

Tea Trade Dynamics: Assessing India's Competitiveness in the Global Scenario using analytical tools RCA and SRCA

Ilias Hussain¹, Dr. Mushtaq Ahmad Shah², Bandna³, Dr. Nitin Gupta⁴, Muzahid Hussain⁵

¹Research scholar, Mittal school of Business, Lovely Professional University, Punjab, India, Email-iliashuj@gmail.com

²Assistant Professor, Mittal school of Business, Lovely Professional University, Punjab, India. Email-mushtaq.26118@lpu.co.in

³Research scholar, Mittal school of Business, Lovely Professional University, Punjab, India, Email-bandnathakur155@gmail.com

⁴Associate Professor, Mittal school of Business, Lovely Professional University, Punjab, India, Email-nitin.20368@lpu.co.in

⁵Research scholar, Department of Commerce, Mahapurusha Srimanta Sankaradeva Viswavidyalaya, Assam, Email-muzahid.hussain6@gmail.com

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ABSTRACT:

India, a pivotal player within the global agricultural landscape, derives considerable economic value from its tea industry, which occupies a critical position in both rural employment and foreign exchange earnings. While tea production has shown steady annual growth, export expansion has lagged, constrained by a complex interplay of factors. This study highlights the significance of tea as a crucial agricultural product for India, contributing to rural employment and foreign exchange earnings. Rising domestic consumption, formidable competition from established tea-exporting nations such as China, Sri Lanka, and Kenya, and the emergence of newer market entrants like Vietnam, the United Kingdom, Japan, Indonesia, and Nepal, collectively exert pressure on India's export share. This study seeks to evaluate the global competitive standing of India's tea industry by applying the Balassa Revealed Comparative Advantage (RCA) and Symmetrical Revealed Comparative Advantage (SRCA) indices, providing a nuanced insight into India's relative positioning. Results underscore that, despite intensified global competition, India's tea industry retains substantial, under-leveraged potential to scale its global presence. This study suggests policy interventions and sustainable practices to ensure the long-term viability of the tea sector.

1. Introduction

India's tea industry, one of the nation's oldest and most resilient economic sectors, has a legacy stretching back nearly 180 years. Worldwide, tea remains the second most widely consumed beverage after water. The industry's origins in India can be traced to the discovery of wild tea plants in Assam by Robert Bruce, Maniram Dewan, and Bessa Gam, which marked the end of China's longstanding monopoly over tea production. Since then, India's tea sector has developed into a highly organized industry, contributing substantially to the national economy (Chatterjee, 2005; Arya, 2013). Despite this, recent years have posed significant challenges to Indian tea exports due to heightened competition from dominant producers such as China, Kenya, and Sri Lanka, alongside emerging competitors like Vietnam, the United Kingdom, and Japan (Uppal, 1994; Jagadeesh et al., 2024). Additional constraints include high input costs (Talukdar et al., 2021), robust domestic demand, constrained value chains, and quality-related issues, each of which has affected the grading and marketability of India's tea for export (Hick, 2009; Chaudhry, 2019; Bera et al., 2024). Recent analyses further underscore how India's agricultural exports, particularly tea, face dynamic global trade conditions and cost-related challenges (Yadav & Chattopadhyay, 2024). Nonetheless, India's tea industry retains immense potential for growth and enhanced global positioning.

This study intends to explore various dimensions of tea production, domestic consumption, export trends, and pricing at both national and international levels over a 15-year period (2008–2009 to 2022–2023), aiming to evaluate the global competitiveness of top tea-producing nations. By employing the Balassa Revealed Comparative Advantage (RCA) and Symmetric Revealed Comparative Advantage (SRCA) index, this research assesses India's competitive standing among the

leading tea exporters worldwide.

