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Analysis of Performance and Challenges of India's Manufacturing Sector In The Global Market

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Abstract
Manufacturing in India accounts for roughly 16-17% of the national GDP, which for all practical purposes has remained the same as it was two decades back. Changing this number to 25% by 2025 through 'Make in India', an initiative taken by the government itself, is still Sandstorm. The contribution of the manufacturing sector in India is just about 1.8% of the global manufacturing output, whereas China contributes about 13.7%. This research critically evaluates the performance of the sector and pinpoints some of the major challenges faced in respect to low productivity, rigid labour laws, and inadequate infrastructure. Though mobile phone manufacturing in India saw remarkable growth the share of India in global production rising from 3% in 2014 to 11% in 2020 the big-ticket sectors such as automotive, pharmaceuticals, and small-scale industries still face inefficiencies in their structure. The comparative study shows that the labour productivity of India is far below those of its overseas competitors, such as China, which has leveraged its high labour efficiency and improvement in an enabling technology as a factor in strategically positioning itself. It also sets the objective of the investigation on the outside-in factors so far affecting the competitiveness of the sector: disruptions in global supply chains and exchange rate fluctuations. Industries 4.0 technologies, in their partial diffusion, have further efficiency enhancing and integration into global value chains. The analysis thus indicates that sustained reforms in labour laws, fiscal policies, and infrastructure and skill development would be impossible to realize with anything less than the stated target of 25% share in GDP. Along with all that, embracing smart manufacturing and sustainable practices would become binding imperatives to drive future growth and establish India as a globally competitive manufacturing hub.

Keywords: India’s Manufacturing Sector, Global Competitiveness, Industry 4.0 Adoption, Make in India Initiative, Labor Productivity

1. Introduction

While the manufacturing sector has seen a high growth in the country, it faces many obstacles in order to make its presence felt with a better foothold in the global market. Different government initiatives like the National Manufacturing Policy and the 'Make in India' programme have been driving sector performance, with a goal to increase its share to GDP from the current 16-17% to 25% by 2025. Low productivity, labour market rigidities, and inadequate infrastructure remain some of the major stumbling blocks for this sector in becoming globally competitive despite these efforts (Das & Das, 2020). In this respect, India as an emerging global manufacturing hub, serious challenges lie ahead in the process of introducing major reforms in the fiscal policy, labour laws, and regulations relating to foreign investment, as all these are considered necessary for luring international manufacturing giants and encouraging innovation and high-technology research and development efforts (Das, 2007). Besides, uneven growth is manifested across different states, where states like Gujarat and Andhra Pradesh remain better off than other states for reasons like better infrastructure and greater compliance with the law (Mehta & Rajan, 2017). Therefore, the challenges remain that India needs to adopt better technologies and invest in infrastructure, sort out the issues of labour quality and skill formation. All these steps are quintessential to enhance productivity and enable the manufacturing sector to contribute a lot to the economic growth of the nation and competitiveness at the global level (Mukherjee, 2010). Manufacturing in India, with respect to a global comparison, still lags far behind its competitors, accounting for no more than 1.8% of the global manufacturing output and 16-17% of GDP. Low

productivity, together with rigid labour laws and poor basic infrastructure, is some of the major deterrents to this sector, notwithstanding efforts made by the government, including 'Make in India'. Specific knowledge gaps include sectoral analysis related to the adoption of Industry 4.0, especially in the automotive and pharmaceuticals sectors; investigation of barriers to adoption, particularly for SMEs; capacity building through bridging the gap in the supply and demand of skills; slow diffusion of advanced technologies; and limited empirical evidence on the impact of supporting policies, such as PLI. Other areas of concern are sustainability-related challenges faced by resource-constrained SMEs, overall economic factors such as geopolitical tensions, and performance disparities in regional manufacturing across states.

The background of the manufacturing sector of India in the global market is a historically complicated tussle between strengths and challenges that led to the emergence of its current position. Traditionally speaking, the manufacturing sector in India has been more or less lagging in terms of growth contribution to the country's GDP compared with other major emerging economies like China. As of today, the sector contributes about 16-17% to the country's GDP and stands at a mere 2% of global manufacturing output, which again is on the lower side from the dimensions of the size and economic potential of the country. More importantly, over the years, growth in this sector has been overshadowed by the scorching pace of growth in the services sector, which has driven India's economic growth since the turn of the millennium (Sangwan, 2016). The sector faces a number of impediments, including inadequate infrastructure, far too complicated a framework of regulation, labour market rigidities, and lack of investment in R&D. These have held back the sector's competitiveness to date at an international level. These challenges have also been realized by the Indian government, and to increase the rate of contribution of the manufacturing sector to GDP by 25% by 2025, certain initiatives such as the 'Make in India' program have been promoted. It is an initiative to achieve foreign direct investment, ensure innovation, and develop skills with the ultimate positioning of India as a global manufacturing hub. Despite these, the challenges that still beset the manufacturing sector are technological upgradations, labour productivity, and better integration into global value chains. These are the areas of hindrance that the sector needs to overcome to achieve future growth by exploiting India's demographic advantage for raising its global competitiveness (Mishra, 2013).

Manufacturing is quite an important sector in the context of growth and development in the global market for the economy of India. Manufacturing has conventionally played a very significant role in the developmental process of economies; in developing economies, it forms a source of substantive employment and productivity earnings. On the other hand, the sector contributes only a meager 16-17% to the country's GDP, very low according to contributions in other large economies like China's (Singh, 2017). In fact, the case for manufacturing in India doubles here and it has great potential by offering employment, exporting, and hence allowing overall economic stability. Growth of the sector can balance the economic structure led so far by the service sector in the country. In essence, manufacturing in India has moved hand in hand and has been closely aligned with the country's integration into global value creation. With the country's ambition to increase its share in global manufacturing, infrastructure improvement, reduction of regulatory bottlenecks, and enhancement in labour productivity have become direly essential. These efforts are most likely to raise the stature of India as a globally competitive manufacturing destination in the world (Miglani, 2019).

Equally high trajectory growth of its economy, strategic contribution to global concerns, and deeper integration into the international economy in a way that is reaching newer frontiers underlines the Indian position in the global market. Over the last decades, India has slowly been working its way from an inward-oriented economy to one more integrated internationally through a series of reforms and greater engagement with global trade. The country's large and growing economy, particularly its booming service and IT sectors, has positioned it as a key player in the global. India's economic integration has been bolstered by its contributions to global knowledge-based industries, such as IT and pharmaceuticals, which have become globally competitive.

The development of both India's stock market and its capital markets is generally observed to have begun in the early 1990s, in light of the widely instituted economic reforms. Neither is quite integrated into international markets yet. On the basis of foreign investment attracted and relative stability in times of shifting global economic fortunes, India has come out as a likely key economic power for the world over the next couple of decades (Chattopadhyay, 2014). Consequently, it also plays a very critical role in addressing such global challenges as climate change, international trade, and issues of security. Its role within the World Trade Organization and other multilateral forums underlines its increasing influence in shaping the international economic order. While India's positioning in the international market is strong and upward, it needs to address the challenges thrown up by its domestic economy, coupled with leveraging of some key strengths of the economic sectors, in building up global competitiveness in order that more successes can be contemplated.

