India Exim Bank

SELF-RELIANT INDIA: APPROACH AND STRATEGIC SECTORS TO FOCUS

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SELF-RELIANT INDIA: APPROACH AND STRATEGIC SECTORS TO FOCUS

India Exim Bank's Occasional Paper Series is an attempt to disseminate the findings of research studies carried out in the Bank. The results of research studies can interest exporters, policy makers, industrialists, export promotion agencies as well as researchers. However, views expressed do not necessarily reflect those of the Bank. While reasonable care has been taken to ensure authenticity of information and data, India Exim Bank accepts no responsibility for authenticity, accuracy or completeness of such items.

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EXECUTIVE SUMMARY

Indian economy, since independence, has encountered various phases of interaction with the world, as far as the trade in goods and services are concerned. Following liberalisation, the external orientation of India increased, however not to the potential of our country.

During the period 1991-92 to 2019-20, the exports from India have increased from US$ 18 billion to US$ 313 billion, which is an increase of over 17 times. However, the flip part of it is that during the same period, imports have also increased from US$ 20 billion to US$ 473 billion, which is close to 24 times. This essentially is a clear indication of the fact that India despite its best efforts has become more dependent on imports than ever before. The trade deficit as a result has further increased by 100 times, from US$ 1.6 billion in 1991-92 to US$ 160.5 billion in 2019-20. This exacerbation is increasingly now becoming a source of concern for an economy which aspires to stand on its own feet through greater self-reliance.

The ambition to produce goods in India rather than importing from abroad is not a novel thought, but nevertheless it provides a sense of renewed focus and vigour, and a greater thought amidst the 'Atmanirbhar Bharat Abhiyan' of the Government of India.

The Government envisages to transform the country into one of the largest manufacturing hubs in the world. The Government has been taking steps which would enable the industry to emerge and remain efficient and resilient to any global shocks. Conscious efforts have been taken by the Government, not only to help the Indian companies to stabilise their footprints in the domestic market, but also to help them to penetrate global markets by negotiating / renegotiating the foreign trade policies with various countries. With the changing dynamics world over, India, going forward would look to engage with nations on a global footing, more preferably on a win-win status quo. This in due course is expected to make India self-reliant more than ever before.

India Exim Bank, has made a concerted effort through this Study titled "Self-Reliant India: Approach and Strategic Sectors to Focus", and has identified crucial

sectors in which India should transform into a net exporter besides becoming self-reliant. This approach would not only help India to reduce its burgeoning trade deficit, but also earn foreign exchange, besides generating employment in the country.

Analysis of India's imports by end-use (capital, intermediate, and consumer goods) indicates that nearly 79 percent of the imports by India in 2019 were intermediate goods, signifying the dependence of India's manufacturing sector on imported intermediates. The significant dependence of Indian manufacturing on imports is also corroborated with the analysis of financial data of a sample Indian companies. The data indicates that the foreign exchange spending of the sample companies accounted for 25.5 percent of the total sales in the India's manufacturing sector in 2018-19. Forex spending as percentage of sales for India's manufacturing sector had declined for four consecutive years before rebounding in 2017-18 and 2018-19. Alongside, the export orientation of the sample companies remained stagnant as evinced by the data for forex earnings as percentage of sales. Over the past decade, the forex earnings as percentage of sales has remained in the range of 16-19 percent. Clearly, the import dependence of Indian manufacturing sector has increased, while its export orientation remained relatively low.

The Study has identified specific sectors, namely, capital goods, chemicals, defence, electronics, plastics, and solar cells/panels, apart from auto-components and steel as sectors of focus in the manufacturing sector. In addition, the Study has also looked into strategies to secure rare-earth resources and cultivation of pulses and oilseeds abroad through strategic collaboration. Import of these items by India, in 2019-20, amounted to US$ 186 billion, which is 39 percent of India's total imports and 50 percent of India's non-oil imports. As regards trade deficit, these sectors contributed to about US$ 91 billion of trade deficit in the year 2019-20. In percentage terms, the trade deficit witnessed in these sectors amounted to about 57 percent of total trade deficit of the country. It may be observed that if the trade in these sectors is neutralised, India could achieve positive trade balance in the non-oil merchandise trade.

Strategic Sectoral Focus for Self-Reliant India

Capital Goods: The capital goods sector has one of the strongest linkages with the industrial sector in India. Nevertheless, it is bereft with a consistent trade deficit which currently stands at around US$ 17 billion. Industrial machinery for dairy, machine tools, AC & refrigeration machinery, electric machinery & equipment, amongst others are some of the largest contributors to the deficit. Another interesting, but alarming point, is that India is significantly dependent on

China for its imports. This is evident from the fact that China is the largest import source in four out of the five top categories of capital goods imports by India. Some of the possible measures for India to pull itself out from the trade deficit under this category would be: encouraging technology transfer and investments in the capital goods sector, fostering innovation-led start-up ecosystem, support for creation of testing and certification infrastructure, promoting capital goods for intelligent manufacturing, expanding the scope of public procurement preference for local manufacturers, among others. Government may also like to look at addressing the issue of inverted duty structure as well as revisiting the duty concessions under FTAs/PTAs which are important aspects for improving the competitiveness of domestic producers and attaining self-reliance. The hi-technology zones like Chengdu in China and Colorado in the USA, both land-locked (away from ports by about 800 km) and yet successful, could be the models for replication in India to set up Hi-tech Manufacturing Zones. The government has launched several schemes for assisting Indian manufacturers to acquire and evolve cutting-edge technologies to catalyse growth and compete in the global market including the Technology Acquisition Fund Programme (TAFP) and the Technology Acquisition and Development Fund. Another route through which the Government could promote technology acquisitions is encouraging M&A through an Alternative Investment Fund. Evidence suggests that among the portfolio companies that engaged in cross-border M&A, about 80 percent completed their first cross-border M&A deal only after the initial private equity investment, highlighting the importance of such an investment fund.

Chemicals and Products: The chemical industry has emerged as one of the fastest growing industries in India, with the country ranking fourth in Asia, and the sixth largest market in the world with respect to output, after the USA, China, Germany, Japan, and South Korea. This industry directly or indirectly touches over 95 percent of all manufactured products. While the industry has registered significant growth in the last two decades, it is to be noted that the sector's growth has largely been a result of growth in the FMCG sector. When it comes to trade, India faces a trade deficit of almost US$ 4 billion in this industry. Some of the products under which India has import dependency are phosphoric acid, styrene, aluminium oxide, and anhydrous ammonia. Data shows that India has a significant dependence on China for antibiotics, penicillin, and heterocyclic nitrogen compounds. While analyzing the forward and backward linkages in the chemical sector in the Indian and Chinese context, it was observed that India has been having a growing dependence (backward linkage) on China for some critical inputs used by the chemical and pharmaceutical industry. It is recommended that in order to reduce the import dependence from China and boost the chemical

exports from India, greater focus should be laid on enhancing India's integration into the GVCs, enabling domestic manufacturers to specialize across various stages of production. It may be surprising to note that even advanced economies like the USA, Germany, Japan and South Korea constituted almost 25 percent of global imports of chemicals in 2019, most being from China. As India scales up its domestic manufacturing capacities, it is suggested that the government should enter into strategic partnerships with these countries to attract investments, besides providing conducive business environment to manufacture and source from India. It would be a win-win situation for both India and these major importing countries.

Defence Sector: In the given scenario, defence equipment is one of the most strategically important areas for India, which is categorised as a monopsony, as the Government is the sole buyer in this case. India is the second largest importer and 23rd largest exporter of major weapons in the world. In its trade in defence equipment, almost 98 percent is accounted by imports. India's trade deficit in this category stands at around US$ 7.8 billion. One of the largest contributors to India's deficit is aircraft (helicopter, aeroplanes) & spacecraft (satellites). Possible action points for India to reduce the deficit can be revisiting the strategic partnership model under the revised Defence Procurement Procedure, removing tax impediments to create a level-playing field, addressing the ambiguity in procurement categories, bringing out policies to ensure greater accountability, and facilitating medium to long term export credit. It may also be important to carry out some revisions in Draft Offset Guidelines 2020 such as revising the quantum and threshold for offset, considering differential quantum levels for single-source procurement vis-à-vis competitive tendering, and reconsidering the multiplier coefficient for parts and components. Financing and facilitation of defence exports, unlike other manufactured goods, often involves medium to long term time horizons. The institutional structure of Export Credit Agencies (ECAs) enables them to facilitate and finance such medium to long term export credit requirements. Several ECAs have dedicated programs, often separate from their commercial operations, for supporting the development of domestic defence industry. Currently, there is no specific fund for supporting the domestic capacity building in the defence sector or facilitating exports of defence equipment from India. Taking cue from the initiatives taken by other major ECAs, a Defence Development Fund (DDF) could be created by the GOI, which could be managed by India Exim Bank. This fund can be a source of competitive finance for the defence sector. Strategic cooperation agreement can be signed by India Exim Bank with the firms identified under the Strategic Partnership model. Defence projects supported through the DDF can be provided concessional financing.

Additionally, the GOI could also launch a credit-linked capital subsidy scheme through this fund for the players in this sector. Such an approach has also been adopted by countries like China and Brazil.

Electronics: Electronics is one of the industries where India has registered huge trade deficit in the recent years, and the figure is expected to grow further. India currently has a trade deficit of over US$ 40 billion in electronics. Electronics components, computer hardware & peripherals, consumer electronics, electronics instruments, and telecom instruments are some of the major segments contributing to the trade deficit in the electronics industry. India's biggest challenge in the electronics industry arises from the fact that it is hugely dependent on China for imports. In fact, under all the product categories within the electronics sector, China is the largest import source for India, which could be a concern for India in the long-term. Some of the plausible steps which could be taken up by India include: attracting large scale GVC oriented investments through production-linked incentives, increasing customs duty on select import items, renegotiating FTAs in the context of electronics, special thrust to investment in medical electronics / devices and strategic electronics segment, focusing on skill development, and promoting innovation and R&D through financial and fiscal incentives. While the recent initiatives to incentivize domestic manufacturing in this sector is a welcome initiative, it is imperative for the players to get easier and low cost working capital. This could be tackled by setting up a fund to provide interest subvention for working capital. Top competing countries like Vietnam and China provide such interest subvention on working capital which enhances their cost competitiveness in the mobile manufacturing segment.

Plastics and Products: India has diversified a lot in the last few years in the plastics industry and hosts more than 2000 exporters. However, the sector has a significant trade deficit of almost US$ 7 billion, and the challenges exist especially in the area of sourcing of raw materials needed for plastic manufacturing. It is suggested that the government may consider including this sector for introducing the production linked incentive (PLI) scheme, to support the plastic industry, along the similar lines as was introduced for the electronics sector in May 2020. Besides satisfying our own requirements, the scheme could position India as a viable alternative to giants like China in the long term. It is also observed that the dire need of the plastics industry is to enter into a Comprehensive Economic Partnership Agreement (CEPA) focusing on technology transfer and investments, besides the trade with select countries, who are major importers of plastic like the USA, Germany, and Mexico that are strong in plastic manufacturing technology, but still outsource their requirements. It is also important to look at regions like the EU, which accounted for one-third of the world imports of plastics in 2019.

Pulses and Edible Oils: India is predominantly an agricultural country and holds nearly a tenth of world's arable land and a fifth of world's irrigated land. With respect to the trade, India has a surplus of almost US$ 15 billion in the agriculture and processed food category. However, a huge import dependence lies in products like edible oil (crude palm oil, crude soya bean oil, safflower oil), and pulses (dried shelled lentils). Indonesia and Canada were the largest import sources for edible oils and pulses, respectively, for India, in the year 2019. It may be noted that during the period 2010 to 2019, while India's imports of edible oils grew at an average rate 5.9 percent, the imports of pulses grew at a higher AAGR of 6.2 percent. It may be observed that situations when forward linkages are greater than the backward linkages, there exist net value-added gains from integrating into GVCs. However, regarding India's agricultural exports, backward linkages are substantially higher than the forward linkages - efforts hence should be made to increase the GVC participation in agriculture, forestry, and fishing through forward linkages with the global food processing industry. Going forward, India needs to increasingly look at having an enduring plan in place facilitating agricultural investments in near shore CLMV region, and in the African continent, where opportunities exist. However, to capture this potential Indian Government would need to provide long-term assurance towards buying back the produce from these regions at a rate not less than the minimum support price for the same produce in India. The Government also needs to have consistent policy regarding import of these two key products, viz., pulses and edible oils. At the same time, in the short to medium term, India may also look at diversifying its import sources.

Rare Earth Elements: Rare Earth Elements (REEs) are one of the important elements required by almost all countries with a strong manufacturing base and needed in various industries such as defence, electronics, and renewables, amongst others. India is the fifth largest country in the world with 6.9 million tonnes of REE reserves, accounting for 5.8 percent of global reserves. However, significant requirement of REEs in India is met through imports, particularly from China. As a way forward, India could explore the feasibility of sourcing REEs from other countries such as Brazil, Vietnam, Russia, Australia and the USA. India could also collaborate with other countries for joint exploration activities and thereby securing REE assets within the country and abroad. Exploration should also be strengthened within the country as India is presumed to be having world's fifth largest reserves of REEs. Indian state-run companies can form joint venture to secure minor mineral assets such as lithium and cobalt that could fuel India's plan for mass adoption of electric vehicles by 2030. The country also needs to promote R&D in order to find better substitutes for priority minerals, as

also in the recycling and material recovery areas. A dedicated overseas strategic investment fund for the purpose of securing REE assets could be thought through, which could be housed and administered by a specialised government financial institution, akin to the Chinese model. The fund's resources could be used for strategic investments by Central and State PSUs. The proposed fund could also become an arm of an existing financial institution with specialised operations in diverse areas. While India exhibits global aspirations to seek foothold across geographies, it is largely bereft of any such dedicated fund to boast of. However, the demand here is not to create a Sovereign Wealth Fund whose objectives are to get better returns from its investments, amongst other objectives. The argument here is for establishing a Strategic Fund which facilitates Indian investments abroad in critical areas, such as REEs. The way ahead essentially means to finalise a course of action. There are several Indian manufacturing companies both in private and public sector which have the wherewithal to secure India's needs. A suitable and a concerted strategy could secure India's aspirations in the long run.

Solar Cells / Modules: India, since the beginning of this century, has progressed immensely in the renewable energy sector, especially in the solar power segment. However, India's strength majorly remained in introducing solar power, rather than manufacturing of solar cells in the country, and hence suffers from a huge deficit in the trade of photovoltaic cells. In the process, India remains dependent on China. Given 300 days of sunlight in the country, India has a tremendous opportunity to provide access to electricity through solar power. The country has also submitted its INDC to UNFCCC, to reduce the emissions intensity of its gross domestic product by 33 percent to 35 percent by 2030 from 2005 level. In order to reduce import dependence and produce solar goods in the country, an extension of the safeguard duty on solar cells and modules is required. Further, to stimulate the demand for solar cells and modules in the market, mandatory uptake of domestically manufactured solar devices in the State and Central Government offices is also suggested. Besides, silicon wafers and ingots, which go into the manufacturing of solar cells and modules, are also not manufactured in India in abundance, and hence being imported. The Government could consider exploring the possibility of providing the viability gap funding (VGF) to projects setting up such facilities. Solar projects which are abundantly implemented in developed economies like the USA, the Netherlands, and Japan, source a significant volume of their import requirements from emerging economies like China and Vietnam. Production by India, with investments from these countries, could lead to diversification of the imports by these countries, and in the process, India could even emerge as a PV cell hub for the global players.

Other Key Sectors

Auto-components: India has overall trade surplus in the auto components industry but depends significantly on China for its imports of certain critical components such as drive transmission and steering parts, cooling systems, suspension and braking parts. India's auto component imports from China accounted for 23.9 percent of India's total imports of auto components in 2019-20. It may herein be noted that, some of the auto-components are placed at the highest slab of GST in India. The GST rates for Internal Combustion Engines (ICE) based vehicles and their components are currently at the highest GST rate of 28 percent. Apart from this, the compensation cess levied on these items is in the range of 1-22 percent, which makes ICE based vehicles one of the highest taxed manufactured products in India. The automotive component industry also faces the challenge of two separate GST rates. While nearly 60 percent of auto components face a GST rate of 18 percent, the remaining face a 28 percent GST. The GST rate on auto components is higher than the MFN duty of 15 percent on several auto components. The tariffs are even lower for imports from countries such as China, South Korea and Japan, which benefit from tariff concessions under various free trade agreements, with tariffs for some auto components being as low as 1.8 percent. The lack of a uniform GST rate for auto components sector and low import duty discourage the domestic production in those sub-segments that have higher GST rates. Further, in the case of electric vehicles, the components of EVs face much higher GST at 18 percent and 28 percent, while EVs face a GST of 5 percent. As such, there is limited indigenisation in EV manufacturing, with about 60–70 percent of the EV components being imported, including batteries and power electronics. An essential step in that direction would be to consider rationalizing the GST levied for auto components from the current levels of 18-28 percent to 5-12 percent. Further, in order to complement the government initiatives to promote domestic manufacturing of EVs, the government could consider rationalizing GST on EV components to 5 percent, bringing it at par with the GST for EVs.

Iron and Steel: The growth in the Indian iron and steel sector has been driven by domestic availability of raw materials such as iron ore and cost-effective labour. Consequently, the iron and steel sector has been a major contributor to India's manufacturing output. While India is the world's second-largest iron and steel producer, as on date, it is still dependent on imports. India's exports of iron and steel were recorded at US$ 17 billion in 2019, up from US$ 13.4 billion in 2010, an AAGR of 4.3%. On the other hand, the imports recorded an AAGR of 3.6 percent by growing from US$ 13.8 billion in 2010 to US$ 16.8 billion in 2019. With

respect to the trade deficit with some of the countries, India had the highest trade deficit in iron and steel industry with South Korea at US$ 2.5 billion in 2019. This was followed by China (US$ 2.3 billion) and Japan (US$ 1.3 billion). It may be noted that India's deficit in iron and steel with South Korea and Japan has almost doubled in the last decade, since it signed FTAs with these nations. While India's average steel use per capita was 74.3 kg in 2019, the world's steel use was 229.3 kg per capita. Going forward, having signed a few PTAs with countries like South Korea and Japan in the past, India may like to review the implications of such PTAs on the industry. Besides, Indian producers need to upgrade themselves to produce iron and steel at globally competitive prices. Indian steel producers need to modernise their plants with state-of-the-art technology in order to increase the productivity, improve quality and reduce maintenance costs. Some of the focus areas could be tubes and pipes, screw, bolts and nuts, stranded wires, ropes and cables, including stainless steels, amongst others. India needs to increase its capacity in production of these items in order to lower our dependence on imports from China in the long run. Other than strengthening the local capacities in these areas, India also needs to raise awareness on the utilisation of preferential tariffs. While the global utilisation of tariff preferences is as high as 70 percent to 80 percent, India generally uses tariff preferences under FTAs only to the extent of 5-25 percent. Better utilisation rate, in the long term, can increase India's exports and ultimately reduce the trade deficit. While India's production has achieved some significant milestones in the recent years such as reaching the 100 MT production and overtaking Japan to become the second largest producer in the world, the country is far behind when it comes to the per capita usage of steel. The per capita consumption of steel in India is just one-third of the global average. The capacity utilisation of the steel industry in India is just over 75 percent and there is significant scope to increase the capacity utilisation and improve productivity. A twin approach may be adopted in this case where on the one hand, the capacity is increased significantly, and on the other hand massive government push is given to the infrastructure sector, which eventually increases the steel consumption in the country.

Strengthening the eco-system for indigenisation

Ensuring WTO compatibility of incentives is a key point to be considered while devising sectoral schemes in these identified sectors. As per Article 3.1 of the Agreement on Subsidies and Countervailing Measures (ASCM) of the WTO, several sector specific schemes of India like EHTP, EOU, SEZ, EPCG Schemes that incentivize export performance, are prohibited. Given this, the Government must ensure that any new incentive framework for domestic players are aligned

with the WTO guidelines. These could include production and capital investment incentives, R&D incentives, tax exemptions, interest subvention on capital investments, among others. Although subsidies for R&D, regional balances, and environmentally friendly technologies are also actionable, these have seldom been disputed, in part because the developed countries also use them often.

Public procurement accounts for around 20-30 percent of India's GDP, making the Government an important buyer for the manufacturing companies. There are several changes which can be undertaken by the Government to ensure that the benefits percolate to the Indian manufacturing sector and encourages investment in innovation. Firstly, India can focus on quality in its procurement guidelines. Cue can be taken from the European Union's 2014 Directive on Public Procurement, which focuses on a "price-quality ratio", moving away from a focus on price only. The Government may also consider making the procurement processes more favourable to MSMEs. In this regard, the Government could consider unbundling large procurement contracts into several smaller ones. Such directives are in place in the EU, which require large public contracts to be divided into smaller batches, allowing SMEs to participate in large tenders.

It may also be noted that the federal structure in India empowers the states to design their own investment policies and sector-specific incentives to attract investments and promote industrial growth. Therefore, it is essential for the State Governments to actively engage in improving the 'ease of doing business' in the States along with designing a sound incentive structure for enhancing industrial development.

Domestic manufacturing faces stiff competition from imports under some of the existing FTAs/ PTAs. The Government may explore the possibility of having a 'graduation clause' for the developing country FTA partners, a 'sunset clause' on some concessions, and a 'trigger mechanism' in case the imports surge from a country for a given product.

Promoting innovation and R&D could be a key game-changer for India to attain self-reliance in manufacturing. Fund allocation for incentivising R&D could be increased, along with introduction of other suitable policy interventions to promote R&D, such as reinstating greater Income Tax deduction on expenditure incurred on R&D. Government could also consider providing dual tax credit allowances system that rewards both incremental expenses in R&D, in addition to the level of spending in R&D, as provided by countries such as Canada.

The Government of India has recently lowered the corporate tax rate to 22 percent from the earlier rate of 30 percent for all companies. However, the specific provisions under the new tax regime forces the companies to relinquish any other tax incentives including the tax exemption under Section 35 (2AB) for R&D purposes in order to avail the lower corporate tax rate. This discourages the companies to invest in R&D. Hence, the Government could consider allowing the tax exemption on R&D under Section 35 (2AB), in addition to the lower corporate tax rate of 22 percent, in order to incentivize the domestic companies to invest in R&D, innovate new technologies, engage in product development and related processes.

India has undertaken major reforms across various areas of doing business, which have improved the investment climate in the country. However, the country still lags in areas such as enforcing contracts and registering property. Simplifying property registration and acquisition of land will be important for further improving the business environment in the country. There is also a need to overhaul the judicial processes for commercial disputes in the country. Leveraging technology will be an important step towards this, and the Hon'ble Supreme Court of India has already developed a paperless module for commercial courts, where trials can be conducted in a digital environment. Such digitization drives need to be undertaken at lower rungs of the judiciary as well. Moreover, the Alternate Dispute Resolution Mechanism (ADR) in India needs to be strengthened by expanding arbitration and mediation centres in the country and setting up specialized commercial courts at High Courts and District Courts, complemented by a conscious effort by stakeholders to reorient the way ADR mechanisms are perceived.

The Government could also consider subsidising the cost of commercialising new innovations, for enhancing the market for domestically produced innovative goods. This would entail interlinking the demand for innovative solutions across industries to the manufacturers of such innovative goods through appropriate incentives. The government could explore policies that incentivize industry efforts to invest in innovation and develop new products. In select high technology sectors, the government could consider incentives such as providing support of up to 50 percent of expenditure for pilot production projects, partial reimbursement of expenses on equipment procured for the purpose of R&D, reimbursement of expenditure incurred on developing prototype products etc. Such enabling provisions would help promote R&D in high technology sectors, facilitate innovation and develop capacity in innovative products.

Conclusion

Manufacturing has traditionally played a key role in the economic growth and development, as also in promoting job creation and enhancing technological capabilities in a country. However, in the Indian scenario, the recent performance of the manufacturing sector has been indicative of an underlying inertia, with the share of manufacturing in India's gross value added (GVA) declining to 15.1 percent in 2019-20, as compared to 18.35 percent in 2010-11, despite the strong and growing private consumption demand in the country. This weakness in the domestic manufacturing sector has translated into greater dependence on imports to meet the growing domestic demand over the years, thereby resulting in a large trade deficit across the key manufacturing sectors. This high reliance on imports has also translated into higher foreign value-added content in India's manufacturing exports.

In this context, the report identifies select sectors for import substitution and enhancing domestic production including electronics, defence equipment, machinery, chemicals and allied sectors, pharmaceuticals, and select agricultural products. These sectors account for more than US$ 186 billion of imports by India, with a share of nearly 39 percent in overall imports and 50 percent in the non-oil imports by India. The report analyses the performance of these sectors in terms of production and export capabilities and highlights the import dependence in these sectors. The report recommends several sector-specific strategies for reducing import dependence by enhancing domestic production, based on an assessment of the specific needs and issues faced by each of the sectors.

While India has made considerable progress in its policy space, improving its ranking in the World Bank's Doing Business Index from 142 in 2014 to 63 in 2019, there are considerable differences in the industrial climate across the country. The differences across Indian states in terms of policy reforms and development of industrial bases underscores the importance of taking the policy and interventions at various levels of governance.

With the current international attention on India's tremendous potential for investments and greater GVC participation, it would be an opportune time to push for rapid progress on structural reforms to drastically increase domestic capabilities. Encouraging R&D and skill development, strengthening industrial clusters, correcting inverted duty structures, utilizing public procurement for capacity development, developing efficient customs and port procedures, creating reliable standards and certification system, and developing robust infrastructure would be the key tenets of the revitalization plan for the Indian manufacturing sector.

INTRODUCTION

Manufacturing sector is important for sustained economic growth. The sector offers greater opportunities than other sectors to accumulate capital, exploit economies of scale, acquire new technologies, and foster technological change. For the developing countries, aiming to drive economic growth, while sustaining job creation, the manufacturing sector offers an opportunity not only to rebalance the economy towards higher value-added sectors but also to provide a relatively wide employment base with higher than average labour productivity. Moreover, as countries develop their industries, the motivation to increase value addition drives a greater application of science, technology and innovation, encourages more investment in skills and education and provides the resources to meet broader development outcomes. Given the inclusive nature of economic growth engendered by the manufacturing sector, it could be stated that many of the fastest growing economies of the past few decades have relied on a strong, export-oriented manufacturing sector to drive output and employment.

In India as well, the manufacturing sector can help leverage the demographic dividend and spur growth. A strong, competitive and diversified manufacturing sector will be crucial for achievement of the target of a US$ 5 trillion economy by 2024-25. But the recent performance of the manufacturing sector of India has been sluggish. National Accounts Statistics indicates that manufacturing accounted for only 15.1 percent of India's gross value added (GVA) in 2019-20, as compared to a share of 18.35 percent in 2010-11. This contraction in manufacturing is in spite of the strong growth in private consumption in the country. Private final consumption expenditure in India registered an annual average growth rate of 12.7 percent during 2011-12 to 2019-20. Prima facie, this is indicative of a greater share of the domestic demand being channeled towards consumption of foreign goods and services. There is a need to address the deficiencies in the manufacturing sector and improve its competitiveness to tap the unmet domestic demand and turn the sector into a growth dynamo.

IMPORT DEPENDENCE OF INDIA

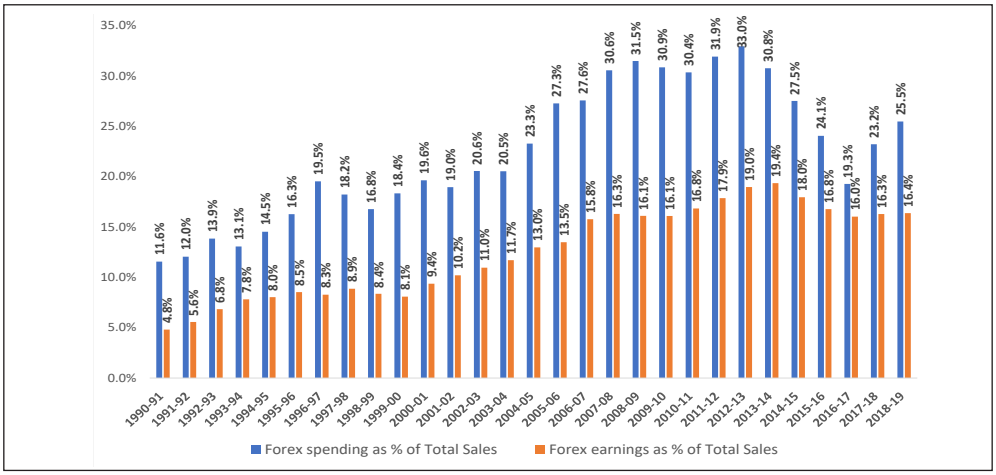
Key Sectors of Imports

A weak manufacturing sector translates into high import dependence and large trade deficit for India. India's merchandise imports stood at US$ 474.0 billion in 2019-20, registering a Compound Annual Growth Rate (CAGR) of 2.8 percent during the period 2010-11 to 2019-20. Crude oil and gems and jewellery alone accounted for nearly 39 percent of India's merchandise imports during 2019-20. Within manufacturing, electronics, machinery, and chemicals and related products are the top import items for India.

Analysis of India's imports by end-use (capital, intermediate, consumer) indicates that nearly 79 percent of the imports by India in 2019 were in the nature of intermediate goods, indicative of the dependence of India's manufacturing sector on imported intermediates. The significant dependence of Indian manufacturing on imports is corroborated by analysis of financial data of a sample of Indian companies. Data indicates that foreign exchange spending accounted for 25.5 percent of the total sales of India's manufacturing sector in 2018-19[1]. Forex spending as percentage of sales for India's manufacturing sector had declined for four consecutive years before rebounding in 2017-18 and 2018-19. Alongside, the export orientation of India's manufacturing sector has remained stagnant as evinced by the data for forex earnings as percentage of sales. Over the past decade, the forex earnings as percentage of sales has remained in the range of 16-19 percent. Clearly, the import dependence of Indian manufacturing sector has increased, while its export orientation remains relatively low. However, it may be noted that this data pertains to mainly listed companies who are in mid and large scale of operations, and the vast majority of unlisted companies, especially from the micro, small and medium enterprises (MSMEs) are not included in this analysis.

[1]Based on sample of 8558 companies as collated by CMIE

Exhibit 1.1: Import Dependence and Export Orientation of India's Manufacturing Sector

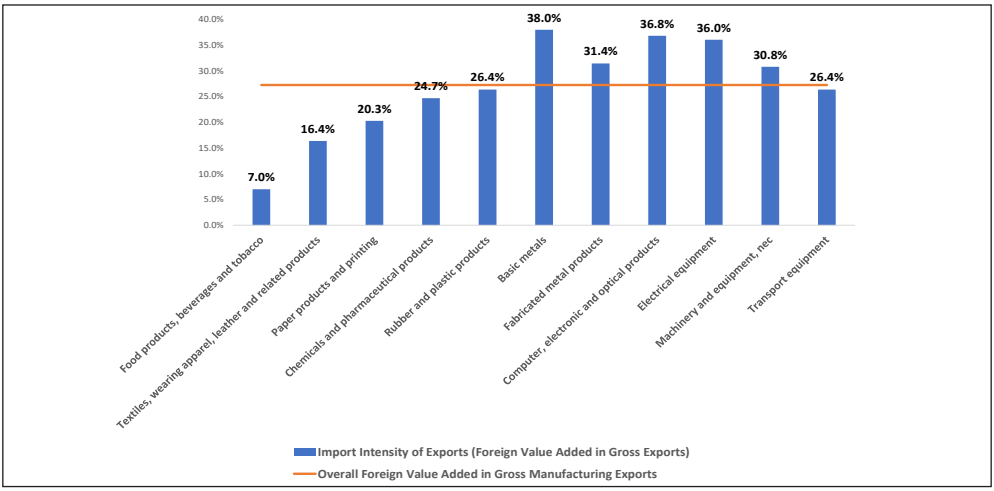


Source: CMIE, India Exim Bank Research

A more accurate level of import dependence can be gauged from the data from the World Input-Output Database (WIOD), in which use of intermediate products in various production processes is broken down according to their origin. Although it provides data only up to 2014, the WIOD provides a more accurate assessment of the dependence on imports as it takes into consideration all manufacturing value added in the country. Data from WIOD indicates that the overall import dependence of India's manufacturing sector was nearly 16.2 percent in 2014. The highest import dependence is in the sectors of transport equipment for ships, boats, railways, defence items, etc.; coke and refined petroleum products; textiles, wearing apparel and leather; chemicals and chemical products; motor vehicles, trailers and semi-trailers; and machinery and equipment (Annexure 1, Table 1).

The high import intensity in the manufacturing sector also translates into a higher level of foreign value-added content in India's manufacturing exports. Data from the OECD Trade in Value Added Database indicates that the foreign value-added content of India's exports declined sharply by 9 percentage points during the period 2012-2016, which on the face of it, seems encouraging. But further analysis indicates that the decline can largely be attributed to the services sectors. The share of imported intermediate inputs embodied in exports has increased for most manufactured products during this period. The import intensity of exports is especially high in case of basic metals, fabricated metal products, computer, electronics and optical products, electrical equipment and machinery and equipment (Exhibit 1.2).

