International Journal of Social Science Research and Review

http://ijssrr.com
editor@ijssrr.com
Volume 8, Issue 7
July, 2025
Pages: 438-451

Tracking Trade Competitiveness in Electronics: RCA-Based Analysis of India and China (2018-23)

Priyansh Agarwal

Delhi Public School, Sector 45, Gurgaon, India

E-mail: getpriyanshagarwal@gmail.com

http://dx.doi.org/10.47814/ijssrr.v8i7.2804

Abstract

This study conducts a comparative analysis of electronic exports from India and China to assess the evolving trade competitiveness of the two countries between 2018 and 2023. Utilizing the Revealed Comparative Advantage (RCA) index across seven key product categories, the research uncovers significant shifts in the global electronics landscape. While China maintains a dominant position, especially in electric accumulators and battery technologies, India has demonstrated notable gains in categories such as smartphones, semiconductors, and optical fibre cables. These improvements are closely tied to policy interventions like the Production Linked Incentive (PLI) Scheme and the India Semiconductor Mission, which have stimulated domestic manufacturing and attracted foreign investment. The findings suggest that although China continues to lead, India is narrowing the gap in several strategic segments, signaling its emergence as a credible alternative manufacturing base. This trend has important implications for global supply chains, trade policy, and industrial strategy, particularly in the context of post-pandemic realignments and shifting geopolitical considerations.

Keywords: *Revealed Comparative Advantage; Country Specific Advantage; Production Linked Incentive Scheme; Trade competitiveness*

1. Introduction

Trade serves as a pivotal metric to assess the international competitiveness of nations about commodities, inputs, and technology. By enabling a country to extend its market output beyond national borders through exports, trade catalyzes economic development. The reasons for a country gaining an advantage in the export of specific commodities can broadly be attributed to four factors: technological superiority, resource endowments, demand patterns, and commercial policies (Gupta, 2014). China exemplifies the concept of comparative advantage through its long-standing dominant role in the global electronics market. Over the years, China has established itself as a global leader, producing 36% of the world's electronics, including smartphones, computers, cloud servers, and telecom infrastructure

(Semiconductor Industry Association, 2021). In 2022, China's exports of electrical machinery and electronics reached $1.1 trillion, securing its position as the largest exporter in this category (The Observatory of Economic Complexity, n.d.). The global electronics market, valued at $4.3 trillion, is not only dominated by China but also by other key players such as Taiwan, the United States, South Korea, Vietnam, and Malaysia. In 2023, Taiwan and the United States exported electronics worth $220 billion and $200 billion, respectively (International Trade Centre (ITC), n.d.). Meanwhile, emerging economies like India are gradually increasing their contribution to this sector, with an annual export value of approximately $32 billion (International Trade Centre (ITC), n.d.).

The consumer electronics market has witnessed sustained growth, with an average annual growth rate of 2.3% between 2018 and 2023. The highest growth during this period was recorded in 2021, with industry revenues soaring by 7.2% year-over-year (Oberlo, n.d.). This growth reflects the increasing dependence on technology for both personal and professional activities. Technological devices and appliances such as smartphones, CCTV cameras, computers, and EV chargers have become indispensable. In India, the value of electronics production has nearly doubled, rising from $48 billion in FY17 to $101 billion in FY23. This growth is primarily driven by mobile phones, which now constitute 43% of the country's total electronics production. Notably, India has significantly reduced its reliance on imported smartphones, with 99% now manufactured domestically (Government of India: Press Information Bureau & NITI Aayog, 2024).

Understanding the competitive dynamics in the trade of commodities necessitates an examination of existing literature. Jayawickrama and Thangavelu (2010), in their study on the trade linkages between China, India, and Singapore highlighted the competitive nature of India and China in the export market. While China exhibits less competitiveness in categories such as beverages, tobacco, fuels, and related products, India demonstrates comparative advantages across a broader spectrum, including food and live animals, crude materials, and manufactured goods. The study utilized the Revealed Comparative Advantage (RCA) index, a metric based on trade, production, and consumption data, to quantify export potential and comparative advantage.

Bhaumik et al. (2015), in their study on the sources of competitive advantage for firms in emerging markets with a focus on China's electronics industry revealed that country-specific advantages (CSAs), such as economies of scale and access to natural resources, significantly contribute to productivity growth. These advantages outweigh firm-specific factors like technological innovation. India, too, benefits from specific CSAs, including a large pool of semi-skilled and skilled labor, which underpins its competitiveness in certain sectors like generic pharmaceuticals. Similarly, globalization has positively impacted India's electronics industry by fostering increased demand and production. Sinha (2016) attributes this growth to changing consumer preferences, greater exposure to global trends, and an increasing affinity for lifestyle and convenience products.

China's success in the electronics sector can be attributed to factors such as high levels of inward investment and outsourcing by Western firms, as well as economies of scale—a key CSA (Bhaumik et al., 2015). While China leverages these advantages, India has also made significant strides in the sector, driven by targeted policies and initiatives (NITI Aayog & Government of India, 2016). The Production Linked Incentive (PLI) Scheme, introduced in 2020, has been particularly impactful, transforming India into an emerging hub for electronics manufacturing (Sajeev, 2023). This policy has catalyzed smartphone exports, which exceeded $10.6 billion in the first seven months of 2024. This reflects a 37% year-over-year increase from US$ 7.8 billion during the same period in 2023 (IBEF, 2024).

Despite extensive studies on India-China trade dynamics, the majority focus on broad industrial comparisons rather than specific sectors like electronics manufacturing. The electronics industry is a vital contributor to national economies, with significant potential for job creation and economic growth.

Evaluating the competitive dynamics of this sector is particularly relevant given its increasing importance in global trade. The Indian government's initiatives to support this industry, including tax concessions, import tariff protections, and skill development programs, underscore its strategic focus.

This paper aims to analyze the trade patterns of electronic goods between India and China, providing insights into the growth and competitiveness of their electronics trade. Key product categories will be evaluated based on export performance from 2018 to 2023, utilizing the Balassa (1965) measure of Revealed Comparative Advantage (RCA).

2. Methodology

2.1 Research Aim and Objectives

The primary aim of this research is to evaluate and compare the trade competitiveness of electronic goods exported by India and China from 2018 to 2023. The study specifically seeks to:

- Measure and analyze the comparative advantage of both countries in key electronics product categories.
- Track the evolution of competitiveness over time, particularly in the post-COVID and post-policy-reform periods.
- Identify sectors where India is gaining ground and those where China continues to dominate.