1.1 Production

India ranks as the world's second-largest tea producer, reflecting a robust growth trajectory (Goswami, 2006; Langford, 2021) with production rising from 285.40 million kg in 1950-1951 to 1,382.03 million kg by 2023-2024, a substantial 484% increase. To meet the ambitious export targets established by the Tea Board of India, enhanced production of high-quality tea has become essential (Mishra, 1986; Powrel & Mishra, 2024). In response, the Tea Board has implemented numerous initiatives, including input optimization, advanced agricultural methods, improvements in irrigation and drainage, systematic pruning, replanting, and expanding planted areas to boost production (Nath & Dutta, 2015; Langford et al., 2022). Financial backing from diverse sources has also been identified as a critical factor in sustaining production growth. While India's government has provided extensive support to bolster the tea industry, high domestic demand accounting for over 80% of total production has limited export volumes (Langford & Nadvi, 2022). Consequently, despite the substantial increase in production, India's overall tea export has experienced relative stagnation in the global market due to this high internal consumption.

1.2. Foreign Trade

India ranks as the fourth-largest tea exporter globally, significantly impacting other leading tea-producing nations (Radhika et al., 2024). Despite a substantial market base, India's tea trade has grown modestly, with an annual increase of merely 5% (Shah, 2013). Indian tea exports face stagnation due to competition from more affordable, high-quality teas from Kenya and Sri Lanka (Manoharan, 1974; Thomas, 2019). Aligning CSR initiatives with the Sustainable Development Goals can boost the global competitiveness of India's tea industry by fostering sustainable practices and enhancing its appeal to socially conscious markets (Bandna et al., 2024), to address these challenges, policy recommendations include reducing production costs and adjusting tax structures (Xu et al., 2022). Although India's tea industry is heavily export-oriented, competing exporters continually challenge its market position. While India's export rate has shown gradual improvement over the years, its global competitiveness remains compromised by factors such as higher costs and quality concerns relative to other nations like Kenya and Sri Lanka (Zuhdi et al., 2022).

This study spans a 15-year period from 2008-2009 to 2022-2023, utilizing the export values of tea and agricultural products from major tea-exporting countries to calculate the comparative advantage. Analysis of the top ten tea exporting countries worldwide over the past 15 years reveals China as the largest tea exporter, commanding a 27% market share with exports valued at 24.45 billion USD, followed by Kenya, Sri Lanka, and India, respectively. The global tea export market stands at a cumulative value of 113.82 billion USD, and the agricultural export sector totaling 19302 billion USD for the study period. For the past 15 years, India has consistently held the fourth position, capturing 16% of the global tea export market share with 14.83 billion USD. The distribution of export values and individual market proportion of the world's top ten tea exporting countries, along with their respective agricultural export during the study period are illustrated in Table 1 and Figure 1.

Table 1: Top 10 tea exporting countries and agricultural products export in US billion dollar from 2008-2009 to 2022-2023

SR. NO.	COUNTRY	TEA EXPORT (billion US \$)	AGRICULTURAL PRODUCTS (billion US \$)
1.	China	24.45	763.21
2.	Kenya	17.53	47.75
3.	Sri Lanka	17.21	31.94
4.	India	14.83	382.55
5.	Germany	4.77	900.32
6.	Vietnam	3.88	371.15
7.	Poland	3.63	309.26
8.	UK	3.26	464.79
9.	Japan	2.41	83.62
10.	UAE	2.3	123.43

