

# Indo-Russia Trade: An Evaluation of Symmetry, Complementarity, Intensity and Similarity

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## Abstract

*This article focuses on Indo-Russia trade relations and evaluates the economic performance of trade in terms of symmetry, complementarity, intensity and similarity and future prospects for Indo-Russia trade relation and the change in the economic scenario over a 24-year period from 1995 to 2018. The article attempted to evaluate Indo-Russia trade using Thiel's symmetry criteria, trade complementarity index (TCI), export intensity index (EII), import intensity index (III), and export similarity index (ESI), analysis in exports and imports in different type of goods categorized on the basis of their production. In terms of symmetry, trade is increasingly asymmetric for Russia-India and is much more visible during 1995 as compared to 2018. Regarding trade intensity, there is a growing trend, as the export intensity index (EII) values for 24-year time period 1995–2018 present an average value of 0.58, the index value which is lower than 1, which means a lower intensity of export trade of India with its partner; however, from 2005 onwards there has been a growth with respect to the export intensity values which were above 1. The highest import intensity index (III) was registered in year 2009 which was 9.095. The III values registered from 1995 to 2011 were greater than 1, showing a great intensity of India's import trade with Russia. Moreover, the declining complementarity trend (in 2010 and 2018) is as a result of production specialization. Regarding export similarity of India against Russia, India enjoys competitive edge in the basic agricultural Commodities. During 2005-2010, the trend reversed as India's exports were getting much more specialized and back in 2015 the trend of similarity remained in India's favor.*

**JEL classification:** F10, F17, F21, F24

**Keywords:** India, Russia, Exports, Imports, Symmetry

## **Introduction**

In the era of globalization, it is difficult to get through a day without the world economy touching the lives in some way or the other. Every day, so much of time is spent either in consuming goods and services from or producing goods and services for other countries. The exposure to the language of international economics is insidious, with terms like exports, imports, trade balance, exchange rate and the names of the organizations (e.g. WTO, IMF and WB) and trade agreements (e.g. NAFTA, SAFTA and IBSA) frequently appearing in newspapers, magazines and the internet. Today, no country inhabits an economic island. Its firms and industries, commercial activities in goods and services, technology and available capital, standard of living, and all features of its economy are related to the economies of other countries. These relationships form a complex flow of goods, services, capital and labor, and technology between countries. As the world economy becomes increasingly integrated, every country has come to terms with this increased interdependence. Every country benefits tremendously from its interactions with other countries. National policies that affect trade, investment, value of the country's currency, and the level of national output can be used to enhance these benefits and lessen the costs of interdependence. To reap these additional benefits, each country needs to base its national policies on an objective analysis of international economics. The purpose of this study is to highlight the performance and prospects of India's trade linkage with Russia as these economies are realized as the future leaders of the world. The dimensions are accordingly selected to prove the justification of India's trade linkage with Russia.

### **1.1 Status of India and Russia**

Russia and India share very old relations but the credit goes to Neill (2001) who introduced the term "BRIC" to portray a cluster of populous budding countries consisting of Brazil, Russia, India and China on description of their economic progress and growth scenario. These countries have independently and in cooperation risen to eminence in global trade. As a consequence, they have been characterized as the 'Southern Engines' of global growth. Russia and India have paved a way to join the position of the world's five largest economies by 2050 (Wilson and Purushothaman, 2003). These countries are progressively trading more with one another.

The surfacing of Indo-Russia economies reflects an enduring alteration in the international economic array. These economies account for a considerable part of global trade. Their amplified economic heaviness has led to a repositioning of economic institutions and given an augmented accent to emerging economies in international transactions. Although the Indo-Russia act as regionally privileged in their respective areas (i.e. Russian Federation in Central Asia and India in South Asia), but their influence is also widely catered in the world. Their dynamism presents central instruction for middle income economies determined to attain structural changes. As trade is a dazzling feature of internationalization of economic system and the factors of production are not adequately available in a country, but these

economies are leaving no stone unturned to prove their presence. For grafting the varied needs, countries engage in international trade. Looking through the global perspective, the world economy has changed rapidly both in horizontal and vertical spectrum. These changes in the world economy have established clearly that no country can segregate itself completely from the world and survive for long (Agarwal, 2002). This unparalleled trend is proved by the emergence of Russia and India economies. The process of rapid transformation linked to the rise of these emerging economies on the international panorama has created the blistering environment for other economies. These economies are undeniably acquiring a principal role as both political and economic actors. The reason for this is their economic growth and size, thus have emerged as important powers at a national as well as global level, accounting altogether for 16 per cent of world population and 6 per cent of world GDP (World Bank, 2018). These figures are substantial amount of proof to prove their broad presence in the global arena.

This study makes an attempt to interpret and quantify the impact of their domestic and global economic transformation on various aspects of trade relations between the nations. Their fast expansion and growth recital in the 21st century has overwhelmed policymakers and researchers alike. This is why the current study is an endeavor to analyse the fundamental nature of structural change in the Indo-Russia trade and in this purview the objectives of the study are to analyze intensity, similarity and complementarity of trade between India and Russia and to analyze the trade potential and the categorization of the commodities according to their trade prospective that could enhance the trade relations between India and Russia.

## **2. Literature Review**

This section includes the literature review which is relevant to the subject matter of the study in order to completely understand the concept of latency, performance and future prospects of India's Trade Linkage with Russia.