To achieve this, the study uses the Revealed Comparative Advantage (RCA) index, developed by Balassa (1965), as the principal metric.

2.2 Research Design

This is a quantitative, comparative, and longitudinal study grounded in international trade analysis. It employs structured secondary data to compare India and China—two major global players in the electronics industry—across a six-year period. The timeframe from 2018 to 2023 captures both pre-pandemic and post-pandemic trends, enabling the study to identify structural shifts linked to global disruptions and national policy changes.

The metric used in the paper is the Revealed Comparative Advantage (RCA) index, which measures a country's comparative advantage in exporting a specific product. The RCA score of a country 'i' in exporting product 'j' can be calculated as:

$$RCA_{ij} = (E_{ij} / \Sigma_j E_{ij}) / (\Sigma_i E_{ij} / \Sigma_i \Sigma_j E_{ij})$$

where E_{ij} is the export value of product j from country i. $\Sigma_j E_{ij}$ is the total export value from country i, $\Sigma_i E_{ij}$ is the total export value of product j from all countries around the world, and $\Sigma_i \Sigma_j E_{ij}$ is the total world exports (Che & Zhang, 2022). An RCA value >1 indicates a comparative advantage, <1 indicates a disadvantage, and =1 implies parity with global average performance.

2.3 Sampling and Data Collection

This is a quantitative study that uses data from secondary sources like the International Trade Center Trade Map, government reports (e.g., PIB), official company websites, and existing publications. A category-based purposive sampling strategy was adopted to focus on key electronics product categories where India has demonstrated either significant growth potential or strategic interest. Starting with the top

nine electronics categories by export value, the study finally selected seven Harmonized System Nomenclature (HSN) codes after excluding two categories due to incomplete or non-representative data (See Table 1). The two categories, namely HSN 8503- Electric Motor/Generator, Generating Sets & Converter Parts and HSN 8538- Parts suitable for use with electrical switching, control, and distribution systems, primarily relate to internal components of electronic products and hence do not satisfy the inclusion criteria of the study. These exclusions ensure analytical consistency and data integrity. The following electronic product categories have been analysed:

Table 1: Selected HSN Codes and Product Categories for Analysis

S. No.	HSN Code	Product Label
1	8517	Telephone sets, incl. smartphones and other telephones for cellular networks or other wireless networks; other apparatus for the transmission or reception of voice, images or other data, incl. apparatus for communication in a wired or wireless network
2	8504	Electrical transformers, static converters, e.g.. rectifiers, and inductors
3	8544	Insulated "incl. enamelled or anodised" wire, cable "incl. coaxial cable" and other insulated electric conductors, whether or not fitted with connectors; optical fibre cables, made up of individually sheathed fibres, whether or not assembled with electric conductors or fitted with connectors
4	8541	Semiconductor devices, e.g., diodes, transistors, semiconductor-based transducers; photosensitive semiconductor devices, incl. photovoltaic cells, whether or not assembled in modules or made up into panels (excl. photovoltaic generators); light emitting diodes LED, whether or not assembled with other light-emitting diodes (LED); mounted piezoelectric crystals
5	8536	Electrical apparatus for switching or protecting electrical circuits, or for making connections to or in electrical circuits, e.g., switches, relays, fuses, surge suppressors, plugs, sockets, lamp holders, and junction boxes, for a voltage <= 1.000 V (excl. control desks, cabinets, panels etc. of heading 8537)
6	8507	Electric accumulators, incl. separators therefore, whether or not square or rectangular; parts thereof (excl. spent and those of unhardened rubber or textile.
7	8501	Electric motors and generators (excl. generating sets)

2.4 Data Analysis Approach

The study uses cross-country time-series data to compute annual RCA values for each of the seven categories, for both India and China, over the 2018–2023 period. This enables the identification of compound annual growth rates (CAGR) in RCA values and the observation of long-term competitiveness trends. The results are interpreted in light of major policy interventions (e.g., India's PLI scheme, China's industrial reforms) and macroeconomic events (e.g., the COVID-19 pandemic, global supply chain realignments). Graphical representations of RCA trends are used to visualize the divergence or convergence in trade performance between the two countries over time.

3. Results and Discussion

This section analyses the Revealed Comparative Advantage (RCA) of India and China across seven product categories. Each category is analysed individually to track trends and determine the possible reasons behind the observed shifts in the RCA. Categories are grouped based on their RCA trends:

3.1 Categories with Rising Competitiveness for India
3.2 Categories with Sustained Chinese Advantage
3.3 Categories Exhibiting Converging Trends

3.1 Categories with Rising Competitiveness for India

This section focuses on product categories where India's RCA has shown sustained growth, largely driven by domestic policy interventions and industry development.

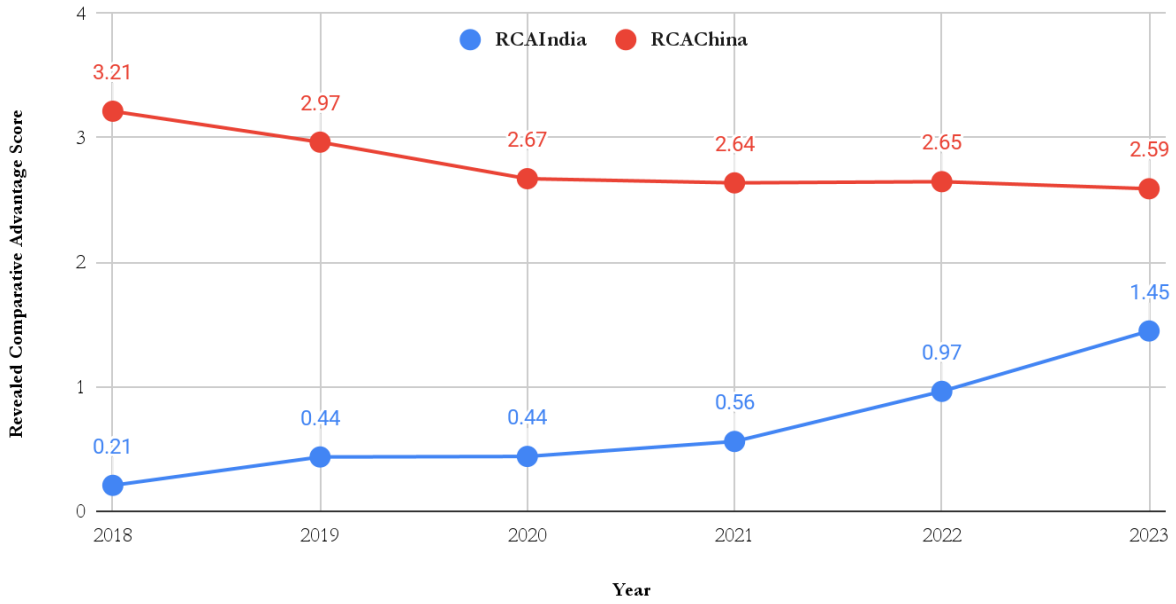

Figure 1: RCA Trends for HSN 8517 - Telephone Sets, including Smartphones and other Telephones for Cellular Network (2018-23)