2. Objectives

- The research paper aims to evaluate the performance of India's manufacturing sector and critically assess the factors affecting its competitiveness in the global market.
- It also seeks to identify the external factors, such as global supply chain disruptions and exchange rate volatility, which hinder the sector's growth.
- Additionally, it underscores the need for labour law reforms, fiscal policy improvements, and technology adoption to achieve the sector's stated target of contributing 25% to GDP by 2025.

3. Historical Performance

India's manufacturing sector has been performing inconsistently in the global market in a mixed story of

challenges and modest progress along varied dimensions. In contrast to a set of reforms for its growth, the sector has reaped serious setbacks over the past couple of decades. In fact, the country's economic reforms in 1990, involving liberalization and dismantling of industrial licensing, were expected to bring about a manufacturing boom with surging output and employment. However, the expected objective development failed to materialize simultaneously strenuous (Kalirajan & Bhide, 2004). Gupta & Kumar (2010), in the 2000s, also the sector failed to get rid of its old problems like inflexible labour laws, insufficient infrastructure besides issues relating to acquisition of land.

3.1 Evolution of Manufacturing in India

Manufacturing in India grew through the long evolution to reach the present state of affairs within the global market. The journey of transformation started in India with liberalization of the economy in the early nineties that exposed her to global markets and created growth spurts across different sectors, manufacturing included. Until then, the manufacturing in India had remained essentially inward-looking with state control, protectionism, and limited integration with the global world. This era of liberalization brought out some key reforms toward enhancing competitiveness and attracting FDI and integrating India with the global supply chain. Rana, Saikia, & Barai (2018) said that during the post-liberalization period, the shift of the manufacturing sector from the mere basic industries to the advanced manufacturing sector started to take place, essentially facilitated by increasing involvement of MNCs and adoption of global best practices. In this industry, serious investment in technology and innovation is mainly found in high-tech industries. But growth in the sector had been uneven, with some forging ahead while others trailed behind, despite persistence of structural problems like lack of infrastructure, rigid labour laws, and a complex regulatory environment. As Aijaz (2016) said, sustained reforms, especially in aspects of fiscal policy, labour regulations, and the enabling environment for R&D and technological development, are required if the country is ever to realize its full potential. The evolution of India's manufacturing sector has proceeded apace with the country becoming a significant player in upper echelons of high-tech industries; however, legacy mistakes have held back its broader manufacturing capabilities.

3.2 Comparison with Global Manufacturing Trends

As Li & Zhang (2018), two of the most critical diversities in recent global manufacturing trends have been over labor productivity and technological advancement. While China has plotted these trends by constructing a highly productive labour market with substantial investment in technological upgradation, India's labour market has been burdened by inflexible labour laws and infrastructural impediments, which have finally culminated in its lower productivity levels. Innovation and advanced technologies power the world manufacturing today, whereas it has taken their due time in India. The discouraging elements for the country to be at par with global frontrunners with regard to manufacturing innovation arise through low R&D investments and late adoption of newer technologies. According to Dash & Chanda (2020), integration into GVCs is essential for manufacturing competitiveness in the global arena. China has positioned itself at the center of these chains in industries such as electronics and consumer goods. This has availed China a privileged position to capture most of the economic value from its manufacturing. On the contrary, India is still a minor player in GVCs, with much of its manufacturing still concentrated within low-value-added activity. This is a limitation in the ability of India to fully realize greater economic benefits from its manufacturing sector and underlines the need for the country to move up the value chain so as to enhance global competitiveness.

4. Current Performance

There have been quite a few important developments in the manufacturing sector of India in recent years, yet a plethora of challenges still remain, impeding its full potential to be realized in the global market. As of now, the contribution of the manufacturing sector to the country's GDP works out at approximately 16-17%, stuck at this figure for a couple of decades already. The number is significantly lower when compared to other major economies, such as China, which comprises about 34 percent of its GDP and 13.7 percent of the output of manufacturing globally. India, therefore, only accounts for about 1.8 percent of global manufacturing, showing where much enhancement must be done to enable it to compete better globally. As Choudhury (2021) cited, since these efforts have borne partial positive results, mobile phone manufacturing increased; India now accounts for 11% of global mobile production, from an all-time low of just 3% in 2014. The number of manufacturing units has also seen a rise in the sector, thereby generating more employment, which contributes to economic gain. Notwithstanding these achievements, the sector still struggles with low productivity, labour market rigidities, and disappointing infrastructure. These factors dent the ability of the sector to scale up and integrate into world value chains, critical preconditions toward increased competitiveness. Labour-intensive manufacturing has done in fits and starts in many economies, with productivity still at relatively low levels.

4.1 Analysis of Growth and Output Metrics

Over the past several years, the manufacturing sector in India has grown by leaps and bounds. Still, it is perennially behind major economies in output and global market share. The sector contributes about 16-17% to India's GDP a figure that has been near static over the last decades despite numerous governmental initiatives concerning a boost in industrial output. The various reasons contributing to this sluggish growth include inadequate infrastructure, inflexible labour laws, and slow diffusion of technology, which have cumulatively affected the sector's scaling-up process with a view to assuring the right level of competitiveness in the global context. Furthermore, stock market performance and output growth rapport have become critical determinants of the shape of this industry. A positive relationship between stock market valuation and output growth is seen in the case of manufacturing firms of India, indicating thereby

that financial market development supports the growth of industries (Dhananjaya, 2020). Though pockets of growth or resilience are visible, more so in high-tech industries, the overall contribution of the sector to the global market remains modest.

4.2 Major Industries Contributing to Manufacturing

The manufacturing in India is contributed by several key industries that contribute a great deal toward its output and presence in the global market. Amongst many key industries leading, probably the automobile industry is the single largest contributor to the major chunk of India's manufacturing output. In fact, this industry has grown very fast, especially since the opening up of the economy in the early 1990s when a window of opportunity was afforded to global players to enter the Indian market. Companies like Maruti Suzuki, Tata Motors, and Mahindra & Mahindra are household names not only in India but also in the world. As unfolded, the automobile sector contributes to the GDP of the country and is also a driver for exports, hence considered central to the manufacturing activity of India (Kumar, 2016). Another major contributor to this situation is the SSIs sector, which, in spite of small individual unit sizes, has a strategic role to play in the areas of employment, production, and exports. Particular growth has come from SSIs within sectors such as chemicals, food and beverages, and textiles. The era of globalization brought forth opportunities and challenges to be faced by SSIs, compelling them to innovate and adapt to the competitive environment. The SSIs thus significantly contribute to India's export performances and reveal its strength in the recent global market (Hillemane, 2005).

The sugar industry is another vital player in the manufacturing sector of India, as it happens to be the second largest agro-based industry. India belongs to the leading category of world fronts that produce a large amount of sugar, accounting for almost 15 percent of the total sugar produced in the world. This industry, other than providing livelihood to millions of farmers and other workers, also contributes to the rural economy. With integrated operations that range from the production of bio-electricity to the production of bio-ethanol, the sugar industry is better placed to make even greater contributions to the economy as well as to actively participate in the global market freely (Solomon, 2011). In similar fashion, the pharmaceutical industry has established the country as a global hub when it comes to manufacturing generic drugs. Now, this has turned out to be one of the major industries involved in the exportation of pharmaceutical products with Indian firms providing affordable medicine across the globe. With the strong backbone of India's manufacturing base, coupled with skilled manpower and cost-effective production processes, the industry is growing by leaps and bounds, hence critical to the global pharmaceutical market. The manufacturing sector in India encompasses a number of industries, namely automobiles, small-scale industries, sugar, and pharmaceuticals—all these individual industries play a very crucial role in marking the presence of India in the global market.