### **2.1 Pattern and Symmetry of Trade**

Neill et.al (2005) presented a study on the strength of the BRICs. The study explains how the BRICs countries have progressed. The study justifies the BRICs and all the world economies attainment in terms of supporting a dynamic setting for growth. The BRICs economies do give the impression to be at the forefront of many other developing economies, both large and small. Shaw and Cooper (2007) examined the developments in Russia in comparison to other emerging economies (China, India and the United States). The central dogma of the contrast is on the scope to which these economies show possibility for functioning as "knowledge-driven" economies. The four pillars for the developmental process include educated and skilled population; a strong network of R&D institutions; a dynamic information infrastructure; and an organization promoting the development of knowledge. Claudia and Mihaela (2010) explained the

fascinating case of the BRIC countries (Brazil, Russia, India and China). The BRIC countries share some common characteristics, but actually being very different in most of the aspects. The study revolves around their unique mission, vision and development strategy and the future of their growth. The study has also take into account the impact of global crisis and how the economies have used their strategies to gallop away from the shocks. Srivastav (2012) studied the origin, impact and benefits of BRICS on Indian economy. It describes major global shifts in Indian subcontinent because of the trade flows from other BRICS countries. Further, it explores the opportunities and challenges with this rise. Light is shed on some common factors which made BRIC increasingly noticeable from last few years. The unprecedented economic growth and the middle class are amongst the visible factors. The other factors are structural and unique advantages which made them globally recognized economies. Pant and Singh (2011) provided a detailed product wide study of intra-BRICS trade covering the period 1995-2007. The study portrayed that the observed growth in intra BRICS trade is largely illusory and is based on exports of low natural resources. The observed growth in intra-BRICS trade is asymmetrical as it is driven largely by Chinese demand for inputs which is not sustainable. However, particularly for India, Brazil, South Africa and Russia there is a reasonable possibility of coordinating exports to third countries in the areas of Vegetable Oils, Chemical Products, Plastics and Iron and Steel. There is no competition between these countries in exports of these products to third markets. Purushothaman and Wilson (2004) explained the fundamental changes in the BRICS economies with special focus on India. The study supports the India's ability to meet the BRICs projections. India's services-led growth strategy, a departure from Asia's traditional manufacturing-led model for growth, is benefiting from both domestic and global demand. Globally competitive firms are emerging from the country's historically protected private sector, and broad-based reform is fostering infrastructure development and greater openness. India lags the other BRICs in levels of openness, basic education and infrastructure, meaning that it has work to do to make the BRICS projections a reality. If the country can strengthen these conditions, India may well realize its potential as the sleeper success story of the BRICs.

## **2.2 Intensity, Similarity and Complementarity of Trade.**

The latest research devoted to Indo-Russia trade analysis was by Havlik et al. (2009), De Castro (2012a, 2012b), Singh et al. (2011), Yuan and Zhao (2011), Çakir and Kabundi (2011) and Sharma and Kallummal (2012). Havlik et al. (2009) analysed the BRIC's and the Triad's (mainly the EU) trade in goods and services elaborating on their global trade positions, geographical and sectoral trade compositions. The findings show a shrinking triad global market share as well as their share in the BRIC's market. It has been proven that the EU still plays a substantial role in the BRIC's trade especially by being Russia's main export partner and China's import partner. Wani et.al (2013) described the experience and future potentialities of BRICS as a

trading bloc. The study employed various techniques like Revealed Comparative Advantage, Revealed Import Dependence, Export Intensity Index, Import Intensity Index and Trade share analysis to assess the importance of this trading bloc. The results portrayed in the study prove the essence of their intra country trade and the bright future for their long existence in the global arena. Shuail and Wang (2011) studied the BRICS economies by adopting the Revealed Comparative Advantage, Constant Market Share and Trade Complementarity Index. This study has made an empirical analysis of the comparative advantages and complementarity of the agricultural trade between BRICS and the United States in terms of sixteen major agricultural products since 1997. The results indicate that the exporting agricultural products of BRICS and the United States reflect the characteristics of the resource endowment of each country; BRICS agricultural product competitiveness has decreased after its WTO accession, while the country's agricultural export structure has been upgraded; Sino-US agricultural trade dependency continues to rise, and the U.S. relies more on China than China does on the U.S.; BRICS and the United States have good complementarity in the agricultural trade, which tends to strengthen after the China's accession to the WTO.

### **3. Data Sources and Research Methodology.**

Keeping in mind the nature of study, secondary data has been collected. The data has been compiled from a wide variety of sources: journals on international trade; yearbooks publishing statistical data with respect to trade, viz World Bank, UN, UNCOMTRADE, IMF and WTO; and through diverse online data sources, textbooks, magazines and websites, etc. Different indices and models have been used to find out symmetry, intensity, similarity and complementarities in production and trade between India and Russia. These include Entropy Model, Export Similarity Index, Trade Complementarity Index and Trade Intensity Index. The complete explanation and their usage by different researchers are explained in their concerned sections. Furthermore, their usage by other researchers is supported by academic literature in their concerned sections.

## **4. Results and Discussions**

### **4.1 Trade Symmetry and Sustainability of BRICS Trade**

Trade continues to be the most powerful force for global economic integration. However, an important economic issue that pinches the trade structure of economies is the sustainability and symmetry of bilateral trade balances. Trade balance is defined when exports of a country equal to its imports, but in real world it is roughly possible as maximum times there is asymmetrical flow of trade. To gauge this asymmetry in trade a tool has been suggested by Theil, called as 'Entropy' denoted by 'H'. According to Theil, as trade becomes more symmetric, the entropy measure of bilateral symmetry increases. Value is calculated for the pair over the period 1995-2016. The results are shown in Table 1 as follows.

**Table 1: Trade Symmetry in Bilateral and Intra-BRICS Trade**

	Entropy (Hij)	
Bilateral Country Group	1995	2016
Russia-India	0.776	0.98

Source: Calculation based on data from Uncomtrade.