As seen in Figure 1, since 2018, China has had a comparative advantage in exporting telephone sets, including smartphones. As of 2023, China has maintained its comparative advantage; however, the gap between the RCA for both countries, India and China, in exporting this category has narrowed in the last 6 years. China's RCA has reduced from 3.21 in 2018 to 2.59 in 2023, whereas India's RCA has increased from 0.21 in 2018 to 1.45 in 2023, indicating it is slowly getting competitive in this category. The CAGR of India's RCA for this category is 38, whereas the CAGR of China for the same scenario is -3.5. One of the major reasons for this is the Production Incentive Scheme (PLI) for Large Scale Electronics Manufacturing. In 2020, the government proposed that this scheme was likely to benefit 5-6 major global players and a few domestic champions in the field of mobile manufacturing and Specified Electronics Components, and bring in large-scale electronics manufacturing in India. The total cost of the proposed scheme was approximately INR 40,995 crore (Government of India: Press Information Bureau, 2020). The scheme attracted large foreign investments via leading players of the mobile phone manufacturing sector, which resulted in more Assembly, Testing, Marking, and Packaging (ATMP) units in India (Wandhe, 2024). Even COVID-19 stimulated many economic changes in the world. There were

many widespread disruptions in supply chains due to enterprises' overdependence on Chinese manufacturing facilities. This encouraged companies to explore the possibilities of partnering with firms from countries other than China (Buch & Sonwaney, 2020). For instance, major players like Apple and Samsung have set up new manufacturing facilities in India (Wandhe, 2024). This has resulted in a greater amount of production and reduced dependence on imports.

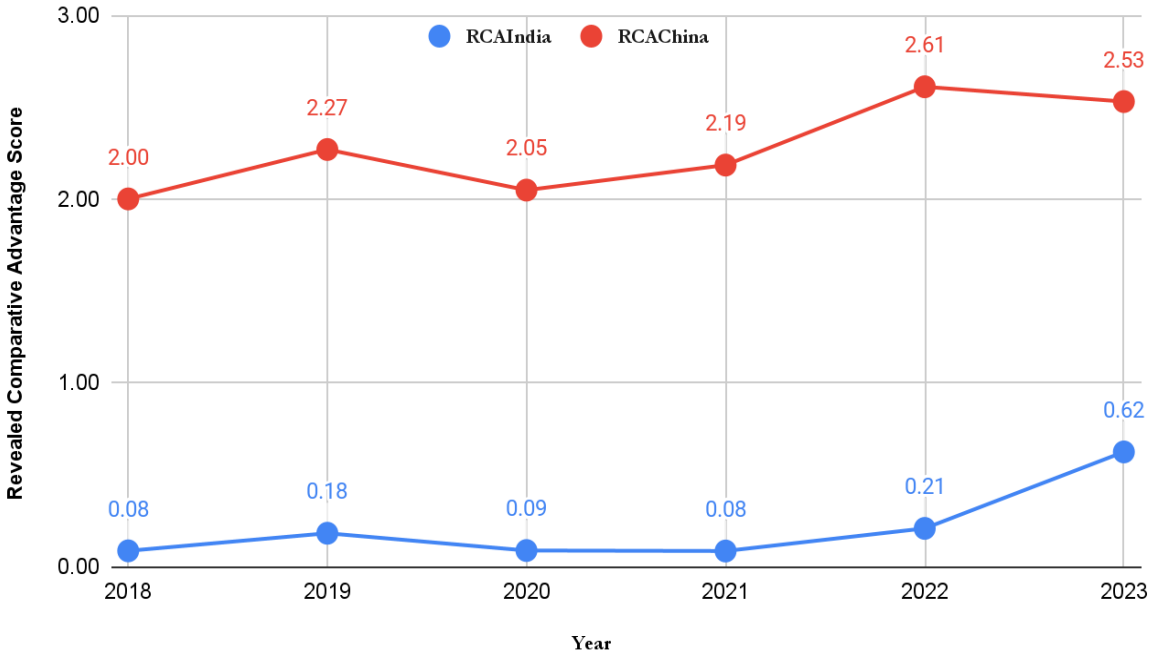

Figure 2: RCA Trends for HSN 8541 - Semiconductor Devices

It is evident from this graph that China's RCA for this category is not very stable and has many fluctuations (See Figure 2). However, India's RCA has remained stable during the period 2018-2022, except for an increase in 2018-2019, but from 2021-2023 it has shown significant growth, especially after 2022. The major reason for the boom in semiconductor manufacturing and export from India after 2021 is the government's 10 billion USD incentive program, introduced in 2021. The scheme has encouraged domestic firms to produce devices that use semiconductors as the foundational blocks. India has now started to emerge as a strong player in the semiconductor industry. Recently, India Semiconductor Mission, Tata Electronics, and Tata Semiconductor Manufacturing signed a Fiscal Support agreement to set up a semiconductor fab in India (Government of India: Press Information Bureau, 2019). Examining China's RCA trend for this category, China's RCA has shown immense growth from 2020-2022, but it fell slightly after 2022. The Chinese government has introduced many policies in the past decade, like financial incentives, that have aided in creating an ecosystem for domestic companies in China to manufacture semiconductors in China itself. China's back-end manufacturing has nearly quadrupled since 2015 to a 40% market share in 2022 of global back-end manufacturing of semiconductors (Choi, 2023). Now, talking about the reasons for the RCA decline in 2022, the Biden administration in the USA had imposed semiconductor export controls on China (Kim et al., 2024). This indirectly affected semiconductor equipment imports in China, decreasing by 32.5% overall. Kim et al. (2024) aimed to investigate if China had attempted to stockpile the equipment before the launch of export control measures, but it wasn't able to locate any such evidence. Thus, the decline in RCA can be largely attributed to the sudden disruption in the supply chain for the equipment used in semiconductor device production. The CAGR of China's RCA for this category is around 4, whereas for India, it is nearly 40.67.

