCS}} = 100 * \left[1 - \frac{\Sigma \left| IM_{BRCS} - EX_{India} \right|}{2}\right] \quad (4)$$

Regarding India's exports to the BRCS countries, the value of the TCI index ranges from zero to one hundred. An index value of zero means that India's exports do not match the imports of any particular BRCS country, while a value of 100 means that India's exports perfectly match those of the BRCS countries.

The estimated TCI value is displayed in Table 5. The TCI value between India and each BRICS partner country had increased over the years (1997–2024). The average TCI value between India and Brazil was 46.22 between 1997 and 2010, but increased to 61.52 between 2011 and 2024. Similarly, the average India-Russia TCI value increased from 44.01 to 51.45 during 1997-2010 to 2011-24. The India-China TCI value increased from 44.55 to 55.41 during 1997-2010 to 2011-24 and the India-South Africa TCI value increased from 46.96 to 62.68 during the same period. Thus, since the formation of the BRICS group in 2011, India's average TCI with all BRICS partner countries has increased. This indicates that India's exports to BRICS have increased since the formation of the group, which means that the other BRICS countries are now importing products from India.

However, during the study periods (1997–2010 and 2011–2024), India's TCI increased by a greater percentage with South Africa (33.48%) and Brazil (33.10%) than with Russia (16.90%) and China (24.38%). This suggests that India's exports are more closely aligned with South Africa's and Brazil's imports than with Russia's and China's. This finding indicates that the formation of the BRICS group could present robust trade opportunities for India.

Table 5. TCI of India with BRCS Countries

Year	Brazil	Russia	China	S. Africa	Year	Brazil	Russia	China	S. Africa
1997	39.30	44.18	38.31	36.84	**2011**	46.31	46.17	52.99	61.47
1998	37.20	36.59	34.01	35.25	**2012**	46.69	45.28	52.47	59.34
1999	35.41	50.49	34.28	37.56	**2013**	61.51	46.41	51.71	61.23
2000	38.43	44.30	38.88	39.66	**2014**	62.51	48.94	52.69	59.51
2001	42.59	45.69	41.92	43.76	**2015**	59.59	53.76	53.95	57.64
2002	43.17	43.38	42.09	43.58	**2016**	60.25	51.06	52.58	58.42
2003	45.73	43.75	44.22	45.27	**2017**	60.51	50.47	52.63	58.58
2004	47.37	43.91	47.99	46.94	**2018**	66.19	54.02	55.58	63.16
2005	49.65	42.88	48.86	49.06	**2019**	66.25	55.63	55.25	62.81
2006	56.07	42.39	49.57	52.94	**2020**	64.11	55.24	52.12	62.14
2007	56.30	42.35	48.85	53.73	**2021**	64.95	53.61	54.90	64.13
2008	59.25	43.94	51.95	57.15	**2022**	65.52	50.48	60.46	68.77
2009	48.15	47.54	50.29	56.54	**2023**	67.32	54.03	65.02	69.25
2010	48.39	44.76	52.47	59.17	**2024**	69.58	55.15	63.41	71.10
Avg.	46.22	44.01	44.55	46.96	**Avg.**	61.52	51.45	55.41	62.68

Source: World Integrated Trade Solution (WITS).

5. Results and discussion

The estimated SRCA index values for the BEC product (HS classification 2022) in India's trade with the other BRICS countries indicate a significant number of products for which India has a comparative advantage. This suggests a considerable amount of trade potential within the BRICS economies. Furthermore, it has been observed that there were few changes in the SRCA index value between 2022 and 2024, meaning stability in trade between India and the other BRICS economies. Further analysis of BEC's disaggregated product groups, considering HS two-digit products, was conducted to obtain more details about India's products with a comparative advantage. The results show that India has a large number of products in which it has a comparative advantage in trade with China (33 products), followed by Russia (32 products), Brazil (27 products) and South Africa (15 products), respectively. Therefore, India has more products with a comparative advantage in trade with China and Russia than with Brazil and South Africa. Eighteen two-digit products reveal India to be at a disadvantage in the global market, yet at an advantage in various BRICS countries. Thus, the findings emphasize the strategic significance of the BRICS nations as key export markets for India. With this in mind, it can be stated that the BRIC countries are particularly important to India's international trade.