Inspection of table 1 demarcates the finding that trade is increasingly asymmetric for Russia-India. From Table 1, it can be depicted whether there is symmetry or not based on the comparison of the values during the reference period. Asymmetry in trade is much more visible during 1995 as compared to 2018. This means that in year 1995 intra- trade is more asymmetric with reference to 2018 trade. Hence asymmetry in trade has been obsessed by trade imbalances and elimination of these imbalances can help in sorting out, thus making trade more symmetric. The findings match the study of Pant and Singh (2011) that provided a detailed product wide study of intra-BRICS trade covering the period 1995-2007. The study portrayed that the observed growth in intra BRICS trade was largely illusory and was based on exports of low natural resources. The observed growth in intra-BRICS trade was asymmetrical as it is driven largely by Chinese demand for inputs which is not sustainable. However, particularly for India and Russia there was a reasonable possibility of coordinating exports to third countries in the areas of Vegetable Oils, Chemical Products, Plastics and Iron and Steel. There is no competition between these countries in exports of these products to third markets. Simplifying the conclusion, it is recommended that India and Russia need to coordinate the balance related to excessive economic dominance of China.

#### **4.2 Intensity, Similarity and Complementarity of Trade between India and Russia**

This section throws light on Intensity, Similarity and Complementarity of trade between India and Russia by employing three methodologies viz Trade Intensity Index, Trade Complementarity Index, and Export Similarity Index. This section carries out an accurate quantitative analysis of bilateral economic and trade relationships between India and the Russia The man focus is to study the increasing intensity of bilateral economic and trade relationships between the economies. In order to assess whether India is competing with the Russia, it is by examining their trade structures. If a country's trade structure is very similar against its partner, then these two economies are competitors to each other. Conversely, if the two countries have very different trade structures, they are then seen more as complements to each other. This is essentially the focus of this section.

##### **A) Trade Intensity between India and Russia**

The assessment of India's trade with Russia is based on evaluation of trade structure. Concerning trade relations, Trade intensity along with its two methods have been applied in this study. The time period for the assessment has been defined from 1995 to 2016. The analysis has been conducted for trade with goods only. The limiting factor of the study is the

focus on trade in goods since data for trade in services lack the statistics needed for the analysis and face difficulty in determining trade barriers. Both Export Intensity Index and Import Intensity Index are calculated for India and Russia. Apart from measuring the performance of bilateral trade in terms of growth rates, trade intensity index proves as a best measure to see the trajectory of trade over the years. This index helps us in identifying that how intensively the countries trade with each other. For the sake of deep understanding of the Trade Intensity, it has been divided into two types (a) Export Intensity Index and (b) Import Intensity Index. The values of Export Intensity Index and Import Intensity Index have been calculated for the time period of 24 years from 1995-2018. Thus an implicit statistical indicator of the growing complementarities in trade between India and BRCS countries is provided by the export and import intensities. This index was first used by K. Kojima (Kojima, 1964). It measures the share of one country's trade with other country as a proportion of the latter's share of world. The average amount of this index is equal to one, if index is greater than one, which means there is a higher degree of trade intensity between two given countries. Opposite of that where the result of the computation is closer to zero, which means there is lower trade relations. Trade intensity index concentrates attention on variations in bilateral trade levels that result from differential resistances by abstracting from the effects of the size of the exporting and importing countries. Table 4.1 provides the Trade Intensity Index between India and Russia.

**Table 2: Trade Intensity Index of India against Russia**

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TII	1.56	2.5	1.56	1.59	1.4	30.8	2.24	1.64	1.33	0.92	0.46	0.4
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
TII	0.33	0.29	4.71	0.57	0.43	0.48	0.55	0.06	0.08	0.09	0.07	0.08

Source: Calculations based on data from UNCOMTRADE

Starting from the year 1995, India enjoyed trade intensity with Russia and taking a closer look on Indo-Russia trade, an interesting feature of India's trade with Russia can be exemplified by the fact that trade flourished well but from 2010 onwards the trade intensity posed a declining trend.

**Table 3: Export Intensity and Import Intensity of India against Russia**

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Russia	EII 0	1.421	1.43	1.66	3.569	2.895	2.104	1.682	1.228	1.482	0.612	0.522
	III 6.98	3.05	3.49	3.46	3.18	1.63	1.6	1.52	1.12	1.55	6.06	3.07
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Russia	EII 0.387	1.471	1.086	1.492	1.602	1.924	1.813	1.257	1.413	1.457	1.32	1.51
	III 2.64	0.28	8.54	0.67	0.54	0.77	0.59	0.33	0.79	0.83	0.73	0.71

Source: Calculations based on the data from UNCOMTRADE.

Note: Data for South Africa is missing from 1995-1999.

The values of Export Intensity Index (EII) and Import Intensity Index (III) have been calculated for the time period 1995-2018, which defines the

growing intensity of trade between the nations. Regarding EII, the intensity of trade of India with Russia, India presented good trade relations with Russia up to 2003, but 2004 onwards the trade intensity of exports remained miniscule. Regarding the Import intensity analysis, implying under-representation of Russia in the India's imports.