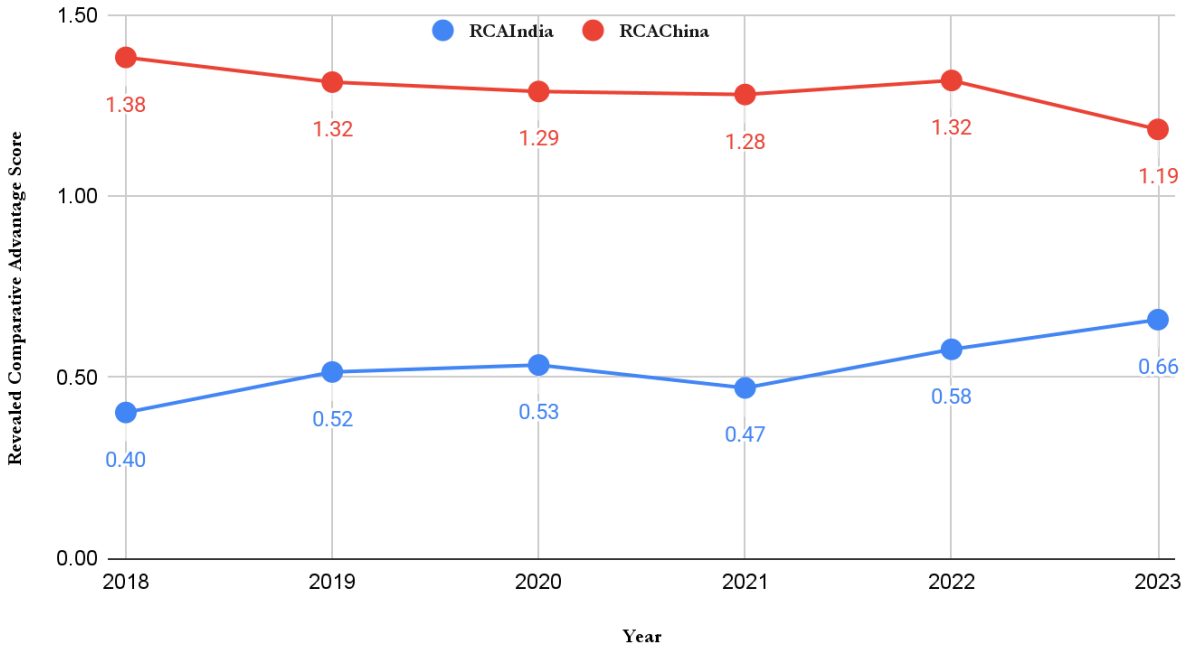

Figure 3: RCA Trends for HSN 8544- Insulated Wires & Optical Fibre Cables

Under this category, China's RCA has been decreasing gradually, showing a slight recovery in 2022, before declining again in 2023 (See Figure 3). India's RCA has been increasing gradually, except for a small dip in 2021, but has had a clear upward trajectory since then. The CAGR for China's RCA for this category is around -2.43, whereas for India, it is nearly 8.7. Optical Fibre communication systems are popular in the telecommunication industry because of the advantages of fibres. Fibres do not cause induction, provide a large bandwidth for multiplexing and are lightweight; thus reducing the cost of constructing a communication system (Rashed, 2013). It is commonly used in backhaul and fronthaul applications, connecting the base stations to the core networks. This graph demonstrates India's immense growth in this field from 2021 to 2023. This growth can be attributed to various reasons, the major reason being the increased demand for telecom services in India. The number of internet users in India increased from 29.4% in 2019 to 56% in 2022. Thus, many telecom service providers started to expand the telecom infrastructure across the country (Sathya et al., 2023), especially in laying optical fibre networks across urban and rural areas. This can be a reason that led to a surge in domestic demand for optical fibre cables (OFCs) and boosted local manufacturing capabilities. Moreover, the PLI scheme is encouraging domestic production of telecom and Internet of Things(IOT) devices in India. It has attracted investments from global manufacturers like Samsung, Ericsson, and Nokia in India (Wandhe, 2024). This notion continued even after 2022. For instance, in April 2025, Ericsson announced its partnership with VVDN Technologies, an Indian electronics manufacturing company, for manufacturing antennas in India (Ericsson, 2025). Antennas are commonly connected to the base stations using optical fibre cables using the Fiber-to-the-antenna (FTTA) system (Chow et al., 2010), and thus, this partnership may result in more optical fibre cables being produced in India in the future.

3.2 Categories with Sustained Chinese Advantage

This section covers categories where China maintains or increases its comparative advantage and where India has struggled to improve its RCA.