Again, we found that the TII of India increased over the period 1997 to 2024 with South Africa and Brazil while decreasing with Russia and China. During 2011 to 24, the average TII in India was comparatively higher than in South Africa and Brazil. This indicates that India's exports are comparatively more significant for South Africa and Brazil compared to China and Russia.

The key finding is that India has a greater comparative advantage in trade with China and Russia than with Brazil and South Africa. However, India's trade intensity is more pronounced with South Africa and Brazil. This paradoxical relationship between SRCA and TII may arise because of the nature of these trade indices. When calculating the SRCA index for a country, only exports of a particular commodity in a given year are considered; however, the TII considers total exports. This means that India's share of total exports to South Africa and Brazil is greater than its share of total exports to China and Russia. However, the number of export-competitive products is lower in the case of South Africa and Brazil than with China and Russia. This means that India only exports comparatively advantageous products to China and Russia.

Thus, India has a greater comparative advantage in trade with China and Russia than with Brazil and South Africa, but the TII is higher with South Africa and Brazil than with China and Russia. This means that India's trade with China and Russia is relatively under-realized, while its trade with South Africa and Brazil is relatively over-realized.

Similarly, India's TCI value is higher with South Africa and Brazil than with Russia and China. This means that, among the BRICS countries, India's exports are highly aligned with South Africa's import profile, followed by Brazil, Russia and China. The most important point to highlight from these trade indices is their positive growth over the years. Therefore, the formation of the BRICS alliance has been beneficial to India's foreign trade.

6. Conclusion

The study indicates that India possesses a sufficient number of products with a comparative advantage, both within the BRICS group and in relation to the rest of the world. It is evident that India's agricultural and associated products hold greater significance on the global stage when compared to those of the other BRICS nations. However, Indian trade has evolved alongside Chinese trade, shifting from low-value products to high-value manufacturing. This change in the BRICS' trade has also been noted in Kocourek's study (2015).

The TII reveals India's trade intensity with other BRICS countries. With the exception of China, the TII value has increased over the years (from 2011 to 2022). However, India's average TII with South Africa and Brazil increased after the formation of BRICS, while it decreased with China and Russia. India's trade intensity with South Africa is the highest among the BRICS countries. Furthermore, India's TCI

values with South Africa are significantly better than with other BRICS. Brazil, another BRICS member country, has also expressed greater interest in trading with India, as their TII value has increased since the formation of the BRICS group.

Finally, TCI's value shows positive results for Indian exports. India's exported products complement the markets of the BRICS countries and are becoming increasingly important over time. Proper trade negotiations between the BRICS countries, supported by each country, could strengthen their position in world trade. Raghuramapatruni (2015) stated that the trade between the BRICS countries is complementary rather than competitive. Therefore, exporting Indian products to the BRICS countries is comparatively advantageous and complementary. However, this study reveals that, despite sharing a border with India, China is not a major export destination for India. South Africa and Brazil are far from India, but these two countries are its most important export partners among the BRICS members. Further, we found that India's trade with Russia was strong but then there has been a decline in the growth rate of TII during the Covid-19 pandemic and the Russia-Ukraine war. Overall analysis of the study reveals the importance of all the other BRICS countries as trade partners of India.

However, taking broader product divisions into account, such as the four- and six-digit HS divisions, would enable us to identify India's comparative advantages within the BRICS economies more specifically. However, this approach does not consider the effect of geographical distance and other economic factors on India–BRICS trade relations. This limitation will be addressed in a future study through the application of a gravity model.