### B) Export Similarity of India with Russia

In this section, the aim is to identify export similarity between India and Russia. Export Similarity Index (SI) is used to measure the degree of similarity of exports between two countries or regions in the third or world market. The model can be depicted as:

$$SI(ab, n) = \left[ \sum \min\left(\frac{Xkan}{Xan}, \frac{Xkbn}{Xbn}\right) \right] * 100$$

where  $SI(ab, n)$  is the similarity index of country  $a$  and country  $b$ 's exports in market  $n$  or in the world market,  $\frac{Xkan}{Xan}$  is the share of the commodity  $k$  of country  $a$ 's export in market  $n$  as against the country  $a$ 's total export value in market  $n$ , whereas  $\frac{Xkbn}{Xbn}$  is the share of the commodity  $k$  of country  $b$ 's export in market  $n$  as against the country  $b$ 's total export value in market  $n$ . This index varies from 0 to 100. If the exports of both countries in the third country or in the world market (i.e. in market  $n$ ) are entirely the same, this index is 100; if totally different, it is 0. When the index continues to rise during a specific period, it indicates that country  $a$  and country  $b$  are getting more and more competitive to each other in the third market (i.e. in market  $n$ ). When the index keeps going down, however, it shows that the trade of country  $a$  and country  $b$  are getting more and more specialized, i.e. more and more complementary. Now we analyze it in commodity context, there is no hurdle and for the same purpose, Finger and Kreinin (1979) devised an index of 'export similarity' to calculate the overlap between the distributions of exports by commodity group of two countries to the markets of a third country. As they noted that a number of propositions in international economics can be examined by the use of an index measuring the similarity of the exports of any two countries (or groups of countries) to a third market. They specifically mentioned the situations of non-reciprocal preferences granted by developed countries to developing countries (and therefore not to other developed countries which also exported to the preference-granting country under consideration), the multilateral extension on an MFN (most-favored-nation) basis of reductions in tariff rates agreed among the developing countries to developing countries, and the relationship between export patterns of two countries and the convergence or divergence of economic structure of the economies of these countries over time.

Subsequently, the Finger-Kreinin (FK) index of export similarity has been used to compare the distribution of exports of two countries or country group by a number of other authors in a number of different contexts. Pomfret (1981) used the measure in a similar way to examine the impact of EEC enlargement on non-member countries' exports to the EEC.



More recently the Australian Productivity Commission (2002) used it to examine the impact of introducing free entry into Australian markets for all least developed countries. Xu and Song (2000) used the FK index of export similarity to explore trade linkages between East Asian economies. Glick and Rose (1998) used it to examine the pattern of contagion in currency crises. The Finger–Kreinin index of similarity can be used to compare any two distributions of trade flows or, in some contexts, stocks. For example, it might be used to compare the distribution of *imports* into two countries from a third country or group of countries (Ng, 2002). Alternatively, it might be used to compare the *geographic* distribution of the exports of two countries, or the *geographic* distribution of imports into two countries. It has been used by Kol and Mennes (1986) to compare the distributions of exports and of *imports* by commodity groups into one country. Further, in any of these domains, the two distributions compared may be observations of some distribution at two different times. It turns out that measures of similarity or matching have been used in a number of contexts. There are in fact two different strands in the trade literature on matching indices that derive from different purposes. One is, matching proportions in two distributions and the other is matching the absolute value of different flows, usually exports and imports classified by industry or product group. As an example of the latter, intra-industry trade is the matching of exports and imports within commodity categories. For ease of description, the first set is referred to as similarity indices and the second as matching indices. This section discusses the use of similarity only in empirical research in international trade, focusing on the choice of measure and the properties of the chosen index.

**Table 4: Export Similarity between India and Russia (1995-2018)**

Commodity name with Code	1995	2000	2010	2018
00 Live animals other than animals of division 03	0.003	0.002	0.001	0.483
01 Meat and meat preparations	0.024	0.023	0.012	0.564
02 Dairy products and birds' eggs	0.101	0.061	0.029	0.342
03 Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof	0.166	0.380	0.558	1.232
04 Cereals and cereal preparations	0.065	0.902	0.652	0.001
05 Vegetables and fruit	0.062	0.078	0.032	0.012
06 Sugars, sugar preparations and honey	0.058	0.044	0.024	0.029
07 Coffee, tea, cocoa, spices, and manufactures thereof	0.024	0.115	0.091	0.558
08 Feeding stuff for animals (not including unmilled cereals)	0.045	0.090	0.078	0.652
12 Tobacco and tobacco manufactures	0.005	0.098	0.089	0.032
21 Hides, skins and furskins, raw	0.018	0.005	0.057	0.024
22 Oil-seeds and oleaginous fruits	0.073	0.043	0.083	0.098
23 Crude rubber (including synthetic and reclaimed)	0.014	0.073	0.002	0.078
24 Cork and wood	0.294	0.014	0.020	0.089
26 Pulp and waste paper	0.587	0.016	0.063	0.057