Exhibit 1.2: Import Intensity of India's Manufacturing Exports



Source: OECD TIVA Database; India Exim Bank Research

Source of Imports

China is the largest source for India's merchandise imports, accounting for nearly 13.8 percent of the total merchandise imports during 2019-20. Within manufacturing imports, the share of China is substantially higher. During 2019-20, China had a share of 40.0 percent in India's imports of organic chemicals[2]; 38.8 percent in electrical and electronics; 34.1 percent in articles of iron and steel; 30.7 percent in machinery and mechanical appliances; 27.7 percent in dyes and pigments; 27.2 percent in fertilizers; 24.3 percent in vehicles and transport equipment; 21.8 percent in aluminium and articles thereof; and 21.3 percent in project goods. Some of the key areas of import dependence on China are highlighted below:

Active Pharmaceutical Ingredients (APIs): India is a manufacturer of more than 500 different APIs, but has steadily lost its base of API production to China. It is estimated that Indian manufacturing of APIs is at a disadvantage of 10 to 30 percent with respect to manufacturing in China. The cost of production in China is an estimated 20-30 percent lesser than in India in fermentation-based products and 10-15 percent in chemical synthesis-based products.

Solar Modules: The dependence on China also has implications for the developments in power sector of India. The Ministry of New and Renewable Energy has set an ambitious target to set up renewable energy capacities to the

[2]This category includes active pharmaceutical ingredients for the pharmaceutical industry

tune of 175 GW by 2022. However, nearly 70 percent of the solar modules are currently imported from China. The benefits from the program therefore does not entirely percolate to the Indian manufacturing sector.

Electronics: Growth in India's exports of electronics, especially mobile phones, is indicative of the growing prowess of the country in the electronics segment. While imports in segments such as mobile phones have declined over the past few years, the share of China in imports of these products has increased.

Auto components: The large presence of global automobile Original Equipment Manufacturers (OEMs) in India has significantly increased the localization of their components in the country. India has become the preferred designing and manufacturing base for most global auto OEMs for local sourcing and exports. However, there is considerable dependence on imports of certain auto components such as drive transmission, steering, electricals, interiors, engine components, and alloy wheels from China.

Insecticides and Pesticides: China and India are among the top suppliers of insecticides, rodenticides, fungicides, herbicides, etc. (HS: 3808). However, India is also among the top importers of these products from China. In 2019-20, nearly 53 percent of India's imports of these products was sourced from China. This is in spite of domestic capabilities in the segment, which can potentially be enhanced to cater to the domestic market.

Iron and Steel: India has significant imports of Iron and Steel, and articles thereof from China. China is the largest producer of steel in the world with considerable effect on supply and price movements in the international market. Steel from China is considered more cost competitive. But according to World Steel Dynamics, India ranked second in terms of cost of conversion of iron ore to steel, after Ukraine in 2016. Indian mills were found to be more cost efficient in converting iron ore to steel than their counterparts in China. However, the cost of finance, logistics, taxes and duties together reduce the competitiveness of Indian steel.

Key Products for Imports Substitution

Notwithstanding the large imports in several manufacturing categories, India has nascent production capacities in some of the top import segments. With appropriate incentives and an import substitution strategy, these domestic manufacturing sectors can tap the large domestic demand, and also cater to the exports market.

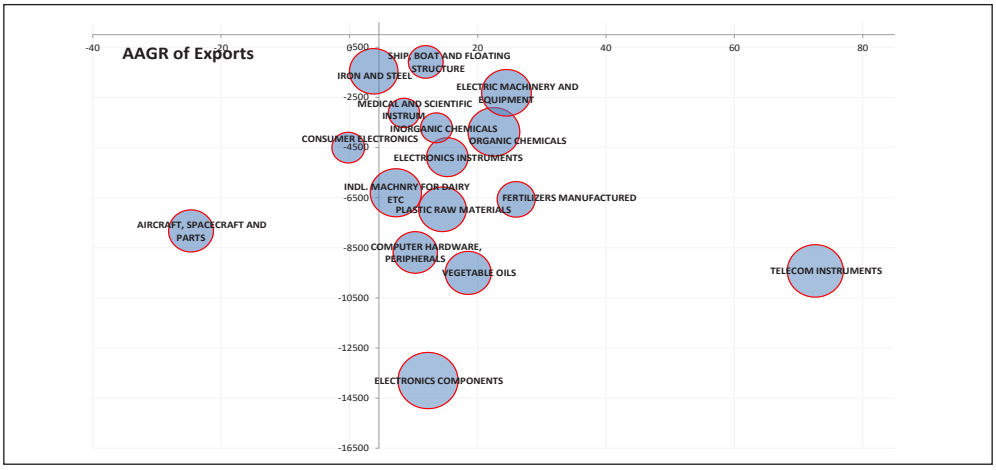
An essential first step for designing the action plan for import substitution in India would be identification of the focus sectors. For identifying the focus products, the top imported items of India are analyzed in Exhibit 1.3. Mapping the average annual growth rate of exports from the manufacturing segments (proxy of growth in domestic supply capabilities) with the trade deficit in these categories (indicative of the domestic demand potential) can provide valuable insights into the areas which have the maximum potential for import substitution.

Analysis indicates that several electronics categories have large dependence on imports, but domestic capabilities are steadily increasing. Telecom instruments sector has emerged as an area where domestic capacity building has gained significant traction over the recent period, and further intervention can narrow the large unmet domestic demand which is currently being catered by imports. Exports from other categories of electronics such as electronics instruments, electronics components, and computer hardware, peripherals have also shown growth rates higher than the average growth in exports from India. Notwithstanding the growth in exports, the trade deficit in the segments remain large.

Machinery products such as electric machinery and equipment and industrial machinery for dairy etc.; chemical and allied products such as inorganic chemicals, organic chemicals, fertilizers, and plastic raw materials are also among the products where supply capabilities have increased as evinced by increasing growth in exports of these products, but there still remains large and yawning unmet demand in the domestic market.

Categories such as aircraft, spacecraft and parts, consumer electronics, and iron and steel would require more concerted efforts for import substitution as these sectors have witnessed deceleration in growth in exports, while the trade deficit in these segments remain high.

Exhibit 1.3: Mapping Supply Capabilities with Demand Potential



Source: DGCI&S, Ministry of Commerce and Industry;India Exim Bank Research

SCOPE OF STUDY

Against this background, the report analyses the constraints to select manufacturing sectors where there are opportunities for import substitution and recommends strategies for boosting production. This includes electronics, defence equipment, machinery, chemicals and allied sectors, pharmaceuticals, and select agricultural products. Apart from this, the report also includes strategies for certain products where India has considerable import dependence on China. Together, the products covered in this report account for more than US$ 186 billion of imports by India, accounting for nearly 39 percent of the overall imports and 50 percent of the non-oil imports by the country. As regards trade deficit, these sectors contributed to about US$ 91 billion of trade deficit in the year 2019-20. In percentage terms, the trade deficit witnessed in these sectors amounted to about 57 percent of total trade deficit of the country. It may be observed that if the trade in these sectors are neutralised, India could achieve positive trade balance in the non-oil merchandise trade.

The Study has also included sectors such as autocomponents, and iron and steel where, though there is overall trade surplus for India, but in some sub-categories, there is trade deficit, particularly with China. Further, the Study has included Rare Earth Elements in the scope, as securing these strategic minerals is very important for India to enter high-tech manufacturing, including defence products.

SECTORAL STRATEGIES FOR INDIGENIZATION

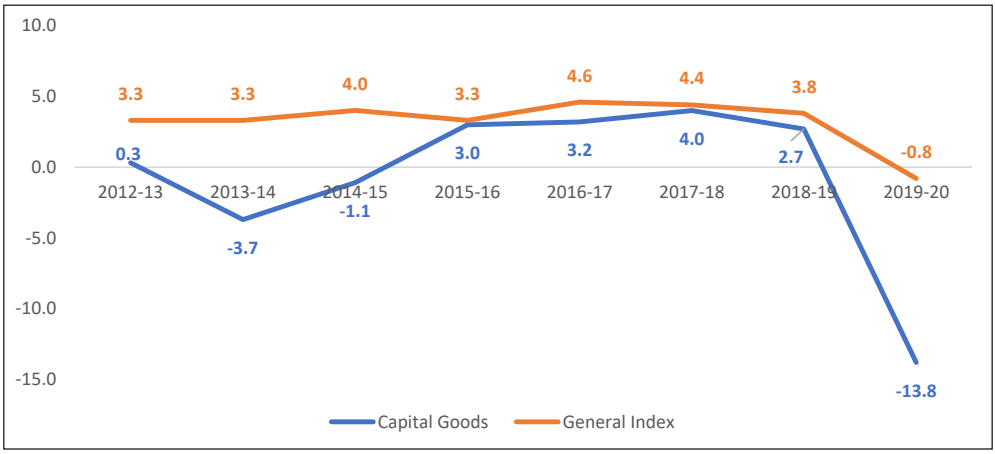
CAPITAL GOODS

Background

The capital goods industry is a strategic segment for any economy. For India as well, the sector is of paramount importance given its strong linkages with the industrial sector in the country. According to the International Yearbook of Industrial Statistics 2020, India was the largest producer of electrical equipment (ISIC 27) and machinery and equipment (ISIC 28) among developing and emerging industrial economies in 2018. Globally, India was the 7th largest producer of both electrical equipment, and machinery and equipment in 2018. Some of the prominent capital goods produced in India include heavy electrical machinery, textile machinery, machine tools, earthmoving and construction equipment including mining equipment, road construction equipment, printing machinery, dairy machinery, industrial refrigeration and industrial furnaces.

The overall performance of the capital goods sector in India can be gauged from the movement of the Index of Industrial Production (IIP) for capital goods (base: 2011-12). During the period 2015-16 to 2018-19, the IIP for capital goods recorded consistent growth. However, the growth momentum in capital goods stalled in 2019-20, with the capital goods index recording a sharper negative y-o-y growth rate of (-) 13.8 percent, as compared to the negative growth rate of (-) 0.8 percent in the general IIP index (Exhibit 2.1).

Exhibit 2.1: Trends in General and Capital Goods Index of Industrial Production

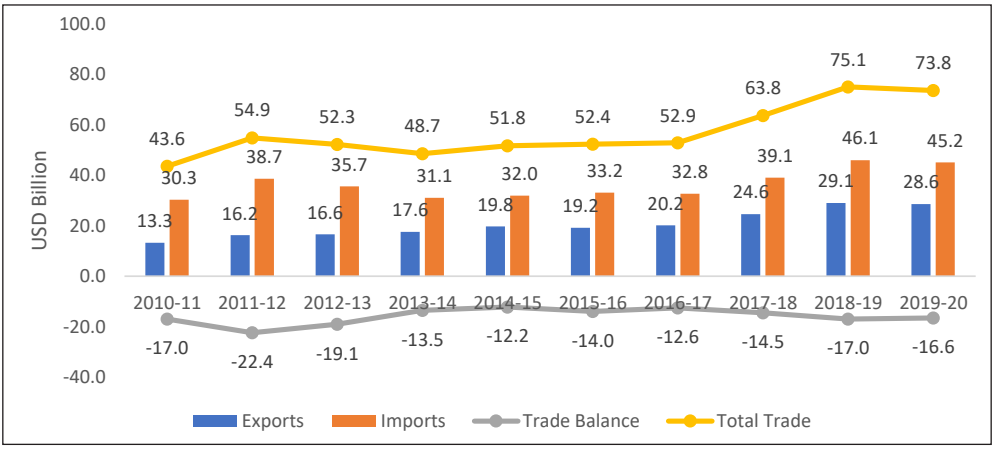


Source: MOSPI; India Exim Bank Research

Trade Performance

India's total trade in capital goods registered a CAGR of 6 percent between 2010-11 and 2019-20, to reach US$ 73.8 billion in 2019-20, primarily driven by a higher growth in exports. Imports constitute nearly 61.3 percent of the total trade in capital goods (amounting to US$ 45.2 billion in 2019-20), while exports hold a share of 38.7 percent in the total trade (amounting to US$ 28.6 billion in 2019-20). Exports of capital goods registered a CAGR of 8.9 percent during 2010-11 to 2019-20, while imports have registered a relatively lower CAGR of 4.5 percent during the same period. Consequently, the trade deficit in the sector has declined over the years, from US$ 17 billion in 2010-11 to US$ 16.6 billion in 2019-20, recording a negative CAGR of (-) 0.3 percent during the period. Notwithstanding the rising exports and reducing trade deficit, the overall import dependence in the sector continues to remain high (Exhibit 2.2).

Exhibit 2.2: Decadal Trade Performance in the Capital Goods Sector



Source: DGCI&S; India Exim Bank Research

Composition of Trade

Electrical machinery and equipment is the largest category of capital goods exports from India, accounting for a share of 31.4 percent in India's total exports of capital goods in 2019-20, followed by industrial machinery for dairy (share of 19.9 percent), other miscellaneous engineering items (9.7 percent), IC engines and parts (8.9 percent), ATM, injection moulding machinery (6.2 percent) and other construction machinery (4.9 percent), among others. Over the past decade, the composition of exports has altered in favour of electrical machinery and equipment, whose share in exports has increased by nearly 9 percentage points between 2010-11 and 2019-20.

On the import side, industrial machinery for dairy stood as the largest import category, with a share of 26.5 percent in the total imports of capital goods in 2019-20, followed by electrical machinery and equipment (25 percent), AC, refrigeration machinery (8.2 percent), other miscellaneous engineering items (6.9 percent), machine tools (6.9 percent) and IC engines and parts (4.9 percent). Over the past decade, the share of electrical machinery and equipment in total imports has increased by nearly 6 percentage points.

A significant contributor to the trade deficit in this sector is the segment of industrial machinery for dairy, with the highest trade deficit of US$ 6.3 billion in 2019-20. Trade deficit in industrial machinery for dairy has registered a CAGR of 1.5 percent during 2010-11 to 2019-20. Trade deficit has also significantly risen in other categories like hand tools (CAGR of 20.7 percent during 2010-11 to 2019-20), accumulators and batteries (20.1 percent), and prime mica and

mica products (11.5 percent). Meanwhile, in several product categories, the trade balance has significantly improved over the past decade, with some categories such as IC engines and parts, nuclear reactor, industrial boiler, and parts, and ATM, injection moulding machinery recording a trade surplus in 2019-20 as compared to a trade deficit in 2010-11.

Table 2.1: Major Contributors to Trade Deficit in Capital Goods

Product Category	Trade Balance 2010-11 (US$ Million)	Trade Balance 2019-20 (US$ Million)	CAGR of Trade Deficit
Industrial Machinery for Dairy	-5502.2	-6304.2	1.5%
Machine Tools	-2059.5	-2691.5	3.0%
AC, Refrigeration Machinery	-1887.9	-2335.4	2.4%
Electric Machinery and Equipment	-2633.9	-2314.1	-1.4%
Accumulators and Batteries	-251.1	-1306.6	20.1%
Cranes, Lifts and Winches	-1107.9	-940.8	-1.8%
Other Misc. Engineering Items	-996.1	-909.7	-1.0%
Other Construction Machinery	-1142.7	-437.3	-10.1%
Prime Mica and Mica Products	-148.3	-393.5	11.5%
Hand Tool, Cutting Tool of Metals	-56.3	-306.9	20.7%
Electrodes	-54.4	-93.0	6.1%
Pumps of All Types	-369.8	-62.5	-17.9%
IC Engines and Parts	-618.7	324.2	-
Nuclear Reactor, Industrial Boiler, and parts	-135.0	377.2	-
ATM, Injection Moulding Machinery	-41.4	788.3	-

Note: Positive CAGR is indicative of worsening trade deficit and vice versa.

Source: DGCI&S; India Exim Bank Research

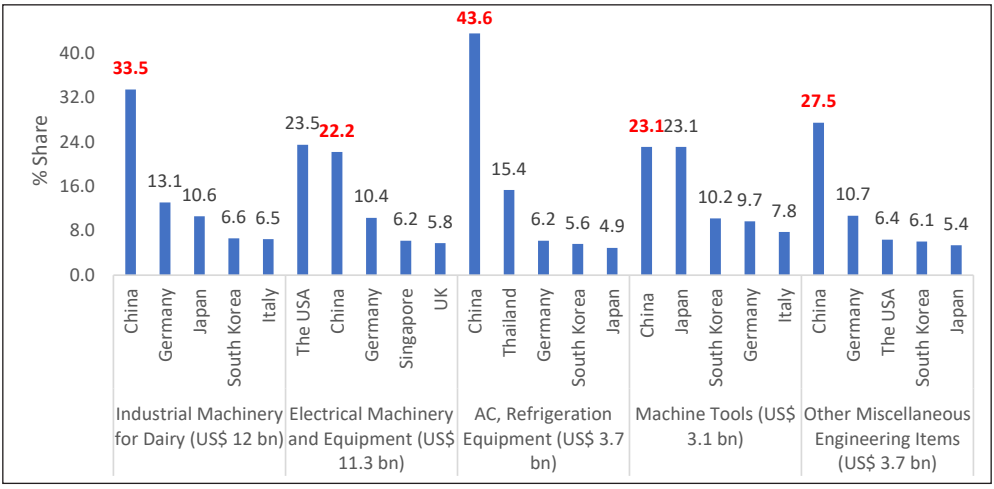
Direction of Trade

The USA was the largest destination for exports of capital goods from India, accounting for nearly 21.7 percent of India's total exports of capital goods in 2019-20, followed by Germany (6.3 percent), the UK (4.5 percent), UAE (4.0 percent), Bangladesh (3.4 percent) and Nigeria (3.3 percent). Meanwhile, China was the largest import source for capital goods for India, accounting for a share of 29.8 percent in the total capital goods imports in 2019-20, followed by the USA (10.4 percent), Germany (10.2 percent), Japan (8.1 percent), and South Korea (6.6 percent).

Rising Import Dependence on China

India's heavy reliance on imports from China is evident from the fact that China is the largest import source in 4 out of the 5 top categories of capital goods imports for India (Exhibit 2.3). China is among the top five import sources for India in other major categories of capital goods as well.

Exhibit 2.3: Top Import Sources in Top 5 Categories of Capital Goods in India (2019-20)



Note: Figure in parenthesis indicate the total imports of these items by India
Source: DGCI&S; India Exim Bank Research

Product-Wise Analysis of Import Dependence on China

In order to analyse import dependence at the product level, an import intensity index has been constructed. An import intensity index provides a useful analytical tool for measuring relative importance of a trading partner in the bilateral trading relationship of a country. The import intensity index (MMI) as given by Brown (1949) and improved by Kojima (1964) is measured as

$$MMI_{ik} = (m_{ijk}/M_{iwk})/[X_{jwk}/(X_{wk} - X_{iwk})]$$

Where,

M_{iwk} = country i's total imports of product k from the world; m_{ijk} = country i's imports of product k from country j; X_{jwk} = country j's total exports of product k to the world; X_{wk} = world's total exports of product k; and X_{iwk} = country i's total exports of product k to the world. Value of $MMI_{jk} > 1$ indicates greater dependence on country j for import of product k.

The index has been normalized as follows

$$NMMI_{jk} = (MMI_{jk} - 1)/ (MMI_{jk} + 1)$$

Wherein values of Normalized MMI (NMMI) > 0 indicate greater dependence on imports of Product k from Country j, and vice versa.

Product-level analysis indicates that there are nearly 37 capital goods (at HS-6 Digit level) for which India has high import demand and there is significant dependence on China for its imports. These 37 products together constituted nearly 40.8 percent of India's total capital goods imports in 2019. This includes electrical capacitators, accumulators and parts, machine tools, air pumps, medical instruments, and certain machinery and mechanical appliances and their parts, among others.

It is noteworthy that among these 37 identified products, there are 7 products where India enjoys an overall trade surplus, viz. gears and gearing for machinery (HS-848340); electric conductors (HS-854449); parts of electric motors and generators (HS-850300); medical instruments such as needles, catheters, cannulae and the like (HS-901839); parts of valves for pipes, boiler shells, tanks (HS- 848190); parts suitable for IC engines (HS-840999); and parts of pumps for liquids (HS-841391). Clearly, there exists substantial opportunities for upscaling capacities in these segments and reducing the dependence on imports from China.

Table 2.2: Top 10 Products (at HS-6-digit level) with High Dependence on Imports from China

HS 6	Product Description	India's Imports from China (USD million)	Share of China in India's Capital Goods Imports (%)	MMI (Import intensity)	Normalized MMI	India's Overall Trade Balance (USD million)	Applied tariffs on Import from China (%)
841430	Compressors for refrigerating equipment	217.5	73.7	2.6	0.4	-269.1	10
850790	Plates, separators and other parts of electric accumulators	166.7	63.6	6.5	0.7	-243.1	10
850300	Parts of electric motors and generators	345.5	58.6	2.1	0.4	102.4	6-7.5
850760	Lithium-ion accumulators	747.2	57.7	1.6	0.2	-1286.0	15
848079	Moulds for rubber or plastics (other than injection or compression types)	138.2	52.3	2.4	0.4	-211.2	7.13-7.5
848210	Ball bearings	219.6	50.5	2.6	0.4	-331.8	7.5
841590	Parts of air conditioning machines	192.7	48.8	1.8	0.3	-314.8	19-20
844331	Machines for printing, copying or facsimile transmission	171.7	45.5	1.4	0.2	-365.0	7.5
841480	Air pumps, air or other gas compressors	273.4	44.0	3.5	0.6	-359.6	7.13-10.0
853229	Fixed electrical capacitors	181.9	43.6	8.8	0.8	-389.2	0

Note: Detailed table with all 37 identified products at HS-6-digit level is given in Annexure1, Table 2
Source: Data accessed from ITC Trade Map; ITC Market Access Map; India Exim Bank Research

Strategies

Promoting Capital Goods for Intelligent Manufacturing

Strong and disruptive technological changes are imminent in manufacturing technologies across the world, which are, in turn, expected to fundamentally transform systems of production, management, and governance in the manufacturing sector. Evolution of such advanced technology products requires engineering skills, along with a combination of hardware, software and system integration skills. This niche area which entails utilization of real-time data analysis, artificial intelligence and machine learning is called intelligent manufacturing. Intelligent manufacturing is driven by high-tech products which entail high value addition but low volumes. Several companies in both developed and developing countries have reaped advantages by making the transition from traditional processes to advanced intelligent manufacturing process. For instance, wind turbines manufactured by General Electric contain some 20,000 sensors that produce 400 data points per second, thereby enabling customers to optimize turbine performance. Similarly, Stanley Black and Decker Inc, a leading tool manufacturer attained significant productivity gains in its operations in Mexico with Internet of Things (IoT).

India has a competitive advantage in this area as a large proportion of value addition in these smart manufacturing products is through software and system integration, where India has strong expertise. In the wake of such disruptive technologies, India must consider adopting strategies to leverage its strength in information technology and take advantage of the opportunities emerging from the IoT and Industry 4.0 for generating greater revenues, saving cost and increasing productivity. In this regard, the government needs to develop an ecosystem for both production as well as mass-scale adoption of Industry 4.0, by facilitating domestic manufacturing of products like sensors, and encouraging adoption of emerging technologies such as embedded technology, networking, etc. This could be done by creating a national policy for adoption of Industry 4.0, which could inter-alia include schemes for facilitating domestic manufacturing of high-technology products like sensors, creation of industry standards to be followed by domestic manufacturers for Industry 4.0 products, capacity building and awareness programmes, and suitable incentive scheme for MSMEs to encourage adoption of digitalisation. The government could consider beginning with “pilot project” for implementation of Industry 4.0, and scale up the project thereafter.

Fostering an Innovation-Led Start-up Ecosystem

There is a need to encourage Start-ups to engage in emerging technologies such as 3D printing, robotics, automation, digitalisation, etc. For this purpose, the government could consider setting up of multiple incubation centres across the country, in Public Private Partnership (PPP) mode to support promising Start-ups engaged in production and/ or development of high-tech capital goods. A cost sharing mechanism could be developed to share the cost of setting up the incubation centres between the government and the industry. Support could also be provided to Start-ups during the pre-incubation and post-incubation phases. For example, the Government could introduce an Innovation Challenge Fund for promoting innovation in specific high-tech areas. The fund could target Start-up innovators and manufacturers who already have incubated technologies that are not yet commercialized. This could encourage creation of an innovation ecosystem in the sector.

Given the critical role of high-tech capital goods in boosting the industrial production in the country, the concept of Innovation Vouchers can also be introduced for manufacturers in this sector. Innovation vouchers refer to funds provided by governments in the form of concessional credit lines or grants, to support R&D projects of private businesses, collaborative R&D projects between companies and research institutes, and promote commercialisation, thereby supporting the overall innovation ecosystem. Several countries such as the UK, Germany and Australia have introduced this scheme wherein MSMEs can avail funding to access professional skills, services or knowledge to commercialise an innovative idea. Applications under the scheme are evaluated on criteria such as the need for the idea/ innovation, level of impact and tangible benefits from the innovation, capability and capacity of the applicant, financial viability, the competitive advantage accruing from the innovation and the need for specialist service providers to advance the idea. The target actors of the scheme are public and private research institutions, higher education institutions, SMEs, researchers and funding organizations, and its purpose is to establish linkages—advice and consultancy and R&D collaboration—among these actors. The voucher is meant to act as an incentive for SMEs to approach knowledge providers seeking innovation-related solutions. While the financing is typically provided to the applicants for engagement of service providers to advance the innovation/ idea, some countries also provide funding to eligible applicants with proven capability and capacity to undertake an eligible project internally. Successful applicants under the program must be able to provide a net cash co-investment of 20:80 (ratio of applicant to government funding).

Testing and Certification Support for Exporters

Exports of capital goods are subject to compliance with several technical standards and certifications, particularly in regulated markets such as Europe. According to a recent report, testing infrastructure in India is fairly limited, which forces manufacturers to undertake testing in high-cost laboratory overseas[3]. Hence, there is a need to upgrade the existing testing and certification infrastructure in the country, including the facilities in institutes such as Central Power Research Institute (CPRI) and Electrical Research and Development Association (ERDA). Moreover, more testing institutes need to be set up to meet the requirements of all the sub-sectors of capital goods. The government could consider developing affordable testing and certification infrastructure in PPP mode. Further, to support exporters, the government could also consider providing funding assistance through refund of expenses incurred in getting the technical certifications such as the Conformite European (CE) for the EU market; Japanese Industrial Standards (JIS) for Japan; China Compulsory Certificate (CCC) for China etc. Such support for promoting exports are also compliant with WTO guidelines.

Addressing the Issue of Customs Duty

The capital goods sector faces the issue of 'inverted duty structure' in several products, whereby imports of finished goods attract much lower duty as compared to imports of raw material and components, which disincentivizes domestic value addition. For instance, in the power sector, basic customs duties on boilers and turbines ranges between 7.5-10 percent. Meanwhile, imports of raw materials including seamless alloy steel tubes, pipes and tubes, carbon steel are subjected to customs duty of nearly 15-25 percent which affects the competitiveness of domestic capital goods producers.

Further, there are several duty concessions on import of machinery and parts under various FTAs/PTAs signed by India, which impinge on domestic production of these goods. For instance, under the India-Japan CEPA, zero duty is applied on injection moulding machines and its parts and about 1.4-7.5 percent on other machines for working plastic. Similarly, under the India-South Korea FTA, import duty is zero for finished goods like Pressure Vessels/Reactors imported from South Korea. It is also noteworthy that in the products identified in the previous section, China enjoys low tariffs ranging between 0-7.5 percent in several product categories. Additionally, China also enjoys duty concessions under APTA in some of the identified products.

[3]Unleashing India's Engineering Exports Potential - EEPC India

Hence, addressing the issue of inverted duty structure as well as revisiting the duty concessions under FTAs/PTAs are important aspects for improving competitiveness of domestic producers and attaining self-reliance.

Encouraging Investments through Hi-tech Manufacturing Zones

In order to build domestic capabilities and enhance R&D spending in the capital goods sector, it is imperative to provide adequate policy support for investments. In this regard, the Government could incentivise investments through high-technology manufacturing zones for capital goods sector. The Government could identify hi-technology zones in consultation with the State governments and other stakeholders. Investments in these zones could be encouraged through fiscal and financial incentives such as tax holidays, capital subsidy, and tax refund, along with establishment of state-of-the-art common R&D centres, logistics and infrastructure and other critical facilities. Such investments could potentially benefit in the long term through job creation, additional investments and eventually more revenues (through both direct and indirect taxes). There would also be spin-off benefits, viz. creation of ancillary segments supplying to the large hi-tech capital goods producing units. An analysis of other hi-technology zones like Chengdu in China and Colorado in the USA reveals that these regions, despite being land-locked (away from ports by about 800 km) have been able to increase their exports, provide additional employment and generate higher tax revenues than neighbouring regions that had not adopted such hi-tech manufacturing strategy. As hi-tech manufacturing is region-neutral, it does not require large land area. Accordingly, suitable districts could be identified across various states to develop such hi-tech zones.

Recognizing Acquisition as an Opportunities to Plug Technology Gaps

In order to produce quality products at competitive prices, the end-user industries seek the latest technologies. There is substantial gap in the manufacturing technologies in India and overseas. Under these circumstances, strategic acquisition of technology by Indian companies could be an essential element of the overall business strategy. Although Indian private companies have been engaging in strategic acquisitions for accessing technology and markets, they need to pursue this at a broader level.

The government has already launched several schemes for assisting Indian manufacturers to acquire and evolve cutting-edge technologies to catalyse growth and compete in global market including the Technology Acquisition Fund Programme (TAFP) and the Technology Acquisition and Development

Fund. Another route through which the Government could promote technology acquisitions is by mergers and acquisitions (M&A) through an Alternative Investment Fund. Evidence suggests that among the portfolio companies that engaged in cross-border M&A, about 80 percent completed their first cross-border M&A deal only after the initial private equity investment, highlighting the importance of such an investment fund.

The proposed fund can be jointly floated by domestic and international institutional investors. Any public sector bank/ financial institution can take lead at the behest of the Government of India for setting up this Fund. The proposed Fund can invest in equity or equity linked instruments of Indian companies in machinery and other high-technology sector. The proposed Fund can adopt a buy and build strategy wherein investments are made in a platform company with a well-developed management team and infrastructure, and thereafter more companies are acquired to build and grow the platform company. Through the buy and build strategy, the proposed Fund can assist firms in the machinery sector to engage in M&A and thereby upgrade production technology.

Expanding the Scope of Public Procurement Preference for Local Manufacturers

India's local demand for capital goods provides a unique opportunity for manufacturers to scale up operations. This fact needs to form the basis for developing a long-term growth strategy for Indian capital goods sector. The Central Government has already taken several steps to encourage the procurement of locally produced goods. However, it is noted that in government tenders, the condition of 'prior supply' often limits domestic manufacturers from participation, particularly when new, advanced technologies are involved. To accommodate new suppliers to supply the tendered items, especially in case of capital goods where the technology is constantly evolving, the government could consider relaxing the prior supply condition. In such categories of capital goods, the companies may be evaluated on the basis of their technology intensity and supply capability, instead of a prior supply condition.

Establishing Joint Ventures in Textile Machinery

India is not only a major importer of textile machinery but also a supplier in several key import markets. To meet the burgeoning domestic demand and increase share in global market, Indian textile machinery manufacturers could enter into joint ventures with foreign companies. This shall also help upgrade the quality and performance of machineries produced in the country. Currently, except for the

units in the spinning sector where the machineries are of international standards, other textile machinery manufacturing leaves a lot of scope for improvement in terms of quality and performance, compared to the European manufacturers. According to the fDi markets database, Germany, Japan, and Switzerland are among the top investors in the textile machinery segment, while China is the topmost destination for investments in the textile machinery segment. Indian companies can make an attempt to forge ties with companies from these top investor countries. The Market Access Initiative (MAI) scheme of the Government can include visits for scouting JV partners from top source countries as an eligible activity for high-technology sectors.

CHEMICALS

Background

The chemical industry contributes significantly to India's economic growth and is a critical component of the modern globalized world economy, converting raw materials like crude oil, natural gas, air, water, metals, and minerals into diverse ready-to-use products. Apart from producing a wide range of finished products like fertilizers, pesticides, LED lighting, and other agrochemical products, the industry also produces key inputs for other manufacturing activities like synthetic fibers and plastics and water chemistry that benefit living standards and consumers around the world.

In India, the chemical industry has emerged as one of the fastest growing, ranking third in Asia and the sixth largest market in the world with respect to output, after the USA, China, Germany, Japan, and South Korea. Indian chemical industry's growth is largely driven by country's consumption growth story.

The per capita consumption of chemicals in India is one-tenth of world average, and even when compared with other developing countries, Indian per capita chemical consumption is low, making it an attractive destination to invest, grow, and export.

The IIP for chemicals and chemical products recorded a decline of (-) 1.09 percent during 2019-20, as against the (-) 0.85 percent decline in the overall IIP during this period.

Production

The domestic production of total major chemicals and petrochemicals in 2018-19 was recorded at 27,858 thousand MT, up from 26,739 thousand MT in the previous year. In 2019-20 (up to September 2019), the production reached 13,871 thousand MT. Out of which, the basic major chemicals accounted for a share of 41 percent with total production amounting to 5,817 MT. Notably, production of alkali chemicals accounts for around 71 percent of the total production of major chemicals for the year 2019-20.

Table 2.3: India's Production of Basic Major Chemicals (2014-15 to 2019-20*)

Group	2014-15	2015-16	2016-17	2017-18	2018-19	CAGR	2019-20*
Alkali Chemicals	6625	6802	7009	7631	8043	5.0%	4112
Inorganic Chemicals	944	1002	1053	1058	1064	3.0%	499
Organic Chemicals	1619	1589	1638	1799	1884	3.9%	922
Pesticides	186	188	214	213	217	3.8%	93
Dyes and Pigments	285	304	320	367	382	7.5%	191
Total Basic Major Chemicals	**9660**	**9884**	**10234**	**11069**	**11589**	**4.7%**	**5817**

*During April – September 2019

Source: Data accessed from Department of Chemicals and Petro Chemicals Annual Report 2019-20; India Exim Bank Research

Despite being a part of the manufacturing sector, the growth in Indian chemical industry in the last few years pales out with regards to both the manufacturing and domestic industrial sector. During the period 2009-10 to 2019-20, while the manufacturing sector registered an average growth of 2.9 percent annually, manufacturing of chemicals and chemical products grew at an average of just 1.5 percent.