4.3 Export and Import Performance

Basically, India's export-import performance in the world market epitomizes its relative strengths and challenges yet to be overcome. The growth in India's exports in recent years, particularly since the opening of its economy in the 1990s, has been quite remarkable. Sectors that are contributing to this growth include but are not limited to the following: pharmaceuticals, engineering goods, agriculture, and textiles. The engineering goods sector in India, for example, is gradually making its presence felt in foreign markets as a vital contributor, touching about 20 percent of the nation's aggregate exports. The sector has been able to permeate even developed markets like the United States and the European Union, reflecting good competitiveness by India in high-quality and sensitive-price goods (Illiyan, 2016). Besides this, India has been placed as one of the major exporters of agri-commodities like rice, spices, and seafood, some of the major constituencies of its export basket. Notwithstanding these successes, India's overall share in global exports remains minuscule if put in perspective with major economies, especially that of China.

India's export performance was constrained by its inconsistent competitiveness and adverse external factors, hence constraining it from achieving a higher global market share. For example, though the growth of exports of India is impressive, the growth has not always matched with the world demand generated due to loss of opportunities in some sectors (Singh, 2014). On the import side, India is highly dependent on the importation of raw materials and capital goods destined for the growing industrial and technological sectors. Major imports include crude oil, electronics, machinery, and other key components of Indian manufacturing and energy. This dependency for imports, particularly in energy, makes it highly vulnerable to global price fluctuations and is detrimental to trade imbalances. Efforts have been made to reduce this, and such proposals are in the form of "Make in India," which ramps up domestic production and reduces reliance on the importation of goods (Bhatia, 2021). Although the export performance of India has shown marked improvement, especially within high-growth sectors, it still faces major challenges regarding its presence in world markets and competitiveness.

4.4 Role of Small and Medium Enterprises (SMEs)

SMEs are very significant in the Indian economic structure and global market presence. These enterprises form a very intrinsic part of the country's industrial structure since they contribute a great deal to employment, GDP, and exports. SMEs account for something around 30% of India's GDP and nearly 50% of the country's exports, thus being highly vital in promoting economic growth and development. The Indian government exposes the crucial role played by SMEs by incorporating them within various five-year plans, which is one step for their growth and integration into the global market (Mukherjee & Mukherjee, 2022). SMEs face different opportunities along with challenges in the global market. All these aspects of smallness mostly help them to be more agile and hence enable them to innovate more than the larger firms, thus rapidly adjusting to changing market conditions. In other words, this is

particularly helpful in industries such as manufacturing and technology, among others, where they have found their niches and performed optimally at the global level. However, they are also faced with serious challenges, including limited access to finance, problems scaling operations, and handling new technologies. These challenges may hinder their ability to perform at an international level, even though they have enormous potential to compete globally (Nayak, 2009).

The internationalization of Indian SMEs is through the enablement of firm factors such as the exploitation of entrepreneurial orientation, human capital, and management commitment. According to many studies, these factors have been proved to significantly influence the success of SMEs in large Indian global markets. Through fostering these areas, the SMEs are able to realize competitive advantage and subsequent sustainable growth in the international markets (Javalgi & Todd, 2011). The SMEs form a very important part of the economic matrix of India both in terms of employment, fostering innovation, or exports. Overcoming this challenge by globalization and technology changes is so vital for continued growth and global market success.

5. Technological Advancements and Innovation

The focus on R&D may be considered one of the main driving forces of technological development in the manufacturing industry of India. Several studies indicate that firms which invest resources in R&D are most likely to develop innovative products or processes, enhancing their international competitiveness. For instance, higher technological efforts and greater outward FDI in pharmaceuticals and automobiles have resulted in improved export performance and greater integration with global value chains (Siddharthan & Narayanan, 2017). At the same time, however, total R&D expenditure in India remains low compared to other major economies. This continues to hamper the growth potential of the sector for sustained long-term growth and innovation continuity (Aijaz, 2016). The paradigm shift in the Indian manufacturing scenario also draws on technologies such as Industry 4.0, the Internet of Things, smart manufacturing systems, and cloud-based manufacturing, besides R&D (Singh et al., 2021). These will offer flexibility, efficiency, and real-time data integration essential elements in the competitive global market. Though still in infancy, these technologies are expected to boost productivity and quality in Indian manufacturing significantly. SMEs, despite being a strong backbone of Indian manufacturing, are unable to leverage advanced manufacturing technologies due to a number of resource, knowledge, and infrastructure barriers. As a result, compared to large-scale companies, the pace of technology integration in SMEs remains slow, thus impacting their global competitiveness (Sharma & Ali, 2010).

5.1 Adoption of Industry 4.0 and Smart Manufacturing

The adoption of Industry 4.0 and smart manufacturing in India epitomizes a sea change in the journey toward digital transformation for the country's manufacturing industry. Industry 4.0 refers to integration with cyber-physical systems, IoT, big data, and cloud for the development of intelligent factories a place where machines and systems communicate and operate independently. This, therefore, allows for higher efficiency and productivity, hence competitiveness in the global marketplace. This ratio for Industry 4.0 adoption in India continues to rise, especially in high-value industries like automotive and electronics manufacturing. More and more, Indian manufacturers realize the dire need to adopt Industry 4.0 technologies. Successful implementation of Industry 4.0 in Indian manufacturing is based on robust internet infrastructure, financial support, and continuous specialized skills training (Jain & Ajmera, 2020).

However, the high cost of investment, lack of technical experience, and insufficient infrastructure remain some of the major barriers that keep the participation of most Indian firms, especially SMEs, from this area. In developing economies like India, these challenges are more pronounced because such smaller firms find the initial investment in smart technologies beyond their reach (Sharma & Chaturvedi, 2021). Despite these, the growth of adoption of such technologies is also emerging as a catch-up game to build higher productivity and efficiency necessary ingredients for global competitiveness. Industry 4.0 in the future is poised to shape the sustainability dimensions in Indian manufacturing industries. Smart manufacturing is aligned with the principles of the circular economy for resource efficiency and waste reduction by adjusting effective manufacturing processes (Bag, Gupta, & Kumar, 2021).

5.2 Innovation Hubs and Start-up Ecosystem

Powered by innovation hubs and a strong culture of promoting start-ups, India has emerged as a powerhouse in the global startup ecosystem. The vibrant entrepreneurial ecosystem of cities like Bangalore has earned them global recognition as the "Silicon Valley of India" for technology start-ups. With skilled human capital, availability of venture capital, and supportive government policies, Bangalore has become internationally recognized as a hub for tech start-up growth. The ecosystem of the city supports innovation, nourishing start-ups through successive stages of development (Hillemane, 2017).