27	Crude fertilizers, other than those of division 56, and crude minerals (excluding coal, petroleum and precious stones)	0.036	0.270	0.013	0.768
28	Metalliferous ores and metal scrap	0.291	0.976	0.008	0.231
29	Crude animal and vegetable materials, n.e.s.	0.879	0.012	0.204	0.321
32	Coal, coke and briquettes	0.014	0.879	0.815	7.432
33	Petroleum, petroleum products and related materials	0.063	-	0.007	3.674
34	Gas, natural and manufactured	3.936	0.063	0.136	0.004
35	Electric current	0.008	3.936	17.040	12.432
41	Animal oils and fats	0.134	9.899	0.053	1.234
42	Fixed vegetable fats and oils, crude, refined or fractionated	0.000	0.201	2.268	2.231
43	Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.	0.072	0.002	5.897	0.230
51	Organic chemicals	0.004	0.925	0.146	1.231
52	Inorganic chemicals	0.739	0.351	0.001	0.897
53	Dyeing, tanning and coloring materials	2.046	0.051	0.793	2.985
54	Medicinal and pharmaceutical products	0.113	0.094	0.440	0.564
55	Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations	0.022	0.166	0.035	0.673
56	Fertilizers (other than those of group 272)	0.142	0.022	0.080	0.897
57	Plastics in primary forms	0.378	0.258	0.131	0.863
58	Plastics in non-primary forms	0.550	0.063	0.017	0.543
59	Chemical materials and products, n.e.s.	0.050	0.135	0.242	0.320
61	Leather, leather manufactures, n.e.s., and dressed furskins	0.286	0.058	0.040	0.327
62	Rubber manufactures, n.e.s.	0.063	0.232	0.089	1.932
63	Cork and wood manufactures (excluding furniture)	0.242	0.073	0.048	0.543
64	Paper, paperboard and articles of paper pulp, of paper or of paperboard	0.304	0.312	0.192	0.342
65	Textile yarn, fabrics, made-up articles, n.e.s., and related products	0.892	0.119	0.061	0.098
66	Non-metallic mineral manufactures, n.e.s.	0.384	0.904	0.347	0.765
67	Iron and steel	0.320	3.978	0.058	4.876
68	Non-ferrous metals	2.182	1.789	0.854	7.064
69	Manufactures of metals, n.e.s.	1.009	0.512	4.690	5.674
71	Power-generating machinery and equipment	1.054	0.905	3.222	8.098
72	Machinery specialized for particular industries	0.203	0.262	0.304	6.786
73	Metalworking machinery	0.460	0.058	0.843	9.098
74	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.	0.278	0.457	0.208	4.785
75	Office machines and automatic data-processing machines	0.908	0.053	0.032	0.897
76	Telecommunications and sound-recording and reproducing apparatus and equipment	0.055	0.236	0.246	2.853

77	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)	0.134	0.504	0.034	1.231
78	Road vehicles (including air-cushion vehicles)	0.752	0.637	0.217	3.213
79	Other transport equipment	0.006	0.749	0.382	3.997
81	Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.	0.253	0.006	0.312	5.675
82	Furniture, and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings	0.029	0.072	0.489	4.763
83	Travel goods, handbags and similar containers	0.083	0.003	0.032	0.043
84	Articles of apparel and clothing accessories	0.000	0.060	0.044	0.321
85	Footwear	0.227	0.013	0.002	0.785
87	Professional, scientific and controlling instruments and apparatus, n.e.s.	0.024	0.289	0.022	1.754
88	Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks	0.566	0.020	0.006	0.653
89	Miscellaneous manufactured articles, n.e.s.	-	0.365	0.245	0.321
91	Postal packages not classified according to kind	1.025	-	0.018	1.213
93	Special transactions and commodities not classified according to kind	0.011	0.000	0.209	2.321
96	Coin (other than gold coin), not being legal tender	-	0.011	1.918	-
97	Gold, non-monetary (excluding gold ores and concentrates)	-	-	0.000	-

Source: Author's calculations based on the data from UNCOMTRADE

India's relations with Russia are a key pillar of India's foreign policy and Russia has been a longstanding time-tested partner of India. Since the signing of "Declaration on the India-Russia Strategic Partnership" in October 2000 (during the visit of President Vladimir Putin to India), India-Russia ties have acquired a qualitatively new character with enhanced levels of cooperation in almost all areas of the bilateral relationship including political, security, trade and economy, defense, science and technology and culture. Under the Strategic Partnership, several institutionalized dialogue mechanisms operate at both political and official levels to ensure regular interaction and follow up on cooperation activities. During the visit of Russian President to India in December 2010, the Strategic Partnership was elevated to the level of a "Special and Privileged Strategic Partnership". Trade, investment and economic cooperation between India and Russia has been growing steadily. In 2012, bilateral trade increased by 24.5% to reach US \$ 11 billion out of which Indian exports amounted to US\$ 3 billion while Russian exports were valued at US\$ 8 billion. In January-September 2013, bilateral trade amounted to US\$ 6.94 billion. Exports from India to Russia amounted to US\$ 2.33 billion while imports from Russia stood at US\$ 4.61 billion. Given this composition of trade between India-Russia, a quick simulation using Degrees of Similarity in Export Structures (Finger-Kreinin Index) can depict the story in reality. Regarding export similarity of India

against Russia, India enjoys competitive edge in the Commodities like (00 Live animals other than animals of division 03) , ( 01 Meat and meat preparations), (02 Dairy products and birds' eggs), (03 Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof), (06 Sugars, sugar preparations and honey), (07 Coffee, tea, cocoa, spices, and manufactures thereof), (32 Coal, coke and briquettes),( 41 Animal oils and fats) , (42 Fixed vegetable fats and oils, crude, refined or fractionated) , (43 Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.) in 2000 and the commodities whose values are above 1 include the following: (52 Inorganic chemicals), (53 Dyeing, tanning and coloring materials), (54 Medicinal and pharmaceutical products), (55 Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations), (56 Fertilizers (other than those of group 272), (57 Plastics in primary forms), (58 Plastics in non-primary forms), (59 Chemical materials and products, n.e.s.), ( 61 Leather, leather manufactures, n.e.s., and dressed furskins), (62 Rubber manufactures, n.e.s.), (63 Cork and wood manufactures (excluding furniture), ( 64 Paper, paperboard and articles of paper pulp, of paper or of paperboard), (65 Textile yarn, fabrics, made-up articles, n.e.s., and related products), (66 Non-metallic mineral manufactures, n.e.s.), (73 Metalworking machinery), (75 Office machines and automatic data-processing machines), (84 Articles of apparel and clothing accessories), (85 Footwear), (87 Professional, scientific and controlling instruments and apparatus, n.e.s), (88 Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks), (89 Miscellaneous manufactured articles, n.e.s.). During 2005-2010, the trend reversed as India's exports were getting much more specialized which include the commodities like (00 Live animals other than animals of division 03),(01 Meat and meat preparations) , (02 Dairy products and birds' eggs), (03 Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof), (08 Feeding stuff for animals (not including unmilled cereals), (12 Tobacco and tobacco manufactures), (21 Hides, skins and furskins, raw), (22 Oil-seeds and oleaginous fruits), (23 Crude rubber (including synthetic and reclaimed)), (24 Cork and wood), (26 Pulp and waste paper), (27 Crude fertilizers, other than those of division 56, and crude minerals (excluding coal, petroleum and precious stones)), (28 Metalliferous ores and metal scrap), (29 Crude animal and vegetable materials, n.e.s.), (33 Petroleum, petroleum products and related materials), (34 Gas, natural and manufactured), (41 Animal oils and fats), (43 Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.), (51 Organic chemicals), (52 Inorganic chemicals), (54 Medicinal and pharmaceutical products), (55 Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations), (56 Fertilizers (other than those of group 272)), (57 Plastics in primary forms), (58 Plastics in non-primary forms), (59 Chemical materials and products, n.e.s), (61), (62), (63), (64),