Foreign Trade

The share of overall chemicals and related products in the country's total exports has been exhibiting a gradual upward trend, indicating that the growth in their exports during the recent past has outperformed India's total exports.

During the period 2010 to 2019, while India's total merchandize exports grew at 5.3 percent on an average, the same for chemicals was approximately 8.4 percent. However, India has remained a net importer of chemicals for a long time and registered a trade deficit of US$ 3.8 billion in 2019.

Table 2.4: India's Major Chemical Export and Import Markets: 2019

Inorganic Chemicals[4]					
Total Exports: US$ 1.8 billion; Total Imports: US$ 6.8 billion					
Export Destinations	**Exports (US$ Billion)**	**Share in Total Exports of HS 28**	**Import Sources**	**Imports (US$ Billion)**	**Share in Total Imports of HS 28**
UAE	0.31	17.40%	China	0.79	11.60%
USA	0.14	7.90%	Morocco	0.76	11.30%
Malaysia	0.11	6.30%	USA	0.49	7.20%
China	0.10	5.70%	Jordan	0.48	7.10%
Japan	0.07	4.20%	Vietnam	0.42	6.30%
Organic Chemicals[5]					
Total Exports: US$ 18.2 billion; Total Imports: US$ 20.5 billion					
Export Destinations	**Exports (US$ Billion)**	**Share in Total Exports of HS 29**	**Import Sources**	**Imports (US$ Billion)**	**Share in Total Imports of HS 29**
China	3.11	17.0%	China	8.23	40.1%
USA	1.92	10.5%	USA	1.78	8.7%
Germany	0.73	4.0%	Singapore	1.27	6.2%
Indonesia	0.57	3.1%	South Korea	1.20	5.9%
Japan	0.57	3.1%	Saudi Arabia	0.83	4.1%
Dyes[6]					
Total Exports: US$ 3.5 billion; Total Imports: US$ 2.1 billion					
Export Destinations	**Exports (US$ Billion)**	**Share in Total Exports of HS 32**	**Import Sources**	**Imports (US$ Billion)**	**Share in Total Imports of HS 32**
China	0.31	8.9%	China	0.56	27.0%
USA	0.26	7.5%	Singapore	0.14	6.7%
Bangladesh	0.22	6.5%	Germany	0.14	6.7%
Turkey	0.22	6.4%	USA	0.13	6.5%
Germany	0.16	4.7%	Spain	0.10	5.1%

[4]HS 28: Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes

[5]HS 29: Organic Chemicals

[6]HS 32: Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring matter; paints and varnishes; putty and other mastics; inks

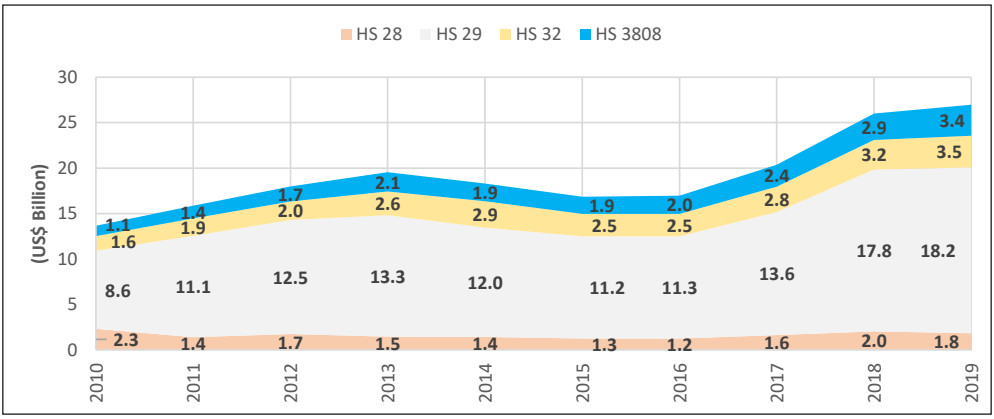
Insecticides and Pesticides[7]					
Total Exports: US$ 3.4 billion; Total Imports: US$ 1.3 billion					
Export Destinations	**Exports (US$ Billion)**	**Share in Total Exports of HS 3808**	**Import Sources**	**Imports (US$ Billion)**	**Share in Total Imports of HS 3808**
Brazil	0.69	20.3%	China	0.67	50.9%
USA	0.69	20.1%	USA	0.18	14.1%
France	0.12	3.6%	Belgium	0.06	5.1%
Belgium	0.10	3.2%	Japan	0.05	4.5%
Vietnam	0.10	3.0%	Israel	0.05	4.1%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Exports

India's exports of chemicals have been predominately organic chemicals – export of which registered a healthy average annual rate of 9.6 percent during the last ten years, increasing from US$ 8.6 billion in 2010 to US$ 18.2 billion in 2019. The other segments of the chemical industry also exhibited similar pattern – while exports of tanning or dyeing extracts increased at an average annual pace of 9.7 percent – increasing from US$ 1.6 billion in 2010 to US$ 3.5 billion in 2019, exports of insecticides and rodenticides registered an AAGR of 13.6 percent, increasing from US$ 1.1 billion to US$ 3.4 billion during this period.

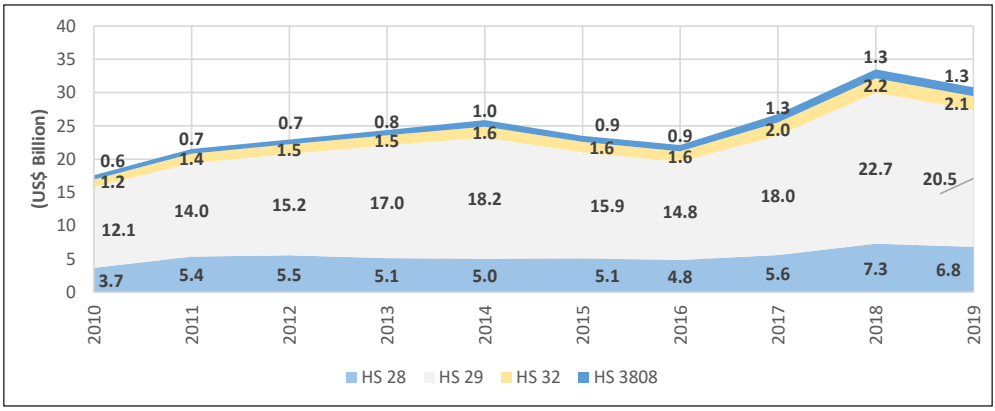
Exhibit 2.4: India's Export of Major Chemicals: 2010-19



Source: Data accessed from ITC Trade Map; India Exim Bank Research

[7]HS 3808: Insecticides, rodenticides, fungicides, herbicides, anti-sprouting products and plant-growth regulators, disinfectants and similar products, put up for retail sale or as preparations or articles, e.g. sulphur-treated bands, wicks and candles, and fly-papers

Exhibit 2.5: India's Import of Major Chemicals: 2010-19



Source: Data accessed from ITC Trade Map; India Exim Bank Research

Imports

During 2015-19, India's imports of major chemicals grew at an average of 8.1 percent from US$ 23.5 billion in 2015 to US$ 30.8 billion in 2019. More than 50 percent of this import demand was met by supplies from China. Around 65 percent of India's total chemical imports comprised of organic chemicals, aggregating to US$ 22.5 billion in 2019, registering an AAGR of 7.8 percent during 2015-19.

Trade Balance

Overall, for the industry, trade deficit amounted to US$ 3.8 billion in 2019, marginally lower than the deficit of US$ 3.9 billion in 2010. A substantial reduction of US$ 3.7 billion in the trade deficit was registered in 2019 (from US$ 7.5 billion of deficit in 2018); however, during the period 2010 to 2019, the trade balance for both inorganic and organic chemicals remained in the negative territory.

It is important to note that during the same period, even though the overall trade balances for dyes and insecticides showed a surplus, India had a trade deficit of US$ 258.7 million and US$ 599.8 million for dyes and insecticides respectively, with China.

Exhibit 2.6: India's Trade Balance for the Major Chemicals (2010-19)

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Table 2.5: India's Trade Balance for the Major Chemicals: 2010 vis-à-vis 2019

HS Code	Description	Trade Balance in 2010 (US$ Billion)	Trade Balance in 2019 (US$ Billion)
HS 28	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes	-1.4	-5.0
HS 29	Organic chemicals	-3.5	-2.3
HS 32	Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring matter; paints and varnishes; putty and other mastics; inks	0.5	1.4
HS 3808	Insecticides, rodenticides, fungicides, herbicides, anti-sprouting products and plant-growth regulators, disinfectants and similar products, put up for retail sale or as preparations or articles, e.g. sulphur-treated bands, wicks and candles, and flypapers	0.5	2.1
Total		**-3.9**	**-3.8**

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Products with High Import Orientation

Phosphoric Acid

In 2019, the highest trade deficit of US$ 1.9 billion was registered for phosphoric acid[8]. It is important to note that India has been the largest importer of phosphoric acid in the last ten years, accounting for about 44 percent of the world imports in 2019.

It is to be noted that phosphoric acid is a key feedstock for diammonium phosphate (DAP) production - a type of soil nutrient. Further, while India happens to be the world's largest buyer of DAP, 50 percent of the country's demand of the same is met through imports from China, and is likely to be sourced from Saudi Arabia, Jordan, and the USA in the post-COVID period. Imports of DAP are deemed crucial for India's millions of farmers who use the fertilizer to boost yields on crops such as rice, wheat, sugar cane, and cotton.

Styrene

Further, the trade balance for chemicals was weighed down substantially by the high imports of styrene[9] - a chemical with widespread uses across the manufacturing of food containers, packaging materials, cars, boats, computers, and video games. The Chemicals and Petrochemicals Manufacturers Association of India (CPMAI) notes that India does not produce styrene and the entire domestic demand is met through imports.

In 2019, 28 percent of the total styrene imports by India were sourced from the USA, followed by 20 percent from South Korea, and 16 percent from Singapore. The top three import sources, hence, accounted for almost 65 percent share in India's total import demand. The total imports of styrene registered an average annual growth of 7.9 percent during the period 2010 to 2019, increasing from US$ 541 million in 2010 to US$ 880.6 million in 2019.

Aluminum Oxide

India was the third largest importer of aluminum oxide[10] in 2019, with total imports amounting to US$ 959.7 million. It is to be noted that more than 65 percent of the total imports demand in 2019 was met by supplies from Australia and Vietnam. The imports of aluminum oxide have grown at an average rate of 29 percent during the period 2010 to 2019.

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[8]HS 280920: Phosphoric acid; polyphosphoric acids, whether chemically defined

[9]HS 290250: Styrene

[10]HS 281820: Aluminum Oxide

The aluminium oxide, also known as alumina, is the essential raw material which is needed to produce aluminium and is obtained on refining bauxite. In order to produce one ton of aluminium, approximately two tons of alumina is required. In this regard, it is important to note that India has one of the largest reserves of bauxite, recorded at 3,896 MT in 2019 - which is sufficient to meet both domestic and export demands[11].

Anhydrous Ammonia

India's imports of anhydrous ammonia[12] registered an average annual growth of 6.9 percent during the period 2010 to 2019, resulting in a trade deficit of US$ 774.4 million in 2019.

For its diverse uses as an industrial and household cleanser, India's demand for anhydrous ammonia has shown an upward trend. As a fertilizer, anhydrous ammonia gas is compressed into liquid and mixed with other plant growth enhancers.

As regards trading partners, Saudi Arabia was the largest source for anhydrous ammonia for India in 2019, accounting for 26 percent of the total imports, followed by Qatar with a share of 21 percent of the total imports. India's dependence on China for the imports of anhydrous ammonia has reduced over the last ten years and was almost negligible in 2019.

Products with High Import Dependence on China

China was the largest import source for India's chemical sector in 2019, accounting for 33 percent of the total imports amounting to US$ 10.3 billion. It is to be noted that India's chemical imports from China registered a higher AAGR of 9.9 percent during the period 2010 to 2019 against the 7.2 percent average annual growth of total chemical imports during the same period.

Antibiotics

Antibiotics[13] accounted for the highest share in India's chemical imports from China in 2019, amounting to US$ 493.2 million and a trade deficit of US$ 469.3 million. It is to be noted that India was the fourth largest importer of antibiotics, globally, in 2019.

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[11]Indian Bureau of Mines: Indian Mineral Yearbook 2019

[12]HS 281410: Anhydrous Ammonia

[13]HS 294190: Antibiotics (excluding penicillin and their derivatives with a penicillanic acid structure, salts thereof, streptomycins, tetracyclines, chloramphenicol and erythromycin, their derivatives and salts thereof)

Table 2.6: India's Top Import Sources for Antibiotics (2019)

Country	Import (US$ Million)	Share in value in India's imports (2019)
China	493.2	76.3%
Spain	20.4	3.2%
Italy	19.5	3.0%
Slovenia	15.3	2.4%
Mexico	13.0	2.0%
Others	85.4	13.1%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Further, around 76 percent of India's total antibiotics imports in 2019 were sourced from China. During the period 2010 to 2019, the imports of antibiotics from China registered an AAGR 5.6 percent, increasing from US$ 321.9 million in 2010 to US$ 493.2 million in 2019.

Penicillin

China accounted for 88.3 percent of India's total imports of penicillin[14] in 2019, amounting to US$ 450.1 million. During the period 2010 to 2019, India's imports of penicillin from China registered an AAGR of 8.3 percent, against the AAGR of 7.8 percent registered for the total imports of penicillin.

Table 2.7: India's Top Import Sources for Penicillin (2019)

Country	Import (US$ Million)	Share in value in India's imports (2019)
China	450.1	88.3%
Denmark	11.5	2.3%
UK	11.1	2.2%
Hong Kong	10.5	2.1%
Austria	6.4	1.3%
Others	19.9	3.8%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

[14]HS 294110: Penicillin and their derivatives with a penicillanic acid structure; salts thereof

Table 2.8: India's Top Import Sources for Heterocyclic Nitrogen Compounds (2019)

Country	Import (US$ Million)	Share in value in India's imports (2019)
China	449.1	70.5%
Germany	27.7	4.4%
Japan	25.3	4.0%
Hungary	18.6	2.9%
United States of America	16.1	2.5%
Others	100.1	15.7%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Heterocyclic Nitrogen Compounds

India's imports of heterocyclic nitrogen compounds[15] was recorded at US$ 636.9 million in 2019, more than 70 percent of which was sourced from China. It is crucial to note that during the period 2010 to 2019, while India's total imports of the heterocyclic nitrogen compounds grew at an AAGR of 27.6 percent, the imports of the same from China grew at a higher AAGR of 30.2 percent.

It is to be noted that heterocyclic compounds have a wide range of application. They are predominantly used in the manufacturing of pharmaceuticals, agrochemicals, and in veterinary products. They also find applications as sanitizers, developers, antioxidants, corrosion inhibitors, copolymers, and dye stuffs.

Apart from the wide applications in pharmaceutical research and drug discovery, heterocyclic nitrogen compounds are used in antibiotics, anti-cancer, anti-migraine, anti-ulcer, anti-inflammatory, anti-viral, and anti-depressant drugs.

Challenges and Strategies

The chemical industry, in India, directly or indirectly touches over 95 percent of all manufactured products. While the industry has registered significant growth in the last two decades, it is to be noted that the sector's growth has largely been a result of growth in the FMCG sector. However, delivering profitable growth in a hypercompetitive market, in a low-growth world has become a bigger challenge today. To effectively address these roadblocks, following set of strategies are suggested to enable the sector to reach its envisaged export potential.

[15]HS 293399: Heterocyclic compounds with nitrogen hetero atom[s] only

Need for Greater Integration into the GVCs

Emphasis is laid on substitution of imports through capacity additions and more importantly the identification of the needs for greater integration into the Global Value Chains (GVCs) to enable specialization at various stages of production.

Analyzing the forward and backward linkages in the chemical sector in the Indian and Chinese context, it is observed that India has been having an increased dependence (backward linkage) on China for some critical inputs used by the chemical and pharmaceutical industry. During the period 2010 to 2019, while India's import of chemicals from the rest of the world increased at an AAGR of 7.2 percent, the imports from China grew at an AAGR of 9.9 percent, making up our imports from China to about 33 percent of total chemical imports in 2019.

It is recommended that in order to reduce the import dependence from China and boost the chemical exports from India, greater focus should be laid on enhancing India's integration into the GVCs, enabling domestic manufacturers to specialize across various stages of production.

Import Substitution through Capacity Addition

Further, it is noted that heavy dependence on China for imports of chemicals that are used as key inputs for producing both the pharmaceuticals and other manufactured products, is affecting the end-use sectors significantly, with the supply chain disruptions due to the COVID pandemic. Also, if there are supply disruptions or price escalation caused by geo-political tensions between the two countries, the production and export commitments would be significantly impacted. Import substitution, in this regard, is not only required to make India self-reliant in end-to-end indigenous chemical manufacturing but more importantly, to make the sector globally competitive. Additionally, capacity addition and mass manufacturing with backward and forward linkages could result in operations of economies of scale.

Investments

Investments in the Indian chemical industry assumes greater importance on the two fronts – technology and innovation. Technological development may be achieved by the chemical industry at two levels. In the bulk products segment, the chemical industry should undertake process innovation with the objective of reduction in cost of production. In addition, the industry needs to invest in technological resources that would lead to specialized product development.

It may be noted that countries like the USA, Germany, Japan, and South Korea were amongst the leading importers of chemicals in 2019, comprising of over 25 percent of the world imports of chemicals. Despite having the technical know-how and availability of resources, these countries were significantly dependent on China to meet their import demand. As India scales up its domestic manufacturing capacities, it is also suggested that the government should enter into strategic partnerships with these countries to boost investments and provide conducive business environment to manufacture in India.

Liberalization process has already increased the possibility of intra-firm transfer of technology and management practices in the form of consolidation within the economy as also from developed countries through foreign direct investment. More specifically, on the technical front, the total R&D investments in the chemical sector stood at 0.3 percent of total sales in FY 19. Apart from sustaining growth and realizing self-sufficiency in the domestic market, R&D activities are equally crucial for the home-grown players to have a larger pie of the global markets as well.

DEFENCE EQUIPMENT

Background

The market for defence equipment in India is large and growing. Defence equipment industry is a monopsony market wherein the government is the sole buyer, which makes the government's defence budget an important indicator of the market size. India's defence budget over the last five years has witnessed a steady increase, registering a CAGR of 6.7 percent during the budget periods 2016-17 to 2020-21. The capital expenditure portion of the defence budget has also increased from ₹863.4 billion in 2016-17 to ₹1137.3 billion in 2020-21, registering a CAGR of 7.1 percent during this period.

The increasing defence budget has concomitantly led to an increase in defence related production in the country. The value of production of Defence PSUs has registered a CAGR of 4.2 percent, to reach ₹450 billion in 2018-19, up from ₹397 billion in 2015-16. The landscape for private participation in India's defence manufacturing has also improved over the recent years, on account of several policy measures introduced by the Government of India. The range of domestically manufactured products has also widened due to R&D incentives and transfer of technology.

Trade Performance

For comparing international trade performance, two major data sources have been considered in the analysis viz. Stockholm International Peace Research Institute (SIPRI) and DGCI&S. The data from SIPRI measures the 'volume', not the financial value, of arms transfers. DGCI&S data, on the other hand, measures the financial value of trade. A limitation with the data from SIPRI is that it does not include transfers of small arms, trucks, ammunition, support equipment, services or technology, and most light weapons and components. On the other hand, the data sourced from DGCI&S does not include all defence items. In order to avoid ambiguity, data sourced from SIPRI have been termed as trade in 'Major Weapons', while that sourced from DGCI&S are termed as 'Defence Equipment'.

Major Weapons[16]

India is the second largest importer and 23rd largest exporter of major weapons in the world, accounting for 9.2 percent share in world imports and 0.2 percent share in world exports of major weapons during 2015-2019. It is important to note that India's import reliance in major weapons has significantly reduced over the recent years, with India's share in world imports declining by 4.8 percentage points in 2015-2019, as compared to 2010-2014. Imports have witnessed a steady decline since 2012 until 2018, followed by a significant growth in 2019. During 2010-2019, imports of major weapons registered a marginal CAGR of 0.2 percent.

At the same time, India's exports of major weapons have steadily increased over the past decade, registering a CAGR of 43.3 percent between 2010 and 2019. Notwithstanding the growth in exports, nearly 96.3 percent of the total trade comprised imports of major weapon, while exports held a meagre share of 3.7 percent in the total trade of major weapons by India during 2019. Accordingly, even though trade deficit has recorded a negative CAGR of (-) 0.2 percent during 2010-2019, it is significantly high due to the high share of imports in overall trade.

Defence Equipment

India's total trade in defence equipment witnessed a steady growth over the past decade, registering a CAGR of 10.8 percent, to reach US$ 8.2 billion in 2019-20. Imports accounted for a share of nearly 98 percent in 2019-20, resulting in a large trade deficit of US$ 7.8 billion during the year. Exports of defence equipment from India has been declining, registering a negative CAGR of (-) 14.2 percent between 2010-11 and 2019-20. During the same period, imports of defence equipment witnessed a steady growth, recording a CAGR of 13.2 percent. It is noteworthy that India was once a net exporter of defence equipment, back in 2013-14 and 2014-15. However, following a significant decline in exports and a simultaneous rise in imports, the trade balance turned negative thereafter.

[16]Major weapons are classified as per SIPRI statistical data on arms transfer, which relates to the actual deliveries of major conventional weapons. To permit comparison between the data on such deliveries of different weapons and to identify general trends, SIPRI has developed a system to measure the volume of international transfers of major conventional weapons using a common unit, the trend-indicator value (TIV). TIV figures do not represent sales prices for arms transfers. Nonetheless, they can be used for calculating trends in international arms transfers over periods of time, and global percentages for suppliers and recipients.

Composition of Trade

Major Weapons

India's exports of major weapons are limited to ships, sensors, aircrafts and missiles. In 2019, the exports were only in the categories of ships and missiles, accounting for shares of 89.7 percent and 10.3 percent, respectively in India's exports of major weapons. Within ships, India's exports were predominantly in the submarine and patrol craft segments.

Aircraft accounted for bulk of major weapons imports by India, with a share of 59.3 percent in India's total imports of major weapons during 2019, contributing significantly to the trade deficit in defence products. This was followed by missiles (share of 10.6 percent), ships (10.1 percent), engines (9.8 percent), artillery (6.9 percent) and sensors (2.9 percent). During the past decade, aircraft accounted for the largest share of 58.8 percent in India's major weapon imports, followed by missiles (share of 10.7 percent), ships (8.8 percent) and armoured vehicles (7.1 percent).

Defence Equipment

Parts and accessories of arms is the largest category of defence equipment exports from India, accounting for a share of 44 percent in India's total exports of defence equipment in 2019-20, followed by bombs, grenades, ammunitions and parts (20.1 percent), aircraft, (helicopter, aeroplanes) and spacecraft (satellites) (14.7 percent), aircraft launching gear; ground flying trainer (14 percent) and swords, cutlasses, bayonets, lances, scabbards and sheaths (3.1 percent), among others. Over the past decade, the composition of exports has changed significantly, whereby the share of aircraft and space craft (HS-8802) has decreased by nearly 60 percentage points, whereas the shares of parts and accessories of arms (HS-9305) and bombs, grenades and ammunitions (HS-9306) in total exports have increased by nearly 42 percentage points and 20 percentage points, respectively between 2010-11 and 2019-20. On the import side, aircraft (helicopter, aeroplanes) and spacecraft (satellites) is the largest import category, with a share of 98.7 percent in total imports of defence equipment in 2019-20, followed by aircraft launching gear; ground flying trainer (share of 0.56 percent) and bombs, grenades, ammunitions and parts (0.5 percent). Over the past decade, there has not been any significant variation in the composition of imports.

Table 2.9: Top Contributors of Trade Deficit in Defence Equipment

HS-Codes	Product Categories	Trade Balance 2010-11 (US$ Million)	Trade Balance 2019-20 (US$ Million)	CAGR of Trade Deficit between 2010-11 & 2019-20
8802	Aircraft, (helicopter, aeroplanes) & spacecraft (satellites)	-2050.8	-7863.2	16.1%
8805	Aircraft launching gear; ground flying trainer	21.5	-21.4	-
9304	Arms, excluding those of heading no 9307	-0.3	-7.6	40.9%
9306	Bombs, grenades, ammunitions & parts	-0.1	-6.6	69.5%
9303	Other firearm & similar devices operating by the firing of an explosive charge	-0.1	-6.4	53.6%

Note: CAGRs indicate worsening of trade balance
Source: DGCI&S; India Exim Bank Research

A significant contributor to the trade deficit in the defence equipment segment is the aircraft and spacecraft category, with the largest trade deficit of US$ 7.9 billion in 2019-20. Meanwhile, it is also noteworthy that India's trade balance has worsened the most in the aircraft launching gear category, from a trade surplus of US$ 21.5 million in 2010-11 to a trade deficit of US$ 21.4 million in 2019-20 (Table 2.9).

Direction of Trade

Major Weapons

Some of the top recipients of major weapons from India include Myanmar, Sri Lanka, Mauritius, Seychelles, Afghanistan, and Mozambique, among others. In 2019, Myanmar and Mozambique were the only recipient countries for India's exports, with shares of 86.9 percent and 13.1 percent, respectively in India's major weapons exports. Russia was the largest import source for India, accounting for nearly 39.6 percent of the total major weapon imports in 2019, followed by France (share of 24.7 percent), the USA (21.6 percent), South Korea (6.4 percent) and Israel (4.2 percent).

Defence Equipment

The USA was the largest export destination for exports of defence equipment from India, accounting for nearly 28.4 percent of the total exports of defence equipment from India in 2019-20, followed by Israel (17.7 percent), Myanmar (13.3 percent), Russia (4.0 percent), Germany and UAE (3.8 percent each). Meanwhile, Kuwait was the largest source for imports of defence equipment by India, accounting for a share of 30.5 percent in the total imports of defence equipment in 2019-20, followed by France (28 percent), Germany (18.8 percent), the USA (15.8 percent), and Canada (3.4 percent).

Strategies

With defence sector being a monopsony market, building sophisticated defence production capabilities requires a long-lasting partnership between the sellers and the government. To make India a defence manufacturing hub, there is a need to incentivize foreign investment, technology transfer and long-term operational involvement of foreign defence OEMs in the country. In this regard, several policy reforms have been undertaken by the Government of India in the recent times, including easing of FDI norms, reforms in defence procurement procedure and offset guidelines, policy push for development of strategic partnerships, and incentivizing indigenous content, among others. The government has also recently revamped its existing defence production policy with the introduction of the Defence Production and Export Promotion Policy (DPEPP) 2020. The new draft policy aims to make India amongst the leading countries in the defence sector by targeting the twin objective of self-reliance and exports. However, there is still a need for fine-tuning existing policies to further incentivize investments, as also to ensure policy consistency, procedural efficiency and greater accountability.

Revisiting the Strategic Partnership Model under the Revised Defence Procurement Procedure

The government has introduced many significant policy changes pertaining to India's defence acquisition. One of the recent reform measures is the Draft Defence Procurement Procedure (DPP)-2020. While there have been several encouraging reforms in the Draft DPP-2020, the chapter on strategic partnership remains unchanged[17]. As per Chapter VII-Appendix-A of DPP-2016, the aximum permitted FDI under the strategic partnership model is 49 percent. Further, any pyramiding of FDI in Indian holding companies or in Indian entities subscribing

[17]Draft DPP 2020 categorically mentions that "Chapter VII of DPP 2016 on 'Strategic Partnership Model' is not included in the draft DPP as no changes are being recommended to the existing chapter."

to shares of the Applicant Company or in the Strategic Partner is not permitted, implying that any indirect foreign investment shall also be accounted for in calculating the 49 percent of FDI. However, the inconsistency between the new FDI announcement of 74 percent foreign investment in defence sector and the strategic partnership model that limits foreign investments to 49 percent makes the model counter-productive.

For instance, if a foreign entity decided to enter into a joint-venture (JV) with a domestic entity to manufacture fighter aircrafts in India through 74 percent ownership in the JV entity under the new FDI regime, and subsequently, intends to bid for a government procurement project for fighter aircrafts using the strategic partnership route, this JV entity would be ineligible to bid due to the 74 percent ownership of the foreign entity, which does not conform to criteria prescribed in the Strategic Partnership model. This lower FDI limit under the strategic partnership model than what has been recently announced under the FDI policy, not only promotes an inefficient acquisition model but also weakens the possibility of attracting higher FDI. Hence, the government could consider revising the strategic partnership program of defence acquisition and allow higher FDI limits under the program, in line with the announcement of higher FDI limits in the sector.

Revisions in Draft Offset Guidelines 2020

Like several countries, India has offset guidelines that enable it to leverage its huge arms imports for developing a robust defence equipment production industry in the country. A formal offset policy has been part of the DPP since 2005. The offset policy guidelines, since inception, have undergone several revisions to keep pace with the emerging needs of the Indian industry, with the recent revision being the Draft Offset Guidelines 2020. The revised guidelines with several revamped features, is a promising attempt by the government to attract technology and investment and promote defence exports. However, to better achieve the aforementioned objectives, the government could consider fine-tuning some of the features.

Revising the Quantum and Threshold for Offset: India's offset quantum is lowest when compared to several other countries, while the threshold for offset is among the highest. According to a recent study[18], India's current level of offset quantum stood at 30 percent, as compared to 50 percent in countries like Israel and South Korea[19], 60 percent in UAE, and even 100 percent in countries like Malaysia

[18]Refining Draft Defence Offset Guidelines 2020, Laxman K Behra, June 2020

[19]South Korea's offset quantum is 10 percent in single-source procurement and 50 percent in competitive contract

and Canada. At the same time, India's threshold of offset stands the highest, at US$ 267 million, as compared to US$ 5 million in Israel, US$ 10 million in UAE and South Korea, US$ 12 million Malaysia, and US$ 14 million in Canada. This implies that India not only foregoes offsets in a large number of arms contracts with values less than its current threshold, but also receives much smaller offset inflows as compared to other countries. Given that the business viability and technological advancement of private sector players, particularly MSMEs, are highly dependent on offsets, the government could consider increasing the quantum of offsets (say 50 percent) and also consider lowering the threshold levels.

Considering Differential Quantum Levels for Single-Source Procurement vis-à-vis Competitive Tendering: The costs and benefits of offset quantum vary across different types of procurement. In the case of competitive tendering, offset costs get minimised. However, in single-source procurement, due to lack of competition in contracts, offset-related costs are often loaded in the main contract, resulting in high cost of discharging the offset obligation. Hence, the government could consider a lower quantum in single-source procurements and a higher offset quantum for competitive tendering. A similar approach has been undertaken by South Korea, wherein the offset quantum is at 10 percent in single-source contracts, whereas in all competitive defence contracts the offset requirement is 50 percent. Further, the government could also consider including offsets in procurement through inter-governmental agreements (IGA) and foreign military sales (FMS), with quantum levels lower than competitive tenderers. Currently IGAs and FMS account for a major share in India's arms import. An exemption to IGA/FMS from the purview of offset impacts the development of private capacities in the defence sector, especially in the MSME sector.

Reconsidering the Multiplier Coefficient for Parts and Components: A multiplier is essentially used for assigning weightage to different offset programmes in an offset obligation. It is the value, which when attached with the actual value of the offset obligations gives the total credit value for fulfilment of the offset obligations. Section 5.10 of the Draft Offset Guidelines 2020 specifies that the multiplier value in the discharge of Offset obligation for eligible products will be 1.0, and that of components of the eligible products will be 0.5, indicating that any purchase of parts and components in an offset obligation would yield half the credits earned earlier. However, it also specifies that in case the components of the eligible products are obtained from an MSME Indian Offset Partner, the permitted multiplier will be 1.5. While this move is meant to incentivize MSME suppliers, the lower multiplier of 0.5 on parts and components could turn out

to be a disincentive, particularly for those foreign OEMs whose supply chains for sourcing parts, components, assemblies and sub-assemblies from India are already well established. Given the disincentive, some OEMs may also consider shifting the supply chain away from India. It is, therefore, important for the government to reconsider the multiplier for parts and components. Instead of disincentivising offset discharge through a lower multiplier on components, the government could consider creating incentives for discharge through multipliers on complete products and systems[20].

Removing Tax Impediments to Create a Level-Playing Field

The Draft DPP-2020 acknowledges the need for a level-playing field in the defence industry, and also recognizes the need to create a conducive environment for the private sector to make long-term investments to develop India as a global defence manufacturing hub. However, the various initiatives for indigenisation must be complemented by appropriate incentives under the indirect tax regime, as this is currently one of the major impediments towards creation of a level playing field for private players. The government has recently extended the exemption from BCD and IGST on defence equipment imported by the Ministry of Defence, the Defence forces, Defence Public Sector Units or other Public Sector Units, for the Defence forces[21]. The list of products include import of equipment as well as parts and components of defence equipment. The duty exemptions are currently being provided for procurement for defence forces alone, and it does not include imports by private companies or their subcontractors. This has not only made domestic manufacturers non-competitive but has also put them into further disadvantage, owing to higher costs due to the levy of customs duty, particularly on inputs. Such exemptions not only encourage direct imports but also discourages indigenization of defence manufacturing due to lack of level playing field. Contrary to the Government of India's efforts to promote 'Make in India', by virtue of this exemption, the government is encouraging 'Buy (Global)' contracts. Thus, the government could consider extending the duty exemption to uses other than for procurement by the defence forces, and could also consider allowing such exemptions for the private players, particularly on import of raw material, components or parts required for manufacturing defence systems domestically.