Other innovation hubs are burgeoning across the country, placing India as one of the leading startup ecosystems in the world. For example, Madhya Pradesh was very active in promoting startups through favourable policies for more enabling environments for innovation and enterprise. Although still in the nascent stage, efforts are indicative of a growing role that regional ecosystems continue to play in fostering India's larger startup culture. According to Kumari (2021), the Indian start-up ecosystem is well-connected with the Global Innovation Network. Interaction between large multinational enterprises and agile startups has created a mutualistic relationship where the MNEs house the key infrastructures and channels of access to markets, while the start-ups bring in creativity and innovation. This dynamic has propelled India to the frontline in global leadership in technology and innovation beyond IT into sectors such as healthcare, agriculture, and renewable energy (Bhagavatula, Mudambi, & Murmann,

2019). Key drivers of growth include internet penetration, venture capital availability, and a critical mass of high-technology enterprises. Meanwhile, this growth has been obliging policy intervention at regional and national levels of government for its sustenance (Joshi & Satyanarayana, 2014). Innovation hubs and their ecology of start-ups form intrinsic parts of the Indian presence in global markets and also serve as an economic and technological reservoir. Continued support from both government and private sectors will hold the key to sustaining and advancing the country's standing in the global start-up landscape.

5.3 Government Initiatives Supporting Technology in Manufacturing

The government of India has established a set of initiatives to aid in the technological development of the manufacturing industry and make it more globally competitive. The key among these is the "Make in India" campaign, initiated in 2014, to turn India into an international manufacturing hub. This has emphasized bringing in more national and international investments, the development of technology, and finally an atmosphere that is favourable for the manufacturing sector. It has played a very important role in promoting new technologies, generating employment opportunities, and enhancing international competitiveness for manufacturing units in India. Supplementing this effort is the Atmanirbhar Bharat Abhiyan concept, which has rightly pointed to the need for breaking dependency on foreign imports and promoting indigenous manufacturing. The initiative aligns with the vision of the Government of India for sustainable economies by making things green due to the commitments sought by the country in response to climate change, besides enhancing local manufacturing (Pulicherla et al., 2021).

The Government of India has implemented different Technology Development (TD) programs to improve the technological capabilities of SMEs in the manufacturing industry. These programs incorporate financial incentives for R&D, technology adoption, and commercialization of new technologies. This is indicative that such initiatives are actually intended to convert these enterprises from being dependent on technology to proactive innovators, enabling them to compete in the global market (Nanda & Singh, 2009). Another important program in operation is one related to the Production-Linked Incentive: direct financial incentives related to the output of production have attracted investment to the priority sectors of the economy. In such industries as electronics or pharmaceuticals, for instance, it has worked quite fine, with India being able to ramp up its manufacturing output and integrate better with global value chains (Emerald Expert Briefings, 2021).

6. Challenges

This is further exacerbated by relying on low-level technologies and uneven investment in upgrading plants, which makes the production of high-quality merchandise cumbersome for Indian manufacturers. Poor infrastructure also restricts the mobility of goods within supply chains, which has lengthened delays and increased costs. These infrastructure deficits put Indian manufacturing firms in a position of competitive disadvantage for the requirements of global markets that need speedier and more reliable supply chains (Sharma & Gautam, 2008). There is a rise in the cost of labour amidst strict labour laws. "It had once gained a comparative advantage because labour in India was cheap, but as the years went by, rising wages have blunted this advantage. This reduces flexibility during increasingly competitive times, making it challenging to expand operations when necessary or reorganize enterprises to meet market demands. Most of the inefficiencies within supply chains are influenced by cultural and social factors, making it difficult to ensure consistency and reliability (Ketkar & Vaidya, 2012). Similarly, the slow diffusion of technology is a problem because, notwithstanding larger enterprises adopting newer and better technologies, SMEs remain unable to do so due to both economic resource constraints and a lack of adequate technical capability. This deficit makes Indian manufacturing less competitive, especially in high-value-added industries where continuous innovation is essential for survival (Singh & Mohanty, 2020).

6.1 Infrastructure and Logistics Bottlenecks

In fact, there are enormous infrastructure and logistics-related bottlenecks which prevent the Indian manufacturing sector from being more competitive globally. Insufficient infrastructure is one of the key factors barring productivity and efficiency in manufacturing. Several studies on the Indian manufacturing sectors report that the deficiency in infrastructure, especially in transport and power, directly impacts TFP and TE.The elasticity of productivity to improvements in infrastructure is very high, meaning that good infrastructure can lead to significant returns through gains in manufacturing output (Mitra et al., 2012). Bottlenecks in logistics are also a fundamental deterrent for manufacturers in India. The growing logistics industry is highly inefficient due to especially poor transport infrastructure. Logistics costs in India are among the highest in the world, at approximately 14% of GDP compared to 8-9% in developed countries. The road and rail network is not appropriately developed, the ports are inefficient; and the warehousing facilities are also insufficient. The final outcome is that goods become costlier and late, making Indian products lose out on their competitiveness in foreign markets (Dubey & Ali, 2013). These factors add to the fragmented nature of the logistics industry. Most LSPs operate independently thereby causing a lack of coordination/integration along the value chain. Because of it, there is inefficiency and increased cost in the absence of proper logistic services. The bottlenecks were expected to be cleared with the help of GST and 'Make in India', but it has been so far slow and many challenges are yet to be overcome (Gupta et al., 2018).

6.2 Regulatory and Policy Challenges

One major challenge is the regulatory environment: it is ordinarily so complex; construed from this bureaucratic delays and cost escalations for the enterprise have been quite frequently experienced. Illustratively, rigid regulations in the electronics manufacturing industry

brought a halt to the investment in plants, equipment, and technology absorption; the outcome was huge reliance on imports, hence bridling domestic production capabilities. The National Policy on Electronics addresses some of these issues, but other areas where reforms could be urgently required include taxation, customs, compliance, and inspections to ensure the sector realizes full potential (Ernst, 2014). Lack of coordination and standardization of regulatory frameworks, especially regarding recent concepts such as Re-distributed Manufacturing.

Poor digital infrastructure, inadequate government policies, and complete lack of any certification programs are also problems faced by the manufacturing industry in India, which are crucial for implementing advanced manufacturing strategies. Such regulatory challenges stifle innovation and create obstacles to competitiveness at a global level in the sector (Luthra et al., 2019). Labour laws and fiscal policies remain highly in need of reform. Labor laws in India are considered to be way too rigid, outdated, and hard to scale efficiently for operations in companies. The fiscal policy environment is in dire need of clarity with respect to foreign investment and taxation policies to become much friendlier to business and lure global manufacturing giants. Environmental regulations and their enforcement pose problems, especially in sectors such as pharmaceuticals, where it is very essential to ensure high environmental and production standards. These, coupled with a lack of uniform enforcement of such regulations, could affect the environment through pollution and a failure to adhere to international standards, further complicating India's integration into the global supply chain (Horner, 2019).