(65) and (66 Non-metallic mineral manufactures, n.e.s) In 2015, the total value of India's exports to Russia was approximately US\$ 2.4 billion, but the trend of similarity remained in India's favor.

### C) Complementarity of India's Trade Against Russia

The study of complementarities in trade is not new to the economics and trade literatures. Such complementarities are now being re-emphasized in wake of the recent recognition of the growing significance of global and regional value chains.

Trade complementarity tests provide a useful tool to indicate future trade arrangements among economies or between economies. The complementarity index used in this study stems from the calculation between India and Russia. It is generally understood that complementarity in the trade structure of the countries facilitates more export and import between them and there is scope for mutual benefit from this increased trade. The faster development of mutual Indo-Russia relations is hindered by the aims of these countries to gain or maintain economic/political power, at least regionally, and by their own specific internal challenges. Thus, this makes it difficult to create close relations with each other.

The index employed to examine the complementarity of trade is TCI. In this section, an attempt is made to construct the index for India and Russia and to see whether increased trade cooperation between the trading partners is possible or not. The level of trade complementarity between two countries measures the export performance of a country in relation to the import requirements of its trading partner.

To measure the level of trade complementarity that exists between two countries a trade complementarity index has been utilized. Trade Complementarity is an impetus to enlarge the scale of international trade and develop the depth of international trade. It is possible to obtain two countries common benefit focus by analyzing the trade complementarity. The trade complementarity index is interpreted as follows, if country *i*'s export specialization matches country *j*'s import specialization closely, then  $C_{ij}$  takes a value greater than unity, while if they match poorly the index will take a value less than unity.

The major proponents of the trade complementarity index (Michaely, 1996; Yeats, 1998) argue that the higher the value of the trade complementarity index the more favorable the outcome of a proposed FTA will be on its potential members. Complementary Index (TCI) was first proposed by Kojima Kiyoshi and perfected by Peter Drysdale in 1967. The model can be described as:

$$C_{kij} = RCA_{kxi} * RCA_{kmj}$$

Where  $C_{kij}$  is the complementarity index between country *i* and country *j* for commodity *k*,  $RCA_{kxi}$  indicates the comparative advantage of country *i* in commodity *k* by way of exports, and  $RCA_{kmj}$  is used to show the

comparative disadvantage of country  $j$  in commodity  $k$  by way of imports, the equations of which are given below:

$$RCA_{kxi} = (X_{ik}/X_i) / (X_{kw}/X_w)$$

$$RCA_{kmj} = (M_{kj}/M_j) / (X_{kw}/X_w)$$

Where  $X_{ki}$  and  $X_{kw}$  are the export value of commodity  $k$  of country  $i$  and the world's total respectively;  $X_i$  and  $X_w$  are the total export values of country  $i$  and the world;  $M_{kj}$  is country  $j$ 's import value of commodity  $k$  and  $M_j$  is the total import value of country  $j$ . In fact,  $RCA_{kxi}$  is the revealed comparative advantage index proposed by Balassa, and the greater the value, the more comparative advantage that country  $i$  has in the commodity  $k$ . Whereas, the greater the value of  $RCA_{kmj}$ , the more commodity  $k$  that country  $j$  imports, hence, the more comparative disadvantage that country  $j$  has in the commodity  $k$ . When country  $i$  has a comparative advantage in commodity  $k$ , for which country  $j$  has a comparative disadvantage, it means that the two countries have trade complementarity in commodity  $k$ , the degree of which can be measured by their product  $C_{kij}$ . If  $C_{kij} > 1$ , it indicates that the two countries have trade complementarity in commodity  $k$ , and the greater the value, the higher the degrees of Complementarity. If  $C_{kij} < 1$ , it means that the complementarity is low, and the smaller that value, the lower the degrees of complementarity.