Addressing the Ambiguity in Procurement Categories

Over the years, there has been a steady increase in the number of procurement categories prescribed in the DPP. From just two categories in 2003 ('Buy' and

[20]"Cutting Edge: Aerospace and Defence", PWC, April 2020

[21]Notification No 03/2020 Customs dated February 2, 2020, CBIC

'Buy & Make') it has now increased to eight categories under the DPP-2020 (six priority categories, plus Leasing and Strategic Partnership Model). However, several overlapping attributes under these categories make the categorisation process unclear, cumbersome and tedious.

For instance, the objectives of 'Buy (Global - Manufacture in India)' can also be met through the 'Buy and Make' category as there seems to be several overlapping attributes between the two categories. As per Draft DPP-2020, 'Buy and Make' category refers to an initial procurement of equipment in Fully Formed (FF) state from a foreign vendor, in quantities as considered necessary, followed by indigenous production through an Indian Production Agency, in a phased manner involving Transfer of Technology of critical technologies as per specified range, depth and scope, with a minimum 50 percent Indigenous Content (IC) on cost basis for the 'Make' portion of acquisitions under 'Buy and Make' category. Meanwhile, the 'Buy (Global - Manufacture in India)' category refers to an outright purchase of equipment from foreign vendors in quantities as considered necessary, with a minimum of 50 percent IC on cost basis of the total contract value which can be achieved in the manufacturing of either the entire equipment or spares/assemblies/sub-assemblies/Maintenance, Repair and Overhaul (MRO) facility for the entire life cycle support of the equipment, through its subsidiary in India. Acquisition under both 'Buy and Make' and 'Buy (Global- Manufacture in India)' categories can be carried out without any initial procurement of equipment in FF state[22]. There are stark similarities in both the categories which makes the process ambiguous. The government could consider merging some of these categories and add further details to the attributes of the combined categories[23].

Bringing Out Policies to Ensure Greater Accountability

For addressing issues relating to integrity and accountability from the sellers, the 'Guidelines of the Ministry of Defence for Penalties in Business Dealings with Entities' prescribes various penalties/punishment that could be invoked in case any company's conduct are found inconsistent with the highest standards of propriety during the entire phase of procurement. The current penalty system includes suspension and banning of companies, which is not consistent with best practices. Suspension and banning of companies not only weaken the already low level of competition in the industry, but also seriously jeopardises the serviceability of the procured items. Instead, the practice of exemplary punishment through stringent financial penalties could be considered for all cases

[22]Draft DPP 2020- Chapter I, Section 9 & 10, March 2020

[23]"Refining Draft DPP 2020: Some Suggestions", Laxman K Behra & Amit Cowshish, April 2020

except where such action is on account of supply of sub-standard material. This could ensure greater accountability on the part of the vendor. Further, to ensure accountability on the part of acquisition personnel, a Code of Integrity for Public Procurement (CIPP) could be considered, similar to the extant Pre-Contract Integrity Pact for the sellers. Such integrity code could be on similar lines as the relevant provisions in the Ministry of Finance's Manual for Procurement of Goods 2017[24].

Facilitating Export Credit

Financing and facilitation of defence exports, unlike other manufactured goods, often involves medium to long term time horizons. The institutional structure of Export Credit Agencies (ECAs) enable them to facilitate and finance such medium to long term export credit requirements. Several ECAs have dedicated programs, often separate from their commercial account, for supporting the development of domestic defence industry (Box 1).

Like other ECAs, the Export-Import Bank of India (Exim Bank) has also been supporting exports of defence related products and equipment, including vessels and vehicles, and defence related service from India, under its various flagship financing programmes viz. the Lines of Credit facility and Buyers' Credit under NEIA (Table 2.10).

Currently, there is no specific fund for supporting the domestic capacity building in the defence sector or facilitating exports of defence equipment from India. Taking cue from the initiatives taken by other major ECAs, a Defence Development Fund (DDF) could be created by the GOI, which could be managed by Exim Bank. This fund can be a source of competitive finance for the defence sector. Strategic cooperation agreement can be signed by Exim Bank with the firms identified under the Strategic Partnership model. Defence projects supported through the DDF can be provided concessional financing. Additionally, the GOI could also launch a credit-linked capital subsidy scheme through this fund for firms. Such an approach has also been adopted by countries like China and Brazil[25].

[24]Ibid.

[25]Defence Equipment Industry: Achieving Self-Reliance and Promoting Exports, India Exim Bank, March 2016

Box 1: ECAs with a Separate Fund/Facility for Defence Exports

Export Finance Australia (EFA), erstwhile Export Finance and Insurance Corporation, provides export credit support in two ways viz. through a Commercial Account and through its National Interest Account. Under the Commercial Account, EFA acts as a profit-making entity, retaining all margins and fees, and bearing all the risks and losses. Meanwhile, the National Interest Account is instituted by the Australian government in EFA as a separate account, with a separate balance sheet. Through this facility, EFA supports transactions that are in the national interest, based on directions from the Government. Such support may be additionally required mainly due to the large size of the transaction, longer tenor or significant exposure to the importing country. The Australian Government makes the decisions under the National Interest Account and also bears all the risks and losses, and no capital against the National Interest Account exposures are held by the EFA. The Government of Australia administers a separate Defence Export Facility worth US$ 3 billion under the National Interest Account of the EFA, in order to build the country's defence export capabilities. The first loans under this were authorised in late 2018. This facility is primarily utilized to finance defence exports where the export credit agency may not be able to provide support under its Commercial Account.

Similarly, the Government of the UK also proposed to create a similar fund worth GBP 1 billion (approximately US$ 1.3 billion) in its budget for the year 2020, for supporting defence and security exports from the country. This fund would be overseen by the UK Export Finance (UKEF), the country's export credit agency. Currently, export credit support for businesses in the defence sector accounted for nearly 46 percent of the total export credit support by the UKEF during 2018-19. The move is likely to further enhance the UKEF's support to defence exporters.

Table 2.10: Exim Bank's Support to Defence Sector under LOC & BC-NEIA Programmes

Equipment/Service Exported	Recipient	Region	Value (US$ Million)
Operative Lines of Credit (LOCs)			
Waterjet Fast Attack Craft	Mauritius	Sub-Saharan Africa	18.00
Construction of berthing jetty and Head Quarter building for National Coast Guard of Mauritius	Mauritius	Sub-Saharan Africa	52.30
Defence related equipment and Vehicles & related services	Mauritius	Sub-Saharan Africa	46.00
Offshore Patrol Vessel	Mauritius	Sub-Saharan Africa	48.50
Defence Project	Bangladesh	Asia	500.00
Purchase of helicopters from HAL	Suriname	Latin America and the Caribbean	5.76
Servicing and maintenance of 3 Chetak Helicopters	Suriname	Latin America and the Caribbean	3.50
BC-NEIA			
Two Offshore Patrol Vessels	Sri Lanka	Asia	116.74

Source: India Exim Bank

ELECTRONICS

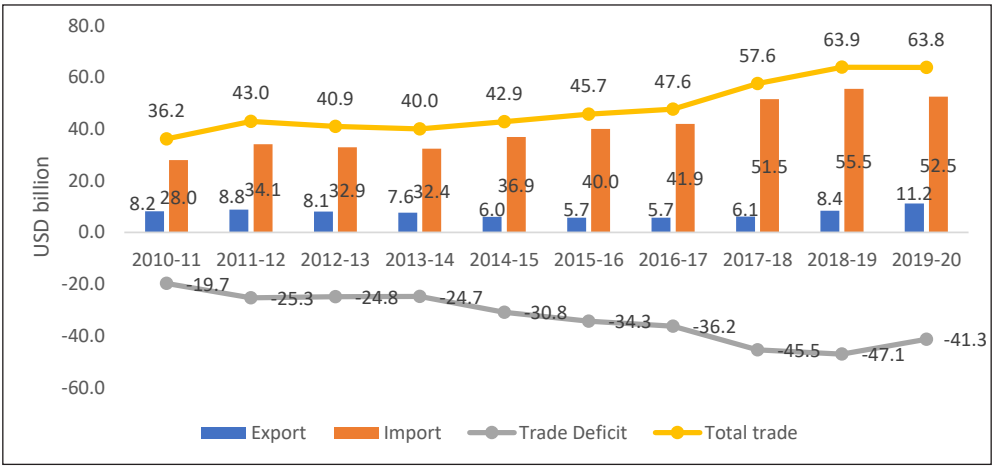
Background

Indian electronics industry manufactures a wide range of goods across the entire spectrum of electronics and ICT, from entry level to state-of-the-art electronic products. Over the recent years, India's Electronics System Design and Manufacturing (ESDM) sector has witnessed a rapid growth, with the total production registering a CAGR of 24.5 percent during the period 2014-15 to 2018-19 to reach an estimated ₹4,58,006 crore. Within the sector, the share of mobile phones in total production has witnessed a significant increase, from 9.9 percent in 2014-15 to 37.1 percent in 2018-19. The increase in domestic production of electronics, particularly mobile phones, is attributable to the policy impetus given to the sector by the Government of India. Meanwhile on the demand side, growing middle-income population, rising personal disposable income, rapid urbanization, adoption of high-end technology devices, have been some of the major drivers for the growth of the industry.

Trade Performance

India's total trade in electronic goods registered a CAGR of 6.3 percent between 2010-11 and 2019-20, to reach US$ 63.8 billion in 2019-20. Nearly 82.4 percent of the total trade comprise imports of electronic goods (amounting to US$ 52.5 billion in 2019-20), while exports hold a relatively lower share of 17.6 percent in the total trade (US$ 11.2 billion in 2019-20), resulting in a large trade deficit. While exports have registered a CAGR of 3.5 percent during 2010-11 to 2019-20, imports have registered a higher CAGR of 7.3 percent during the same period. Consequently, the trade deficit in the sector has also increased over the years, from US$ 19.7 billion in 2010-11 to US$ 41.3 billion in 2019-20, recording a CAGR of 8.6 percent during the period. This large trade deficit is primarily due to a large unmet domestic demand which is currently being addressed by imports, despite the significant growth in domestic production over the recent years.

Exhibit 2.7: Decadal Trade Performance in the Electronics Sector



Source: DGCI&S; India Exim Bank Research

Composition of Trade

Telecom instruments is the largest category of electronic exports from India, accounting for a share of 42.8 percent in India's total electronics exports in 2019-20, followed by electronics instruments (27.1 percent), electronics components (22.5 percent), consumer electronics (4.5 percent) and computer hardware and peripherals (3.1 percent). Over the past decade, the composition of exports has altered in favour of electronics instruments in particular, whose share in exports has increased by nearly 10 percentage points between 2010-11 and 2019-20. During the same period, share of telecom instruments increased by nearly 1.7 percentage points.

On the import side, electronics components is the largest import category, with a share of 31.1 percent in total electronics imports in 2019-20, followed by telecom instruments (27.1 percent), computer hardware, peripherals (17.2 percent), electronics instruments (15.1 percent) and consumer electronics (9.5 percent). Over the past decade, the share of electronics components in total electronics imports has more than doubled. Alongside, the share of telecom instruments in imports has dropped by 14.3 percentage points during this period under consideration, on account of increase in domestic production of these items.

A significant contributor to the trade deficit in this sector is the electronics components category, wherein the trade deficit has registered the highest CAGR of 24.5 percent during 2010-11 to 2019-20, followed by computer hardware, peripherals (CAGR of 7.7 percent), consumer electronics (6.9 percent),

electronics instruments (6.3 percent), and telecom instruments (1.7 percent). This is indicative of an increasing import dependence in intermediate electronics goods as compared to finished goods.

Table 2.11: Trends in Composition of Trade

Product Categories	Exports 2010-11 (US$ Bn)	Imports 2010-11 (US$ Bn)	Trade Deficit 2010-11 (US$ Bn)	Exports 2019-20 (US$ Bn)	Imports 2019-20 (US$ Bn)	Trade Deficit 2019-20 (US$ Bn)	CAGR of Trade Deficit (FY11- FY20)
Electronics Components	2.2	4.2	-1.9	2.5	16.3	-13.8	**24.5%**
Computer Hardware, Peripherals	0.5	4.9	-4.4	0.3	9.0	-8.7	7.7%
Consumer Electronics	0.8	3.2	-2.5	0.5	5.0	-4.5	6.9%
Electronics Instruments	1.4	4.2	-2.8	3.0	7.9	-4.9	6.3%
Telecom Instruments	3.4	11.4	-8.1	4.8	14.2	-9.4	1.7%

Source: DGCI&S; India Exim Bank Research

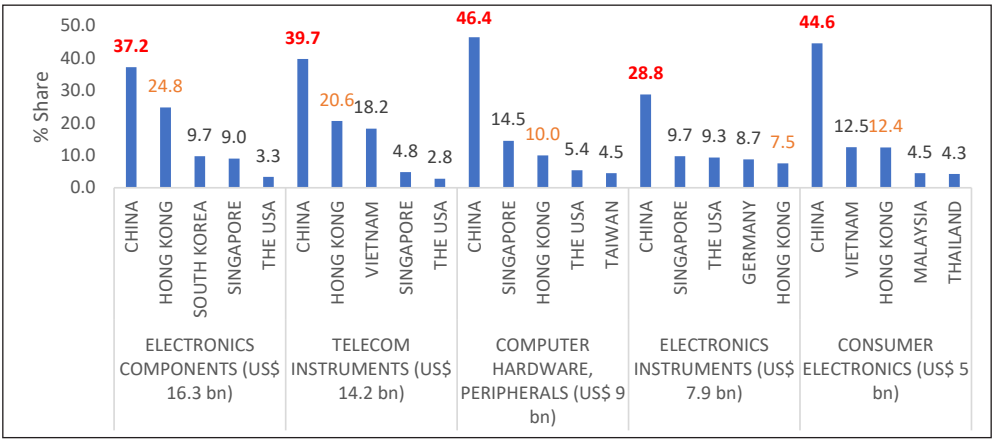
Direction of Trade

UAE was the largest export destination for electronics exports from India, accounting for nearly 21.8 percent of the total electronics exports from India in 2019-20, followed by the USA (16.6 percent), China (7.9 percent), Russia (4.7 percent), Singapore (3.8 percent) and Germany (3.7 percent). Meanwhile, China was the largest import source for electronics goods in India, accounting for a share of 38.9 percent in the total electronics imports in 2019-20, followed by Hong Kong (17.3 percent), Singapore (8.4 percent), Vietnam (7.6 percent), and South Korea (4.7 percent).

Growing Import Dependence on China

India's heavy reliance on imports from China is evident from the fact that in all the product categories in the electronics sector, China is the largest import source for India (Exhibit 2.8). Although China is the largest import source, imports from China in terms of value has been declining over the past two years, contracting from US$ 31 billion in 2017-18 to US$ 20.4 billion in 2019-20. However, the imports from Hong Kong has parallelly witnessed a significant rise in the last two years, rising from US$ 1.2 billion in 2017-18 to US$ 9.1 billion in 2019-20. As a result, Hong Kong featured among the top import sources in all product categories in 2019-20. This trend is indicative of a possibility that China is re-routing its exports through Hong Kong into India.

Exhibit 2.8: Category-wise Top Import Sources for Electronics Goods in India (2019-20)



Note: Figure in parenthesis indicate the total imports of these items by India
Source: DGCI&S; India Exim Bank Research

Segment-wise analysis indicates that imports of telecom instrument (including mobile phones) from China have declined in value terms over the last two years, from US$ 15.6 billion in 2017-18 to US$ 5.6 billion in 2019-20. Alongside, the imports of electronic components (including those used in mobile phones, such as integrated circuit boards, etc.) from China have increased over the years, from US$ 5.5 billion in 2017-18 to US$ 6.1 billion in 2019-20. It is also noted that imports of electronics components from Hong Kong have particularly surged over the past two years, from US$ 0.2 billion in 2017-18 to US$ 4 billion in 2019-20, indicating a heavy reliance on imported electronic components, particularly for mobile phone assembling facilities in India.

Product-Wise Analysis of Import Dependence on China

To analyse the import dependence at the product level, an import intensity index has been constructed using the methodology indicated earlier in this report. Analysis indicates that there are nearly 30 electronics products (at HS-6 Digit level) for which India has high import demand and there is significant dependence on China for its imports. This includes mobile phones and telephones and their parts, electronic integrated circuits, data-processing machines and its parts, photosensitive semiconductor devices, cameras, processing units for automatic data-processing machines, parts of transmission and reception apparatus, among others. These 30 products together constituted nearly 77.6 percent of India's total electronics imports in 2019.

Among these identified products, there are 2 products where India enjoys an overall trade surplus, viz. static converters (HS 850440) and mobile phones (HS 851712). Clearly, there exists substantial opportunities for building capacities in these two segments and reducing the dependence on imports from China.

Table 2.12: Top 10 Products (at HS-6 digit level) with High Dependence on Imports from China

HS 6	Product Description	India's Imports from China (US$ million)	Share of China in India's Electronics Imports (%)	MMI (Import intensity)	Normalized MMI	India's Trade Deficit (US$ million)
851770	Parts of telephone and mobile phones	3737.5	45.8	1.26	0.1	-7874.5
854231	Electronic integrated circuits including processors and controllers	2071.8	39.0	2.78	0.5	-5221.0
847130	Automatic Data-processing machines	2659.9	74.1	1.13	0.1	-3553.4
851762	Machines for the reception, conversion and transmission or regeneration of voice	1035.9	29.9	1.01	0.0	-2950.0
854140	Photosensitive semiconductor devices, incl. photovoltaic cells	1814.9	73.8	1.78	0.3	-2181.4
854239	Electronic integrated circuits (excluding such as processors, controllers, memories and amplifiers)	333.0	13.8	3.02	0.5	-2277.5
852580	Television cameras, digital cameras and video camera recorders	764.8	36.7	1.34	0.1	-2020.0
847150	Processing units for automatic data-processing machines	418.2	22.9	1.03	0.0	-1776.6
852990	Parts of transmission and reception apparatus	836.0	59.4	2.77	0.5	-1267.3
847330	Parts and accessories of automatic data-processing machines	444.3	33.2	1.29	0.1	-1231.0

Note: Detailed table with all 30 identified products at HS-6 digit level is given in Annexure1, Table 3

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Strategies

Strategies in the electronics sector should focus on leveraging the large domestic demand to catalyse growth of the domestic industry and thereby neutralizing India's substantial trade deficit in the sector. Building domestic capabilities, attracting foreign investments, and adopting best practices in the broader policy space will form the critical tripod for promoting exports and neutralizing the trade deficit in this sector.

Attract large scale GVC-Oriented Investment through Production Incentives

In order to catapult India to become a leader in the electronics manufacturing industry, it is crucial to recognize the role of GVC integration, which has empirically proven to be responsible for boosting sectoral growth. The electronics industry is characterized by high modularity as a result of which, production can be distributed over different geographies. In the era of increasing global value chains, the electronics industry in India now requires not just competitiveness in terms of costs and market access, but also the achievement of global standards. To achieve this and to be able to compete globally and gain market share, the industry requires large scale investments. While global lead firms in the electronics space already have presence in India, their operations have been limited to assembly, as opposed to manufacturing across different stages of the value chain. In order to attract and encourage investments to boost manufacturing and exports, global lead firms must be incentivized to upscale their operations.

The recently launched Production Linked Incentive Scheme for Large Scale Electronics Manufacturing (PLI) and Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS) are encouraging initiatives for engendering large scale investments in the sector. However, there is a need to consider recalibration of both the schemes in order to cover a larger segment of beneficiaries under these schemes. For instance, the PLI scheme is currently restricted to large scale mobile phones and its components alone. Considering the high import dependence in electronic components, and the high potential and demand for medical devices, the government could consider extending the scheme to cover other important high value electronic products and components such as health devices, telecom equipment other than mobile phones, computing equipment like laptops and others, as well as to electronics components. Further, upstream segments such as chip designing could also be considered for inclusion.

Further, the PLI Scheme considers incremental investment and sales of manufactured goods, which is indirectly linked to the incremental exports receipts, as it is estimated that nearly 70 percent of incremental sales would be derived

from exports, thereby prima facie drawing prohibited subsidy provisions of the WTO's Agreement on Subsidies and Countervailing Measures. Instead, value addition could be considered as the criteria for evaluation.

On similar lines, while the incentives proposed under the SPECS shall bode well for electronics components manufacturers, certain upstream electronics segments such as chip designing are conspicuously absent from the items eligible for incentives under the SPECS. Finance and technology required to build a leading-edge fab is prohibitive, and the profit margins are low due to intense competition, short product life cycles and regular bouts of excess capacity in the global market. Chip design, on the other hand, can be profitable, and forms a critical part of final product functionality and design. Several Indian companies have begun operations in this segment, and inclusion of this segment can help establish the country as a chip design hub.

Moreover, the minimum threshold investment for a project to be eligible for benefits under the scheme could be revisited, and revised downward in some cases. For instance, in the case of Display Fabrication Units for Electronic Units including LCD, LED, and OLED, the minimum threshold investment is set as ₹1,000 crore. Such high threshold would only allow large companies to benefit from the proposed scheme. In a recent instance in September 2019, Taiwan-based Qisda, a manufacturer of liquid crystal display televisions, monitors, and opto-mechatronics products, made a greenfield investment to the tune of US$ 40 million (approximately ₹285 crore) to establish a wholly-owned subsidiary in Vietnam, which will operate as Qisda Vietnam and manufacture mid-range and entry-level products in large volumes. Such mid-sized investments would not be eligible for support under the proposed scheme. Thus, the relaxation of minimum threshold investment across various categories could be considered, in order to encourage investments from mid-sized firms.

Financial and Fiscal Incentives

While the overall business environment in India is supplemented by investor-friendly tax regime, conducive policy framework, and improving ease of doing business, India's policies in comparison to other electronics hubs like China and Vietnam are relatively less favourable. The key differentiating factors for electronics manufacturers in China and Vietnam are primarily those related to finance and fiscal incentives that lead to cost reduction. This includes corporate tax benefits, reduced cost of power, interest subvention on working capital, R&D subsidy, incentives for supporting the industry, exemption/reduction of land rentals, industrial land development support, labour subsidy, logistics, among others (Table 2.13).

Table 2.13: Comparison of Factors That Lead To Cost Reduction in Mobile Phone Manufacturing

Factor resulting in cost-reduction	India	Vietnam	China
Corporate income tax exemption/reductions	0.73-0.95%	1.5-2%	2%
Subsidy for machinery and equipment	-	0.20%	3%
State subsidies in India for capital investments	0.6-1.2%	-	-
Cost of power	-	1%	1%
Interest subvention on working capital	-	1.5-2%	3-3.5%
R&D subsidy	0.15%	0.4-1%	2%
Incentive for supporting industry	-	0.5-1%	0%
Exemption/reduction of land rental	-	0.50%	0.60%
Industrial land development support	0.40%	0.50%	0.60%
Building (or plug and play)	-	0.30%	1%
Labour subsidy	-	0.50%	2%
Logistics	-	0.50%	1%
Duty free imports for creating fixed assets, as also for inputs not available domestically	-	0.50%	-
Production-Linked Incentive Scheme	4-6%	0%	1-2%

Source: EY-ICEA

A recent study corroborates that in the mobile manufacturing segment, Indian manufacturers are at disadvantage vis-à-vis Chinese and Vietnamese manufacturers with cost competitiveness differential of nearly 15 percent and 5.8 percent respectively, if higher-end cost ranges are considered. These differentials could range between 9.4-12.5 percent in the case of Vietnam, and 19.2-21.7 percent in the case of China, if low to medium-end cost ranges are considered. Of this, interest subvention incentive on working capital alone leads to nearly 1.5-2 percent cost reduction for mobile manufacturers in Vietnam and nearly 3-3.5 percent cost reduction for those in China[26].

Despite the recent initiatives to incentivize the industry, a priority concern that continues to impact the Indian electronics firms is the availability and cost of funds. To address these concerns, the domestic manufacturing firms should get easier access to credit facilities, as well as some form of Credit Guarantee and Interest Subvention on working capital for boosting the domestic industry. This could be done by setting up a Debt Venture Fund for working capital to provide interest subvention on the financing cost. As mentioned above, top competing

[26]"Mobile manufacturing in a post COVID-19 world", EY & ICEA, May 2020

countries like Vietnam and China provide such interest subvention on working capital which enhances their cost competitiveness in the mobile manufacturing segment.

Additionally, more attractive tax benefits could be provided to firms in the electronics sector. This could include tax holidays or lower corporate tax rates for manufacturers of certain high value-added products, GST exemptions on technology transfer, etc. State Governments could also provide tax reimbursements for setting up electronics manufacturing parks based on the size of investments. Already some states are providing such reimbursement to attract investments across several manufacturing segments. For example, the Government of Maharashtra provides an Industrial Promotion Subsidy of 40-100 percent of Gross SGST payable by a unit on the first sale of eligible products billed and delivered within Maharashtra, to encourage investments in select thrust sectors, including investments by MSMEs. Such sector-specific incentives to attract investments in electronics manufacturing could be considered by the State Governments, and the scope of these incentives could also be expanded to include reimbursements of SGST for a longer duration of time. A similar approach has been adopted by Vietnam for promoting mobile manufacturing. Vietnam provides a 30-year tax holiday window at a nominal tax rate of 10 percent on mobile phone manufacturing, including a 100 percent exemption in the first four years and a 50 percent exemption over the next nine years. Additionally, a VAT exemption is applied on technology transfer and several other tax incentives are also granted based on location and size of investments[27].

The government could also consider bringing in a duty differential under GST regime in the form of tax refunds, that can be proportional to the domestic value addition, starting with components manufacturers where the import dependence is currently higher. Such differential duty rebate/refunds could also be extended to OEMs exporting from India with a high domestic value addition. This will incentivize manufacturers to locally design, source and manufacture critical components. A similar approach was adopted by the Government of India in case of mobile phones, wherein differential duty structure was created between the import of Completely Built Up (CBU) mobile handsets and domestically manufactured mobile phones, which led to a gradual shift from the CBU import model to domestic assembly, progressively increasing the intensity of manufacturing[28].

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[27]"Maximizing Local Value Addition in Indian Mobile Phone Manufacturing: A Practical Phased Approach", Counterpoint Technology Market Research and IIM-Bangalore, November 2016

[28]"Incentivizing domestic handset manufacturing in India under the GST regime", EY & Broadband India Forum, December 2016

Increasing Customs Duty on Select Goods

India entered the World Trade Organization's (WTO) Information Technology Agreement (ITA-1) in 1996 with a belief that reduced duties on a range of high technology products would result in enhanced competitiveness in exports from the software sector and an increased market access for India. ITA-1 was intended to establish tariff-free trade of electronics products such as computers, telecom equipment, semiconductors, manufacturing and testing equipment for semiconductor, software, and scientific instruments, among others. However, by the time the ITA-1 was implemented, several Asian countries had already become competitive in this sector, while Indian industry was still at a nascent stage. This, in turn, adversely affected the domestic manufacturers in India. In the current scenario, the option of lowering tariffs in this sector is limited, except for inputs needed to strengthen domestic manufacturing, which is already being done in a phased manner under the PMP. Nevertheless, the government could consider appropriately increasing duty on goods not covered by the ITA-1. This includes products like networking switches, access points, media convertors, transceivers, repeaters, optical fibre splitters and passive optical network products, set-top boxes, and antennae, among others (refer to Table 4 in Annexure 1).

Renegotiating Free Trade Agreements (FTAs) in the Context of Electronics

There is substantial evidence that trade liberalization efforts and other reform measures such as tariff reduction through FTAs did not result in greater competition and improved productivity in the electronic hardware manufacturing of India, but resulted in an increased import dependence instead. While ITA-1 crippled India's electronics manufacturing, tariff liberalisation under various FTAs have fostered the import dependence in non-ITA products as well.

In the previous section, a list of 30 products at HS-6 digit level were identified where India has significant import dependence on China. It may be noted that in some of these products, such as video cameras, China enjoys duty concessions under the Asia-Pacific Trade Agreement (APTA). Further, in the case of India–ASEAN FTA, India committed to make 170 non-ITA product lines duty-free by 2013. Similarly, in the case of India's Comprehensive Economic Partnership Agreement with South Korea, a total of 8 non-ITA product lines were made duty-free immediately, while 60 tariff lines became duty-free from January 2014, and nearly 277 lines became tariff-free from January 2016. Under India's trade agreement with Japan, which came into force in 2011, India committed to bring

down the tariffs on 132 non-ITA product lines in 10 equal reductions by 2020[29]. It is important to note that Japan and South Korea, and several ASEAN countries have strong manufacturing base in the electronics sector. Duty concessions in FTAs make electronics imports from these countries even more competitive in the Indian market vis-a-vis the domestic production. It is clear that effects of trade liberalisation under FTAs have been rather unfavourable for the domestic electronics firms. In this regard, the government must consider renegotiating some of these FTAs.

Promoting Medical Electronics Devices segment

Lack of proper regulatory structure, lack of guidance and dialogue regarding product specifications have inhibited the growth of medical devices industry in India. To promote the sector, the government could embrace a public-private partnership model to support R&D. For instance, guidance for product development in medical devices could be provided by the Central Drugs Standard Control Organization (CDSO) regarding product specifications. The CDSO could also support commercialisation of technologies developed by academic laboratories or private sector R&D institutions. Further, to help the medical device industry thrive, the government could facilitate the establishment of industrial parks or develop clusters with appropriate infrastructure for carrying out testing, evaluation, accreditation and compliance. To encourage start-ups in this industry, the government could also consider providing common manufacturing facilities, tinkering labs, and other facilities. The Government of India has recently approved the proposal for setting up of four medical devices parks, one each in Andhra Pradesh, Telangana, Kerala and Tamil Nadu, under the scheme for Assistance to Medical Device Industry for Common Facility Centre[30]. More of such initiatives could be encouraged. The government could also consider providing subsidised access to these facilities to MSMEs.

Promoting Strategic Electronics- Trusted Foundry Program

The aerospace and defence industry is witnessing a major transformation globally, wherein the value contribution of electronics has increased by more than 40 percent[31], across most leading defence platforms such as armoured personnel carriers, fighter aircrafts, navel destroyers and submarines, among others. India imports a significant portion of defence related electronic goods, which makes it an important area for India to promote domestically. The government could

[29]"India's Electronics Manufacturing Sector: Getting the Diagnosis Right", Smitha Francis, August 2018

[30]"Medical Devices Park", PIB, December 13, 2019

[31]"Strategic Electronics Report 2019", Roland Berger – IESA, September 2019

encourage building capabilities, in order to source strategic electronic goods domestically. This would require creating long-term partnerships in the electronics sectors and attracting global leaders in this segment to set up manufacturing in India.

The new draft Defence Production and Export Promotion Policy 2020 envisions the setting up of missions through the DRDO in collaboration with other scientific and industrial establishments, in select areas, with an aim to develop futuristic and critical systems/platforms/materials. In order to ensure a trusted supply chain for strategic electronics, these missions could be modelled on the lines of the Trusted Foundry programme of the USA's national security arrangements, which not only ensures that the critical national defence systems are sourced from secure, domestic sources, but also promotes capacity building in these critical areas. The model in the USA included development of domestic foundry capability and full-range of microelectronics services from design to prototyping, packaging and assembly, photomask manufacturing, and aggregation, among others. On the lines of the Trusted Foundry Model, India needs to liaison with the domestic private sector for setting up semiconductor facilities for strategic applications. Government can provide necessary guidance in terms of its requirements and assure offtake. The recent measures announced as part of the Atmanirbhar Bharat programme paves way for greater private sector participation in the defence sector, and creates the necessary ecosystem for initiating a Trusted Foundry program in India.

Skill Development

Government and leading organizations could invest in creating specialized Centres of Excellence in academic institutions to inculcate the research mind-set towards electronics, semiconductors and materials and support future research in areas like 5G, automated manufacturing robotics, etc. This would not only help in building strong domestic intellectual property (IP), but also build a strong pool of highly skilled professionals. Centres of Excellence could be set up in major electronic hubs across the country to provide training in advanced networking, telecom technologies, biomedical engineering, etc. at select major engineering colleges, polytechnics and other technical institutes, as well as supporting research in these areas. The National Skill Development Corporation, and the State-Level Skill Development Councils have major role to play in implementing this strategy. This shall help build the skill set required for research, commercialization and production of electronics items.

R&D/ Innovation Enablers

Promoting innovation and R&D could be a key game-changer for domestic manufacturers. For enhancing the market for domestically produced electronics goods, it is essential to interlink the demand for upstream industries to downstream manufacturers through appropriate incentives. Central and state governments could promote the manufacturing and marketing of innovative devices across health, education, defence, and e-governance space through the procurement and promotion of such solutions from indigenous manufacturers/ solution providers. Government may consider having an additional criteria of indigenous R&D, design, and/or product development in their procurement of electronics devices.

Government could also use several innovation challenges and research grants for evolving technologies, in order to provide an impetus to new indigenous solutions and products that integrate domestic design, software, data analytics etc. In this regard, the Technology Incubation and Development of Entrepreneurs initiative to support technology incubation centres in institutes of higher learning, and the Multiplier Grants Scheme support for collaborative R&D between industries and academic and R&D institutions, are important support schemes for fostering innovation. The schemes were extended until March 2017 and March 2020 respectively, but have now expired. These support schemes need to be continued and given additional impetus for encouraging setting up of more incubation centres.

In order to encourage more domestic firms to manufacture innovative electronic products, a seed fund could also be created under a PPP model with 50-50 contribution from Government and private investors. Such a fund could have a preference clause for investing in start-up ideas in the electronics sector, with a specific percentage of investment allotted to investments in the areas of fabless chips, assembly, testing, marking and packaging (ATMP) units, medical devices, strategic electronics etc.