6.3 Labor and Skill Gaps

It is the mismatch between the skills available in the workforce and the demand from modern manufacturing industries that has created the problem. While industry has been upgrading itself by adopting the latest technologies, the requirement for skilled workers has spiralled upwards with few matching supplies of adequately trained manpower coming on stream. A study concerning the Indian labour market points out that there is an acute emerging surplus of low-skilled labour and a shortage of labour with high-level skills required to operate and manage new technologies (De, Mukherjee, & Ray, 2022). This mismatch in skills is further worsened by the generally poor quality of education and training imparted to its workforce. Skilled labour is often absent in graduates, which is why high unemployment and underemployment rates are found in the lot having formal education. The academic institutions have been disconnected quite long from the needs of industry due to which work is hampered without a fully prepared workforce to meet emerging demands of industry (Bosco, 2014). Technological changes in the manufacturing sector have shifted demand towards more highly skilled labour, thus widening the wage gap between skilled and unskilled workers. As Indian firms adopt capital-intensive and technology-driven forms of production, the relative demand for low-skilled labour falls while the demand for skilled workers in operating and managing sophisticated equipment increases. This has resulted in greater wage disparity and has kept a large segment of the working population unable to get jobs in the emerging economy (Majumder, 2018). In the light of the challenges mentioned above, it is required that skill development programs should be articulated and focused upon on the requirements of the industry. Programs like NSDC have been established to combat this gap between the requirement of skilled manpower and the industry's need for them. Such initiatives have made provisions for vocational training and up-skilling that are directly relevant in current and future demands within the manufacturing sector (Singh & Sharma, 2016).

5.4 Environmental and Sustainability Issues

Indian manufacturing is very environmentally challenged and on matters of sustainability, which needs to be pursued vigorously in order to create competitiveness at the level of global markets. A big factor yielding pressure is to integrate sustainable practices into manufacturing processes, something which, in the light of global concerns, has increasingly become important to tackle challenges such as climate change, resource depletion, and environmental degradation. This calls for the adoption of sustainable manufacturing practices that are inherent in green manufacturing to reduce the environmental impact that results from industrial activities. However, with the Indian context, it is observed that this practice is very slow, especially among SMEs, who actually lack resources and expertise to implement advanced sustainable technologies (Singh & Mohanty, 2020). The Indian manufacturing sector itself faces acute difficulties in adopting sustainable practices across boards due to the lack of specific guidelines and frameworks. While large business sectors increasingly work out strategies such as lean and green manufacturing, the barriers to sustainability from SMEs remain high in terms of high costs to implement sustainable practices, limited access to green technologies, and slack in regulatory rules (Shankar, Kannan, & Kumar, 2017). It therefore calls for a more comprehensive approach to policy formulation and incentives, painting appropriate expectations for sustainability on different levels in manufacturing industries. There is an increasing pressure for Indian manufacturers to adhere to more stringent environmental regulations, yet most organizations do not have the exorbitant costs requisite in managing wastes and adopting appropriate systems for waste disposals. Original equipment manufacturing industries like automotive and electronics especially are confronted with enormous challenges in end-of-life product management and ensuring materials are recovered by recycling or environmentally benign disposals are made (Gupta et al., 2018).

6.5 Competition from Other Emerging Markets

Manufacturing in India attracts fierce competition. In particular, the rapid growth of countries like China, Brazil, and Russia has situated these developing nations as potential challengers to India in the manufacturing sector. These countries have managed to lure considerable foreign direct investment and adopt aggressive industrial policies to gain a competitive edge in the global market. Chinese firms were therefore able to acquire and absorb

foreign technologies successfully, helping them improve innovation capabilities and sell products in the global market with much success. Therefore, Chinese firms have fast-tracked the adaptation process of innovation and become competitive in selected sectors against their Indian rivals such as electronics, automotive, and heavy machinery industries (Kotabe & Kothari, 2016). Aggressive industrial policies and strategic state support in countries such as China and Brazil have indeed allowed for the rapid scaling up of their firms vis-à-vis international competition. But developing the global champions has often been achieved by using subsidies, tax incentives, and other types of support for R&D activities. On the other hand, Indian corporations most often find themselves in a more difficult regulatory environment and face less government support than they need for blossoming enterprise to compete fairly in any market. All this above means that emerging markets have managed to create global brands for which their characteristic features echo in the minds of consumers all over the world. Particularly, innovation and quality helped to keep the lead for South Korean companies such as Samsung in technology and Hyundai in the automotive sector. On the other hand, Indian companies are still striving to achieve not only building such global brands but also the perception issues accompanying "Made in India" products (Sharma & Jha, 2016).

7. Impact of Global Economic Factors

The deepest impacts have come from globalization, which restructured the sector through its inclusion in GVCs. Employments within the manufacturing sector due to participation in GVCs show a mixed effect; evidence shows that while forward linkages domestic value-added in exports apparently have had little effect, backward linkages foreign value-added in output have negatively affected job growth. This means that the reliance on imported inputs may crowd out the domestic labour, hence the sector's capacity of job creation could be affected. Gauges critical factors: Exchange rates and crude oil prices are considered the macroeconomic influence of the performance of various sectoral indices in India, including manufacturing. For example, any volatility in the price of crude oil and exchange rates can directly impact production cost and overall profitability, therefore the global competitiveness of the Indian manufacturing firms (R.S. & Sivakumar, 2016). The growth in exports has been facilitated by the buying and absorption of foreign technologies and greater presence of MNCs in India. All these have contributed to enhancing the export competitiveness of Indian manufacturing firms. At the same time, competition from other emerging markets particularly China remains a significant challenge in view of generally better infrastructure, more conducive economic policies, and greater integration with international markets in these countries. Various global economic perspectives, such as globalization, macroeconomic variables, and international competition, become critical determinants of the performance of the manufacturing sector of India in the global market (Banga, 2016; Mishra & Jaiswal, 2012).

7.1 Influence of Global Trade Policies

In the last two decades, trade policy reforms have significantly affected the internationalization of Indian manufacturing firms through deeper participation in GVCs and IPNs. Of these, the most far-reaching reforms have been trading liberalization "the reduction of tariffs has facilitated easier access by Indian manufacturers to the rest of the world. "However, greater participation in GVCs has also meant a decline in the domestic value-added content of Indian exports due to greater involvement of foreign firms higher up in the value chain. India's trade policies traditionally had a protectionist stance towards domestic industries; liberalization has gradually exposed these industries to greater competition from foreign firms (Aggarwal et al., 2021). The result has been to force Indian manufacturers to become more efficient and productive, although there are also some challenges that come with this competition, mainly in the form of how SMEs can compete against much larger and more established international players (Ramaswamy & Gereffi, 2000). Third, NTMs also play a very important role in how much India is able to export in manufactured goods on a yearly basis from its production. It involves the imposition of quotas, import licensing, and technical standards that would increase the export cost and act as a trade barrier. In the case of imports into India from China, for example, NTMs appear to impose effects both directly and indirectly along value chains so as to magnify the trade restrictiveness, thus affecting the overall competitiveness of Indian manufacturing in the global market. Ongoing reforms, such as the "Atmanirbhar Bharat" initiative, go further to reveal plans toward reducing dependence on imports, adding value to manufactured exports in the country. It sought integration of the manufacturing sector with more employment by enhancing Indian firms' domestic capabilities, hence reducing high dependence on global trade policies that conventionally damage the growth of the sector.