Source: www.fao.org and www.wto.org

The table 1 & Figure 1 presents data on the top ten tea-exporting countries and their respective agricultural product exports, measured in billions of US dollars, over a 15-year period from 2008-2009 to 2022-2023. China leads the list with tea exports valued at \$24.45 billion, reflecting its dominant position in the global tea market. Additionally, China's agricultural products export significantly outpaces other countries, totaling \$763.21 billion, indicating a broad and diversified agricultural export base. Kenya follows with \$17.53 billion in tea exports, highlighting its role as a key player in the tea export market. Its agricultural products export, however, is considerably lower at \$47.75 billion, suggesting a strong specialization in tea compared to other agricultural goods. Sri Lanka closely matches Kenya with tea exports of \$17.21 billion but has a lower total agricultural export value of \$31.94 billion, emphasizing its reliance on tea as a primary export commodity. India ranks fourth in tea exports with \$14.83 billion. Its agricultural exports are more substantial at \$382.55 billion, indicating a diversified agricultural sector with significant contributions beyond tea. Germany stands out with lower tea exports at \$4.77 billion but has an impressive \$900.32 billion in agricultural exports, underscoring its prominence in global agricultural trade, particularly in value-added products. Vietnam reports \$3.88 billion in tea exports and \$371.15 billion in agricultural exports, showing a balanced contribution from both tea and other agricultural products. Poland has \$3.63 billion in tea exports and \$309.26 billion in agricultural products, indicating a moderate presence in the tea market with a strong agricultural export sector. The United Kingdom (UK) records \$3.26 billion in tea exports and \$464.79 billion in agricultural products, reflecting its historical ties to tea trade alongside a robust agricultural export portfolio. Japan has lower tea exports at \$2.41 billion, complemented by \$83.62 billion in agricultural exports, reflecting its niche market focus and high-value agricultural products. The United Arab Emirates (UAE) rounds out the list with \$2.3 billion in tea exports and \$123.43 billion in agricultural products, showcasing its strategic position as a trade hub for both tea and a variety of agricultural goods.

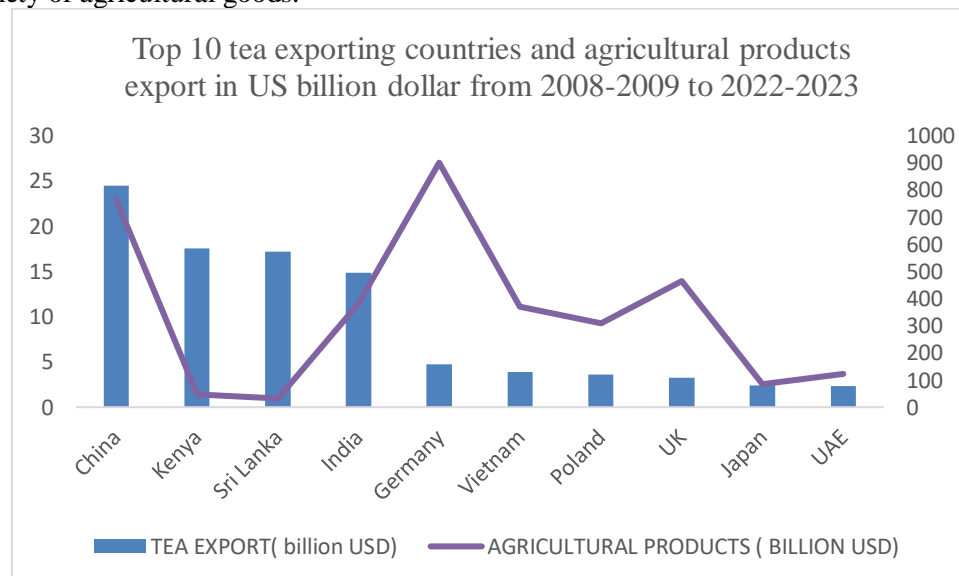


Figure 1:Top 10 tea exporting countries and agricultural products export in US billiondollar from 2008-2009 to 2022-2023

Source: Authors

2. Review of literature

India's tea industry is a cornerstone of the nation's agricultural economy, deeply rooted in its history and culture(Tiwari et al., 2022). The historical progression of tea cultivation in India began with the discovery of wild tea plants in Assam, which marked the end of China's monopoly over global tea production(Baruah, 2017). This pivotal moment laid the foundation for India's tea industry, which has since evolved into a well-structured sector contributing significantly to rural employment and foreign exchange earnings(Bonareri, 2019; Tiwari et al., 2022). The tea industry's historical significance is not only a matter of economic importance but also a reflection of India's cultural heritage. Over the

decades, tea production in India has witnessed substantial growth, positioning the country as the second-largest tea producer globally (Chen & Lu, 2021; Lim, 1968; Ru, 2022).