PLASTICS

Background

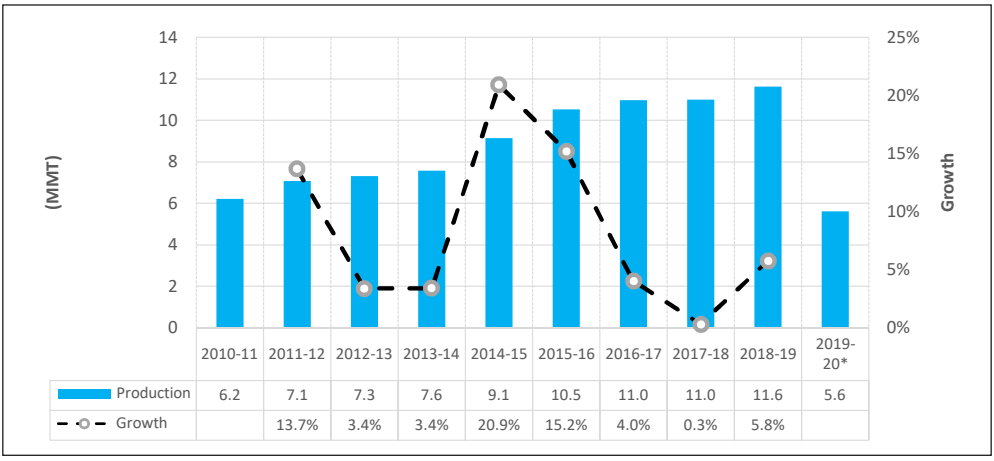
The Indian plastics industry produces and exports a wide range of raw materials, plastic-moulded extruded goods, polyester films, soft luggage items, writing instruments, plastic woven sacks and bags, polyvinyl chloride (PVC), leather cloth and sheeting, packaging, consumer goods, sanitary fittings, electrical accessories, medical surgical ware, tarpaulins, laminates, fishnets, travel ware, and others.

In India, the plastic industry has emerged as one of the most diversified industries spanning across the country, and hosts more than 2,000 exporters. The industry employs about 4 million people and comprises more than 30,000 processing units, 85-90 percent of which are small and medium-sized enterprises[32].

Production

Plastic is considered a part of downstream hydrocarbons derived from crude oil and natural gas. The domestic production of plastic in 2019-20 (up to September 2019) was recorded at 5.6 million MT. During 2010-11 to 2018-19, the production of plastics in India registered an impressive AAGR of 8.3 percent. Additionally, during the same period, while the production of performance plastics recorded an AAGR of 10.9 percent, the same for polymers was registered at 8.5 percent.

Exhibit 2.9: India's Production of Plastics (2010-11 to 2019-20)



	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20*
Production	6.2	7.1	7.3	7.6	9.1	10.5	11.0	11.0	11.6	5.6
Growth		13.7%	3.4%	3.4%	20.9%	15.2%	4.0%	0.3%	5.8%	

*During April – September 2019

Source: Data accessed from Department of Chemicals and Petro Chemicals Annual Report 2019-20; India Exim Bank Research

[32]India Brand Equity Foundation, Department of Commerce

Foreign Trade

The share of plastics[33] in the country's total exports has been exhibiting a gradual upward trend, increasing from 1.6 percent of the total merchandize exports in 2010 to 2.2 percent in 2019.

During the period 2010 to 2019, while India's total merchandize exports grew at 5.3 percent on an average, the same for plastic products was approximately 10.1 percent. However, India has remained a net importer of plastic in the last ten years and registered a trade deficit of US$ 7.2 billion in 2019.

Exports

India's exports of plastics were recorded at US$ 7.4 billion in 2019, less by US$ 0.4 billion over the previous year, and registering an AAGR of 10.1 percent during the period 2010 to 2019. With regards to export destinations, these were considerably diversified. During 2010 and 2019, China remained the top destination for India's exports of plastics with its share in India's total exports of plastics rising from 10.1 percent in 2010 to 13.2 percent in 2019.

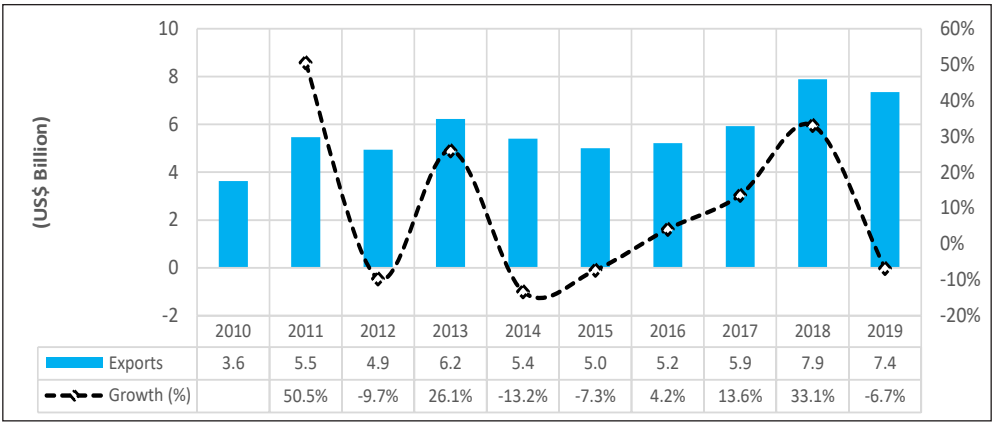
Table 2.14: Major Markets for Export and Import of Plastics by India: 2019

Total Exports: US$ 7.35 billion; Total Imports: US$ 14.6 billion					
Export Destinations	**Exports (US$ Billion)**	**Share in Total Exports of Plastic**	**Import Sources**	**Imports (US$ Billion)**	**Share in Total Imports of Plastic**
China	0.97	13.2%	China	2.8	19.3%
USA	0.92	12.5%	USA	1.6	11.4%
UAE	0.39	5.3%	Singapore	1.1	7.7%
Italy	0.27	3.7%	South Korea	1.1	7.6%
Bangladesh	0.25	3.3%	Saudi Arabia	0.9	6.5%
Others	4.56	62.0%	Others	7.1	47.5%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

[33]HS 39: Plastics and articles thereof

Exhibit 2.10: India's Export of Plastics: 2010-19



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Exports	3.6	5.5	4.9	6.2	5.4	5.0	5.2	5.9	7.9	7.4
Growth (%)		50.5%	-9.7%	26.1%	-13.2%	-7.3%	4.2%	13.6%	33.1%	-6.7%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Polyethylene terephthalate (PET)[34] accounted for the highest plastic exports from India in India at US$ 768.1 million in 2019. PET is a clear, strong, and lightweight recyclable plastic that is widely used for packaging foods and beverages, especially convenience-sized for packing soft drinks, juices, and water.

The world import demand for PET registered an average growth of 21 percent during 2017 and 2019, led by Japan, the USA, and Italy.

It is important to note that India was the third largest exporter of PET in 2019, accounting for 8.1 percent of the world exports and enjoys a comparative advantage in its export.

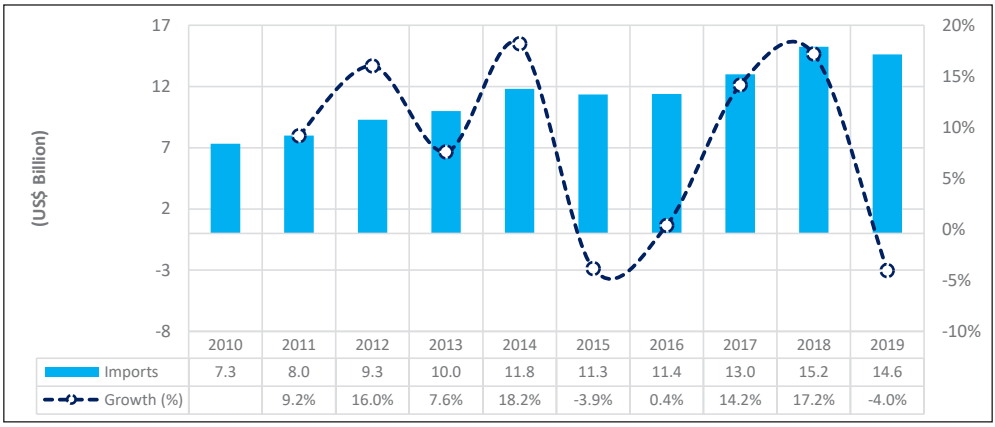
Imports

During 2010-19, India's imports of plastic grew at an average of 8.3 percent from US$ 7.3 billion in 2010 to US$ 14.6 billion in 2019. Poly Vinyl Chloride (PVC) [35] accounted for the highest imported plastic product by India in 2019, amounting to US$ 1.9 billion, a marginal increase from its value in 2018, and registering a high AAGR of 45.3 percent during 2010 and 2019.

[34]HS 390761: Poly"ethylene terephthalate", in primary forms, having a viscosity number of >= 78 ml/g

[35]HS 390410: Poly"vinyl chloride", in primary forms, not mixed with any other substances

Exhibit 2.11: India's Import of Plastics: 2010-19



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Imports	7.3	8.0	9.3	10.0	11.8	11.3	11.4	13.0	15.2	14.6
Growth (%)		9.2%	16.0%	7.6%	18.2%	-3.9%	0.4%	14.2%	17.2%	-4.0%

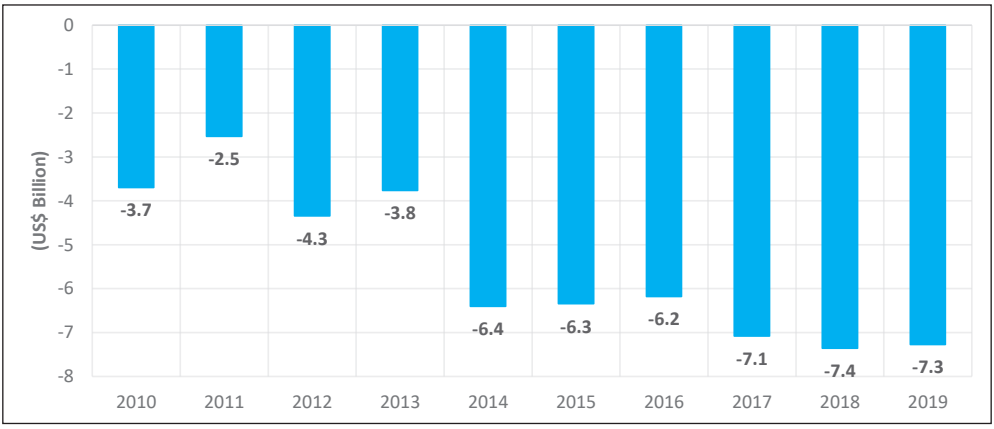
Source: Data accessed from ITC Trade Map; India Exim Bank Research

Trade Balance

Overall, for the plastic industry, India's trade deficit amounted to US$ 7.3 billion in 2019, substantially higher than the deficit of US$ 3.7 billion witnessed in 2010. A reduction of US$ 83.5 million was noted in the trade deficit for plastics in 2019, over 2018. Additionally, the products contributing the most to the trade deficit largely remained the same in 2010 and 2019.

While China was India's largest export destination for plastics in 2019, it also a major source for India's imports of plastics. The trade deficit under this category was primarily due to import of products like non-cellular plastics, acrylic polymers, PET and self-adhesive plastics.

Exhibit 2.12: India's Trade Balance for Plastics (2010-19)



Source: Data accessed from ITC Trade Map; India Exim Bank Research

Table 2.15: India's Trade Balance for Major Plastic Products: 2010 vis-à-vis 2019

Description	Trade Balance in 2010 (US$ Billion)	Trade Balance in 2019 (US$ Billion)
PVC	- 0.11	- 1.93
Polyether	- 0.17	- 0.43
Acrylic polymers	- 0.12	- 0.41
Polycarbonates	- 0.27	- 0.41
Non-cellular plastics	- 0.06	- 0.37
Total	**- 3.96**	**- 7.27**

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Products with High Import Orientation

Poly Vinyl Chloride (PVC)

In 2019, the highest trade deficit of US$ 1.9 billion was registered for Poly Vinyl Chloride (PVC)[36], under the plastics industry. It is important to note that India has emerged as the largest importer of PVC in the last ten years, accounting for about 17 percent of the world imports in 2019, substantially higher from 1.1 percent in 2010. The key reasons for the rapidly growing PVC imports by India are relatively lesser import duties on PVC imports, compared to other countries and low investments and capacity creation in the PVC manufacturing space.

[36]HS 390410: Poly vinyl chloride", in primary forms, not mixed with any other substances

Table 2.16: India's Top Trading Partners Contributing to the Trade Deficit for PVC (2019)

Country	Trade Balance (US$ Billion)	Import (US$ Billion)	Share in value in India's imports of PVC (2019)
Japan	(-) 0.43	0.43	22.3%
Taipei	(-) 0.42	0.42	21.8%
South Korea	(-) 0.31	0.31	15.9%
Russia	(-) 0.10	0.10	5.0%
China	(-) 0.08	0.08	4.1%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

PVC is a high strength thermoplastic material widely used in applications such as pipes, medical devices, wire, and cable insulation. Further, it is noted that increasing investments in residential and commercial infrastructure are further propelling the demand for PVC in India.

Fundamentally, PVC is a synthetic resin made from the polymerization of vinyl chloride. It is the third largest plastic in production and consumption. A key feature of PVC is that it can be combined with additives and fabricated into a wide variety of forms. This quality, together with features such as durability, self-extinguishing property, resistance to most chemicals and oil, mechanical strength, and ease of processing, implies that PVC is a competitive and attractive option for many end-uses in construction and infrastructure, agriculture, electrical products, and healthcare.

While a part of the rapid surge in imports of PVC by India is explained by the prevailing low import duties, it is also important to note that the investments and capacity creation for PVC manufacturing in India has remained subdued in the last few years.

Polyether

In 2019, the second highest trade deficit (of US$ 432.2 million) in the plastics industry was registered for polyether[37]. India was the fourth largest importer of polyether in 2019, exhibiting an AAGR of 11.7 percent during the period 2010 to 2019, as against the AAGR of 3.7 percent for the world imports during the same period. India's share in the global imports of polyether increased from 2.1 percent in 2010 to 3.8 percent in 2019, while the same for other major importers like China, Germany, and Italy witnessed a substantial reduction during the same period.

[37]HS 390720: Polyethers, in primary forms (excluding polyacetals and goods of 3002 10)

Table 2.17: India's Top Trading Partners Contributing to Trade Deficit for Polyether (2019)

Country	Trade Balance (US$ Million)	Import (US$ Million)	Share in value in India's imports of Polyether (2019)
China	(-) 81.7	83.4	17.2%
Singapore	(-) 57.7	78.8	16.2%
Saudi Arabia	(-) 55.6	58.1	12.0%
South Korea	(-) 50.1	55.6	11.5%
USA	(-) 42.5	54.7	11.3%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Polyether is widely used in industries like automobiles, and used as an essential raw material for rubber processing, pipe insulations, and brake fluids.

Acrylic Polymers

In 2019, a significant trade deficit of US$ 418.3 million was also registered for acrylic polymers[38]. Import demand for acrylic polymers in India has grown at an AAGR of 13.9 percent during the period 2010 to 2019, as against the average growth of 3.3 percent in the world imports during the same period. China and Japan, together, catered to more than half of India's import demand for acrylic polymers in 2019.

Owing to the wide variety of properties that can be achieved – like UV resistance, adhesiveness and broad tensile balance, acrylic polymers find use in every market where water-based systems are used.

[38]HS 390690: Acrylic polymers, in primary forms (excluding polymethyl methacrylate)

Table 2.18: India's Top Trading Partners Contributing to Trade Deficit for Acrylic Polymers (2019)

Country	Trade Balance (US$ Million)	Import (US$ Million)	Share in value in India's imports (2019)
China	(-) 195.2	196.6	37.9%
Japan	(-) 69.7	69.7	13.4%
South Korea	(-) 33.3	33.9	6.5%
Netherlands	(-) 32.4	32.7	6.3%
Singapore	(-) 25.5	26.2	5.0%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Products with High Import Dependence on China

China was the largest import source for India's plastic sector in 2019, accounting for 19.3 percent of the total imports amounting to US$ 2.8 billion. It is to be noted that India's plastic imports from China registered a higher AAGR of 16.7 percent during the period 2010 to 2019 against the 8.3 percent average annual growth of total plastic imports by India, during the same period.

Articles of Plastics[39]

China accounted for 32.8 percent of India's total imports of articles of plastics in 2019, amounting to US$ 267.1 million. During the period 2010 to 2019, India's imports of articles of plastics from China registered an AAGR of 13.4 percent, against the AAGR of 7.5 percent registered for the total imports of articles of plastics by India. India's overall trade deficit for articles of plastics was recorded at US$ 229.5 million in 2019, substantially higher from the deficit of US$ 157.3 million recorded in 2010.

[39]HS 392690: Articles of plastics and articles of other materials of heading 3901 to 3914, n.e.s (excluding goods of 9619)

Table 2.19: India's Top Trading Partners Contributing to Trade Deficit for Articles of Plastics (2019)

Country	Trade Balance (US$ Million)	Import (US$ Million)	Share in value in India's imports (2019)
China	(-) 260.7	267.2	32.8%
South Korea	(-) 72.3	73.1	9.0%
Hong Kong	(-) 67.5	68.6	8.4%
Germany	(-) 34.4	57.3	7.0%
Japan	(-) 32.7	44.2	5.4%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Product-wise, articles of plastics also accounted for the highest trade deficit of US$ 260.7 million between India and China arising from the plastic trade in 2019, substantially higher from the deficit of US$ 109.1 million recorded in 2010.

Non-Cellular Plastics[40]

China accounted for 19.3 percent of India's total imports of non-cellular plastics in 2019, amounting to US$ 244.7 million. During 2010-19, India's imports of non-cellular plastics from China registered an AAGR of 57.1 percent, against the AAGR of 25.3 percent registered for the total imports of non-cellular plastics by India.

Table 2.20: India's Top Trading Partners Contributing to Trade Deficit for Non-Cellular Plastics (2019)

Country	Trade Balance (US$ Million)	Import (US$ Million)	Share in value in India's imports (2019)
China	(-) 240.2	244.7	57.6%
Hong Kong	(-) 92.0	95.4	22.5%
USA	(-) 21.4	24.3	5.7%
South Korea	(-) 14.3	14.3	3.4%
Vietnam	(-) 10.0	11.5	2.7%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

[40]HS 392099: Plates, sheets, film, foil and strip, of non-cellular plastics, n.e.s., not reinforced, laminated, support ed or similarly combined with other materials, without backing, unworked or merely surface-worked or merely cut into squares or rectangles (excluding self-adhesive products, floor, wall and ceiling coverings of heading 3918 and sterile surgical or dental adhesion barriers of subheading 3006.10.30)

Non-Cellular plastics accounted for a trade deficit of US$ 240.1 million between India and China in 2019, substantially higher from US$ 29.7 million recorded in 2010.

It is to be noted that India's imports of non-cellular plastics were relatively lower from Japan, world's largest exporter of the good, accounting for over 30 percent of the world exports in 2019.

Challenges and Strategies

Production Linked Incentives and Infrastructure Creation

As India's plastic industry strives towards creating additional manufacturing capacity to achieve self-reliance in the plastics industry, it is suggested that the government should introduce the production linked incentive (PLI) scheme,to support the plastic industry, along the similar lines as was introduced for the electronics sector in May 2020. The scheme proposes a financial incentive to boost domestic manufacturing and attract large investments across the entire value chain. It also provides for an incentive of 4 percent-6 percent on incremental sales of the goods manufactured in India, enabling India to emerge as a viable alternative to giants like China in the medium term.

Give thrust to the PCPIR policy to reduce logistics costs

India's plastic manufacturers have long been a subject to inefficiencies arising on account of rising logistics cost. For instance, ethylene is an important chemical used widely across the production of polymers. It is suggested that developed petrochemical infrastructure can greatly reduce logistics cost if the intermediary feedstock like ethylene is sourced through pipeline.

In India, these products are shipped across long distances involving huge logistics cost which makes domestic manufacturers uncompetitive compared to international counterparts. In this regard, it is important to give thrust to the Petroleum, Chemicals and Petrochemicals Investment Region (PCIPR) policy to boost investment that helps reduce the logistics cost for domestic manufacturers and ensures the timely availability of inputs.

Capacity Creation for Raw Material

It is noted that a large fraction of the PVC produced in India is based on imported ethylene dichloride (EDC) or vinyl chloride monomer (VCM). While the increasing demand-supply gap for these raw materials has created room for new capacities but lack of ethylene availability has deterred most Indian

petrochemical manufacturers from planning new manufacturing facilities. It may be noted that by itself, ethylene is used either alone, as in the production of polyethylene, or in reaction with other chemicals, as in the production of polyvinyl chloride, polystyrene, and polyester resins and a variety of other derivatives used in applications such as manufacturing of detergents, antifreeze, adhesives, and lubricants. In this regard, it is important to focus on designing schemes to incentivize investments in ethylene production.

Entering into Comprehensive Economic Partnership Agreements

It is noted that India's plastic industry is in a dire need of a comprehensive economic partnership agenda focusing on technology transfer and investments besides the trade. To achieve real self-reliance, while the country will need to incentivize innovation, research and development to keep India at the cutting edge of the industry, it is also important to relook at the existing trade agreements to ensure a check on the balance of payments as well as technology sharing. It is, therefore, suggested that the government may forge partnerships with major importers of plastic like the USA, Germany, and Mexico, that are strong in plastic manufacturing technology, but still would depend on imports, for manufacturing in India. It is to be noted that, together, these three countries comprised of 41 percent of the world imports in 2019, more that 10 percent of which was sourced from China. In addition, China's share in the USA's total imports of plastic increased from 28.5 percent in 2010 to 32 percent in 2019.

As the Government of India looks to partner with countries in its drive to achieve self-reliance in the plastics industry, it is also important to look at regions like EU and CLMV which comprised of 33.4 percent and 2.6 percent of the world imports of plastics in 2019. During 2010-19, while the imports of plastics by the EU grew at an AAGR of 2.9 percent, the same by CLMV registered an AAGR of 12.8 percent.

Further, it is equally important to recalibrate the design of the FTAs to which India is a signatory, in order to eliminate the possibility of Chinese repackaged goods entering the domestic market through India's FTA partner countries. The government may also focus on the mechanisms through which India can create a globally competitive plastics sector that can demand market access in India's partner countries.

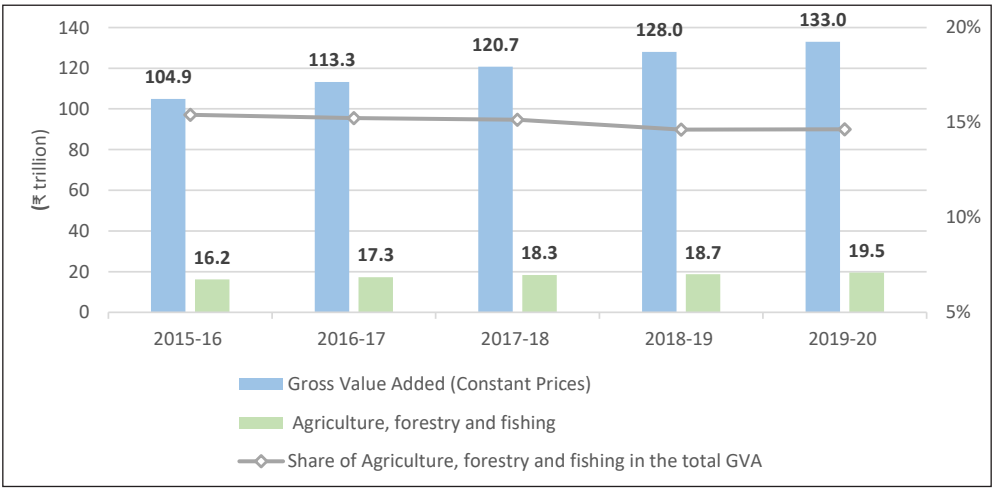
PULSES AND EDIBLE OILS

Background

India has nearly a tenth of world's arable land and a fifth of world's irrigated land. More than 58 percent of the rural households depend on agriculture as their principal means of livelihood. The Indian food and grocery market is the world's sixth largest, with retail contributing to 70 percent of the sales.

The GVA at constant basic prices by the agriculture; forestry; and fishing sector in absolute terms was recorded at ₹ 19.5 trillion in 2019-20, up from ₹ 18.7 trillion in 2018-19, as per the latest estimates. As a result, the average annual growth rate registered by this sector in the last five years was 4.8 percent, with the highest rate being recorded in 2016-17 at 6.8 percent. The sector contributed 15 percent to the total GVA at constant prices in 2019-20.

Exhibit 2.13 Contribution of Agriculture to India's GVA



Source: Data accessed from Ministry of Statistics and Programme Implementation; India Exim Bank Research

India's Trade in Agriculture and Allied

Exports

India's exports of agricultural and allied products[41] were valued at US$ 33.9 billion in 2019, recording a negative year-on-year growth of (-) 1.5 percent. However, exports of agricultural and allied products registered an AAGR of 9 percent during 2010 to 2019, against the average growth of 5.3 percent registered by India's overall exports during the same period.

Some of India's major exported products in 2019 under the agriculture and allied sector were rice (20.1 percent), crustaceans (13.8 percent), frozen meat (9 percent), cane or beet sugar and chemically pure sucrose (5.1 percent), and fixed vegetable fats and oils[42] (2.8 percent).

Imports

On the other hand, India's imports for agriculture sector were registered at US$ 19.3 billion in 2019, up from US$ 12.4 billion in 2010, thereby recording an AAGR of 5.9 percent, during this period. This is higher than the AAGR of 4.6 percent, registered by India's overall imports, during the same period.

Analysis shows that India's major imported products under this category in 2019 were palm oil and its fractions (28 percent), soya-bean oil and its fractions (11.7 percent), sunflower-seed, safflower or cotton-seed oil and fractions (9.3 percent), dried leguminous vegetables or pulses (8 percent), and coconuts, Brazil nuts and cashew nuts[43] (6 percent).

Trade Balance: Case of Pulses and Edible Oils

While India registered a trade surplus in the agriculture and allied sector of almost US$ 14.5 billion in 2019, it registered a deficit of US$ 10 billion for pulses and edible oils in the same year. With regards to trading partners for pulses and edible oils, the highest deficit of US$ 2.6 billion was noted against Indonesia, of which US$ 2.3 billion, arose on account of crude palm oil[44], alone.

[41]HS 1-23

[42]HS 1006, HS 0306, HS 0202, HS 1701, and HS 1515, respectively

[43]HS 1511, HS 1507, HS 1512, HS 0713, and HS 0801, respectively

[44]HS 151110

Table 2.21: India's Trade Balance for Pulses and Edible Oils (2010-19)

Pulses		Edible Oils	
Country	**Trade Balance (US$ Million)**	**Country**	**Trade Balance (US$ Million)**
Canada	(-) 430.6	Indonesia	(-) 2675.6
Myanmar	(-) 344.7	Malaysia	(-) 2268.6
Tanzania	(-) 132.0	Argentina	(-) 1788.2
Mozambique	(-) 115.1	Ukraine	(-) 1550.1
Brazil	(-) 58.8	Nepal	(-) 249.8

Source: Data accessed from ITC Trade Map; India Exim Bank Research

A notable narrowing of India's trade deficit in pulses and edible oils was registered from US$ 14.5 billion in 2017 to US$ 10.1 billion in 2019. During this time, the trade balances for items like crude palm oil (-US$ 4.6 billion in 2017 to -US$ 3.6 billion in 2019), crude soya-bean oil[45] (-US$ 2.7 billion to -US$ 2.2 billion), and pulses (-US$ 3.7 billion to -US$ 1.4 billion), have shown significant improvement.

The trade in edible oil was moderately balanced by marginal surplus generated by select items like castor oil (US$ 856 million), sesame oil (US$ 22 million) and crude groundnut oil[46] (US$ 20 million) in 2019.

Exports of Pulses and Edible Oils

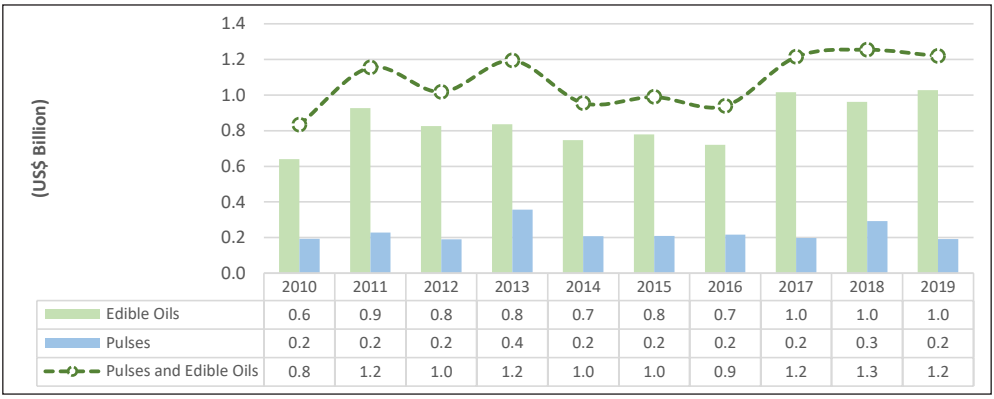
Particularly, with reference to Pulses and Edible Oils[47], India's exports were recorded at US$ 1.2 billion in 2019, registering an AAGR of 5.8 percent during the period 2010 to 2019.

[45]HS 150710

[46]HS 151530, HS 151550, and HS 150810, respectively

[47]HS 1507 – 1515

Exhibit 2.14: India's Export of Pulses and Edible Oils (2010-19)



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Edible Oils	0.6	0.9	0.8	0.8	0.7	0.8	0.7	1.0	1.0	1.0
Pulses	0.2	0.2	0.2	0.4	0.2	0.2	0.2	0.2	0.3	0.2
Pulses and Edible Oils	0.8	1.2	1.0	1.2	1.0	1.0	0.9	1.2	1.3	1.2

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Table 2.22: India's Exports: Pulses and Edible Oils (2019)

Pulses			Edible Oils		
Total Exports of Pulses: US$ 191.5 million; Total Exports of Edible Oils: US$ 1 billion					
Export Destinations	**Export (US$ Million)**	**Share in Total Exports**	**Export Destinations**	**Export (US$ Million)**	**Share in Total Exports**
Algeria	31.5	16.4%	China	393.5	38.3%
USA	24.7	12.9%	Netherlands	151.9	14.8%
China	19.0	9.9%	USA	103.5	10.1%
Sri Lanka	16.0	8.4%	France	78.3	7.6%
Bangladesh	12.8	6.7%	Thailand	31.5	3.1%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Imports of Pulses and Edible Oil

India's imports of pulses and edible oils were valued at US$ 11.3 billion in 2019, recording a year-on-year growth of 1 percent.

Table 2.23: India's Imports: Pulses and Edible Oils (2019)

Pulses			Edible Oils		
Total Imports of Pulses: US$ 1.5 billion; Total Imports of Edible Oils: US$ 9.7 billion					
Import Sources	Import (US$ Million)	Share in India's Total Imports of Pulses	Import Sources	Import (US$ Million)	Share in India's Total Imports of Edible Oils
Canada	439.3	28.3%	Indonesia	2679.2	27.6%
Myanmar	344.7	22.2%	Malaysia	2278.7	23.4%
Tanzania	132.1	8.5%	Argentina	1789.0	18.4%
Mozambique	115.2	7.4%	Ukraine	1551.0	16.0%
Brazil	58.8	3.8%	Nepal	251.9	2.6%

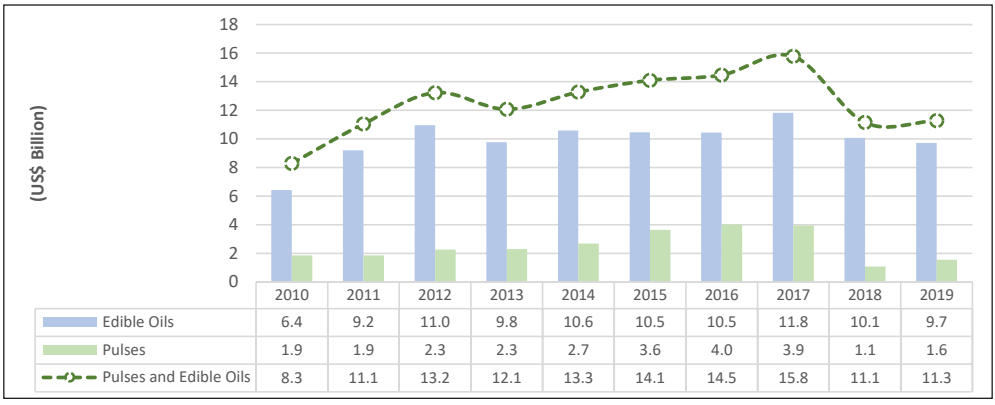
Source: Data accessed from ITC Trade Map; India Exim Bank Research

The cumulative imports of pulses and edible oils, on the other hand, registered an AAGR of 4.9 percent during the period 2010 to 2019, reaching US$ 11.3 billion. Within this category, the imports were largely dominated by edible oils.

Products with High Import Dependence

Indonesia and Canada were the largest import sources of edible oils and pulses, respectively, for India during 2019. It is to be noted that during 2010 and 2019, while India's imports of edible oils grew at an average rate 5.9 percent, the imports of pulses grew at a higher AAGR of 6.2 percent.