7.2 Effects of Exchange Rate Fluctuations

The major effects of volatility of the currency exchange rates are observed to impact the cost structure of the manufacturing firms. During depreciation of the Indian Rupee, the cost of importation of raw materials and capital goods will increase, which may raise the cost of production of the Indian manufacturers. Since this will reduce the profit margin, it may eventually lead to higher prices for the exported goods, thereby making those items less competitive in the international markets. Conversely, if the Rupee appreciates, it can reduce the price of imports, increasing the price of Indian exports and hence becoming unaffordable for foreign buyers with a decrease in the volume of exports (Dhasmana, 2013). The relationship between the exchange rate movements and export performance is not uncomplicated. In the case of a study conducted on Indian nonfinancial sector firms, for instance, it was observed that the currency appreciation generally has a strong and significant negative impact on export shares. This is particularly true for the firms with smaller export shares, which are more sensitive to exchange rate volatility. These firms mostly do not have the financial resilience to absorb the resultant shocks from

the exchange rate fluctuations, which contributes to the decline in their international competitiveness (Cheung & Sengupta, 2013). Where Cheung & Sengupta (2013) support this fact, it can be added that the sectors which are dependent on imported raw materials suffer more during an exchange rate fluctuation. Actually, the volatility of exchange rates hits certain sectors harder than others. For example, from an empirical standpoint, analysis of the manufacturing export in India indicated that though the exchange rate volatility of the country badly affected industries like textiles, other produce items like chemicals and engineering goods are less vulnerable to the changeability in the nation's exchange rate (Jyoti & Bhatt, 2022).

Global Supply Chain Disruptions

The application of material supplies became disrupted, causing production to be postponed and the product costs higher. These disruptions are often associated with the emergence or influence of natural disasters, geopolitical tension, and lately the finalizing COVID-19 pandemic, which has thrown into sharp light the vulnerability of global chains before unexpected jolts. This present study has highlighted the impact of supply chain disruptions on the Indian firms, and "The problems related to the supply of inferior quality material, delayed deliveries, and unwarranted cost escalations are their major concern." The tangible and intangible losses are the possible outcomes of supply chain disruptions. These losses would certainly affect the credibility and business potential of these firms in the global market (Ketkar & Vaidya, 2012). Of course, the prevailing COVID-19 pandemic has further aggravated these issues and widened its circle of influence on food markets, the automobile industry, and many other industries. For example, the lockdown effect created by the COVID-19 pandemic in India alone significantly reduced long-distance supply chains of essential items like vegetables and fruits due to their high vulnerability, hence reducing the availability of the product and substantial welfare loss for urban consumers and farmers. COVID-19 also severely disrupted the automotive sector—a key segment of the manufacturing in India. Companies like Maruti Suzuki India Limited faced severe stops in production, thus reducing sales and production volume drastically. The pandemic underlined the implementation of strong mitigation strategies for the control of such supply chain disruptions and ensuring resilience against future crises (Sudan & Taggar, 2022).

7.3 Impact of Geopolitical Tensions

Large geopolitical tensions have been the reason for India's manufacturing sector, operational and competitive in the world market. Most of such tensions reaching disruptions in the supply chain increase the price and unimaginable trade relations—harmful to the performance of this sector. However, geopolitical conflict between India and China in 2020 increased the uncertainty for investors, particularly for sectors dependent upon the Chinese supply chains, such as automobiles and energy, along with pharmaceuticals. These uncertainties manifested in stock market herding behavior wherein this fear about supply chain disruption and operational risks emanating from this geopolitical situation do collectively influence the course of investors' decisions in the market (Krishna & S., 2022).Geopolitical risk may alter the stock market's dynamics and thereby affect the overall financial stability of the manufacturing sector. Although several studies are indicative that India was relatively resilient to geopolitical risks, especially while comparing to other BRICS nations, volatility is still a factor of concern in the sector, more so during recent times when geopolitical tensions have gone high. This may further lead to a fall in investment, slow down production, hence affecting the capability of manufacturers with regard to sustaining their share in the global market. Geopolitical factors, such as the Russia-Ukraine War, have larger implications on world trade and hence on the manufacturing sector in India. It changes the trading response and diversification imperatives both at the level of investments and manufacturing capabilities. These changes underline and hint at the development of home manufacturing infrastructure in India with a view to cutting reliance on turbulent international markets and dealing more effectively with geopolitical uncertainties (Agarwal, 2023).

8. Government Policies and Initiatives Make in India Initiative

The overall vision of "Make in India" aims at raising the share of the manufacturing sector from the current 16-17% to 25% of India's GDP by 2025 and, in the process, creating millions of jobs. Success so far has been marked by an unprecedented increase in FDI inflows, strengthening the growth of the manufacturing sector. FDI inflow was hugely increased during the period between 2014-2016, reflecting investors' confidence in India's manufacturing potential. New manufacturing units have been set up, and existing units have expanded, especially in electronics, automotive, and pharmaceuticals. This growth has, moreover, been supported by efforts at improving the Ease of Doing Business rankings of India, thus making the setting up of operations by companies easier. While rigidity in its labour laws has been cited as one of the challenges to growth that confront scaling operations and adapting to the dynamic nature of global manufacturing. While environmental regulations are necessary, they pose a challenge in the balance between growth and sustainability that manufacturers should find (Pulicherla et al., 2021).

8.1 Production-Linked Incentive (PLI) Scheme

The Production Linked Incentive Scheme is specifically designed to attract both domestic and foreign investments in key sectors of electronics, automotive, pharmaceuticals, and medical devices, with financial incentives linked to production output. The PLI scheme shall be a major step in enhancing India's capacity to manufacture, bringing down the import burden besides increasing exports on its road towards emerging as a global hub for manufacturing. The PLI scheme has indeed worked wonders on the ailing sectors of electronics and pharmaceuticals. To name a few, there has been this unprecedented inflow of investments in electronics manufacturing for which India surely remains in that enviable position where it considers itself an

important player in the supply chain for mobile phones and other electronic goods globally. The PLI scheme is targeted at the pharmaceutical sector in order to reduce the country's reliance on the import of Active Pharmaceutical Ingredients, particularly from countries like China, and improve the resilience of the Indian health supply chain (Mahapatra et al., 2022). Basically, the PLI scheme supports the "Atmanirbhar Bharat" or Self-Reliant India mission aimed at promoting indigenous manufacturing with a view to reducing dependence on imports. This shift in policy from import substitution to export promotion has raised debate on the concept that India is going back to an inward-looking industrial strategy reminiscent of the pre-liberalization era. However, the fact that the scheme specifically focuses on integrating India into global value chains balances the approach; the country intends to strengthen its domestic industries but will be export-oriented toward world markets (Singh & Singh, 2022). The PLI Scheme shall be an important driver for India's manufacturing sector to surge its contribution towards global market share and as a preferred destination for the global manufacturing community.

8.2 Ease of Doing Business Reforms

The reforms taken by India for "Ease of Doing Business" have given a fillip to the competitive manufacturing sector in the international arena. The government, through this decade, has pursued reduction in bureaucratic hurdles and simplification in regulatory procedures coupled with building a more investor-friendly climate for business. These reforms afford a fitting complement to initiatives like "Make in India" for attracting foreign investment and enhancing domestic manufacturing. One of the significant areas of improvement had been streamlining labour laws that have conventionally been one of the more incandescently complicated areas to do business in India. It tried to reform this with a view of making its labour market globally more competitive while protecting workers by amendments to the Factories Act, 1948, Labour Laws Amendment Act, 2011, and finally, the Apprenticeship Amendment Act, 2014 (Shukla et al., 2017).