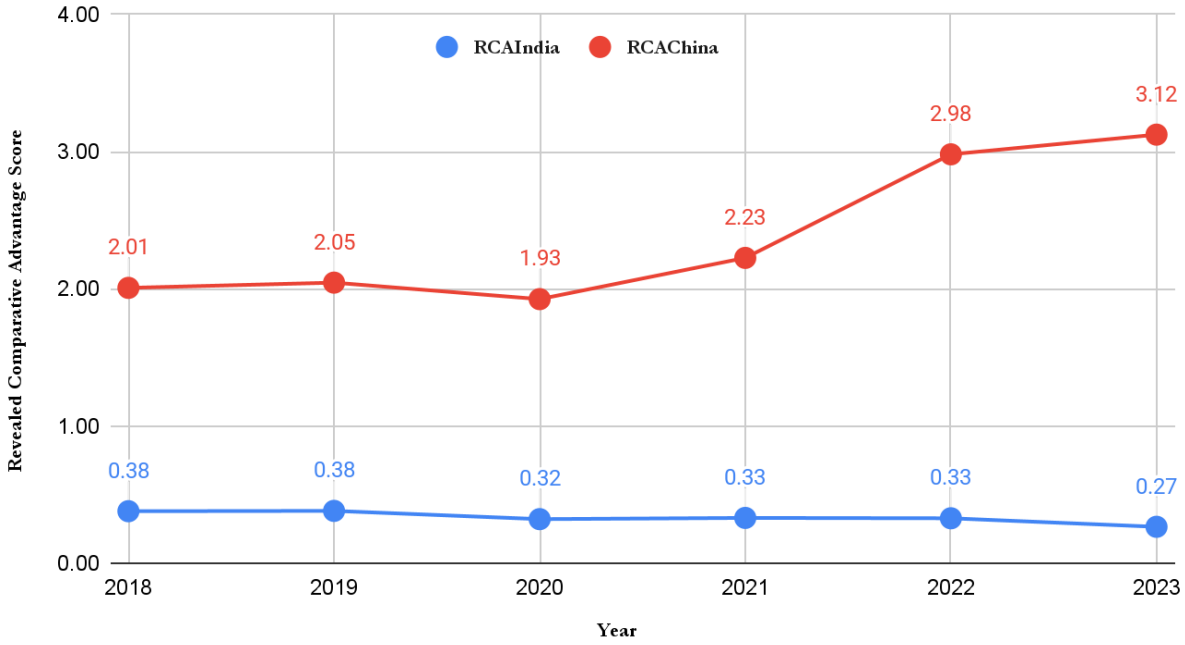

Figure 4: RCA Trends for HSN 8507- Electric Accumulators, Rechargeable Batteries, and their Parts

According to the graph shown in Figure 4, India's RCA has remained stable throughout these years. China's RCA was stable from 2018-2020. However, from 2020, China's RCA has shown continuous growth, increasing from 1.93 in 2020 to 3.12 in 2023. Overall, the gap between the RCAs of both countries has widened over the past few years. Greitemeier et al. (2025) revealed that China controls the global supply chain for EV batteries, including processing raw materials to manufacturing them. The EV sector has been booming since 2016. Electric vehicle sales have been growing at a rapid rate, increasing from $1 million in 2016 to $11 million in 2023 (Šebo, 2024). This has given China a competitive edge in being looked at as the favourite destination for global automotive companies to manufacture their products. For instance, BYD, a multinational automotive company, announced its world's largest battery plant in a lithium-rich Chinese province in 2018 (BYD, 2018). The continuous growth in China's RCA for this product category, especially during the period 2020-2023, underscores China's advantage in producing batteries and accumulators, not only for electric vehicles but also for all industrial applications. The CAGR for China's RCA for this category comes to be around 7.6, whereas for India, it is around -5.53.

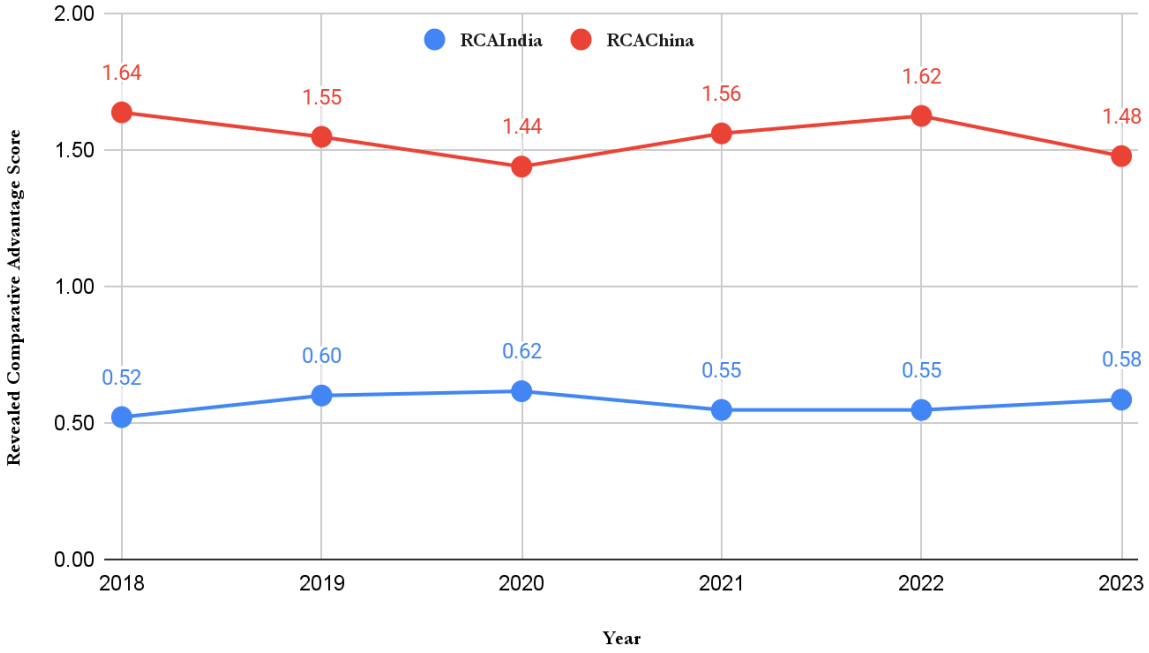

Figure 5: RCA Trends for HSN 8501- Electric motors and generators (excluding generating sets)

As seen in Figure 5, China's RCA shows a gradual decline from 1.64 in 2018 to 1.48 in 2023, followed by a recovery during the period 2020-22. However, it fell drastically between 2022 and 2023. India's RCA has overall remained stable throughout these years. The CAGR for China's RCA for this category is around -1.69, whereas for India, it is nearly 1.83. This category includes electric motors and generators. It is evident from the graph that China became competitive in exporting this category during the COVID-19 pandemic, i.e., during the period 2020-2022. One of the reasons for this boost is China's growth in the medical devices sector. An electric motor is an indispensable part of medical devices, such as oxygen concentrators. According to Vitania Solutions (2024), due to the increased demand for such medical devices during the pandemic, China became a major exporter. The export value of China's medical devices reached USD 20.288 billion, accounting for an 11.85% year-over-year increase. Moreover, China is a leader in manufacturing electric vehicle equipment for global companies and controls the supply chain. The electric vehicle (EV) industry has experienced significant growth over the past few years (Čejchan, 2024). EV cars use electric generators and motors to support the Regenerative Braking System of the car (Yang et al., 2024). This has also aided in boosting China's exports for this category. However, after 2022, the RCA for China has decreased, probably due to the same reason- enterprises exploring manufacturing locations outside China because of the supply chain disruption.

3.3 Categories Exhibiting Converging Trends

This section includes product categories where the RCA gap between India and China is narrowing or fluctuating without a decisive advantage for either country.