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Appendix A

HS Two-Digit Classification of 2022[2]

SECTION I: Live Animals; Animal Products

1. Live animals.
2. Meat and edible meat offal.
3. Fish and crustaceans, molluscs and other aquatic invertebrates.
4. Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included.
5. Products of animal origin, not elsewhere specified or included.

SECTION II: Vegetable Products

6. Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage.
7. Edible vegetables and certain roots and tubers.
8. Edible fruit and nuts; peel of citrus fruit or melons.
9. Coffee, tea, mate and spices.
10. Cereals.
11. Products of the milling industry; malt; starches; inulin; wheat gluten.
12. Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder.
13. Lac; gums, resins and other vegetable saps and extracts.
14. Vegetable plaiting materials; vegetable products not elsewhere specified or included.

SECTION III: Animal, Vegetable or Microbial Fats and Oils and Their Cleavage Products; Prepared Edible Fats; Animal or Vegetable Waxes

15. Animal, vegetable or microbial fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes.

SECTION IV: Prepared Foodstuffs; Beverages, Spirits and Vinegar; Tobacco and Manufactured Tobacco Substitutes; Products, Whether or Not Containing Nicotine, intended for Inhalation Without Combustion; Other Nicotine Containing Products Intended for The Intake of Nicotine into The Human Body

16. Preparations of meat, of fish, of crustaceans, molluscs or other aquatic invertebrates, or of insects.
17. Sugars and sugar confectionery.
18. Cocoa and cocoa preparations.

[2] Search Links: https://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/hs-nomenclature-2022-edition/hs-nomenclature-2022-edition.aspx

19. Preparations of cereals, flour, starch or milk; pastry cooks' products.
20. Preparations of vegetables, fruit, nuts or other parts of plants.
21. Miscellaneous edible preparations.
22. Beverages, spirits and vinegar.
23. Residues and waste from the food industries; prepared animal fodder.
24. Tobacco and manufactured tobacco substitutes; products, whether or not containing nicotine, intended for inhalation without combustion; other nicotine containing products intended for the intake of nicotine into the human body.

SECTION V: Mineral Products

25. Salt; Sulphur; earths and stone; plastering materials, lime and cement.
26. Ores, slag and ash.
27. Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.

SECTION VI: Products of The Chemical or Allied Industries

28. Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes.
29. Organic chemicals.
30. Pharmaceutical products.
31. Fertilizers.
32. Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring matter; paints and varnishes; putty and other mastics; inks.
33. Essential oils and resinous; perfumery, cosmetic or toilet preparations.
34. Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial waxes, prepared waxes, polishing or scouring preparations, candles and similar articles, modelling pastes, "dental waxes" and dental preparations with a basis of plaster.
35. Albuminoidal substances; modified starches; glues; enzymes.
36. Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations.
37. Photographic or cinematographic goods.
38. Miscellaneous chemical products.

SECTION VII: Plastics and Articles Thereof; Rubber and Articles Thereof

39. Plastics and articles thereof.
40. Rubber and articles thereof.

SECTION VIII: Raw Hides and Skins, Leather, Furskins and Articles Thereof; Saddlery and Harness; Travel Goods, Handbags and Similar Containers; Articles of Animal Gut (Other Than Silk-Worm Gut)

41. Raw hides and skins (other than furskins) and leather.

42. Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silk-worm gut).
43. Furskins and artificial fur; manufactures thereof.

SECTION IX: Wood and Articles of Wood; Wood Charcoal; Cork and Articles of Cork; Manufactures of Straw, Of Esparto or of Other Plaiting Materials; Basket ware and Wickerwork

44. Wood and articles of wood; wood charcoal.
45. Cork and articles of cork.
46. Manufactures of straw, of esparto or of other plaiting materials; basket ware and wickerwork.