Exhibit 2.15: India's Import of Pulses and Edible Oils (2010-19)



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Edible Oils	6.4	9.2	11.0	9.8	10.6	10.5	10.5	11.8	10.1	9.7
Pulses	1.9	1.9	2.3	2.3	2.7	3.6	4.0	3.9	1.1	1.6
Pulses and Edible Oils	8.3	11.1	13.2	12.1	13.3	14.1	14.5	15.8	11.1	11.3

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Crude Palm Oil

Crude palm oil accounted for the highest share in India's edible oil imports in 2019, amounting to US$ 3.5 billion. India is not a significant producer of crude palm oil, and thus, imports serve as a major source to meet the demand. It is important to note that India was the largest importer of crude palm oil in 2019, accounting for 37.9 percent of the world imports. Also, while the world imports of crude palm oil have registered a negative average growth of (-) 1.5 percent, that of India's has grown by 2.1 percent during 2010 and 2019.

As can be seen, crude palm oil was imported only from the five trading partners – Indonesia, Malaysia, Singapore, Thailand, and Papua New Guinea. Imports of crude palm oil from other major exporters like Guatemala, Colombia, and the Netherlands remained muted during 2019.

Table 2.24: India's Top Import Sources for Crude Palm Oil (2019)

Country	Import (US$ Million)	Share in value of India's imports of Crude Palm Oil (2019)
Indonesia	2352.9	66.1%
Malaysia	933.6	26.2%
Singapore	179.1	5.0%
Thailand	88.8	2.5%
Papua New Guinea	5.7	0.2%
Others	0.9	0%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

With effect from January 2020, the import duty on crude palm oil was brought down from 45 percent to 37.5 percent under the ASEAN agreement and India-Malaysia Comprehensive Economic Cooperation Agreement (MICECA). The reduction in difference of duty between crude and refined palm oil to 15 percent is likely to make the imports of refined palm oil more attractive in 2020.

Crude Soya-bean Oil

India's imports of crude soya-bean oil were valued at US$ 2.2 billion in 2019, registering a substantial average growth of 10.5 percent during the period 2010 to 2019, against the negative AAGR in world imports of (-) 0.8 percent. Like crude palm oil, this has also been classified in the category where the global import demand in the last ten years has been weak and the India's exports exhibited relatively lesser competitiveness compared to other exporters.

Table 2.25: India's Top Import Sources for Crude Soya-bean Oil (2019)

Country	Import (US$ Million)	Share in value in India's Total Imports of Crude Soya-bean Oil (2019)
Argentina	1680.1	76.0%
Brazil	222.4	10.1%
Switzerland	202.7	9.2%
Netherlands	40.2	1.8%
Ukraine	33.0	1.5%
Others	31.5	1.4%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

India's import of the crude soya-bean oil was largely concentrated with Argentina and Brazil in 2019. Notably, in the last ten years, imports from the USA and China have declined rapidly and amounted to zero from 2014 onward.

Safflower Oil

India's imports of safflower oil[48] were valued at US$ 1.7 billion in 2019, registering an average annual increase of 16 percent during 2010 and 2019, almost double the average of world import growth. India's exports of safflower oil have remained substantially lower than the imports, resulting in a huge trade deficit.

During the period 2010 to 2019, while India's import of safflower oil has grown substantially from Ukraine and Russia, the imports from the USA and Australia have fallen drastically. India's imports of safflower oil from other major exporters like the Netherlands, Bulgaria, and Hungary also remained low.

Table 2.26: India's Top Import Sources for Safflower Oil (2019)

Country	Import (US$ Million)	Share in value in India's Total Imports of Safflower Oil (2019)
Ukraine	1517.7	84.5%
Russia	157.4	8.8%
Argentina	108.7	6.1%
Romania	6.9	0.4%
Cyprus	3.6	0.2%
Others	0.4	0.1%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

[48]HS 151211: Crude sunflower-seed or safflower oil

Dried Shelled Lentils

Pulses accounted for a trade deficit amounting to US$ 1.3 billion in 2019, lower than the deficit of US$ 1.6 billion recorded in 2010 and the spike of US$ 3.8 billion recorded in 2016. It is important to note that India was the world's largest importer of Pulses in 2019, accounting for 16.9 percent of the world imports. Also, while the world imports of pulses have registered an average growth of 2.2 percent, the same for India has grown by 6.2 percent, during the period 2010 to 2019.

In particular, the highest trade deficit of US$ 331.4 million was registered for Dried shelled lentils[49] in 2019, substantially higher from the deficit of US$ 208.6 million registered in 2010.

Table 2.27: India's Top Import Sources for Dried Shelled Lentils (2019)

Country	Import (US$ Million)	Share in value in India's imports of Dried Shelled Lentils (2019)
Canada	273.7	79.1%
Australia	33.6	9.7%
USA	27.4	7.9%
Turkey	6.5	1.9%
Singapore	2.5	0.7%
Others	2.6	0.7%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

As can be seen, dried shelled lentils were imported largely from the five trading partners – with the highest import dependence on Canada. It is to be noted that while India was the largest importer of dried shelled lentils in 2019, Canada was the largest exporter of the same – accounting for 54 percent of the world exports.

Challenges and Strategies

Integrating into Global Value Chains

Nearly 70 percent of international trade today involves global value chains (GVCs). India witnessed an increase in overall foreign value-added share of gross exports from 18.8 percent in 2005 to 25.1 percent in 2011, indicating growing integration in the world production network. However, in the recent years, India's foreign value-added content of gross exports fell rapidly, declining by 9 percentage points from 25.1 percent in 2011 to 16.1 percent in 2016.

[49]HS 071340: Dried, shelled lentils, whether or not skinned or split

Regarding agriculture, forestry and fishing, while India's foreign value-added content of gross exports[50] registered an increase from US$ 64.9 million in 2005 to US$ 194.3 million in 2015, the forward linkages[51] increased from just 0.2 percent in 2005 to 0.3 percent in 2015.

Further, India's backward linkages[52] in the agriculture, forestry and fishing were recorded at 3.7 percent in 2015, up from 3.4 percent in 2005. It is to be noted that the backward linkages for countries like Hong Kong and Malaysia were as high as 24.4 percent and 14.4 percent respectively. This indicates India's relatively lower dependence on imports of intermediates for agriculture exports.

It may be noted that situations when forward linkages are greater than the backward linkages, there exist net value-added gains from integrating into GVCs. However, with regard to India's agricultural exports, backward linkages are substantially higher than the forward linkages. Efforts should be made to increase the GVC participation in agriculture, forestry and fishing through forward linkages with the global food processing industry.

Possibilities to Explore Agricultural Investments in CLMV Region

The Mekong region in nearby India, particularly Cambodia, Myanmar, Lao PDR, and Vietnam offers good opportunity for India in the agricultural sector. This is largely due to the abundance availability of land and water for cultivation throughout the year. India in this region can cooperate in boosting productivity by providing technology and agri-equipment, while sourcing its own needs as well.

However, to capture this potential, Indian Government would need to provide long-term assurance towards buying back the produce from these regions at a rate not less than the minimum support price for the same produce in India. The Government also needs to have consistent policy regarding import of these two key products, viz., pulses and edible oils.

As pulses are not consumed substantially by the local population in countries such as Lao PDR, there is limited knowledge in the country with regard to agricultural practices for pulses. Indian investors could be encouraged to invest in agro-cultivation through strategic tie-ups with local producers and share the expertise in the cultivation of pulses. Under the collaborative model, India

[50]Represents the foreign value added embodied in the exports by domestic industry in country

[51]Calculated as domestic value added embodied in foreign exports as a share of gross exports, forward linkages represent the extent of a country's integration with the world through the export of inputs

[52]Calculated as the share of foreign value-added share of gross exports, backward linkages describe the integration of an economy with the world through imports of intermediates

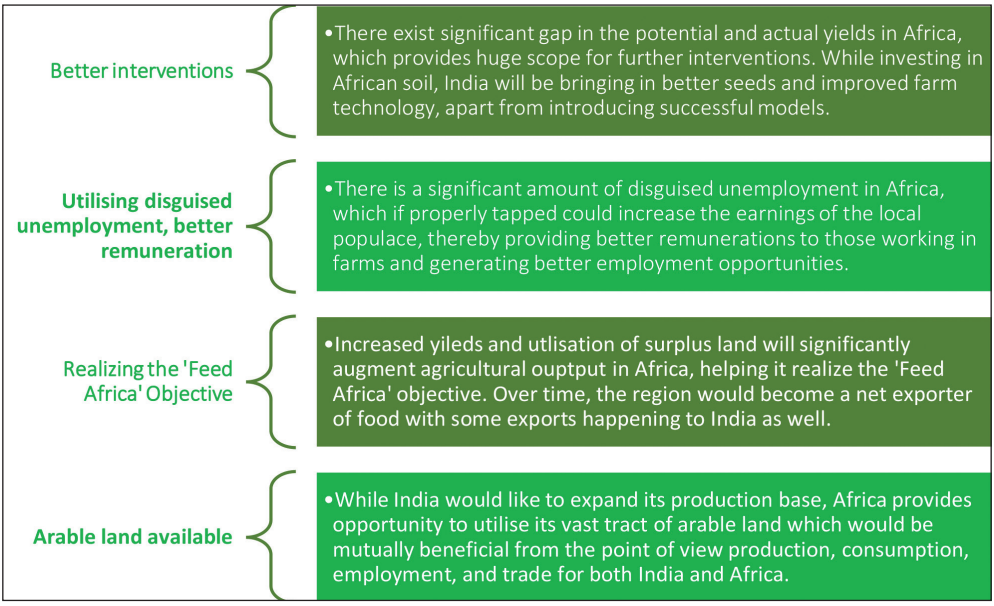
could also identify a network of farmers in these countries with the help of its Embassies / Missions or local agents and help them with seeds and other requirements for pulses cultivation.

India has already made some headwinds in nearby Myanmar, and imports beans & pulses apart from timber from the country. An India-Myanmar Advanced Center for Agricultural Research and Education has also been opened at the Yezin Agricultural University (YAU) in Nay Pyi Taw to develop advanced agricultural methods.

Investments in Agriculture Farms in Africa

The Government of India has been encouraging outward FDI in agriculture in Africa which would not only help Indian companies to purchase land abroad for cultivation but will also help serve the local communities by creating employment opportunities, enhancing productivity, thereby resulting in increased income generation for the local population. These efforts would help Africa in serving its objective of becoming a self-sufficient region in food production, while India is able to cater to its import needs.

Exhibit 2.16: Win-Win situation for India-Africa Cooperation in Farm Investments



Source: India Exim Bank Research

A study by Land Matrix, a global land monitoring initiative that tracks land dealings worldwide, placed India eighth in a list of countries by the amount of land acquired abroad. In recent years, Indian investors have acquired large chunks of land abroad for agricultural investments. In Ethiopia, Indian companies have acquired 6,00,000 hectares. For example, Emami Biotech (part of the Emami group) had acquired 100,000 acres of land in Ethiopia to cultivate edible and non-edible oil seeds and cereals like gram, maize, sunflower, and soybean. Recent offers by African governments allow Indian farmers to acquire much larger tracts of contiguous land on lease for 50 years, and in some cases even up to 99 years.

According to Financial Times database, fDi Markets, India's total envisaged capex in Africa's agribusiness, during 2010-19, stood at US$ 99.2 million and created local jobs for more than 1,837 people across three projects. While two of these projects with an envisaged capex of US$ 77.8 million were done in Tanzania, one project with an envisaged capex of US$ 21.3 million was done in South Africa.

Table 2.28: Select Indian Companies Having Invested In African Agriculture

Indian Company	Country	Details
Karuturi Ago Products Plc.	Ethiopia	Acquired 1,00,000 ha in the Jakao and Itang Districts of the Gambela Region for growing palm, cereal and pulses, with conditional option to acquire another 200,000 ha. Karuturi Ago Products is a subsidiary of Karuturi Global Ltd.
Ruchi Soya Industries	Ethiopia	Acquired 25-years lease for soyabean and processing unit on 152,649 ha in Gambela and Benishangul Gumaz States.
Verdanta Harvests Plc.	Ethiopia	Acquired a 50-years lease for 5,000 ha in the Gambela region for a tea and spice plantation.
Chadha Agro Plc	Ethiopia	Acquired up to 100,000 ha in Guji Zone in Oromia Regional State for a sugar development project.
Sterling Group	Argentina	Purchased a 2,000-hectare olive farm and another 17,000 ha for graining peanuts.
Olam International	Gabon	Acquired 300,00 ha in Gabon for palm oil.
Varun International	Madagascar	Subsidiary Varun Agriculture Sari leased or purchased 232,000 ha to grow rice, corn and pulses.
Uttam Sucrotech	Ethiopia	Won a US$ 100-million contract to expand the Wonji-Shoa sugar factory.
McLeod Russel India	Uganda	Purchased tea plantations worth $25 million, including Uganda's Rwenzori Tea Investments; McLeod Russel India is owned by BM Khaitan.
Neha International	Ethiopia	Leased land in the Oromia region- in Holetta for floriculture and near Bako for rice, maize, oilseeds and pulses.

Sannati Agro Farm Enterprise Pvt. Ltd.	Ethiopia	Acquired a 25-years lease on 10,000 ha in Dimi District, Gambela Region, for the cultivation of rice, Pulses, and cereals.
Jay Shree Tea & Industries	Rwanda, Uganda	Acquired two tea plantations in Rwanda and one in Uganda; Jay Shree Tea & Industries is controlled by BK Birla.
BHO Bio Products Plc.	Ethiopia	Acquired 27,000 ha to grow cereal, pulses and edible oil crops.

Source: Land Matrix

Diversifying its Import Needs

In order to become self-reliant, India should also focus on diversifying its import needs. For example, in the case of palm oil, it may be noted that while Indonesia and Malaysia contribute to 84 percent of the global production of palm oil, countries such as Thailand, and Nigeria are also important producers of the same. India may explore the possibility of collaborative arrangements with these countries. In fact, Nigeria plans to increase its palm oil production by 700 percent over the next eight years to help improve its foreign-exchange earnings that are largely dependent on crude oil exports. In this regard, Nigeria can be attractive destination to invest in, and India could reduce its huge dependence on nations such as Indonesia and Malaysia and diversify its sourcing options.

RARE EARTH ELEMENTS

Background

The rare earth elements (REEs) are a set of 17 metallic elements. These include the 15 lanthanides on the periodic table plus scandium and yttrium. The rare earth elements are all metals, and as a result, they are often termed as the “rare earth metals”. However, these metals are very difficult to mine because it is unusual to find them in concentrations high enough for economical extraction.

Availability and securing such rare goods are of paramount importance for the long-term security of the country. It is pertinent to note that manufacturing of products across industries such as defence, aerospace, electronics, electrical equipment, including renewable energy, is highly dependent on the rare earth elements (REEs).

It will not be out of place to mention that India had taken cognizance of such a need soon after its independence, with the Government of India establishing the Indian Rare Earths Limited as early as in the year 1950.

While the status of REEs is well known, the extraction of the same is highly complex. This complexity arises not just due to the economic viewpoint but also the various environmental and radioactive risks associated with it. In fact, the US was one of the first countries to have taken the step for the extraction of REEs from its Mountain Pass mine in California.

It is important to note that high-tech manufactured goods including the products in the electronics industry are some of the most demanded goods in the world. Given that China has the largest reserves and was ready to incur the risks associated with the extraction of the REEs, the world, including India, became increasingly dependent on China, especially in the last few decades.

While China has remained a key supplier of REEs, there are concerns related to single-source dependency for such crucial minerals.

Reserves and Production

According to the United States Geological Survey (USGS), the total world reserves of the REEs were estimated to be around 120 MT in 2018. Out of the 120 MT, China alone accounted for 37 percent of the global reserves and is followed by Brazil and Vietnam at 18 percent each.

Table 2.29: Global Reserves of Rare Earth in '000 tonnes

Country	Global reserves of rare earth	Share in world reserves
China	44,000	36.7%
Brazil	22,000	18.3%
Vietnam	22,000	18.3%
Russia	12,000	10.0%
India	6,900	5.8%
Australia	3,300	2.8%
Greenland	1,500	1.3%
USA	1,400	1.2%
Tanzania	890	0.7%
Canada	830	0.7%
South Africa	790	0.7%
Other countries	4,080	3.7%
World total (rounded)	**120,000**	100%

Source: USGS; India Exim Bank Research

The total global production of rare earth was recorded at 170,000 tons in 2018, and has come a long way in the last two decades when the production stood at 64,000 tons in 1994 – exhibiting an average annual growth rate of 40.5 percent. The share of China in global production of REEs has increased from 47.4 percent in 1994 to as high as 97.7 percent in 2010 before falling back to 70.6 percent in 2018.

Trade

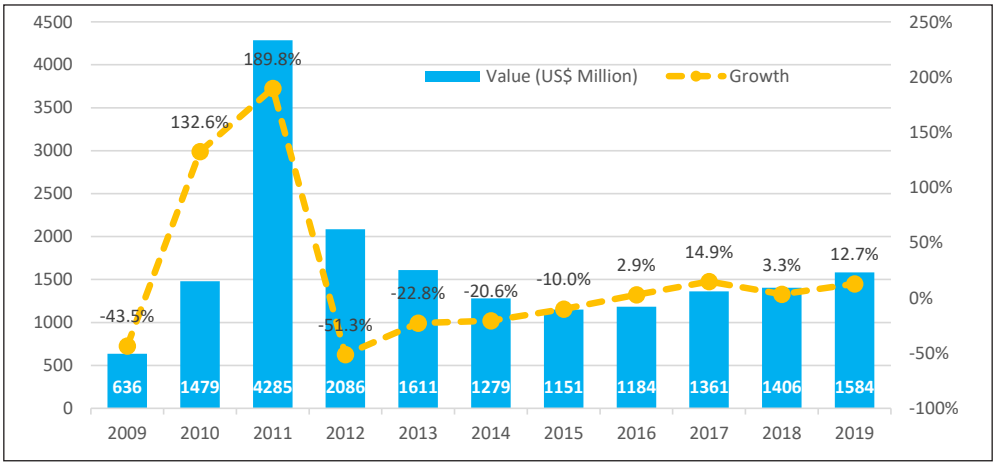
The trade of the REEs is evaluated by taking into account two items, namely, Earth-metals, rare; scandium and yttrium, whether or not intermixed or inter-alloyed[53], and Compounds, inorganic or organic, of rare-earth metals; of yttrium or of scandium or of mixtures of these metals[54].

The global exports of REEs were registered at US$ 1584.2 million in 2019, up from US$ 635.8 million in 2009, recording an AAGR of 25.1 percent, during this period.

[53]HS 280530

[54]HS 2846

Exhibit 2.17: Global Exports Of Rare Earth Elements (US$ Million)

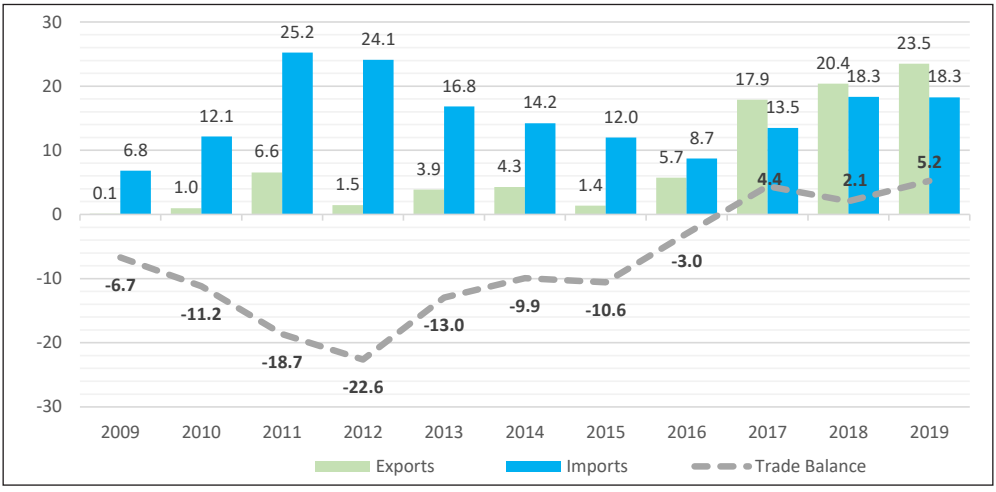


Source: Data accessed from ITC Trade Map; India Exim Bank Research

The top exporters in 2019 were China (28 percent); Malaysia (16 percent); Japan (14 percent); Vietnam (10 percent); and Myanmar (9 percent).

With respect to India's trade in REEs, India's exports of REEs were recorded at US$ 23.5 million in 2019, up from US$ 0.1 million in 2009. During the same period, the imports increased from US$ 6.8 million to US$ 18.3 million. Further, while India was registering trade deficits consistently during the last few years, the country registered a trade surplus during 2017 (US$ 4.4 million), 2018 (US$ 2.1 million), and 2019 (US$ 5.2 million).

Exhibit 2.18: India's Trade In Rare Earth Elements (US$ Million)



Source: Data accessed from ITC Trade Map; India Exim Bank Research

India's exports of the rare earth elements have been quite erratic, both with respect to their value as well as the export destinations. In terms of consistency, Japan has been one of the major export destinations for India. Japan's share in India's total exports of RREs in the last few years has mostly been in the double digits. In 2019, Vietnam was the largest exporting destination for India with a share of 32 percent, followed by Japan at 28 percent.

Dependency on China

With the advent of colour televisions in the world, the USA started exploiting its Mountain Pass Mine in California for REEs. Europium was the main element for the colour images in the TVs and the Mountain Pass Mine produced Europium from bastnasite, which contains 0.1 percent Europium. This led to the USA being the largest producer of REEs in the world in 1960s.

However, China entered the REEs market and began producing since 1980s. The other economies in the world could not really compete with China in terms of the mining cost. China further strengthened its position with a rising demand for REEs in the industries like defence, consumer electronics, amongst others. In fact, China evolved as not just the largest producer of REEs but also its largest consumer of the same.

With respect to India's dependency on China, it may be noted that China's share in India's imports of REEs was 44.3 percent in 2009 (from 31 percent in 2004) which reached as high as 49 percent in 2014.

However, the dependency gradually reduced, and China's share was registered at 26.4 percent in 2019, lower than that of Japan, whose share was at 30.5 percent in the same year.

Further, China's dominance in the world market can be noted from the fact that its trade surplus was recorded at US$ 173 million in 2019. The same was registered at US$ 274 million in 2009 and went as high as US$ 2600 million in 2011. The high value in 2011 was due to the reason that this was the time when China brought down the export quota, due to which the quantity exported reduced and the price rose. Therefore, in value terms, exports from China to world increased by almost 184 percent in 2011.

India's need for REEs

The Government of India intends to increase the share of manufacturing in India's GDP to 25 percent by 2022, up from the present range of 14 percent-16 percent. It may also be noted that the share of high-tech exports in India's total

manufactured exports is less than 10 percent. In order for India to achieve the manufacturing target of 25 percent in national GDP, the country will have to focus on the domestic manufacturing activity in various industries and this will further be dependent upon securing the availability of various critical minerals.

- Electric Vehicles: Government of India announced an outlay of ₹10,000 crore for Phase 2 of the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles, or FAME 2 scheme in 2019, to boost electric mobility and increase the number of electric vehicles in commercial fleets. Government has a target of 30 percent of vehicles in India as electric vehicles by 2030. A number of different types of vehicle design utilise electricity for drive. Common to these designs are electric motors and batteries, both of which contain critical metals. While a number of competing battery technologies exist, lithium-based battery chemistries are the current batteries of choice for electric vehicle manufacturers. Many electric motors use high-powered magnets in their design. These magnets contain neodymium and dysprosium, which are both rare earth elements often cited as critical metals[55].

- Renewable Energy: Ahead of COP 21, India submitted its Intended Nationally Determined Contribution (INDC) to the UNFCCC, outlining the country's post-2020 climate actions. India's INDC builds on its goal of installing 175 gigawatts (GW) of renewable power capacity by 2022. India has set a target to increase the country's share of non-fossil-based installed electric capacity to 40 percent of the total capacity by 2030. Most of the renewable energy sources such as solar, wind, and nuclear depend on components such as solar photovoltaic cells, turbines (geared or direct drive), and reactor control rods for efficient functioning of equipment. These components in turn, are manufactured from various minerals including copper, indium, boron, dysprosium, neodymium, and hafnium among others.

- Defence: India's requirements on defence are catered largely by imports. In fact, according to Stockholm International Peace Research Institute (SIPRI), India was the world's second largest importer of major arms during the period 2014-18, and accounted for 9.5 percent of the global total. For defence purposes, rare earth elements are found in two types of commercially available, permanent magnet materials. They are samarium cobalt (SmCo), and neodymium iron boron (NdFeB). NdFeB magnets are considered the world's strongest permanent magnets and are essential to many military weapons systems. SmCo retains its magnetic strength at elevated temperatures and

[55]Strategic Energy Technologies Information System, European Commission

is ideal for military technologies such as precision-guided missiles, smart bombs, and aircraft. The superior strength of NdFeB allows for the use of smaller and lighter magnets in defence weapon systems.

- Electronics: India's trade deficit in this industry was over US$ 47 billion in 2019-20. The Government of India's National Policy on Electronics, 2019 seeks to promote domestic manufacturing and export in the entire value-chain of Electronics System Design and Manufacturing (ESDM) for economic development to achieve a turnover of US$ 400 billion (approximately INR 26,00,000 crore) by 2025. In such a scenario, securing rare earth becomes even more important. Rare earths are metallic elements, and therefore contain unique properties, including high heat resistance, strong magnetism, and high electrical conductivity. These specific properties make them well suited for use in a variety of products, including cell phones, batteries, loudspeakers, lights, and magnets.

Possible Strategies to Secure REEs

India has been making efforts to domestically produce and manufacture products and make India more self-reliant. Such an approach gives the country a valid reason to increasingly looking at furthering the exploration securing REE assets. India's efforts toward securing a supply of such minerals, is crucial at a time when some countries are putting restrictions in export of rare earths as part of geo-political issues.

REEs are integrated into multiple industries that contribute to a nation's economy and security. Some of these elements are considered as strategic minerals because of their use in defence, energy, and other strategic sectors. The usage of rare earths in the manufacturing sector is growing, as also the growth in demand from the existing end-user sectors. Thus, it is important to develop a national strategy with regard to application, consumption, exploration of REEs in the domestic economy, as also its trade and mineral cooperation in the international arena.

As a way forward, India could explore through its diplomatic associations in other countries for collaboration in joint exploration activities and thereby securing REE assets within the country and abroad. It may be noted that in 2019, three Indian state-run companies, namely National Aluminium Company Ltd., Hindustan Copper Ltd., and Mineral Exploration Corporation Ltd., formed a joint venture (KhanijBidesh India) to explore mines in Argentina, Bolivia, Chile, and other countries for minerals used to produce EV batteries, besides building strategic reserves of tungsten, nickel, and rare earths.

It should also be noted that India has the fifth largest reserves of rare earth in the world. However, Indian companies are not investing in exploration activities domestically. Only a few private players like Cochin Minerals and Rutile Ltd (CMRL), Beach Minerals Co. Pvt. Ltd, V.B. Minerals, and Resins Pvt. Ltd etc. are operating in this sector. Though, at present, the demand is catered through imports, especially from China, there could be restrictions on export of rare earth, given the current circumstances. Thus, it is very essential to look at investments in the sector strategically.

Some of the possible strategies which India can adopt to secure its access of RREs would include:

1. Indian state-run companies can form joint venture to secure minor mineral assets such as lithium and cobalt that could fuel India's plan for mass adoption of electric vehicles by 2030. The learnings of International Coal Ventures Limited, jointly formed by SAIL, RINL, Coal India Ltd, National Mineral Development Corporation (NMDC), and NTPC Ltd. may be looked into while forming such strategic joint ventures.

2. Indian companies may look at opportunities for international collaborations in this space. The partnership could also be in the areas of joint exploration, and refining, and trading of critical minerals. Exploration should also be strengthened within the country as India is presumed to be having world's fifth largest reserves of REEs. With such collaborations and local manufacturing, the trade deficit of India could be reduced, especially in the areas such as electronics.

3. The country also needs to promote R&D in order to find better substitutes for priority minerals, as also in the recycling and material recovery areas.

4. A dedicated overseas strategic investment fund for the purpose of securing REE assets could be thought through, which could be housed and administered by a specialised government financial institution, akin to the Chinese model. The Fund's resources could be used for strategic investments by Central and State PSUs. The proposed fund could also become an arm of an existing financial institution with specialised operations in diverse areas.

5. While India today exhibits global aspirations to seek foothold across geographies, it is largely bereft of any such dedicated fund to boast of. However, the demand here is not to create a Sovereign Wealth Fund whose objectives are to get better returns from its investments, amongst other purposes. The argument here is for establishing a strategic fund which facilitates India's investments overseas in critical areas.

Exhibit 2.19: Learnings from other countries for India

Source: India Exim Bank Research

The way ahead essentially means to finalise a course of action. There are several Indian manufacturing companies both in private and public sector which have the wherewithal to secure India's needs. A suitable and a concerted strategy could secure India's aspirations in the long run.

SOLAR CELLS AND MODULES

Background

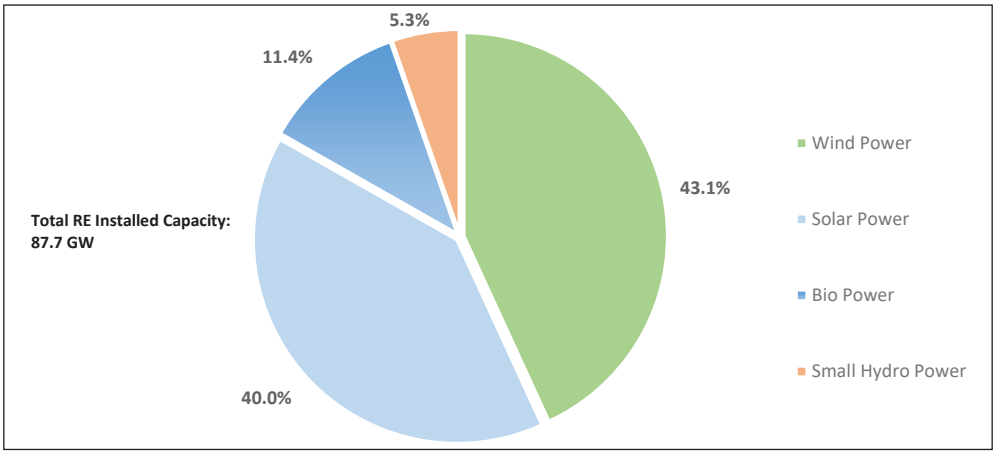
Over the last decade, renewable energy sector in India has emerged as a significant player in the grid connected power generation capacity. The total installed power capacity in India was recorded at 371.1 GW as on June 2020, with a generation mix of thermal, hydro, renewable, and nuclear energy.

Renewable energy sources accounted for 23 percent of India's total installed capacity at 87.7 GW, in June 2020. During this time, wind power had the highest share of 43.1 percent in India's renewable energy mix, followed by solar power at 40 percent. Notably, with regards to total installed capacity for renewable energy, India ranked fifth, globally – after China, the USA, Brazil, and Germany.

It is to be noted that as a part of its Paris Agreement commitments, the Government of India has set an ambitious target of achieving 175 GW of renewable energy capacity by 2022. These include adding 100 GW of solar capacity and 60 GW of wind power capacity. The Government, further, plans to establish renewable energy capacity of 500 GW by 2030, in line with its target of renewable energy accounting for 55 percent of the total installed power capacity by 2030.

Beyond this, the Government has also announced a 'One Sun One World One Grid' vision for India to replicate its global solar leadership by encouraging the phased development towards a single, globally connected, electricity grid to leverage the multiple benefits of ever-lower-cost renewable energy.

Exhibit 2.20: Renewable Energy Mix in India



Source: International Renewable Energy Agency; India Exim Bank Research

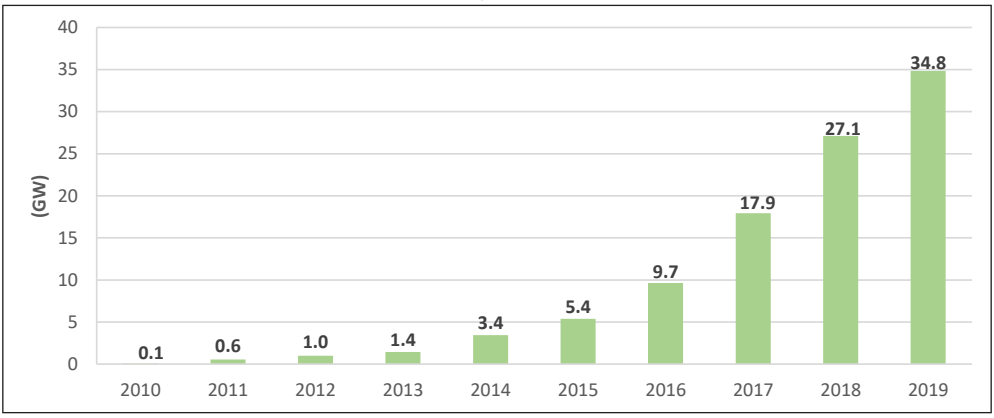
Production

India has low conventional energy resources compared to its required energy needs driven by huge population and rapidly increasing economy. With regards to solar energy, India is endowed with a vast potential. Most parts of the country have about 300 sunny days. As a result, India gets approximately 5000 trillion kWh/year equivalent of solar energy which is much more than India's total energy consumption.

As per IRENA, India's installed capacity of solar photovoltaic reached 34.8 GW in 2019, substantially higher from a meagre 0.1 GW in 2010. The electricity generated by solar photovoltaic in India was recorded at 30,707 GWh in 2019, up from 65 GWh in 2010.