**Table 5: Trade Complementarity Index of India against Russia (1995-2018)**

Commodity name with Code	Russia			
	1995	2005	2010	2018
00 Live animals other than animals of division 03	-	-	-	-
01 Meat and meat preparations	-	1.6	-	0.016
02 Dairy products and birds' eggs	0.000		3.52	1.34
03 Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof	0.003	3.93	0.18	0.079
04 Cereals and cereal preparations	0.038	5.82	0.01	0.09
05 Vegetables and fruit	0.022	0.09	0.04	0.00
06 Sugars, sugar preparations and honey	0.002	1.09	3.63	7.71
07 Coffee, tea, cocoa, spices, and manufactures thereof	3.81	0.08	0.30	0.024
08 Feeding stuff for animals (not including unmilled cereals)	13.83	8.73	0.14	0.46
12 Tobacco and tobacco manufactures	1.34	0.05	0.19	0.003
21 Hides, skins and furskins, raw	-	-	-	2.62
22 Oil-seeds and oleaginous fruits	0.034	9.43	0.00	0.004
23 Crude rubber (including synthetic and reclaimed)	0.000	5.54	0.00	0.000
24 Cork and wood	3.483	-	4.42	-
26 Pulp and waste paper	0.033	5.76	0.00	0.002
27 Crude fertilizers, other than those of division 56, and crude minerals (excluding coal, petroleum and precious stones)	0.006	6.96	0.00	0.019
28 Metalliferous ores and metal scrap	0.36	0.96	4.59	0.004

29	Crude animal and vegetable materials, n.e.s.	0.01	0.64	0.07	0.022
32	Coal, coke and briquettes	-	-	2.82	0.00
33	Petroleum, petroleum products and related materials	-	-	6.70	2.65
34	Gas, natural and manufactured	-	-	-	-
35	Electric current	-	-	-	-
41	Animal oils and fats	-	-	-	0.000
42	Fixed vegetable fats and oils, crude, refined or fractionated	0.34	0.34	0.00	0.02
43	Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.	-	0.42	0.00	0.09
51	Organic chemicals	3.52	1.56	0.00	8.02
52	Inorganic chemicals	0.00	1.48	0.00	0.02
53	Dyeing, tanning and coloring materials	0.01	0.27	0.03	0.03
54	Medicinal and pharmaceutical products	0.28	0.20	0.06	0.02
55	Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations	0.03	9.55	0.12	0.007
56	Fertilizers (other than those of group 272)	-	1.38	-	0.00
57	Plastics in primary forms	1.00	4.18	0.00	0.006
58	Plastics in non-primary forms	0.00	0.18	0.01	0.008
59	Chemical materials and products, n.e.s.	0.01	3.96	0.00	0.034
61	Leather, leather manufactures, n.e.s., and dressed furskins	0.09	8.44	0.00	0.11
62	Rubber manufactures, n.e.s.	0.07	3.99	0.09	0.015
63	Cork and wood manufactures (excluding furniture)	0.40	6.84	0.83	0.076
64	Paper, paperboard and articles of paper pulp, of paper or of paperboard	0.06	6.15	0.00	0.001
65	Textile yarn, fabrics, made-up articles, n.e.s., and related products	0.06	0.82	0.00	0.041
66	Non-metallic mineral manufactures, n.e.s.	0.00	3.25	0.05	0.016
67	Iron and steel	0.00	5.07	0.00	0.007
68	Non-ferrous metals	0.00	6.04	0.00	0.085
69	Manufactures of metals, n.e.s.	0.61	5.74	0.45	0.770
71	Power-generating machinery and equipment	0.50	6.70	0.06	0.915
72	Machinery specialized for particular industries	0.16	7.99	0.53	0.49
73	Metalworking machinery	0.01	1.54	0.83	0.004
74	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.	0.00	1.93	0.38	0.007
75	Office machines and automatic data-processing machines	0.00	7.81	0.07	0.000

76	Telecommunications and sound-recording and reproducing apparatus and equipment	8.74	1.73	0.14	0.000
77	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)	0.00	8.64	0.02	0.000
78	Road vehicles (including air-cushion vehicles)	0.00	1.92	0.04	0.001
79	Other transport equipment	0.00	3.79	0.03	5.28
81	Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.	0.00	5.19	0.00	0.003
82	Furniture, and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings	5.20	1.17	0.00	0.00
83	Travel goods, handbags and similar containers	0.04	2.68	0.07	0.006
84	Articles of apparel and clothing accessories	0.03	2.71	0.51	0.089
85	Footwear	0.01	2.11	0.14	0.022
87	Professional, scientific and controlling instruments and apparatus, n.e.s	0.00	4.12	0.67	0.687
88	Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks	0.00	8.61	0.19	0.001
89	Miscellaneous manufactured articles, n.e.s.	0.01	2.48	0.05	0.048
91	Postal packages not classified according to kind	-	-	-	-
93	Special transactions and commodities not classified according to kind	-	5.84	0.71	0.705

Source: Author's calculations based on the data from UNCOMTRADE

From table 5, looking at the trade complementary of India's trade with Russia in 1995, there is a fascinating feature which comes into display that there are 8 commodities in the complementary list (07, 08, 12, 24, 51, 57, 76 and 82). In year 2005, Indian economy underwent structural transformation and as a result, trade increased manifold. The economic laurels crossed new heights as India opened its arms for BRCS economies. Contrary to 1995, the scene is very different in 2005, as India enjoys complementary advantage in 45 commodities against Russia. Since world witnessed the worst financial crises of 2007 and completely shook the nerves of the economies, but these economies were the first to get stabilization. In year 2005, the trade complementarity of India against BRCS entered into bad phase as maximum of the commodities were in competitive list as the trade complementary of India against Russia is in 6 commodities namely (02 Dairy products and birds' eggs), (06 Sugars, sugar preparations and honey), (21 Hides, skins and furskins raw), (33 Petroleum, petroleum products and related materials), (51



Organic chemicals) and (79 Other transport equipment). An interesting observation is that there is not a single common commodity in which India enjoys trade complementarity against Russia. The idea that India and other Russia economies are complementary because they have different domains of economic competence ignores the fact that both countries view their current industry/service composition as transitory. Each of the economies wants to rebalance the composition of their economy. In fact, one of the most convincing critiques of India's performance record is that it has underperformed in the area where other economies have excelled - labor-intensive industrial export production. Given the growing importance of trade among the economies, and that India's new trade policy announced in August 2014, the scenario of trade has changed as the economies seem to diverge back to competition. In year 2016 India's complementary edge against Russia is in 6 commodities (02 Dairy products and birds' eggs), (06 Sugars, sugar preparations and honey), (21 Hides, skins and furskins, raw), (33 Petroleum, petroleum products and related materials), (51 Organic chemicals) and (79 Other transport equipment). Complementarity index employed in Indian context against Russia has been slightly deteriorating. Thus, the results are again rather ambiguous. Moreover, the declining complementarity trend (in 2010 and 2016) can be a result of production specialization. Generally, trade diversion usually occurs as a result of a PTA accompanied by tariff cuts and the preferential treatment of PTA partners at the expense of nonmembers. Right now, there has been no existing single PTA covering these economies.