Additionally, the new government has placed ample emphasis on freeing the industry from unnecessary red tape and on de-licensing. These reforms, besides the liberalized foreign trade and investment policies, have enhanced efficiency and productivity in Indian industries. This has attracted more FDI and allowed Indian firms to compete more effectively on the global stage (Thakur et al., 2012). Although these reforms have positively affected the sector, efforts are yet required to overcome other challenges and ensure that the momentum of reform is maintained.

8.3 Investment in Infrastructure and Innovation

The gains accrued from infrastructure development cannot be ignored, and this is because infrastructure directly affects productivity and efficiency in manufacturing processes. Therefore, on the analysis of impacts on the infrastructures on the productivity situation in the Indian manufacturing industry, core infrastructure seems to have significantly caused TFP and TE. The estimates showed that both measures are strongly elastic; hence, infrastructure improvements can give the needed gains substantially in terms of productivity performance, which is an essential factor to continue being competitive in the global market. Innovation investment is one of the most crucial investments that enhance performance in firms in the manufacturing sector (Mitra et al., 2012). A study targeted at the Indian food and agricultural manufacturing industry showed that R&D investments have positively impacted firms' growth. The conclusion was drawn that R&D investments are a driver of growth also in enabling a firm to exploit industry externalities because of an increase in its global competitiveness (Manogna & Mishra, 2021). Also, from the perspective of OFDI, it has been shown to play its role in enhancing innovation. OFDI by Indian multinationals, especially through acquisitions in global cities, promotes access to technological advancement and innovation opportunities. However, the influence of innovation is nuanced in that though the acquisition normally enhances technological capability, such benefits may be dampened if investments are concentrated in global cities due to increasing competition and costs (Amendolagine et al., 2021).

Case Studies of Successful Manufacturing Industries

A good example of this is the automotive industry, where Indian firms have moved from 'domestic-oriented' to integral parts of GVCs. Upgrading the capabilities, investing in R&D, and pursuing strategic mergers and acquisitions to attain not only domestic but also international competitiveness by integrating into global markets are some of the ways they get ahead. An indication of this success is provided by the fact that at an international level, the sector has turned out to be adequately competitive and is contributing a considerable amount to the manufacturing exports of India (Saranga, Schotter, & Mudambi, 2019). In a given industry, particularly among SMEs, the pharmaceutical sector has developed a niche regarding the placement of Indian manufacturers in the global market. The Indian biotech industry also has risen as an international player with the driving innovation capabilities of the domestic firms. Those companies are enabled to achieve this through favorable institutional factors, that is, governments' policies as well as technological transfers from public and international research institutions. This sector is a typical example of how innovation and capability development may account for success in very competitive global industries (Fan & Watanabe, 2008). This has been facilitated by the removal of restrictive policies of various governments on issues to do with production, imports, and exports. Outcome, the telecommunication industry has expanded its services in addition to developing a lucrative manufacturing industry to complement India's potential role as a global manufacturing hub (Mani, 2007). The foregoing discussion of examples in the automotive, pharmaceutical, biotechnology and telecommunications industries illustrates the different facets of Indian manufacturing in the global market. The potential to implement innovation, strategic investment, and enabling policy supports for such industries is the reason for their

success, which positions India as a major manufacturing country in the world.

8.4 Automotive Sector

Whereas Indian automotive firms were previously dogged by a reputation for inferior quality and low labour productivity, investors have followed a course of strategic investment in technology, R&D, and the best practices from international markets, and this has made them globally competitive. India today has emerged as the fourth largest automobile market in the world, and its domestic and export markets are substantial. More precisely, in the context of the auto components industry, the growth of the sector has been aggressively facilitated with increased investments and FDI inflow. In the context of the automotive industry, too, it has grown as one of the major contributors toward the GDP of India, creating millions of jobs and positioning India in the front leading position within the global automotive supply chain (Nag, 2011; Parry & Kadakol, 2016). Over the years, Indian automobile manufacturers have embraced innovation and digitization as a way to handle dynamically changing needs on the global platform. Two key trends that Indian automotive firms have started embracing little by little in production include the shift towards electric vehicles and the adoption of the industry 4.0 revolution. This aspect enables innovation, which is very significant in the fast-changing landscape among automobile companies in the world today as sustainability and technological advancement rise to become watchwords for success (Miglani, 2019).

8.5 Pharmaceuticals and Biotechnology

This makes the pharmaceutical industry alone stand out among the largest and developed industrial sectors of the world, accordingly represented as the third-largest in global volume and 14th in value. Its share in the global pharmaceutical market is 2.4% by value and 10% by volume, which again shows the robust production capabilities and extension of reach in international markets. This is one of the driving reasons for the India pharmaceutical industry to do so well: it concentrates most of its effort on producing generic drugs, which comprise a large portion of its exports. India is the largest supplier of generic medicines in the world, accounting for 20% of global demand in volume terms. In this respect, the pharmaceutical industry in the country also took leading strides in producing vaccines, meeting 60% of the global vaccine demand. Another facilitating feature is an entire network of over 3,000 companies and 10,500 manufacturing units that are attended to accordingly with an abundant supply of skilled labour and raw materials (Akhtar, 2013; Tikkha, 2023). Indian biotech companies have played an important role in the production of recombinant-DNA therapeutic proteins and other advanced biopharmaceuticals, thereby contributing a great deal to the global healthcare scenario. Government initiatives and policies supporting such industries, along with a favourable research and development environment, place India in the frontline for undertaking biotechnology-related activities (Jagadish, 1991). Due to its capabilities for high-quality and cost-effective production and commitment to innovation and R&D, the Indian pharmaceutical and biotechnology industry has become an indispensable part of the global market.

8.6 Electronics Manufacturing

The rapid growth in consumer electronics, however, has the industry heavily dependent on imports, especially for high-value additions, including semiconductors indispensable for high-tech electronic products. Such dependencies have been one of the major stumbling blocks to success in developing a genuine local manufacturing ecosystem right since the early era of industrialization. The proper implementation of these policies needs major improvement in various areas like taxation, customs, compliance, and technical standards. Second, the policy framework must provide for linking the electronics manufacturing capabilities of India with its globally competitive chip-design industry that essentially remains disconnected from Indian manufacturing (Ernst, 2014). The main sectors in which India has made significant strides include the mobile phone manufacturing segment. Starting from 3% in 2014, Indian mobile phone production had increased to 11% in 2019, positioning the country as the second biggest hub for this category. Growth in this sector has been rapid, with gains that have trickled into job creation and helped solidify a strong export base (Choudhury, 2021). The lack of indigenous semiconductor manufacturing bases has brought the dependence on imports to a very high level. As a result, India has been unable to reap the complete benefits of electronics manufacturing. The government has brought forward initiatives that incentivize the building of semiconductor manufacturing; however, huge investments and policy reforms are still needed, which may build a self-sufficient ecosystem that will fulfill both domestic and global demands (Kumar, 2021).