The Tea Board of India has played a crucial role in promoting the industry by implementing initiatives focused on agricultural advancements and input optimization (Bera et al., 2024; Holmes, 2015; Shrestha, 2014). These efforts have led to a remarkable increase in production, from 285.40 million kg in 1950-51 to over 1,382 million kg by 2023-24. Despite these achievements, the industry faces several challenges. High input costs, quality issues, and a robust domestic demand that absorbs over 80% of production have limited the potential for exports (Gunathilaka & Tularam, 2016; Langford, 2021; van der Wal, 2008). This strong domestic consumption, while beneficial for local markets, has created constraints on the industry's ability to expand its global footprint (Talbot, 2002).

India's tea export growth has been modest, primarily due to stiff competition from other major tea-producing countries such as China, Kenya, and Sri Lanka. These nations have managed to capture significant market shares by offering high-quality tea at competitive prices (Choudhry & Lister, 1997; Mohan, 2016). The global tea market is highly competitive, and India's relatively higher production costs and quality-related constraints have hindered its ability to compete effectively. Emerging players like Vietnam and Indonesia have also added to the competitive pressures, further challenging India's position in the global market (Sapkota, 2018; Sury, 2017).

The application of the RCA provides valuable insights into India's export potential (Jain, 2015; Maryam et al., 2018). SI focuses on addressing the asymmetry problem of tea exporting countries while maintaining the index's ease of use and practicality (Kasahara, 2019). Despite maintaining a consistent fourth-place ranking in global tea exports, India's competitiveness is not fully realized (Saikia & Hussain, 2022). Addressing the challenges of high domestic consumption and export stagnation requires a multi-faceted approach (Jarzebski et al., 2020). Strategic interventions should focus on cost reduction, quality improvement, and market diversification (Namu et al., 2014). Reducing production costs through technological advancements and better resource management can make Indian tea more competitive globally. Enhancing the quality of tea through stringent quality control measures and certification processes can help improve its marketability (Abhiram, 2024). Additionally, exploring new markets and diversifying export destinations can reduce dependence on traditional markets and mitigate the risks associated with global competition (Kumarihami & Song, 2018). Enhancing the global competitiveness of India's tea industry, by adopting low-carbon and sustainable practices in tea production can improve energy efficiency, reduce emissions, and appeal to environmentally conscious markets, thereby strengthening the industry's position in the global trade landscape (Bandna & Shah, 2024). By leveraging its comparative advantage and addressing these challenges, India can enhance its global market share and economic contribution from tea exports, ensuring the sustainable growth of its tea industry (van der Wal, 2008).

3. Research Methodology

This study primarily relies on secondary annual data sourced from authoritative bodies such as the Food and Agriculture Organization (FAO), the World Trade Organization (WTO), the World Bank, and the Tea Board of India, supplemented by additional data from research publications and specialized websites on tea production and marketing. Covering a 15-year span from 2008-2009 to 2022-2023, the research leverages the export values of tea and related agricultural products from key tea-exporting nations to compute the RCA and SRCA indices. Using data for these parameters, Comparative advantage indices were derived for the top 10 countries holding the largest market shares in the global tea trade. The world tea market, therefore, has been assessed through the lens of both indices. The analysis utilizes (Balassa, 1965) Revealed Comparative Advantage (RCA) Index (Rousseau, 2019), is represented here as BI_{jt} , to identify a product's comparative trade advantage. To address the shortcomings of the Balassa Index (BI_{jt}), particularly its asymmetry, (Vollrath 1991) proposed using a logarithmic transformation of the BI_{jt} , this adjustment aimed to resolve the asymmetry issue while preserving the index's simplicity and practicality (Sanidas & Shin, 2010). However, this solution introduced a new limitation: the index could not be calculated in case of zero export (i.e., $BI_{jt} = 0$). Later, developed a more refined measure that overcome both the asymmetry problem and the zero-export issue (Dalum et al., 1998). This new approach, referred to as the Symmetrical Revealed Comparative Advantage (SRCA) index, is denoted as SI_{jt} in this

study. Thus, both the BI_{jt} and SI_{jt} index used to analyze the competitiveness of top 10 tea exporting countries world-wide are mentioned below:

3.1. Balassa Revealed Comparative Advantage (RCA)

Balassa Revealed Comparative Advantage Index here it is represented as BI_{jt} . Balassa in 1965 made a significant contribution to the understanding of how to compare the export shares of various commodities from various countries in a global context or a group of countries. BI_{jt} is generally considered to compare a country's particular commodity's export performance in the sense it is expected in a world where world products of a particular commodity are conveyed among countries with respect to their portion of share of the world products (Bowen, 1983).

Here,

$$BI_{jt} = \frac{\left(\frac{X_{jt}}{X_{ja}} \right)}{\left(\frac{X_{wt}}{X_{wa}} \right)}$$

where, X_{jt} = Total value of tea export of the Country. X_{ja} = Total value of agricultural product export of the Country. X_{wt} = Total value of tea export of the World. X_{wa} = Total value of agricultural product export of the World.

When, $BI_{jt} > 1$ then, it is interpreted as a country to have a comparative advantage or net exporter in that particular commodity and, when $BI_{jt} < 1$ then, it is interpreted as a country to have a comparative disadvantage or net importer in that commodity moreover if $BI_{jt} = 1$ then, it is interpreted as a neutral comparative advantage.

3.2. Symmetric Revealed Comparative Advantage (SRCA)

Symmetric Revealed Comparative Advantage Index is represented as SI_{jt} . BI_{jt} is non comparable and non-varying in nature for long run moreover it also lacks the property of symmetry. Idea of taking a log change of the BI_{jt} was suggested by (Vollrath, 1991) as a solution for the asymmetry problem. SI_{jt} was introduced by (Laursen, 2015) the dispersion of SI_{jt} meets normal more oftentimes than that of BI_{jt} hence it is named as symmetric revealed comparative advantage.

Here,

$$SI_{jt} = \frac{BI_{jt} - 1}{BI_{jt} + 1}; \text{ Where,}$$

BI_{jt} = Balassa Revealed Comparative Advantage Index.

When, $SI_{jt} > 0$ then, it is interpreted as a country to have a comparative advantage in that particular commodity and, when $SI_{jt} < 0$ then, it is interpreted as a country to have a comparative disadvantage in that commodity moreover if $SI_{jt} = 0$ then, it is interpreted as a neutral.

4. Analysis

The data presents the Balassa Index (BI_{jt}) and Symmetric Revealed Comparative Advantage (SI_{jt}) for the top ten tea-exporting countries, offering insights into their comparative advantage and market positioning in the global tea industry. Table 2 and Figure 2 shows that, Sri Lanka leads with a BI_{jt} of 89.804 and an SI_{jt} of 0.978. The high BI_{jt} reflects a substantial comparative advantage in tea exports, indicating Sri Lanka's strong specialization in this sector. The SI_{jt} value, being close to 1, confirms Sri Lanka's significant global competitiveness and specialization in tea exports relative to its overall trade. Kenya follows with a BI_{jt} of 61.187 and an SI_{jt} of 0.968, demonstrating a strong comparative advantage. The SI_{jt} value suggests that Kenya's tea export performance is highly competitive and well-aligned with global trade patterns, reinforcing its prominent position in the international tea market. India has a BI_{jt} of 6.461 and an SI_{jt} of 0.732. This indicates a moderate comparative advantage in tea exports, with India maintaining a competitive presence in the global market. The SI_{jt} value, though lower than Sri Lanka and Kenya, reflects India's balanced engagement in both domestic consumption and export markets, suggesting potential for enhanced global competitiveness. China shows a BI_{jt} of 5.339 and an SI_{jt} of 0.685. Despite being a major tea producer, China's comparative advantage in exports is moderate. The SI_{jt} value indicates a fair alignment with global trade patterns, reflecting a strong domestic consumption base that tempers its export focus.