## 5. Conclusion

In recent years, considerable consideration has been devoted to the growing importance of few developing nations. Collectively these nations have come to be referred as emerging economies or emerging markets namely BRICS (Akbar and Samii, 2005; Hoskisson et al., 2000; London and Hart, 2004). It is widely argued that these economies will amend the spirited landscape of the global market place, and they show significant pledge in becoming central players in years to come. In this regard, two countries that have consistently merited academic attention are India and Russia (Mistry, 2004; Saran and Guo, 2005; Tan and Peng, 2003). The intensity of trade between India and Russia presents the growing intensity of trade between the nations. The results in this study and the amount of prior empirical data and evidence suggest the mutual amicable trade between the economies. In short, bilateral trade between these countries seems to present greater possibilities for breaking away from a purely inter-industrial to a more intra-industrial type structure.

In order to evaluate the symmetry, Theil's Criteria was used to analyze symmetry and sustainability of Indo-Russia trade. The findings reveal that trade is increasingly asymmetric. From the results, it has been realized that the Indo-Russia have grown into markedly increased interdependent economies. The intensity of trade between India and other Russia have been studied by employing the Trade Intensity Index (TII) and the data is covered

from 1995-2018. From year 1995, India enjoyed trade intensity with Russia but with the passage of time the relations got much more amplification and trade started flourishing. Regarding export similarity of India against Russia, India enjoys competitive edge in the Commodities like (00, 01, 02, 03, 06, 07, 32, 41, 42 and 43) in 1995 and the commodities whose values are above 1 include (52, 53, 54, 55, 56, 57, 58, 59, 61, 62, 63, 64, 65, 66, 73, 75, 84, 85, 87, 88 and 89). During 2005-2010, the trend reversed as India's exports were getting much more specialized which include the commodities like (00, 01, 02, 03, 08, 12, 21, 22, 23, 24, 26, 27, 28, 29, 33, 34, 41, 43, 51, 52, 54, 55, 56, 57, 58, 59, 61, 62, 63, 64, 65 and 66). In 2015, the total value of India's exports to Russia was approximately US\$ 2.4 billion, but the trend of similarity remained in India's favor. India enjoys specialization in four product categories which are: electrical, electronic equipment; machinery, nuclear reactors, boilers; vehicles other than railway; and plastics and articles thereof. Regarding Trade complementarity of India against Russia the commodities which are on the complementary side are (07, 08, 12, 24, 51, 57, 76 and 82). Thus India enjoys complementary advantage in 8 commodities against Russia.

In year 2005, Indian economy underwent structural transformation and as a result, trade increased manifold. The economic laurels crossed new heights as India opened its arms for BRCS economies. Contrary to 2000, the scene was very different in 2005, as India enjoyed complementary advantage in 45 commodities against Russia. Since world witnessed the worst financial crises of 2007 and completely shook the nerves of the economies, but the India and Russia economies were the first to get stabilization. The Complementarity index employed in Indian context against Russia indicates that the complementarity evolution has been slightly deteriorating. Thus, the results are again rather ambiguous. Moreover, the declining complementarity trend (in 2010 and 2018) has been as a result of production specialization.

## **6. Implications of Research and Recommendations**

Literature suggests that trade plays a vital role in determining an economy's health. In this context the role of trade is an area of interest for many researchers. This research has attempted to link two of the most important and contemporary trade paradigms –Performance and Prospects. This study has presented the Indian perspective on these issues with respect to Russia. It has provided insight into the trade performance and prospects disclosure practices adopted by India and presented the current scenario of Indo-Russia trade. This study has comprehensively and simultaneously examined performance of India on all the dimensions viz, Intensity, Similarity, Complementarity, Symmetry and Identification of potential commodities traded.

The study through its data analysis has provided insights into the minds of the strategic decision and policy makers. The core issues of trade and the role of trade in BRICS has provided very important information for policy makers to strengthen the cause of trade sustainability and promotion. Given

the inter-industrial nature of trade between India and Russia, the region should seek to create partnerships between its firms and successful Indian companies, in order to gain access to supply chains that produce more complex, technologically sophisticated inputs and services for production units. Strategic partnerships should also be created to increase value added throughout the production and marketing chain, and mutually beneficial technological partnerships should be developed (to apply advances in biotechnology to agro-industry, mining, forestry and fishery, for example). Reducing the impediments to trade by building on the foundations of the dialogue process, there has to be free movement of goods, capital, and people—businessmen, investors, students, media persons, and skilled workers. Strengthening Private Sector Cooperation is essential to ensure an increase in investments and international trade. The conclusions of this study can be precious to the policy makers and regulators of India and Russia economies for defining policies and standards applicable to the revelation of trade governance. Indo-Russia must realize the necessity of complementarity rather than head to head competition. Following the principle of "More Cooperation, More Growth", BRICS is strengthening intra- BRICS cooperation to transform their individual comparative advantages into international competitive advantage to influence the future political and economic structure of the world.

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