SECTION X: Pulp of Wood or of Other Fibrous Cellulosic Material; Recovered (Waste and Scrap) Paper or Paperboard; Paper and Paperboard and Articles Thereof

47. Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard.
48. Paper and paperboard; articles of paper pulp, of paper or of paperboard.
49. Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts and plans.

SECTION XI: Textiles and Textile Articles

50. Silk.
51. Wool, fine or coarse animal hair; horsehair yarn and woven fabric.
52. Cotton.
53. Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn.
54. Man-made filaments; strip and the like of man-made textile materials.
55. Man-made staple fibres.
56. Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables and articles thereof.
57. Carpets and other textile floor coverings.
58. Special woven fabrics; tufted textile fabrics; lace; tapestries; trimmings; embroidery.
59. Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable for industrial use.
60. Knitted or crocheted fabrics.
61. Articles of apparel and clothing accessories, knitted or crocheted.
62. Articles of apparel and clothing accessories, not knitted or crocheted.
63. Other made-up textile articles; sets; worn clothing and worn textile articles; rags.

SECTION XII: Footwear, Headgear, Umbrellas, Sun Umbrellas, Walking-Sticks, Seat-Sticks, Whips, Riding-Crops and Parts Thereof; Prepared Feathers and Articles Made Therewith; Artificial Flowers; Articles of Human Hair

64. Footwear, gaiters and the like; parts of such articles.
65. Headgear and parts thereof.
66. Umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops and parts thereof.
67. Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles of human hair.

SECTION XIII: Articles of Stone, Plaster, Cement, Asbestos, Mica or Similar Materials; Ceramic Products; Glass and Glassware

68. Articles of stone, plaster, cement, asbestos, mica or similar materials.
69. Ceramic products.
70. Glass and glassware.

SECTION XIV: Natural or Cultured Pearls, Precious or Semi-Precious Stones, Precious Metals, Metals Clad with Precious Metal and Articles Thereof; Imitation Jewellery; Coin

71. Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal and articles thereof; imitation jewellery; coin.

SECTION XV: Base Metals and Articles of Base Metal

72. Iron and steel.
73. Articles of iron or steel.
74. Copper and articles thereof.
75. Nickel and articles thereof.
76. Aluminium and articles thereof.
77. *(Reserved for possible future use in the Harmonized System)*
78. Lead and articles thereof.
79. Zinc and articles thereof.
80. Tin and articles thereof.
81. Other base metals; cermet's; articles thereof.
82. Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal.
83. Miscellaneous articles of base metal.

SECTION XVI: Machinery and Mechanical Appliances; Electrical Equipment; Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, And Parts and Accessories of Such Articles

84. Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.

85. Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles.

SECTION XVII: Vehicles, Aircraft, Vessels and Associated Transport Equipment

86. Railway or tramway locomotives, rolling-stock and parts thereof; railway or tramway track fixtures and fittings and parts thereof; mechanical (including electro-mechanical) traffic signalling equipment of all kinds.
87. Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof.
88. Aircraft, spacecraft, and parts thereof.
89. Ships, boats and floating structures.

SECTION XVIII: Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus; Clocks and Watches; Musical Instruments; Parts and Accessories Thereof

90. Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof.
91. Clocks and watches and parts thereof.
92. Musical instruments; parts and accessories of such articles.

SECTION XIX: Arms and Ammunition; Parts and Accessories Thereof

93. Arms and ammunition; parts and accessories thereof.

SECTION XX: Miscellaneous Manufactured Articles

94. Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; luminaires and lighting fittings, not elsewhere specified or included; illuminated signs, illuminated name-plates and the like; prefabricated buildings.
95. Toys, games and sports requisites; parts and accessories thereof.
96. Miscellaneous manufactured articles.

SECTION XXI: Works of Art, Collectors' Pieces and Antiques

97. Works of art, collectors' pieces and antiques.
98. *(Reserved for special uses by Contracting Parties)*
99. *(Reserved for special uses by Contracting Parties)*