Table 2: Comparative Index of top 10 tea exporting countries rank with respect to BI_{jt} and SI_{jt}

RANK	COUNTRY	BI	SI
1.	Sri Lanka	89.804	0.978
2.	Kenya	61.187	0.968
3.	India	6.461	0.732
4.	China	5.339	0.685
5.	Japan	4.803	0.655
6.	UAE	3.105	0.516
7.	Poland	1.956	0.323
8.	Vietnam	1.742	0.271
9.	UK	1.169	0.078
10.	Germany	0.883	- 0.062

Source: Authors

Japan has a BI_{jt} of 4.803 and an SI_{jt} of 0.655, indicating a niche comparative advantage. The SI value suggests moderate global competitiveness, likely driven by specialized, high-quality tea exports that cater to specific market segments. UAE presents a BI of 3.105 and an SI_{jt} of 0.516, indicating a smaller but notable comparative advantage in tea exports. The SI_{jt} value points to moderate competitiveness, positioning the UAE as a key player in regional trade rather than a primary producer. Poland shows a BI_{jt} of 1.956 and an SI_{jt} of 0.323. This suggests a limited comparative advantage in tea exports, with the SI_{jt} value reflecting a relatively weaker competitive position and alignment with global tea trade dynamics.

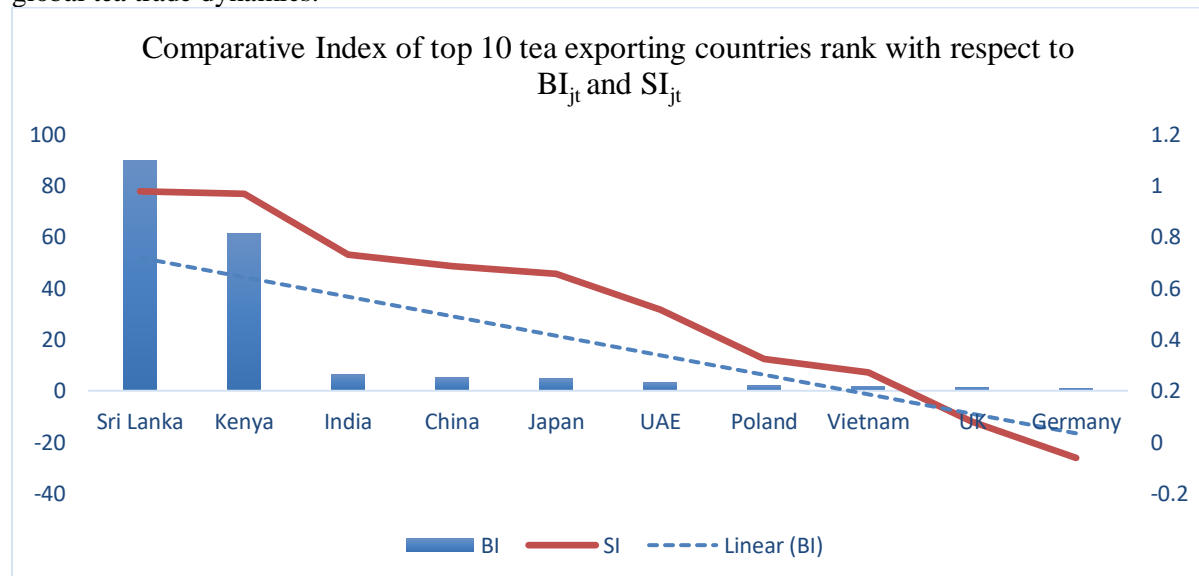


Figure 2: Comparative Index of top 10 tea exporting countries rank with respect to BI_{jt} and SI_{jt} . (Source: Authors)

Vietnam has a BI_{jt} of 1.742 and an SI_{jt} of 0.271, indicating a minor comparative advantage. The low SI_{jt} value suggests limited competitiveness, reflecting Vietnam's developing role in the global tea export market. UK reports a BI_{jt} of 1.169 and an SI_{jt} of 0.078, indicating marginal comparative advantage. The low SI_{jt} value suggests minimal competitiveness in tea exports, likely due to the UK's focus on re-exporting and processing rather than production. Germany has the lowest BI_{jt} at 0.883 and an SI_{jt} of -0.062. This negative SI_{jt} indicates no comparative advantage in tea exports and reflects a divergence from competitive positioning in the global tea trade, likely due to Germany's role as a re-exporter and processor rather than a direct producer.