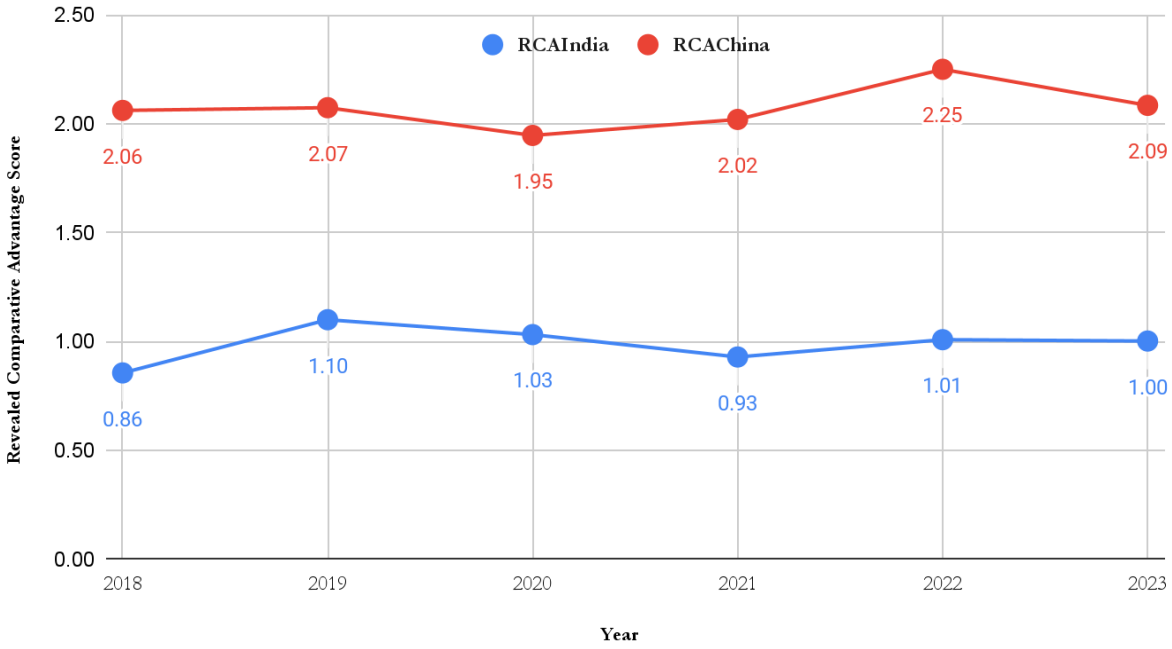

Figure 6: RCA Trends for HSN 8504 - Electrical Transformers, Static Converters, e.g., Rectifiers, and Inductors

The graph shown in Figure 6 suggests that overall, China's RCA for this category remains stable but has fluctuated slightly over the years. decreased to 1.95 in 2020, but it recovered during the period 2020-2022. China's RCA touched 2.25 in 2022. India's RCA increased from 0.86 in 2018 to 1.10 in 2019, but it had a dip in the period 2019-2021. However, India showcased a slight recovery in 2022. In the big picture, the gap between China's RCA and India's RCA has certainly narrowed. CAGR of India's RCA for this category comes to around 2.54 as compared to China's 0.24 for the same scenario. This category includes electric transformers and static converters. Electronic transformers are one of the most expensive parts in an electronic distribution system. Their uses include power transmission and distribution in various electrical and electronic devices (Kang et al., 1999), and they are used widely in renewable energy systems. One of the major reasons for China's RCA boom in the period 2022-2024 is the explosive growth of solar power generation technology. Wind and solar production contributed to 37% of the total power capacity in China in 2024. This is an 8% increase from 2022, and is expected to increase further (Yu et al., 2024). This means that manufacturing and export of photovoltaic equipment in China saw a rapid growth in this period, which in turn increased the export for electric transformers, as these transformers are used widely in the manufacturing of solar cells. However, China's RCA for this category declined again after 2024. A possible reason for this can be the supply chain disruption after COVID-19. MNCs' overdependence on Chinese firms for manufacturing equipment forced them to look for options outside China, thus decreasing China's RCA.