8.7 Textiles and Apparel

The Indian textile and apparel industry is second to none, quite literally considering its long history, high capacity, and great contribution it has provided for the nation's economy. Industry is the second-biggest employment provider in the country, next only to agriculture, providing direct employment to more than 45 million people. It also holds an important place in the country's exports, which account for about 5% of the global textiles and apparel trade. It also prospered mainly on account of the receipts provided by India with abundant raw materials, including cotton, thereby leaving adequate production facilities (Annapoorani, 2017). Abolishing the quotas under the Multi-Fibre Arrangement in 2005 opened up new frontiers for the Indian Textile and Apparel Industry to increase its exports immensely. The competitive advantages of design and manufacturing have been licensed by the companies of India to reach more significant shares in the Global Market. Competition from other competing countries like China, Bangladesh, and Vietnam has confronted India's performance in clothing exports. These countries are able to gain from their relatively lower costs of production and also from more beneficial trade policies, thereby whittling away market shares from India in some segments (Kathuria, 2018). One of the major strategies the Indian

textiles and apparel industry has followed to achieve and then further improve its market share globally is diversification with innovation. There is incremental shifting in industry towards value-added products like technical textiles and sustainable green textiles, something quite important if the industry were to sustain competitiveness in an increasingly quality, sustainability, and innovation-conscious world market. Besides, the government itself has intervened with initiatives such as the "Make in India" campaign in view of positioning India as a global manufacturing hub ready for textiles and apparel (Chugan, 2011).

9. Future Prospects and Strategies

With globalization of markets, access to improved technology and innovation becomes critical to sustaining competitiveness. This therefore means that the Indian manufacturing firms should focus on the technological advancement and development of high-class products meeting global standards (Sharma & Gautam, 2008). All this will be possible through the partnerships with international companies, integration into global value chains, which would thus increase the productive ability of Indian manufacturers, giving them broader access to the marketplaces. This integration will facilitate the adoption of best practices and state-of-the-art technologies from world-class players and give a further boost to this sector's performance (Sisodia, Chowdhary, & Mangal, 2005). The global market environment in the future will require better quality and quicker delivery of the product, which is possible only through skilled labour. It is therefore important that the Indian firms invest in the development of employee skills and training programs with a view to empowering the workers to rise up to the demands of the global market (Singh, Garg, & Deshmukh, 2007).

9.1 Embracing Digital Transformation and Automation

For India's SMMEs, digital transformation plays a vital role; these firms need to participate in Industry 4.0 technologies to be valid and competitive in the global turbulent markets. Main areas where SMMEs can adopt digital technologies to enhance their performances are operational measurements, followed by manufacturing and design interventions (Dutta et al., 2020). Software automation technologies rewrite traditional manufacturing workflows by freeing up production processes and making them more efficient and error-free, hence enhancing overall quality. This is very important in the context of global supply chains where efficiency and agility are major concerns if one wants to keep the competitive edge. Automation enhances the level of operational efficiencies but also allows turning supply chains to be resilient and responsive, hence better equips Indian manufacturing to stand up to the challenges in global markets (Badmus, 2023).

9.2 Enhancing Workforce Skills and Education

A large proportion of the Indian workforce does not have formal skill training; reportedly, only 2.3% have formal training, while in most developed countries, the percentages are very high. This skills gap demonstrates the urgent requirement for substantial training programs to equip the workforce with the demands of modern manufacturing related to the adoption of advanced technologies and processes (R. Anita & V. Swamy, 2016). The establishment of the NSDC promoted public-private partnership, which is necessary for skill development to scale and be appropriate for the needs of the industry. Education aligned with the needs of industry is another critical step that helps bridge the gap between theoretical knowledge and practical skills needed at the workplace. Introduction of dual systems of vocational education, similar to what happens in countries like Germany and Switzerland, would greatly enhance employability prospects for Indian graduates. These kinds of systems merge class learning with workplace training so that novices emerge out of classrooms well-prepared for the demands of modern manufacturing environments (R. Sharma & I. Sharma, 2021).

9.3 Strengthening Global Trade Relations

This is reflected in the fact that the share of imported inputs into India's exports is higher than for other countries at the same level of development, which thus suggests the use of stronger backward production linkages. However, for the same reason, this implies weaker forward production linkages in the sense that while India imports a large input, India's contribution to global consumption and, equally important, to global production networks is not as important. Better trade relations and policies could develop these forward linkages, helping India to turn out to be a more powerful player in the world's manufacturing arena (Paul & Barua, 2022). India's integration into the world economy had been determined by its trade policies since the 1990s. The liberalization efforts have removed trade barriers and signed FTAs, giving a way for India to integrate with international markets. Such efforts have helped in diversification of the export base of the country, thereby enhancing access to key inputs that are essentially required for growth in the manufacturing sector. Besides, there is still considerable scope for revising trade policies in keeping with global best practices so as to fully realize the gains of globalization in India's manufacturing sector (Yadav, 2012).

9.4 Sustainable Manufacturing Practices

It implemented sustainable manufacturing in the Indian automotive, electronics, and machinery industries. It identified key practices that included sustainable product and process design, lean practices, agile operations, and sustainable supply chain management, hence making it the most valued means of attaining the paramountcy of sustainability performance. This practice enables companies to reduce wastes, optimize resources, and provide perfection to the operational efficiency of the companies concerned (Gupta et al., 2018). The Indian context assessed the concepts of sustainable manufacturing practices, which particularly enlisted the 6R ideas: reduce, reuse, recycle, recovery, redesigning, and remanufacturing. In regard to this fact, there was an overlapping conclusion that focus on the 6R ideas could incredibly improve the implementation of sustainable practices in manufacturing and thus provide improvement

in the direction of environmental performance and support long-term sustainability goals (Shankar, Kannan, & Kumar, 2017).

Conclusion

Though the manufacturing sector occupies a critical position in the economic architecture of India, it is prey to severe hiccups that come in the way of it becoming really globally competitive. Despite initiatives like Make in India by the government, aiming to raise the contribution of the sector in GDP from 16-17% to 25% by 2025, its growth is slow on account of structural problems like labour market rigidities, inadequate infrastructure, and low productivity. While certain industries, such as mobile phone manufacturing, do show growth-increasing the global share from 3% in 2014 to 11% in 2020-the overall share of global manufacturing that belongs to India remains rather modest at 1.8%, significantly below leaders such as China, at 13.7%. That means the integration in value chains is very limited in India, and this has impacted negatively on the potential economic gains derived from manufacturing. The increased technological adoption, in particular of Industry 4.0, is slow, especially within reach for small and medium enterprises. Innovation and productivity are therefore slowed down as a result. Labour law reforms, fiscal policies, infrastructure development, enhancement in skill formation and workforce capacity will have to be initiated if targets are to be achieved. In this connection, the future growth would also depend upon the adoption of smart manufacturing technologies and sustainable practices. Addressing these issues will not only serve in enhancing manufacturing output within the country but also position India as a vital player in the global market. Strategic investments in research and development, complemented by strong global trade policies, will go a long way in strengthening the manufacturing sector of India so that it remains competitive in the long term in the fast-changing world economic order.

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