A target has been set to commission 175 GW of renewable energy capacity by the year 2022 which includes 100 GW of Solar (utility scale, distributed, off-grid/mini-grid), 60 GW of Wind (utility scale), 10 GW of Bioenergy (Biomass & Bagasse), and 5 GW of Small Hydro. As on June 2020, the total grid connected installed capacity from renewable energy sources is 87.6 GW[56].

Exhibit 2.21: Installed Capacity of Solar Photovoltaic (2010-19)



Source: International Renewable Energy Agency; India Exim Bank Research

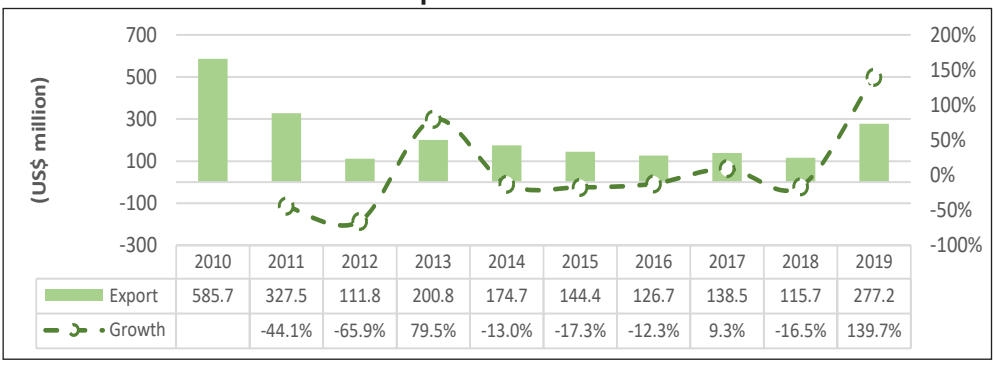
[56]Central Electricity Authority

Foreign Trade

Exports

India's exports of photovoltaic cells[57] were recorded at US$ 277.2 million in 2019, substantially lower from US$ 585.7 million in 2010, and registering an AAGR of 6.6 percent during this period.

Exhibit 2.22: India's Export of Photovoltaic Cells: 2010-19



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Export	585.7	327.5	111.8	200.8	174.7	144.4	126.7	138.5	115.7	277.2
Growth		-44.1%	-65.9%	79.5%	-13.0%	-17.3%	-12.3%	9.3%	-16.5%	139.7%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

With regards to export destinations, the exports were significantly concentrated, in 2019, with the USA accounting for 70.4 percent of India's total exports of photovoltaic cells, followed by Vietnam and UAE with a share of 7.6 percent and 6.9 percent, respectively.

During 2010 and 2019, while the USA emerged as the leading export destination for photovoltaic cells by India, the share of Germany in India's total exports of photovoltaic cells decreased substantially from 28.2 percent in 2010 to 0.1 percent in 2019. Similarly, a notable proportionate decrease in India's export of photovoltaic cells to Italy was also noted, from 24.4 percent in 2010 to 0.1 percent in 2019.

During 2010 and 2019, while India's total merchandize exports grew at 5.3 percent on an average, the same for photovoltaic cells was approximately 6.6 percent. However, India has remained a net importer of photovoltaic cells in the last ten years and registered a trade deficit of US$ 2.1 billion in 2019.

[57]HS 854140: Photosensitive semiconductor devices, incl. photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes (excluding photovoltaic generators)

Table 2.30: India's Major Export and Import Markets for Photovoltaic Cells: 2019

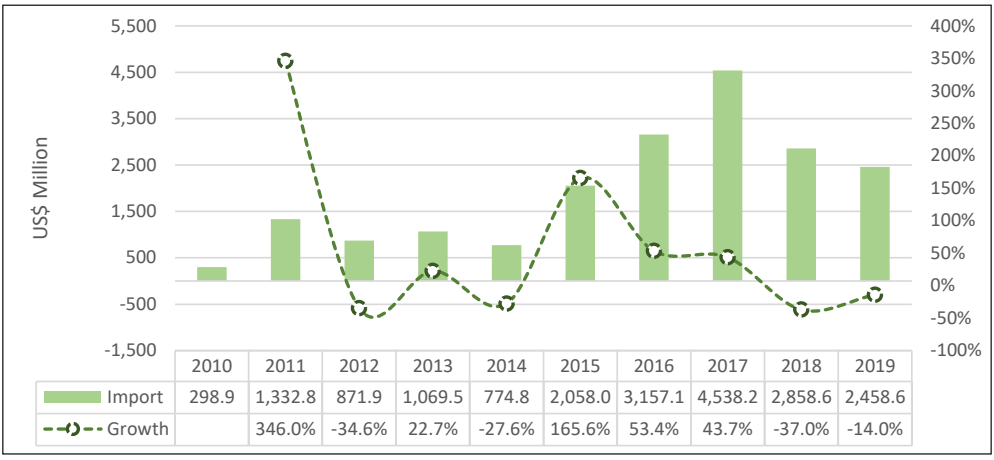
Total Exports: US$ 277.2 Million; Total Imports: US$ 2458.5 Million					
Export Destinations	**Exports (US$ Million)**	**Share in Total Exports of PV Cells**	**Import Sources**	**Imports (US$ Million)**	**Share in Total Imports of PV Cells**
USA	195.1	70.4%	China	1814.9	73.8%
Vietnam	21.1	7.6%	Vietnam	171.6	7.0%
UAE	19.1	6.9%	Thailand	135.8	5.5%
Belgium	7.0	2.5%	Singapore	102.4	4.2%
Turkey	6.2	2.2%	Hong Kong	92.4	3.8%
Others	28.7	10.4%	Others	141.4	5.7%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Imports

During 2010 and 2019, India's imports of photovoltaic cells exhibited an erratic trend, registering an AAGR of 57.6 percent - from US$ 298.9 million in 2010 to US$ 2.4 billion in 2019. The highest annual growth in imports of Photovoltaic Cells at 346 percent was recorded in 2011.

Exhibit 2.23: India's Import of Photovoltaic Cells: 2010-19



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Import	298.9	1,332.8	871.9	1,069.5	774.8	2,058.0	3,157.1	4,538.2	2,858.6	2,458.6
Growth		346.0%	-34.6%	22.7%	-27.6%	165.6%	53.4%	43.7%	-37.0%	-14.0%

Source: Data accessed from ITC Trade Map; India Exim Bank Research

It is to be noted that more than 70 percent of India's imports of photovoltaic cells in 2019 were sourced from China, up from 28 percent in 2010. During 2010 and 2019, the share in India's import of photovoltaic cells from Vietnam and Thailand, too, witnessed a steady increase while that from the USA, Germany, and Malaysia registered a sharp decline.

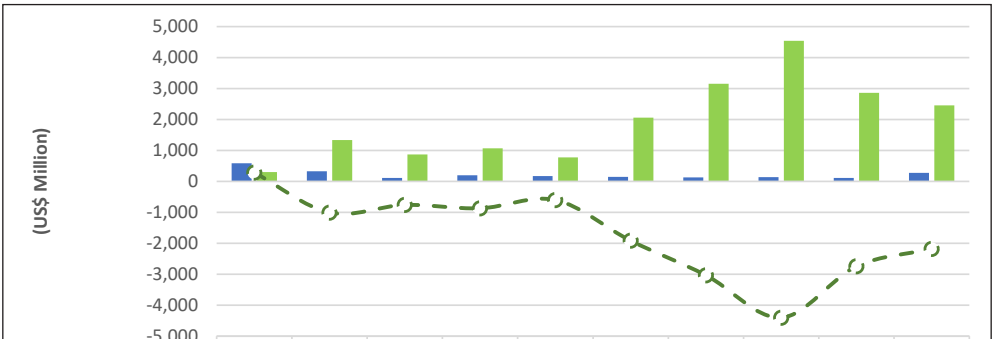
In order to protect the domestic solar manufacturers, a safeguard duty was imposed on solar cells and modules imported from China and Malaysia in July 2018. As a result, while imports of solar cells and modules from China registered an average decline of (-) 25.5 percent during 2018 and 2019, the imports from Malaysia fell even more drastically by an average of 74.5 percent during the same time.

Trade Balance

Overall, for the photovoltaic cells, India's trade deficit amounted to US$ 2.1 billion in 2019, substantially higher from the surplus of US$ 0.2 billion in 2010.

With regards trading partners, while China was India's largest import source for photovoltaic cells in 2019, it also accounted for the largest trade deficit of US$ 1.8 billion.

Exhibit 2.24: India's Foreign Trade of Photovoltaic Cells: 2010-19



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Export	585.7	327.5	111.8	200.8	174.7	144.4	126.7	138.5	115.7	277.2
Import	298.9	1,332.8	871.9	1,069.5	774.8	2,058.0	3,157.1	4,538.2	2,858.6	2,458.6
Trade Balance	286.9	-1,005.3	-760.1	-868.7	-600.1	-1,913.6	-3,030.4	-4,399.7	-2,743.0	-2,181.4

Source: Data accessed from ITC Trade Map; India Exim Bank Research

High Import Dependence on China

As has been noted earlier, China was the largest import source for photovoltaic cells by India in 2019, accounting for 73.8 percent of the total imports amounting to US$ 1.8 billion. It is to be noted that India's photovoltaic cells imports from China registered a higher AAGR of 90 percent during the period 2010 to 2019 against the 57.6 percent average annual growth in total import of photovoltaic cells by India, during the same period.

It is observed that solar panels imported from China cost less, about US$ 0.16 - US$ 0.20 per watt, compared to domestic modules (US$ 0.25-US$ 0.28 per watt) or those imported from South Korea (US$ 0.22- US$ 0.24).

China was also the world's largest exporter of photovoltaic cells in 2019, with exports amounting to US$ 23.6 billion. It is to be noted that China's share in the world exports of photovoltaic cells increased from 34.4 percent in 2010 to 41.2 percent in 2019.

Challenges and Strategies

As the Government of India strives to change its energy mix and achieve its ambitious target of 100 GW of solar energy by 2022, it is important to address the following challenges.

Dependency on China

India's dependency on China for sourcing photovoltaic cells has increased significantly over the years. In order to reduce this import dependence on China, as the domestic manufacturers expand the manufacturing capacity, an extension of the safeguard duty on solar cells and modules is required. Even though the duty was first imposed in July 2018 for a period of two years to support domestic manufacturers, it did not result in any major benefit to Indian manufacturers. In addition, a proposed Basic Customs Duty (BCD) on imports of solar cells and modules from China is further expected to supplement the imposition of safeguard duty. Notably, as was the case with regard to safeguard duty, the government has assured the project developers that the additional burden of BCD will be passed on the end-consumers.

Further, to stimulate the demand for solar cells and modules in the market, mandatory uptake of domestically manufactured solar devices in the State and

Central Government offices is also suggested. The mandate could support the Government's initiative to encourage public sector companies to set up more renewable energy projects in the coming years.

Incentivizing Domestic Manufacturers

There are various components used in the manufacturing of solar PV cells. Two of the most critical components are silicon wafers and ingots that go into manufacturing solar cells and modules. However, India does not have manufacturing facilities for these components which are largely imported from China. China is the largest producer of these components globally.

The Government of India can explore the possibility of providing the viability gap funding (VGF) to projects setting up solar wafer and ingot manufacturing facilities. VGF, which is usually a grant, one-time or deferred, provided to support infrastructure projects that are economically justified but fall short of financial viability, would be helpful to promote manufacturing of solar wafers and ingots.

Mobilizing Investments

Investment in renewables needs to gain impetus if the targets are to be met and their great potential is to be tapped. The total envisaged capex in India's solar electricity space during the period 2010 to 2019 was recorded at US$ 21.4 billion[58]. However, achieving the central government's ambitious target of 500 GW of renewable energy by 2030 requires capacity installation of 36 GW annually. This, in turn, requires further capital flow from both Indian and international investors.

The recent downgrading of India's sovereign credit rating highlights increased risk for global investors and poses a threat for attracting more investment into the renewable energy sector. The government needs to undertake reforms and strengthen the supervision, regulation, and capitalization of the financial sector to boost investor confidence.

While it is known that the world is critically dependent on China for PV cells and batteries, it is also important to look at the two major determinants that have propelled China's solar industry's growth. First, a US$ 15 billion annual subsidy and second, a massive domestic solar programme, which attracted substantial investment in solar manufacturing capacities, making China a leader in the PV cell space. It is important to note that the subsidies offered by China for the

[58]fDi Markets

development of the solar sector are focused on the infrastructure requirements for the solar projects (both the large-scale solar power projects and the rooftop solar projects) and are therefore, compliant with the WTO norms.

In India's context too, it is crucial to mobilize investments to scale up both the existing equipment manufacturing capacities as well as to encourage new entrants in the market. Going ahead, it is also important to acknowledge that the solar industry will ride on new research, artificial intelligence, and Industry 4.0 led manufacturing, uptake of which will require investments in research and development as well. India, on similar lines of China, can attempt to come up with a financial package which has a targeted and focused approach for the creation of solar PV cell capacities in India and not just the solar power projects.

Targeting the Global Importers to Make in India

India imports around 4 percent of the global PV cells[59] imports. However, there are various nations which have a huge and a higher demand of these cells.

Some of the nations that can be targeted are the USA, the Netherlands, and Japan. The USA imports almost 14.3 percent of the global PV cells trade. Almost 33 percent of US imports are from Malaysia, followed by Vietnam (20 percent), and South Korea (9.2 percent). The case of the Netherlands and Japan is even stronger. The Netherlands imports around 7 percent of the global trade of PV cells while Japan imports around 6 percent. It may be noted that 63 percent of Netherlands' imports are from China while 61 percent of Japan's imports are from China.

India has been the flag bearer of International solar alliance and can possibly explore its diplomatic relations with these countries and enter into economic agreements to set up their plants in India and manufacture PV cells in India. This can lead to diversification of the imports of these countries rather than significantly being dependent on a single or two sources. At the same time, India will be able to benefit from an increased domestic capacity of PV cells and in the long run, can even emerge as a PV cell hub for the global players.

Given that make in India should also be made for the world, India would need manufacturing base and technology which is globally competitive. In this regards, technology sharing pacts can also be entered into with these nations other than providing them incentives such as tax holidays for setting up their plants in India.

[59]HS 854140

OTHER INDUSTRIES

STEEL

India is the world's second-largest steel producer, as on date. The growth in the Indian steel sector has been driven by domestic availability of raw materials such as iron ore and cost-effective labour. Consequently, the steel sector has been a major contributor to India's manufacturing output.

India's production of crude steel was recorded at 111.2 MT in 2019, up from 69 MT in 2010, thereby registering an AAGR of 5.5 percent during this period. India's share in the global crude steel production was 6 percent in 2019.

Further, India's apparent steel use[60] was 101.5 MT in 2019, a growth of 5 percent over 2018. However, India's apparent steel use per capita remains low as compared to the world average. While India's average steel use per capita was 74.3 kg in 2019, the world's steel use was 229.3 kg per capita.

Trade Deficit

India's exports of iron and steel[61] were recorded at US$ 17 billion in 2019, up from US$ 13.4 billion in 2010, an AAGR of 4.3 percent. On the other hand, the imports recorded an AAGR of 3.6 percent by growing from US$ 13.8 billion in 2010 to US$ 16.8 billion in 2019. As a result, India's trade balance which was in deficit of US$ 408 million in 2010, transformed into a surplus of US$ 201 million in 2019.

It may be noted that while India has a trade deficit of (-) US$ 2 billion in 'iron and steel' category, it has a surplus in the trade of 'articles of iron or steel' category (US$ 2.2 million). With respect to the trade deficit with some of the countries, India had the highest trade deficit in iron and steel industry with South Korea at US$ 2.5 billion in 2019. This was followed by China (US$ 2.3 billion) and Japan (US$ 1.3 billion). It may be noted that India's deficit in iron and steel with South Korea and Japan has almost doubled in the last decade, since it signed FTAs with these nations.

[60]Apparent steel use is obtained by adding up deliveries (defined as what comes out of the steel producer's facility gate) and net direct imports

[61]HS 72 and 73

Table 2.31: Iron And Steel Products With High Trade Deficit For India: 2019

Commodity	Trade deficit (US$ billion)	Major source countries for trade deficit with India
Flat-rolled products of alloy steel other than stainless, of a width of >= 600 mm	-1.4	China, South Korea, Japan
Tubes, pipes and hollow profiles, seamless, of iron or steel	-0.7	China, Japan, Mexico
Flat-rolled products of stainless steel, of a width of >= 600 mm	-0.6	Indonesia, South Korea, China
Other bars and rods of alloy steel other than stainless	-0.3	China, Japan, South Korea
Screws, bolts, nuts, coach screws, screw hooks, rivets etc.	-0.3	China, Japan, South Korea

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Challenges and Strategies

Reducing Dependence on China

India's total imports for iron and steel were US$ 16.8 billion in 2019, of this almost US$ 3 billion were from China, i.e., close to 18 percent. However, more dependency is seen in the imports of articles of iron and steel (HS 73) where US$ 1.7 billion were from China, out of the total US$ 5 billion imports.

It may be noted that India has a trade deficit of almost (-) US$ 2.3 billion with China in iron and steel. Some of the items where India has high trade deficit with China are 'Tubes, pipes and hollow profiles, seamless, of iron or steel[62]' (- US$ 541 million), 'Flat-rolled products of alloy steel other than stainless, of a width of >= 600 mm[63]' (- US$433.4 million), 'Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers, incl. spring washers, and similar articles, of iron or steel[64]' (- US$ 178 million), amongst others.

Having signed a few PTAs with countries like South Korea and Japan in the past, India may like to review the implications of such PTAs on the industry. Besides, Indian producers need to upgrade themselves to produce iron and steel at globally competitive prices and seek Government help in this regard. Indian steel producers need to modernise their plants with state-of-the-art technology in order to increase the productivity, improve quality and reduce maintenance costs. Some of the focus areas could be tubes and pipes, screw, bolts and nuts,

[62]HS 7304

[63]HS 7225

[64]HS 7318

stranded wires, ropes and cables, including stainless steels, amongst others. This can lead to lower dependence on imports from China in the long run in some of the segments.

Deficit with South Korea

India and South Korea entered into Comprehensive Economic Partnership Agreement (CEPA) in 2009 which came into effect on 1st January 2010. It may be noted that for India, this agreement didn't turn to be of much benefit. India's trade deficit in iron and steel with South Korea was (-) US$ 1.1 billion in 2009 and increased to (-) US$ 2.5 billion in 2019. With respect to steel products imported from South Korea, flat-rolled products of iron or non-alloy steel are majorly responsible for the trade deficit.

Other than strengthening the local capacities in these areas, India also needs to raise awareness on the utilisation of preferential tariffs. While the global utilisation of preferences is as high as 70 percent to 80 percent, India generally uses tariff preferences under FTAs only to the extent of 5-25 percent[65]. Better utilisation rate, in the long term, can increase India's exports and ultimately reduce the trade deficit.

Exploring the Safeguard Duty Route

The Indian authorities may possibly explore the route of safeguard duty on select countries and products in a rational way. In fact, safeguard duty in steel industry in recent times was imposed in March 2016 and had expired in phases between March and May, 2019. While the duty on coils was initially 20 percent of the landed value, that on sheets and plates was 8 percent ad valorem, minus anti-dumping duty payable.

Recently, in a petition filed with the Directorate General of Trade Remedies, the Indian Steel Association (ISA), on behalf of domestic steelmakers, argued that as a consequence of duties imposed by the USA, and consequently by the EU, Turkey and Canada, steel exports from some Asian countries are being diverted to India. As per the petition, steel exporters from South Korea, Japan, China, and ASEAN countries have diverted as much as 43 percent of the volume, or 1.2 MT, which they lost in market share in the US, into India.

Safeguard duty is a stop-gap arrangement and perhaps does not serve the intended purpose in the Indian context – the exercise, hence, may be futile. However, the time from the imposition of the safeguard duty to its expiry should be utilized in strengthening the domestic steel production.

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[65]Non-tariff Measures on Indian Exports, India Exim Bank

Boosting Per Capita Steel Consumption

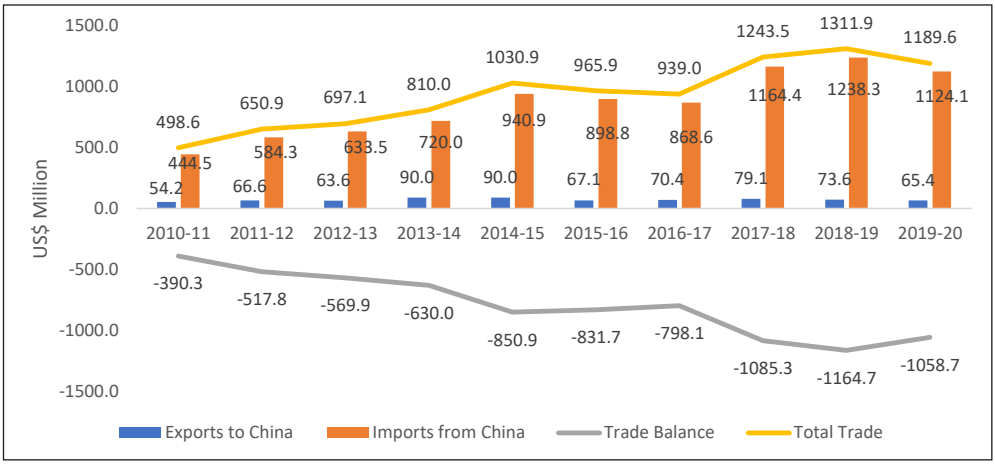
While India's production has achieved some significant milestones in the recent years such as reaching the 100 MT production and overtaking Japan to become the second largest producer in the world, the country is far behind when it comes to the per capita usage of steel. The per capita consumption of steel in India is just one-third of the global average. The National Steel Policy 2017 also targets to increase the per capita consumption to almost 158 Kgs by 2030-31.

The capacity utilisation of the steel industry in India is just over 75 percent and a significant scope is there to increase it. A twin approach may be adopted in this case where on the one hand, there is a massive government push on the infrastructure front which eventually increases the steel consumption in the country, which essentially could lead to increase in production.

AUTO COMPONENTS SECTOR

India has an overall trade surplus in the auto components industry, but depends significantly on China for its imports of certain critical components such as drive transmission and steering parts, cooling systems, suspension and braking parts. India's auto component imports from China accounted for 23.9 percent of India's total imports of auto components in 2019-20. Imports from China registered a consistent increase over the past few years, before witnessing a dip in 2019-20. The two major factors that make Chinese imports more competitive in Indian market are: a) technological competence limited to only a few manufacturers in India in various segments of components including parts of electronic vehicles; and b) the price competitiveness of Chinese manufacturers due to mass manufacturing.

Exhibit 2.25: Decadal Trends in India-China Trade in Auto Components



Source: DGCI&S; India Exim Bank Research

Strategies

Technology Upgradation Fund for the Auto Component Industry

The auto component industry is faced with several technology-intensive disruptions in the areas of emission level, safety, Industry 4.0, electric mobility, and increasing usage of automotive electronics, which enunciates the need to periodically upgrade technology in the auto component space. For instance, changes in emission norms that resulted in a shift from Bharat Stage IV (BSIV) to Bharat Stage VI (BSVI) is posing a challenge for Indian manufacturers of components due to the technology-intensive nature of the management modules of BSVI. Most of the technology used in these aspects is still imported and the Indian eco-system is striving hard to compete at the same level as internationally developed and scaled alternatives. Similarly, it is important for the Indian manufacturers to develop Indian solutions in the areas of Anti-lock braking systems (ABS) and airbag which have been made mandatory and are also highly import dependent. In order to incentivize the indigenization of such technology-intensive auto components, the Government could consider setting up specific technology upgradation fund for facilitating these upcoming technological changes. The resources of the Fund could be utilized for incentivising capital investments and low-cost funding.

Encouraging JVs for Technology Transfer

Auto components industry is highly fragmented with majority of the firms being Indian businesses, with relatively lower number of foreign firms and JVs operating

in the segment. However, one of the major challenges faced by the indigenous component manufacturers is the low-level of technology adaptation and R&D intensity. In order to stay competitive, indigenous manufacturers need to focus extensively on technology upgradation, digitization, and process automation. In this context, engaging in JVs with lead firms could play a pivotal role in helping companies in bridging the technology gaps. Several lead firms in India, including both Indian and foreign firms have made significant efforts towards technology upgradation over the years, including the use of advanced modular platforms, new materials, and platform sharing in India. Among Indian companies, Mahindra & Mahindra, and Ashok Leyland have made significant investment in R&D centres and technology development and testing centres. Meanwhile several global firms including Bosch, BorgWarner, Denso and Magneti Marelli have also been developing technology locally in India. In the past, there have been several successful cases of JVs between local players and lead firms, which have enabled acquisition of world class technologies and standards in short period of time. An interesting example is that of Sona Group, which had started a forging company in collaboration with the Mitsubishi Group and later entered into a joint venture with Koyo-Japan for manufacturing steering systems. Eventually, after developing adequate in-house technology, Sona Group has exited both the JVs. While there are multiple reasons for indigenous firms to engage in a JV with a lead firm, the key reason remains the access to technology and customer base. In this regard, the government could encourage more of such JVs in high-technology areas within the sector. The MAI program of the Govt. of India can include visits for scouting JV partners in high-technology areas in its scope of eligible activities.

Tax Rationalisation

Some of the auto-components are placed at the highest slab of GST in India. The GST rates for Internal Combustion Engines (ICE) based vehicles and their components are currently at the highest GST rate of 28 percent. Apart from this, the compensation cess levied on these items is in the range of 1-22 percent, which makes ICE based vehicles one of the highest taxed manufactured product in India. The automotive component industry also faces the challenge of two separate GST rates. While nearly 60 percent of auto components face a GST rate of 18 percent, the remaining face a 28 percent GST. The lack of a uniform GST rate for auto components sector creates disincentives for enhancing greater domestic production in some of the sub-segments with higher GST rates. The GST rate on auto components is higher than the MFN duty of 15 percent on several auto components. The tariffs are even lower for imports from countries

such as China, South Korea and Japan, which benefit from tariff concessions under various free trade agreements, with tariffs for some auto components being as low as 1.8 percent. Further, in the case of electric vehicles, the components of EVs face much higher GST at 18 percent and 28 percent, while EVs face a GST of 5 percent. As such, there is limited indigenisation in EV manufacturing, with about 60–70 percent of the EV components being imported, including batteries and power electronics. In order to promote indigenization of auto components by attracting investments in key areas such as batteries and domestic power electronics, as also to develop robust domestic capabilities in the EV space, it is important to streamline the taxes and duties on auto components, including EV components. An essential step in that direction would be to consider rationalizing the GST levied for auto components from the current levels of 18-28 percent to 5-12 percent. Further, in order to complement the Government's initiatives to promote domestic manufacturing of EVs, the government could consider rationalizing GST on EV components to 5 percent, bringing it at par with the GST for EVs.

STRENGTHENING THE ECO-SYSTEM FOR INDIGENISATION

The preceding sections highlight the sector-specific strategies for boosting productive capacities in the sectors of high import dependence for India. But there are certain cross-cutting strategies which can incentivize indigenization across the entire manufacturing sector. The government has been proactively undertaking several policy measures in the recent years for improving the overall eco-system for manufacturing in the country, including lowering the corporate tax rate for new manufacturing companies, introducing a uniform GST regime, undertaking reforms for improving ease of doing business in the country, and attracting investments in the country through the Make in India initiative. Nevertheless, there still remains scope for improving the competitiveness of manufacturing in the country vis-à-vis other competing nations such as China.

ATTRACTING FOREIGN INVESTMENTS

While the government has brought out several policies to attract and encourage investments to boost the manufacturing and exports, it is important to foster an investment ecosystem whereby global lead firms are incentivized to invest and upscale their operations in India. This would entail a focussed approach involving sector-specific investment promotion strategies, which are also WTO compatible.

Sectors and sub-sectors vary in terms of their production, technological, organizational and market conditions. As a result of these sector-specific conditions, certain sectors tend to have relatively fewer and larger firms (mega firms) with nearly no scope for small companies; while other sectors comprise relatively larger number of small and medium size companies, alongside a few big ones. Additionally, the scale, distribution, composition and elasticity of demand also matter in shaping sectoral differences. Such intra-sectoral heterogeneity necessitates tailored policy incentives for investment which are reflective of the specific needs of the sectors. Recognizing the need for such specific incentive schemes, the Government of India has come up with comprehensive sector-specific incentives for electronics, semiconductors, bulk drugs and API, food processing, among others, in the recent months.

Going forward, given that the fiscal allocations for these schemes are substantial, the Government of India should focus mainly on sectors where India lacks domestic capacity and would require foreign investment, especially in areas where it is not already forthcoming despite easing FDI norms.

In order to identify target sectors for promoting investments, a model of revealed comparative advantage for FDI has been used, as follows

$$\text{RCA-FDI} = \frac{(\text{Volume of FDI into country i in industry x/ Volume of world FDI in industry x})}{(\text{Volume of FDI into country i/ Volume of total world FDI})}$$

Wherein a score greater than unity indicates that the country has a revealed comparative advantage in the sector for inward FDI, while a score less than unity indicates that the country has a revealed comparative disadvantage in the sector for inward FDI.

Using this method, the sectors of renewable energy, food and beverages, plastic, pharmaceuticals, and biotechnology have been identified for targeting greater investments through appropriate incentives (Table 3.1). Some of these sectors have “producer-driven” value chains, wherein there are a few lead firms which control the design of products as well as most of the assembly which is fragmented across different countries. In these sectors, there is a need for engagement with lead firms to understand the fiscal reforms and/ or incentives which could attract investments from these firms. In these producer-driven value chains, the import tariffs on components and inputs need to be reduced to create a favourable environment for investments by the lead firms. In the buyer-driven value chains, the focus should be on bringing the cost of domestic production of the items lower than the cost of imported items through punitive tariffs and trade related measures on imports of these products, along with WTO compatible subsidies for domestic production. This would encourage foreign companies to establish production capacities and benefit from the cost advantages.

Table 3.1: Target Sectors for Attracting Greater Foreign Investments

Industry Sector	FDI inflows in India – US$ Million (Cumulative between Jan-2003 to May 2020)	RCA-FDI
Renewable energy	43,022.9	0.9
Chemicals	18,573.4	0.5
Food & Beverages	17,210.3	0.6
Textiles	6,027.5	0.4
Semiconductors*	12,847.8	0.8
Plastics	3,227.1	0.4
Pharmaceuticals*	7,167.3	0.9
Paper, printing & packaging	2,196.1	0.3
Biotechnology	1,265.7	0.4
Wood products	337.5	0.1

*Note: *indicates that some sectoral policies are already in place*
Source: FDI Markets database; India Exim Bank Research

Ensuring WTO compatibility of incentives is a key point to be considered while devising sectoral schemes in these identified sectors. As per Article 3.1 of the Agreement on Subsidies and Countervailing Measures (ASCM) of the WTO, several sector specific schemes of India like EHTP, EOU, SEZ, EPCG Schemes that incentivize investments and exports, are prohibited. Given this, the Government must ensure that any new incentive framework for domestic players are aligned to the WTO guidelines. These could include production and capital investment incentives, R&D incentives, tax exemptions, interest subvention on capital investments, among others. Although subsidies for R&D, regional balances, and environmentally friendly technologies are also actionable, these have seldom been disputed, in part because developed countries often use them.

PUBLIC PROCUREMENT POLICY FOR BOOSTING DOMESTIC MANUFACTURING

Public procurement accounts for around 20-30 percent of India's GDP, making the Government an important buyer for the manufacturing companies. The Government has started utilizing its Public Procurement Policy to engender industrial investments in the country. This began with the introduction of purchase preference for domestic bidders who were allowed to match the price of the lowest bidder in global tenders and get the contract. The recent announcement by the Government further proposes inviting domestic bids from only those suppliers who do at least 50 percent value addition in India, if sufficient capacity

exists in the country in the sector under consideration. The Government has also disallowed global tender for procurement up to ₹200 crore. Although the WTO Agreement on Government Procurement places restrictions on some measures, India is currently not a signatory to this agreement (but is an observer).

There are several other changes which can be undertaken by the Government to ensure that the benefits percolate to the Indian manufacturing sector and encourages investment in innovation. Firstly, India can focus on quality in its procurement guidelines. Cue can be taken from the European Union's (EU) 2014 directive on public procurement, which focuses on a "price-quality ratio", moving away from a focus on price only. Public procurement contracts in the EU are awarded on acceptable trade-offs between price and quality, which authorities can gauge based on different contexts. Rigorous quality criteria are considered, including technical merit, qualification and experience of staff assigned to the contract. India can adopt a similar framework with quality considerations, to promote an ecosystem for innovation. In certain high technology sectors, the "swiss-challenge" method of procurement can also be a part of the procurement guidelines. This method has already been used by several state governments. Under this, bidders can make unsolicited proposals to the government. If found innovative and useful, the state can seek counterproposals from other bidders, with the original bidder retaining rights of first refusal.

There is also a need to introduce a separate law for public procurement. Presently the procurement is guided by the General Financial Rules (GFR) of the Ministry of Finance which comprises comprehensive rules and directives on financial management and procedures for government procurement. The GFR was initially implemented in 1947 and last modified in 2017, and outlines the principles for all government purchases, that must be adhered to, including specific rules on procurement of goods and services, and also contract management. In addition to this, there are also the Manual for Procurement of Goods, 2017 which consists of guidelines for the purchase of goods, and the Delegation of Financial Power Rules, 1978 which delegates the government's financial powers to various ministries and subordinate authorities, who will be responsible for ensuring efficiency, competition, transparency, and fair treatment of suppliers in public procurement. These administrative guidelines are supplemented by manuals and policies governing procurement by individual ministries and departments,

such as defence, telecom, railways[66] etc, as a result of which the procurement process is impacted by several different policies and manuals. There is a lack of comprehensive legislation to exclusively govern public procurement in the country. The absence of a central procurement legislation with enabling guidelines, policies, formats, and procedures for grievance redressal leads to ambiguity and procedural delays.