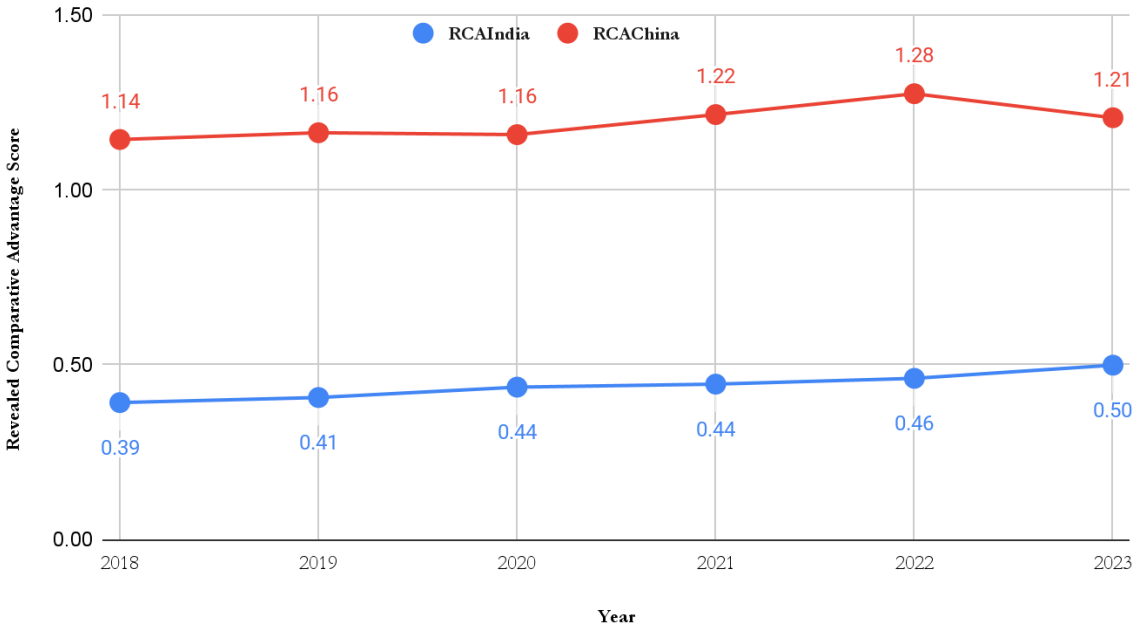

Figure 7: RCA Trends for HSN 8536 - Electrical Switches and Protectors

Overall, the RCA of both countries has remained stable throughout these years. However, in FY 2022-2023, India's RCA has an upward slope, whereas China's RCA has a downward slope (See Figure 7). The CAGR for China's RCA for this category is around 0.99, whereas for India, it is around 4.22. This category includes electrical apparatus for switching or protecting electrical circuits, or for making connections to or in electrical circuits, e.g., switches, relays, fuses, surge suppressors, plugs, sockets, lamp holders, and junction boxes (Drip Capital, n.d.). A popular product that uses components of this category is switchgear. Switchgear refers to a collection of electrical devices, like circuit breakers, fuses, and switches, used to control, protect, and isolate electrical equipment (Eaton, n.d.). The significant decrease in China's RCA after 2022 can be attributed to the companies shifting their manufacturing location of switchgear and related devices to other countries than China, which made China less competitive in exporting this category. For example, Siemens Energy announced a new switchgear manufacturing plant in Berlin in 2021 (Siemens Energy, 2021). Even India's RCA is showing a gradual yet slow growth in exporting this category, which is due to companies starting production in the country. For instance, Havells is operating multiple switchgear facilities in Indian cities like Faridabad (Havells, n.d.).

Taken together, these trends reveal that India's RCA has grown faster than China's in six out of seven categories, suggesting targeted policy impact and increased competitiveness, despite China's continued dominance in certain high-tech sectors.

Conclusion

This study examined the comparative export performance of India and China across seven key electronics product categories between 2018 and 2023, using the Revealed Comparative Advantage (RCA) index. The findings reveal that while China continues to hold a dominant position across most categories, owing to its advanced manufacturing ecosystem and deeply integrated global supply chains, India has made significant strides in improving its export competitiveness. This progress is most evident

in categories such as smartphones (HSN 8517), semiconductors (HSN 8541), and optical fibre cables (HSN 8544), where India's RCA values have shown consistent growth. These gains are closely associated with government-led initiatives, particularly the Production Linked Incentive (PLI) Scheme and the India Semiconductor Mission, both of which have attracted foreign investment, boosted domestic manufacturing capacity, and contributed to import substitution. Importantly, the analysis reveals that in six out of the seven selected categories, the compound annual growth rate (CAGR) of India's RCA has surpassed that of China, indicating a narrowing gap in trade competitiveness. The only exception is electric accumulators (HSN 8507), where China has further consolidated its advantage, driven by its strategic dominance in electric vehicle battery production and control over the associated raw material supply chains. These findings suggest that while China remains the global leader in electronics exports, India is beginning to establish itself as a credible alternative manufacturing hub, particularly in high-growth and technology-driven segments.

The implications of this study are particularly relevant for policymakers and industry stakeholders. For India, the evidence affirms the effectiveness of recent policy interventions and highlights the importance of sustaining momentum through continued investment in infrastructure, research and development, and workforce training. There is also a case for extending targeted support to underperforming areas such as EV battery production, where India continues to lag behind. For China, although it retains a stronghold in global electronics trade, the gradual erosion of its lead in specific segments suggests the need to respond proactively to shifting global trade dynamics, supply chain diversification, and technological competition. For international businesses and trade partners, India's emergence presents new opportunities for diversifying production bases and reducing dependence on a single geography.

While the study offers important insights into the evolving trade dynamics between India and China, it is not without limitations. It focuses solely on two countries and analyzes only seven product categories, potentially excluding broader trends in the global electronics market. Moreover, the RCA index, while useful for assessing export competitiveness, does not account for innovation intensity, domestic consumption, or value-added production. Future research can build upon this work by expanding the country sample to include other key players such as Vietnam, South Korea, and the United States, by incorporating additional trade metrics, and by exploring firm-level drivers of competitiveness in the electronics sector.

References

Bhaumik, S. K., Driffield, N., & Zhou, Y. (2015). Country specific advantage, firm specific advantage and multinationality – Sources of competitive advantage in emerging markets: Evidence from the electronics industry in China. International Business Review,25(1), 165–176. https://doi.org/10.1016/j.ibusrev.2014.12.006

Buch, K., & Sonwaney, V. (2020). Can India Emerge As An Alternate Hub For Cell Phone Manufacturing Post Covid 19? In Psychology And Education (Vol. 57, Issue9,pp.6107–6114)[Journal-article]. https://pdfs.semanticscholar.org/1d2e/15ede70f9abeb76d131b307bd3bcc366880c.pdf

BYD. (2018). Press Release: BYD builds the world's largest battery plant in Lithium-Rich Chinese province [Press release]. Technological Innovations for a Better Life | BYD USA. https://en.byd.com/news/press-release-byd-builds-the-worlds-largest-battery-plant-in-lithium-rich-chinese-province/

Čejchan, J. (2024). Potential impacts of increasing Chinese dominance in the electric vehicle industry. In Digitální repozitář UK. https://dspace.cuni.cz/handle/20.500.11956/190574

Che, N., & Zhang, X. (2022). High Performance Export Portfolio: Design Growth-Enhancing Export Structure with Machine Learning. IMF Working Paper, 2022(075), 1. https://doi.org/10.5089/9798400207013.001

Choi, J. (2023). Growth of the Chinese Semiconductor Industry. Research Archive of Rising Scholars. https://doi.org/10.58445/rars.252

Chow, C. W., Kuo, F. M., Shi, J. W., Yeh, C. H., Wu, Y. F., Wang, C. H., Li, Y. T., & Pan, C. L. (2010). 100 GHz ultra-wideband (UWB) fiber-to-the-antenna (FTTA) system for in-building and in-home networks.Optics Express, 18(2), 473. https://doi.org/10.1364/oe.18.000473

Drip Capital. (n.d.). HS Code Tool. https://www.dripcapital.com/hsn-code/8536

Eaton. (n.d.). Low-voltage Switchgear Fundamentals. https://www.eaton.com/us/en-us/products/low-voltage-power-distribution-control-systems/switchgear-lv/low-voltage-switchgear-fundamentals---eaton.html

Ericsson. (2025). Ericsson sets up antenna manufacturing in India—strengthening innovation, growth, and global delivery [Press release]. https://www.ericsson.com/en/press-releases/2/2025/4/ericsson-expands-antenna-manufacturing-in-india