Overall, the data underscores the varying levels of comparative advantage and competitiveness among the top tea-exporting countries, with Sri Lanka and Kenya showcasing strong specialization and global competitiveness, while countries like Germany and the UK demonstrate limited or negligible comparative advantage in this sector.

5. Discussion on the findings

The findings from the analysis reveal significant variations in the comparative advantage and competitiveness of the top ten tea-exporting countries, as evidenced by the Balassa Revealed Comparative Advantage (BI_{jt}) and Symmetric Revealed Comparative Advantage (SI_{jt}). Sri Lanka and Kenya emerge as the most competitive players in the global tea market, with exceptionally high BI_{jt} and SI_{jt} values indicating strong specialization and alignment with global trade patterns (Laursen, 2015). These countries benefit from their strategic focus on tea production, which enables them to capture a substantial share of the international market. India, while showing a moderate BI_{jt} and SI_{jt} , demonstrates a balanced approach, maintaining a strong domestic consumption base alongside its export activities. This balance offers India potential for enhanced competitiveness, especially if it can address challenges related to production costs and quality improvements (Mohan, 2016). China, despite being a major tea producer, reveals only moderate export competitiveness. This can be attributed to its significant domestic consumption, which limits its focus on the global market (Pan et al., 2022; van der Wal, 2008). Japan and UAE, with niche comparative advantages (Hajra, 2017, 2019), capitalize on specialized and high-quality exports, allowing them to maintain a competitive presence in specific market segments. These countries have carved out a distinct position, leveraging their unique offerings to compete in the global arena. On the lower end of the spectrum, countries like Poland, Vietnam, the UK, and Germany exhibit limited or minimal comparative advantage (Gupta, 2016). Their lower BI_{jt} and SI_{jt} values highlight challenges in global competitiveness, often due to factors such as a focus on re-exporting, processing rather than direct production, or developing roles in the global tea market. Germany, in particular, shows a negative SI_{jt} , indicating a divergence from competitive positioning, which underscores its role more as a re-exporter than a primary producer. Overall, the analysis underscores the diverse strategies and competitive dynamics among the top tea-exporting nations. It highlights the importance of strategic focus on quality, production efficiency, and market specialization to enhance global competitiveness and leverage comparative advantages effectively.

6. Conclusion

India's tea industry holds a prominent position globally as a leading producer and a moderate exporter. The analysis provides a comprehensive overview of the competitive dynamics within the global tea export market. Sri Lanka and Kenya emerge as dominant players, with their exceptionally high BI_{jt} and SI_{jt} values signaling strong specialization and alignment with global trade patterns, making them the most competitive tea exporters. While India maintains moderate comparative advantages just ranking above China, thus it reveals that export of tea from India is affected by domestic consumption, it has potential for enhanced competitiveness through improvements in production and export strategies. Countries like Japan and the UAE, although having smaller comparative advantages, leverage niche markets by focusing on high-quality exports and specialized offerings. In contrast, nations such as Poland, Vietnam, the UK, and Germany exhibit limited comparative advantages, largely due to their focus on re-exporting, processing, or developing roles in the tea market rather than direct production. Germany, with a negative SI_{jt} , reflects a divergence from competitive positioning, emphasizing its role more as a re-exporter than a producer. Conclusively, the findings highlight Indian tea industries' strategic focus on specialization, quality, and production efficiency for enhancing global competitiveness in the tea export sector. Tea industry of India should align their trade practices with these factors to better position, leverage comparative advantage and maintain strong positions in the global tea market. Strengthening these facets is essential for India to sustain and potentially elevate its competitiveness within the tea export sector, particularly against dominant exporters like Sri Lanka and Kenya.

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