Although the Public Procurement Bill was introduced in 2012, with a view to regulate public procurement while ensuring transparency, accountability and probity in the procurement process, this bill was not passed in the parliament. In 2015, this bill was revamped by the Central Government, however, it was also not passed. Both versions of the bill had provisions for a robust internal machinery for grievance redressal. Existing constitutional provisions such as Article 282 provides for financial autonomy in public spending, but there is a lack of provisions to provide any guidance on public procurement principles, policies, procedures or for grievance redressal. A separate law, in this regard, can ease the bureaucratic challenges, and also encourage more companies to participate. Such separate laws exist in many countries like Brazil[67], France[68], UK[69], and the EU Public Procurement Law which governs the public procurement in the EU, aiming to ensure equal access and fair competition to all operators in the EU Member States to procurement opportunities within the EU[70].

The Government can also consider making the procurement processes more favourable to MSMEs. In this regard, the Government could consider unbundling large procurement contracts into several smaller ones. Such directives are in place in the EU, which require large public contracts to be divided into smaller batches, allowing SMEs to participate in large tenders. Unbundling large contracts can occur by dividing up and awarding several small lots at the same time, spreading the contract out over time to allow tendering for small amounts, or limiting the amount of work that can be done by a single firm[71].

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[66]Procurement Rule and Trends in India 2020, ICLG

[67]Public Procurement Law (Federal Law No. 8,666/93), applicable to the federal, state, and municipal entities

[68]Public Procurement Code, 2019, applicable to procurement contracts, concessions, and PPP contract

[69]Public Contracts Regulations 2015 for establishing rules relating to procurement of services, supply or work contracts by public bodies other than utilities; Utilities Contracts Regulations 2016, for procurement of services, supply or works contracts by utilities; and Concessions Contract Regulations, 2016 relating to procurement of services concessions and work concessions by public bodies.

[70]EU Public Procurement Rules 2020, ICLG

[71]Arrowsmith, Sue (2010). Horizontal policies in public procurement: a taxonomy. Journal of Public Procurement, 10 (2). pp. 149- 186.

THE ROLE OF STATE GOVERNMENTS IN IMPROVING BUSINESS CLIMATE

While Central Government initiatives to promote business-activities form an important aspect of the overall industrial development, these must be supplemented by state-level initiatives. As per the Seventh Schedule of the Constitution of India, industries are normally under the purview of the state governments except those which the Central Government declares to be expedient in the public interest. The federal structure in India empowers the states to design their own investment policies and sector-specific incentives to attract investments and promote industrial growth. Some states such as Andhra Pradesh, Karnataka, Maharashtra, Gujarat and Tamil Nadu have been progressive and made the business environment relatively conducive, by announcing an array of state-level incentives including SGST concessions, stamp duty exemptions, capital and interest subsidies, and reductions in power tariffs, among others. As a result, these States are among the largest recipients of cumulative FDI in the recent years. An analysis of the parameters of the Business Reform Action Plan (BRAP 2017-18)[72] indicates that most of the states with higher FDI inflows are those that perform exceptionally well as compared to the relatively less-performing states, in key parameters such as availability of land, obtaining electricity connection, obtaining utility permits, access to information and transparency enablers, contract enforcement, registering property, among others. Several states such as Punjab, Kerala, Goa and Himachal Pradesh, which offer investment incentives attract relatively lower FDI due to the business climate not being conducive in the states, as evinced by their relative ranking on the BRAP. Meanwhile several other states with relatively higher BRAP score also attract lower investments, possibly due to a less aggressive incentive structure for attracting greater investments. Therefore, it is essential for the State Governments to actively engage in improving ease of doing business in the States along with designing a sound incentive structure for enhancing industrial development.

[72]BRAP rank all the States/UTs in the country on the reforms undertaken by them on 372 action points. The aim of this exercise is to create conducive business environment by streamlining regulatory structures and creating an investor-friendly business climate by cutting down red tape.

Table 3.2: State-wise FDI Inflows in India – Top 20 States

Destination State	FDI Inflows in US$ Million (Jan 2003 to May 2020)	% Share in total FDI Inflows	BRAP Score (2017-18)
Maharashtra	97,862.9	14.0	92.88
Karnataka	82,153.2	11.7	96.42
Tamil Nadu	66,486.0	9.5	90.68
Gujarat	54,407.0	7.8	97.99
Andhra Pradesh	40,736.2	5.8	98.30
Telangana	35,028.7	5.0	98.28
Haryana	32,834.0	4.7	98.06
Delhi	22,848.7	3.3	31.69
Rajasthan	20,649.4	2.9	95.70
Odisha	20,438.5	2.9	92.08
Uttar Pradesh	18,315.8	2.6	92.89
Kerala	14,936.1	2.1	44.82
West Bengal	14,178.7	2.0	94.59
Chhattisgarh	11,134.4	1.6	97.31
Madhya Pradesh	10,842.9	1.5	97.30
Jharkhand	8,450.5	1.2	98.05
Punjab	8,272.6	1.2	54.36
Himachal Pradesh	3,420.3	0.5	87.90
Uttarakhand	2,574.2	0.4	94.24
Goa	2,313.6	0.3	57.34

Source: FDI Markets Database, DPIIT;India Exim Bank Research

RECALIBRATING FTAs/PTAs

Industry players opine that India's tariff concessions to several of its FTA/PTA partner countries have put the domestic manufacturers at a disadvantage. The analysis of preferential tariffs in FTAs indicates that India's tariffs have fallen and are low under several FTAs across all stages of processing, but tariffs remains relatively higher in case of raw materials/ intermediate inputs, which creates a type of inverted duty structure. Further, there is some sort of an "Unequal Exchange" in India's FTAs in terms of tariffs. During 2016-2018, the cumulative share of preferential imports from all FTAs in total imports of India stood in the range of 16-17 percent. The cumulative share of preferential imports by India in its imports from FTA/RTA partners is particularly high in the case of Afghanistan, Bangladesh, Sri Lanka, Nepal, South Asian Association for

Regional Cooperation (SAARC), Japan and Chile. However, the cumulative share of preferential imports of these FTA/RTA partners in their imports from India is much lower. For instance, in the case of Singapore, the cumulative share of preferential imports from India in Singapore's total imports from India is negligible, as Singapore's MFN tariffs were already low. Analysis indicates that the cumulative preferential tariffs (weighted) is much lower than the MFN tariffs on India's import from all FTA partner countries except for APTA, while in India's FTA partners' side, the cumulative preferential tariffs are closer to MFN tariffs in all cases except South Korea, APTA and MERCOSUR. This shows that the margin of preference given by India to its FTA partners is higher than the margin of preference given by them to India except mainly in the case of South Korea and APTA.

In this regard, the government could consider renegotiating existing FTAs/ PTAs in a manner that addresses the issues of inverted duty structures, and also allows greater market access for India's finished goods. The basic principle of graded duties – higher duties for finished goods, medium for intermediate inputs and lower duties for raw materials – must be considered across various sectors during such negotiations for giving greater impetus to domestic production. Given the stiff competition from the imports under some of the existing FTAs/ PTAs, the Government should also explore the possibility of having a 'graduation clause' for the developing country FTA partners, a 'sunset clause' on some concessions, and a 'trigger mechanism' in case the imports surge from a particular country for a given product. Further, negotiations for newer FTAs, such as those with Australia, New Zealand, the EU, the USA, and the UK, among others, must be carefully undertaken, taking into account the sensitivities of the domestic industries, particularly those that are already impacted negatively by the existing FTAs. Electronics and agricultural sectors should be kept in the exclusion list to the extent possible. The objectives of 'Make in India' and the interests of sensitive items particularly in the agricultural sector should be kept in mind while rationalizing tariffs in future FTAs.

PROMOTING R&D AND AN INNOVATION-FRIENDLY ECOSYSTEM

Promoting innovation and R&D could be a key game-changer for India to attain self-reliance in manufacturing. A strategy of strengthening the innovation system would not only promote indigenization of complex technology products, but would also be highly complementary for integrating and upgrading within GVCs.

Fund allocation for incentivising R&D could be increased, along with introduction of other suitable policy interventions to promote R&D, such as reinstating greater

Income Tax deduction on expenditure incurred on R&D. Before 2016-17, the Central government provided a weighted tax deduction of 200 percent for any capital and revenue expenditure incurred on in-house R&D by a company, excluding expenditure on land and buildings. The Finance Act, 2016 restricted the availability of expenditure incurred on scientific research to 150 percent from April 1, 2017 and no weighted deduction from April 1, 2020. Reinstating this tax incentive would be important to boost the R&D spending. Government could also consider providing dual tax credit allowances system that rewards both incremental expenses in R&D, as well as the level of spending in R&D, as provided by countries such as Canada.

The Government of India has recently lowered the corporate tax rate to 22 percent from the earlier rate of 30 percent for all companies, which is an encouraging move. However, the specific provisions under the new tax regime forces the companies to relinquish any other tax incentives including the tax exemption under Section 35 (2AB) for R&D purposes in order to avail the lower corporate tax rate. This has brought out significant disincentives for companies engaged in R&D as the tax concession under section 35 (2AB) comprised expending capital as well as operating expenditure for scientific research at 150 percent. This exemption allowed companies to enhance their capex on R&D. Hence, the Government could consider allowing the tax exemption on R&D under Section 35 (2AB), in addition to the lower corporate tax rate of 22 percent, in order to incentivize domestic companies in innovating new technology, product development and related processes.

The Government could also consider subsidising the cost of commercialising new innovations, for enhancing the market for domestically produced innovative goods. This would entail interlinking the demand for innovative solutions across industries to the manufacturers of such innovative goods through appropriate incentives. The Government could explore policies that incentivize industry efforts to invest in innovation and develop new products. In select high technology sectors, the Government could consider incentives such as providing support of up to 50 percent of expenditure for pilot production projects, partial reimbursement of expenses on equipment procured for the purpose of R&D, reimbursement of expenditure incurred on developing prototype products etc. Such enabling provisions would help promote R&D in high technology sectors, facilitate innovation and develop capacity in innovative products.

The foundations of an innovative ecosystem lie in research institutes that can assist in technology transfer and adaptation, as also facilitate development of resources that can be used by local firms for upgrading their production

processes. Such institutions can also provide technical advice on specialized technology/ machinery, its use and maintenance, offer training and other capacity building measures in the areas of quality control, safety management etc. In several sectors, such institutes already exist, but need more funding to become effective and/or do not have sufficient linkages with the local industry. Creating the space for local industry, foreign investors, research institutes and other intermediaries to interact and identify local capacity needs would be helpful in targeting limited resources towards areas where demand exists. Facilitating such interaction among these key stakeholders can improve the dynamism of the domestic innovation system. In this regard, establishing a permanent collaborative platform for integrating and upgrading technology solutions would be essential, with partnership among the academic institutions, research institutions and the industry.

CAPACITY BUILDING OF INDUSTRIAL CLUSTERS

Industrial clusters often aim to provide specialized infrastructure and services that can be used by clustered firms, thereby reducing their individual investment needs. Clusters also benefit from technological/ knowledge spillovers arising from geographical proximity, development of specialized skills and possibilities for flexible specialization. Clusters also facilitate better integration into GVCs as enterprises that participate in clusters, including SMEs, have the ability to join GVCs through the external linkages developed by the cluster. Moreover, enterprises can also achieve high level of competitiveness if they work in a cluster environment as this ensures complementarities, availability of common facilities, and collaboration through collective activities, including collective sourcing and marketing. Clusters can also engender adequate exportable surplus from entities which are otherwise unable to export on a standalone basis. In the Indian scenario also, development of clusters has proven to be advantageous in promoting the industrial growth across several industry sectors. There already exist a number of industrial clusters spread across an array of sectors in India, at various stages of development.

In order to ensure continued progress across these industrial clusters, an essential initiative would be to develop a mechanism for assessing the performance of these clusters, in order to review the current status of existing clusters as well as identify sectors/subsectors for developing newer clusters. Such an assessment must cover aspects pertaining to prevailing infrastructure bottlenecks, as well as challenges in technological upgradation, access to skilled human resources, environmental sustainability, etc. This would, however, require State-level support and collaboration, as majority of these clusters are developed through

State-level initiatives. The Central Government could incentivize the initiatives taken by the States to assess the clusters, through financial support; to cite an example, Studies could be supported by the Central Government under the Market Access Initiative (MAI) scheme. Upon assessment of the clusters, relevant capacity building activities can be undertaken by the State Government, including construction/ upgradation of physical infrastructure, building institutions, setting up of quality certification labs, common facility centres, design centres, and development of human resources, among others. State Governments could avail financial support for capacity building activities under the Micro & Small Enterprises - Cluster Development Programme.

IMPROVING THE EASE OF DOING BUSINESS

India has undertaken major reforms across various areas of doing business, evinced by the improvement in the country's ranking in the World Bank Ease of Doing Business Report, from 142nd in 2014 to 63rd in 2019. While there has been substantial improvement in India's scores across several areas of doing business, India still lags in areas such as enforcing contracts (163rd rank) and registering property (154th).

According to the World Bank Doing Business Report 2020, it takes 58 days and costs on average 7.8 percent of a property's value to get a property registered in India, which is longer and at greater cost than several developing countries. In Shanghai (China), for example, property registration takes 9 days and costs 4.6 percent of property value. Simplifying property registration and acquisition of land will therefore be important to further improve the business environment in the country.

The judicial processes for commercial disputes also need a major overhaul. It takes nearly four years for a company to resolve a commercial dispute through a local first-instance court in India, which is almost three times the average time in OECD high-income economies. Time taken to enforce a contract is also higher than other developing countries such as Indonesia, China and Brazil which require 1.2, 1.4 and 2.2 years, respectively. Clearly, there is a need to drive the reform agenda in the area of enforcing contracts.

Insufficient commercial courts, lack of digitization and the limited success of tribunals in reducing the burden on courts are some of the reasons for the low ranking on the parameter of enforcing contracts. India needs to leverage technology to improve procedural aspects of the legal processes. While the judiciary has tried to digitize the system over the past few years, litigants have

typically struggled to adapt to the new system. Notwithstanding the challenges, the COVID-19 crisis has reignited the push towards digitization of Indian courts. In the aftermath of the pandemic, the Hon'ble Supreme Court of India has developed a paperless module for commercial courts, where trial shall be conducted in a digital environment. This is expected to allow speedy disposal of commercial disputes. There is a need to launch such digitization drives at lower rungs of the judiciary as well.

Globally, Alternate Dispute Resolution (ADR) mechanisms have also proven to improve efficiency of court systems by reducing case backlogs and bottlenecks. India has also tried to incorporate ADR mechanisms but the arbitral tribunals continue to be plagued by interference from the judiciary. The New Delhi International Arbitration Centre Act, 2019 paves way for strengthening the ADR mechanisms in the country. Going forward, there is a need to expand the arbitration and mediation centres in the country and enhance the judicial capacity through specialized commercial courts at High Courts and District Courts, complemented by a conscious effort by stakeholders to reorient the way ADR mechanisms are perceived.

SKILL DEVELOPMENT

The advent of the Industry 4.0 is impacting and changing the industrial landscape, and with that, skill requirements, thereby forcing the government, industry, and academia to focus on developing skills like critical thinking, design thinking, creativity, sustainability, etc. among the workforce. According to the World Economic Forum's Future of Jobs 2018 report, more than one-half of India's workforce will need to be reskilled by 2022 to meet the demands of the Industrial Revolution 4.0.

Policy and implementation in a country like India cut across various dimensions. While a number of initiatives have been launched by the government, including the Skill India Initiative, establishment of the National Skill Development Council, and several Sectoral Skill Development Councils, it is important to create a national ecosystem that harmonizes and coordinates these efforts to prepare the new age skilled workforce for the dynamic industrial needs.

Against this backdrop, the Government and the leading organizations could invest in creating Sector-specific, specialized Centres of Excellence in academic institutions to inculcate the research mind-set towards high technology sectors such as machinery, electronics, semiconductors and materials, biotechnology, among others. Centres of Excellence could be set up in major high technology

hubs across the country to provide training in advanced networking, telecom technologies, biomedical engineering, etc. at select major engineering colleges, polytechnics and other technical institutes. This could be further complemented by the creation of industry-specific curriculum in schools, colleges, and universities to develop technological acumen and workforce through a robust model of industry and education partnerships. The National Skill Development Corporation, and the State-Level Skill Development Councils have major role to play in implementing this strategy.

Further, a fund could be created separately to provide focussed trainings to popularize and demystify Industry 4.0 technologies in higher and vocational educational institutions, by international and national experts from industry and academia, in areas such as AI, machine learning, cybersecurity, data analytics, etc.

CREATING A MARKET FOR COMPETITIVE PROCUREMENT OF STEEL

An essential input across several sectors is steel. The cost of steel is a critical parameter affecting competitiveness of many manufacturers, as any fluctuations in steel prices impact their operating margins. Currently, India's domestic steel price is higher than the export price, with an estimated price gap range of US$ 50-100/MT of steel. Domestic steel price is also much higher than imported steel from China. To ease the price pressure on domestic steel, the government could consider reducing most favoured nation (MFN) duty for the steel categories where India has limited domestic production capabilities, such as Ferro-nickel, CRGO, CRNO, and various grades of alloy steel. The Government could also consider promoting competitive procurement of steel by developing an e-commerce platform which can serve as an online steel marketplace for MSMEs. Further, a mechanism could be developed for aggregating steel demand of MSMEs for bulk orders, enabling them to obtain bulk discounts.

CONCLUSION

Manufacturing has traditionally played a key role in the economic growth and development, as also in promoting job creation and enhancing technological capabilities in a country. However, in the Indian scenario, the recent performance of the manufacturing sector has been indicative of an underlying inertia, with the share of manufacturing in India's gross value added declining to 15.1 percent in 2019-20, as compared to 18.35 percent in 2010-11, despite the strong and growing private consumption demand in the country. This weakness in the domestic manufacturing sector has translated into greater dependence on imports to meet the growing domestic demand over the years, thereby resulting in a large trade deficit across key manufacturing sectors. This high reliance on imports has also translated into higher foreign value-added content in India's manufacturing exports.

In this context, the report identifies select sectors for import substitution and enhancing domestic production including electronics, defence equipment, machinery, chemicals and allied sectors, pharmaceuticals, and select agricultural products. These sectors account for more than US$ 186 billion of imports by India, with a share of nearly 39 percent in overall imports and 50 percent in the non-oil imports by India. The report analyses the performance of these sectors in terms of production and export capabilities and highlights the import dependence in these sectors. The report recommends several sector-specific strategies for reducing import dependence by enhancing domestic production, based on an assessment of the specific needs and issues faced by each of the sectors. For instance, in sectors like agriculture and rare earth, there is a greater need for strategies that enable collaborative arrangements and encourage outward investments into partner countries for meeting domestic requirements, while in technology-intensive sectors the strategies are focused on creating domestic capacities and transfer of technology for reducing import dependence, through specific interventions for encouraging innovation-led manufacturing, addressing issues with customs duty, encouraging joint ventures, revising government regulations and programmes, among others.

These sector-specific strategies are one facet of the mosaic of elements which would influence the manufacturing landscape in India. Overall development in manufacturing would also critically hinge on broader economic policies including direct/indirect taxes, trade openness, and other business climate issues, including regulatory procedures and infrastructure quality. While India has made considerable progress in its policy space, improving its ranking in the World Bank's Doing Business Index from 142 in 2014 to 63 in 2019, there are considerable differences in the industrial climate across the country. The differences across Indian states in terms of policy reforms and development of industrial bases underscores the importance of taking the policy and interventions at various levels of governance.

With the current international attention on India's tremendous potential for investments and greater GVC participation, it would be an opportune time to push for rapid progress on structural reforms to drastically increase domestic capabilities. Encouraging R&D and skill development, strengthening industrial clusters, correcting inverted duty structures, utilizing public procurement for capacity development, developing efficient customs and port procedures, creating reliable standards and certification system and developing robust infrastructure would be the key tenets of the revitalization plan for the Indian manufacturing sector.

ANNEXURE 1: ADDITIONAL TABLES

Table 1: Import Dependence of Manufacturing Sectors in India (2014)

Sectors	Domestic Contribution (US$ Mn)	Total Output (US$ Mn)	Domestic Contribution in Overall Output
Transport Equipment for ships, boats, railways, defence items, etc.	8333	21616	38.5%
Coke And Refined Petroleum Products	107530	153328	70.1%
Textiles, Wearing Apparel And Leather Products	119559	154448	77.4%
Chemicals And Chemical Products	105911	132229	80.1%
Motor Vehicles, Trailers And Semi-Trailers	88441	104029	85.0%
Machinery And Equipment N.E.C.	59369	68700	86.4%
Furniture; Other Manufacturing	106911	123103	86.8%
Electrical Equipment	40053	46034	87.0%
Basic Metals	146238	167537	87.3%
Rubber And Plastic Products	44837	51253	87.5%
Fabricated Metal Products, Except Machinery And Equipment	58175	66252	87.8%
Computer, Electronic And Optical Products	24477	27826	88.0%
Food Products, Beverages And Tobacco Products	181063	198660	91.1%
Basic Pharmaceutical Products And Pharmaceutical Preparations	18237	19903	91.6%
Other Non-Metallic Mineral Products	51143	55001	93.0%
Wood And Of Products Of Wood And Cork, Except Furniture; Articles Of Straw And Plaiting Materials	25860	27563	93.8%
Paper And Paper Products	16262	17158	94.8%
Total Manufacturing	***1202400***	***1434639***	***83.8%***

Source: WIOD;India Exim Bank Research

Table 2: Capital Goods (at HS-6 digit level) with High Dependence on Imports from China

HS- 6 Digit	Product Description	Share Of China In India's Imports (%)	MMI (Import Intensity)	Normalized MMI	Trade Balance (US$ Mn)
841430	Compressors for refrigerating equipment	73.7	2.6	0.4	-269.1
850790	Plates, separators and other parts of electric accumulators,	63.6	6.5	0.7	-243.1
850300	Parts suitable for use solely or principally with electric motors and generators	58.6	2.1	0.4	102.4
850760	Lithium-ion accumulators (excluding spent)	57.7	1.6	0.2	-1286.0
848079	Moulds for rubber or plastics (other than injection or compression types)	52.3	2.4	0.4	-211.2
848210	Ball bearings	50.5	2.6	0.4	-331.8
841590	Parts of air conditioning machines, comprising a motor-driven fan	48.8	1.8	0.3	-314.8
844331	Machines which perform two or more of the functions of printing, copying or facsimile transmission	45.5	1.4	0.2	-365.0
841480	Air pumps, air or other gas compressors and ventilating or recycling hoods	44.0	3.5	0.6	-359.6
853229	Fixed electrical capacitors (excluding tantalum, aluminium electrolytic, ceramic, paper, plastic)	43.6	8.8	0.8	-389.2
844630	Weaving machines for weaving fabrics of a width > 30 cm, shuttleless type	42.5	2.1	0.4	-410.8
843149	Parts of machinery of heading 8426, 8429 and 8430	38.2	2.0	0.3	-297.1
854449	Electric conductors, for a voltage <= 1.000 V, insulated, not fitted with connectors	35.6	2.2	0.4	15.1
848190	Parts of valves and similar articles for pipes, boiler shells, tanks, vats or the like	34.7	1.5	0.2	178.9
848340	Gears and gearing for machinery (excluding toothed wheels, chain sprockets and other transmission)	34.1	2.5	0.4	158.2
847780	Machinery for working rubber or plastics or for the manufacture of products from these materials	30.5	1.5	0.2	-571.0

841490	Parts of air or vacuum pumps, air or other gas compressors, fans and ventilating or recycling	29.1	1.7	0.3	-57.3
847989	Machines and mechanical appliances	26.5	2.9	0.5	-875.0
853690	Electrical apparatus for switching electrical circuits, or for making connections	24.9	1.3	0.1	-311.0
847990	Parts of machines and mechanical appliances	24.7	3.8	0.6	-220.9
842199	Parts of machinery and apparatus for filtering or purifying liquids or gases	23.4	1.6	0.2	-220.2
841989	Machinery, plant or laboratory equipment, whether or not electrically heated, for the treatment	22.9	2.0	0.3	-107.1
844399	Parts and accessories of printers, copying machines and facsimile machines	22.3	1.7	0.2	-412.7
853669	Plugs and sockets for a voltage <= 1.000 V (excluding lamp holders)	19.7	1.6	0.2	-219.6
842139	Machinery and apparatus for filtering or purifying gases (excluding isotope separators)	19.1	1.5	0.2	-179.8
841391	Parts of pumps for liquids	16.5	1.3	0.1	89.3
843143	Parts for boring or sinking machinery of subheading 8430.41 or 8430.49	16.2	1.3	0.1	-96.8
840991	Parts suitable for use solely or principally with spark-ignition internal combustion piston	14.3	1.3	0.1	-53.4
903180	Instruments, appliances and machines for measuring or checking	13.9	1.1	0.1	-774.6
901890	Instruments and appliances used in medical, surgical or veterinary science	12.8	3.4	0.5	-469.8
846630	Dividing heads and other special attachments for machine tools	11.7	3.7	0.6	-226.2
902780	Instruments and apparatus for physical or chemical analysis, or for measuring or checking viscosity	11.6	1.8	0.3	-364.5
840734	Spark-ignition reciprocating piston engine, of a kind used for vehicles	10.9	3.0	0.5	-345.5
840999	Parts suitable for use solely or principally with compression-ignition internal combustion	9.6	1.3	0.1	74.5
901839	Needles, catheters, cannulae and the like, used in medical, surgical, dental or veterinary	9.1	2.0	0.3	25.4
845710	Machining centres for working metal	4.9	1.8	0.3	-388.3
841112	Turbojets of a thrust > 25 kN	1.9	1.5	0.2	-527.2

Source: Data accessed fromITC Trade map; India Exim Bank Research

Table 3: Electronic Goods (at HS-6 digit level) with High Dependence on Imports from China

HS-6 Digit	Product Description	Share of China in India's Imports (%)	MMI (Import intensity)	Normalized MMI	Trade Balance (US$ Mn)
851770	Parts of telephone sets, telephones for cellular networks	45.8	1.26	0.1	-7874.5
854231	Electronic integrated circuits as processors and controllers	39.0	2.78	0.5	-5221.0
847130	Data-processing machines, automatic, portable, weighing <= 10 kg	74.1	1.13	0.1	-3553.4
851762	Machines for the reception, conversion and transmission or regeneration of voice, images	29.9	1.01	0.0	-2950.0
854140	Photosensitive semiconductor devices, incl. photovoltaic cells	73.8	1.78	0.3	-2181.4
854239	Electronic integrated circuits (excluding such as processors, controllers, memories and amplifiers)	13.8	3.02	0.5	-2277.5
852580	Television cameras, digital cameras and video camera recorders	36.7	1.34	0.1	-2020.0
847150	Processing units for automatic data-processing machines	22.9	1.03	0.0	-1776.6
852990	Parts suitable for use solely or principally with transmission and reception apparatus	59.4	2.77	0.5	-1267.3
847330	Parts and accessories of automatic data-processing machines or for other machines	33.2	1.29	0.1	-1231.0
850440	Static converters	48.4	1.56	0.2	75.0
851769	Apparatus for the transmission or reception of voice, images or other data	24.1	1.47	0.2	-915.8
854290	Other Parts of electronic integrated circuits	97.7	22.65	0.9	-941.2
852380	Media for the recording of sound or of other phenomena	2.3	7.47	0.8	-835.2
852872	Reception apparatus for television, colour	39.9	1.45	0.2	-876.4
851712	Telephones for cellular networks "mobile telephones" or for other wireless networks	73.0	1.56	0.2	2541.8
901890	Other Instruments and appliances used in medical, surgical or veterinary sciences	12.8	3.38	0.5	-469.8

853400	Printed circuits	45.3	1.48	0.2	-514.5
903289	Regulating or controlling instruments and apparatus	15.5	1.60	0.2	-398.2
850490	Other Parts of electrical transformers and inductors,	35.3	1.44	0.2	-317.6
853890	Parts suitable for use solely or principally with the apparatus of heading 8535, 8536 or 8537	19.6	1.67	0.2	-139.5
853710	Boards, cabinets and similar combinations of apparatus for electric control	14.5	1.08	0.0	-159.4
844399	Other Parts and accessories of printers, copying machines and facsimile machines	22.3	1.66	0.2	-412.7
853229	Fixed electrical capacitors (excluding tantalum, aluminium electrolytic, ceramic, paper, plastic)	43.6	8.82	0.8	-389.2
844331	Machines which perform two or more of the functions of printing, copying or facsimile transmission	45.5	1.44	0.2	-365.0
852852	Monitors capable of directly connecting to and designed for use with an automatic data processing	65.7	1.33	0.1	-351.9
854129	Transistors with a dissipation rate >= 1 W (excluding photosensitive transistors)	20.7	1.13	0.1	-311.9
851830	Headphones and earphone	51.4	2.24	0.4	-311.4
852351	Solid-state, non-volatile data storage devices for recording data from an external source	19.4	2.63	0.4	-259.3
902290	X-ray generators other than X-ray tubes, high tension generators, control panels and desks	13.1	1.30	0.1	-205.1

Source: Data accessed from ITC Trade Map; India Exim Bank Research

Table 4: Non-ITA-1 Products for Tariff Rationalization

Sl no	Description of goods	CTH
1	Networking Switches	85176290/ 85176990
2	Access Points	85176290
3	Repeaters	85176290
4	Transceivers	85176290
5	Media Convertors	85176290
6	Optical Fiber Splitter	85367000
8	Optical Fiber Enclosures	85369030
9	Passive Optical Network Products (PON) – Optical Network Unit (ONU)/ Optical Line Termination (OLT)	85176290/ 85176990
10	Set-Top Boxes Including Android Boxes	85287100
11	Antennae	85177090

Source: MAIT; India Exim Bank Research

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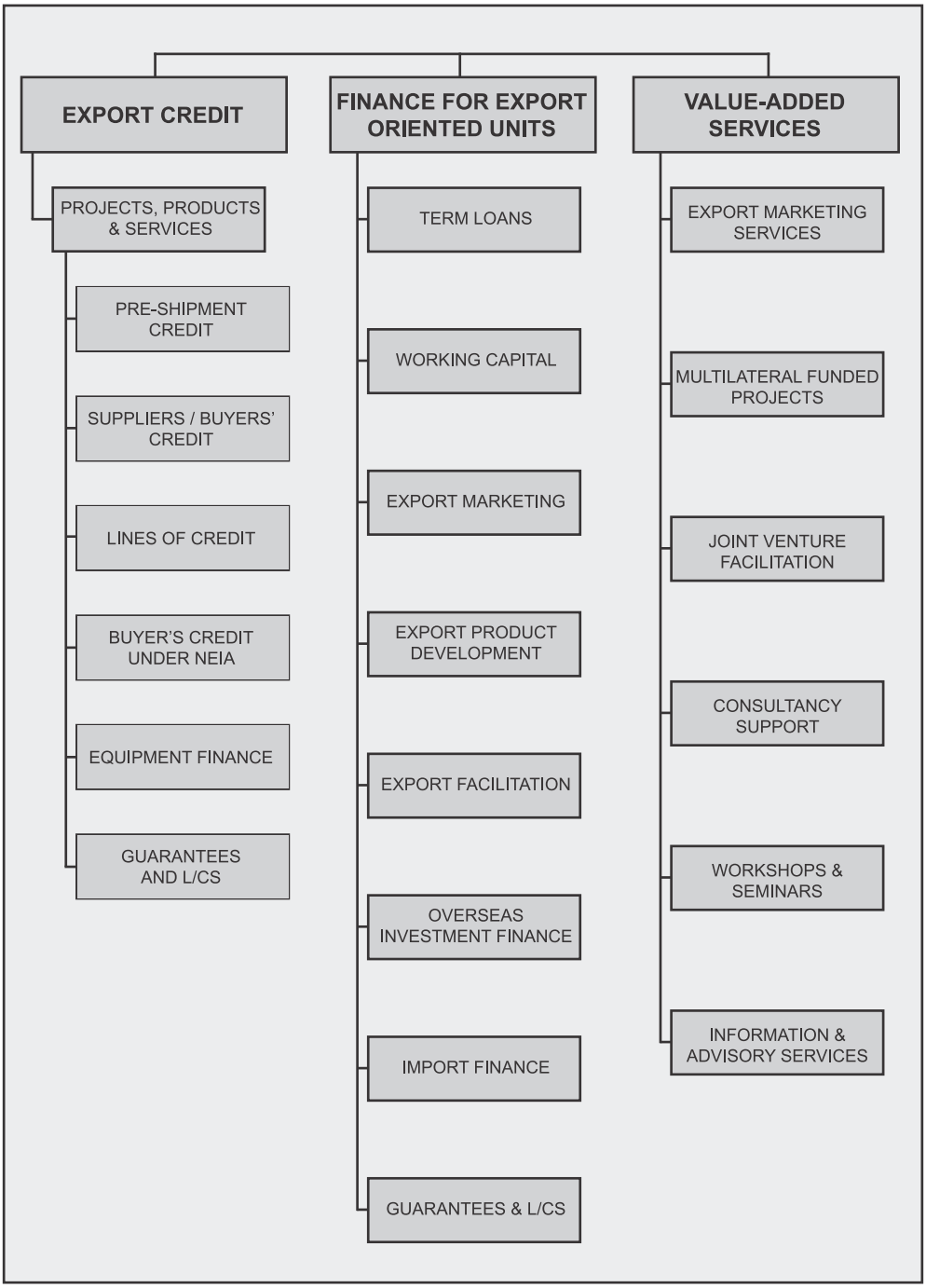

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