Government of India. (2016). Make in India strategy for electronic products. http://164.100.94.191/niti/writereaddata/files/document_publication/Electronics%20Policy%20Final%20Circulation.pdf

Government of India: Press Information Bureau. (2019). Cabinet approves programme for development of semiconductors and display manufacturing ecosystem in India. https://www.pib.gov.in/PressReleasePage.aspx?PRID=1781723

Government of India: Press Information Bureau. (2020). Cabinet approves Production Linked Incentive Scheme for Large Scale Electronics Manufacturing [Press release]. https://www.pib.gov.in/PressReleasePage.aspx?PRID=1607487

Government of India: Press Information Bureau & NITI Aayog. (2024). Electronics: Powering India's participation in global value chains. https://www.pib.gov.in/PressReleseDetailm.aspx?PRID=2034096

Greitemeier, T., Kampker, A., Tübke, J., & Lux, S. (2025). China's hold on the lithium-ion battery supply chain: Prospects for competitive growth and sovereign control. Journal of Power Sources Advances, 32, 100173. https://doi.org/10.1016/j.powera.2025.100173

Gupta, S. D. (2014). Comparative Advantage and Competitive Advantage: An Economics perspective and a synthesis. Athens Journal of Business & Economics, 1(1), 9–22. https://doi.org/10.30958/ajbe.1-1-1

Havells. (n.d.). Manufacturing facilities. https://havells.com/corporate/made-in-india/manufacturing-facilities

IBEF. (2024). India's smartphone exports surpasses $2 bn mark in Oct, sets new record. India Brand Equity Foundation. https://www.ibef.org/news/india-s-smartphone-exports-surpasses-2-bn-mark-in-oct-sets-new-record

International Trade Centre (ITC). (n.d.). Trade Map - List of exporters for the selected product (Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television . . .). https://www.trademap.org/Country_SelProduct_TS.aspx?nvpm=1%7c%7c%7c%7c%7c85%7c%7c%7c2%7c1%7c1%7c2%7c2%7c1%7c2%7c1%7c1%7c1

Jayawickrama, A., & Thangavelu, S. M. (2010). Trade linkages between China, India and Singapore. Journal of Economic Studies, 37(3), 248–266. https://doi.org/10.1108/01443581011061267

Kang, M., Enjeti, P. N., & Pitel, I. J. (1999). Analysis and design of electronic transformers for electric power distribution system. IEEE Journals & Magazine | IEEE Xplore, 14(6). https://ieeexplore.ieee.org/abstract/document/803407

Kim, H. J., Oh, J., & Kwon, H. J. (2024). Investigating the effect of the U.S. semiconductor export controls on China. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.5033926

NITI Aayog & GoThe Observatory of Economic Complexity. (n.d.). Electrical machinery and electronics. https://oec.world/en/profile/hs/electrical-machinery-and-electronics

Oberlo.(n.d.).Consumer Electronics Industry size.https://www.oberlo.com/statistics/consumer-electronics-industry

Rashed, A. N. Z. (2013). Optical fibre communication cables systems performance under harmful gamma irradiation and thermal environment effects. IET Communications, 7(5), 448–455. https://doi.org/10.1049/iet-com.2012.0313

Sajeev, S. (2023, January). Analysis of the Production-Linked Incentive Scheme of the Government of India: The Hits and the Misses (University of Delhi). https://doi.org/10.13140/RG.2.2.17956.76168

Sathya, Dr. J., Kanakarani, Dr. P., & Williams, Dr. A. R. E. (2023). DETERMINANTS OF GROWTH OF INTERNET USERS IN INDIA. In Digital India: A Progress towards SDGs. https://books.google.co.in/books?hl=en&lr=&id=kEvYEAAAQBAJ&oi=fnd&pg=PA131&dq=internet+usage+increase+india&ots=0RiqLyuFF7&sig=gcbH4m-QhY6zAA4liZNOASMcN6o&redir_esc=y#v=onepage&q=internet%20usage%20increase%20india&f=false

Šebo, D. (2024). IMPACT OF ELECTRIC VEHICLE MARKET GROWTH ON AUTOMOTIVE INDUSTRY TRANSFORMATION: TRENDS, POT AND CHALLENGES ANALYSIS. https://www.croris.hr/crosbi/publikacija/prilog-skup/820618

Semiconductor Industry Association. (2021). SIA Whitepaper: Taking Stock of China's Semiconductor Industry. In semiconductors.org(pp.1–3).https://www.semiconductors.org/wp-content/uploads/2021/07/Taking-Stock-of-China%E2%80%99s-Semiconductor-Industry_final.pdf

Siemens Energy. (2021). New production facility in Berlin: Siemens Energy wants to eliminate the world's most potent greenhouse gas from power transmission [Press release]. https://www.siemens-energy.com/global/en/home/press-releases/new-production-facility-berlin-siemens-energy-wants-eliminate-worlds-most-potent-greenhouse-gas-from-power-transmission.html

Sinha, S. (2016). Globalization and its Impact on Electronics Industry in India. In Rai Management Journal: Vol. XIII (Issue 1). https://www.jru.edu.in/wp-content/uploads/RMJ/vol-11/Globalization%20and%20its%20Impact.pdf

VITANIA SOLUTIONS. (2024). China's medical device industry: Navigating global markets for unprecedented growth | VITANIA SOLUTIONS. vitania.net. https://www.vitania.net/chinas-medical-device-industry-navigating-global-markets-for-unprecedented-growth

Wandhe, P. (2024). An overview on Production Linked Incentive (PLI) scheme by the Government of India. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.4693578

Yang, C., Sun, T., Wang, W., Li, Y., Zhang, Y., & Zha, M. (2024). Regenerative braking system development and perspectives for electric vehicles: An overview. Renewable and Sustainable Energy Reviews, 198, 114389. https://doi.org/10.1016/j.rser.2024.114389

Yu, A., Lu, S., O'Malia, K., & Prasad, S. (2024, July 11). China continues to lead the world in wind and solar, with twice as much capacity under construction as the rest of the world combined - Global Energy Monitor. Global Energy Monitor. https://globalenergymonitor.org/report/china-continues-to-lead-the-world-in-wind-and-solar-with-twice-as-much-capacity-under-construction-as-the-rest-of-the-world-combined/

Copyrights