

# **An Analysis of Bangladesh's Light Engineering Sector- Export Items, Export Volume and Growth Trends**

**Md. Kamruzzaman Rasel**

Directorate of Continuing Education,  
Bangladesh University of Engineering and  
Technology (BUET), Dhaka  
kamruzzamanipe@gmail.com

**Proma Acharjee**

Industrial and Production Engineering,  
National Institute of Textile Engineering and Research  
(NITER), Savar, Dhaka  
pacharjee@niter.edu.bd

## **Abstract**

From the perspective of Bangladesh, the Light Engineering (LE) sector plays a very important role in supplying the necessary machinery and high-cost, time-consuming spare items. The Light Engineering (LE) sector has high potential to contribute towards economic development as well as employment generation by reducing the quantity of imported spare parts for our industrial machinery, since this sector is labor-intensive. This labor-intensive sector can be a vital opportunity to reduce the unemployment rate in Bangladesh. The purpose of this article is to study of present situation and finding the hindrances to expanding the Light Engineering (LE) sector and finally providing recommendations for the development of the Light Engineering (LE) Sector.

## **Keywords**

Light Engineering, Labor-intensive, Economic Development, Unemployment Rate

## **1. Introduction**

The Light Engineering (LE) industry constitutes a significant segment of the economy of Bangladesh by contributing in the employment generation, producing output as spare parts, value addition of raw materials, and exporting the generated products. The Light Engineering (LE) sector plays a vital role in the socio-economic development of the country.

According to Trading Economics (n.d.), as showing Figure 1, the unemployment rate in Bangladesh expanded to 4.70 percent in 2024 from 4.20 percent in 2023, averaging 3.81 percent from 1991 to 2024, with a peak of 5.30 percent in 2020 and a low of 2.20 percent in 1991, coming to an all-time high of 5.30 percent in 2020 and a record low of 2.20 percent in 1991. To reduce the rate of unemployment in Bangladesh, the Light Engineering (LE) sector can play a significant role, since this sector requires less capital and can generate more employment per unit of capital. Here an overall statistical analysis based on the recent years is depicted to the below Figure 1 showing the rates over unemployment that impacts the country's overall economy.

These small Light Engineering industries are mainly manufacturing various types of import-substitute small products, spare parts, and thus saving the local currency. These small and micro engineering enterprises contribute to the livelihood of a huge number of the poorest citizens around the country.

In this sector, having the opportunity to create of large number of employments by developing the light engineering industry by giving relevant opportunities to attract foreign investors in Bangladesh and gradually entering into the foreign market after fulfilling the local demands of produced spare parts by the Light engineering sector.

This paper has been structured to identify the present situation Light Engineering (LE) sector based on the Export items, Export volume and Export Growth rate. The paper has been structured into five sections. The first section states the study background and introduction, second section represents the objective of the study; section three represents the literature review, Present situation of the light engineering sector has been described in section four, five and six, section nine represents key recommendation of the light engineering industry of Bangladesh.

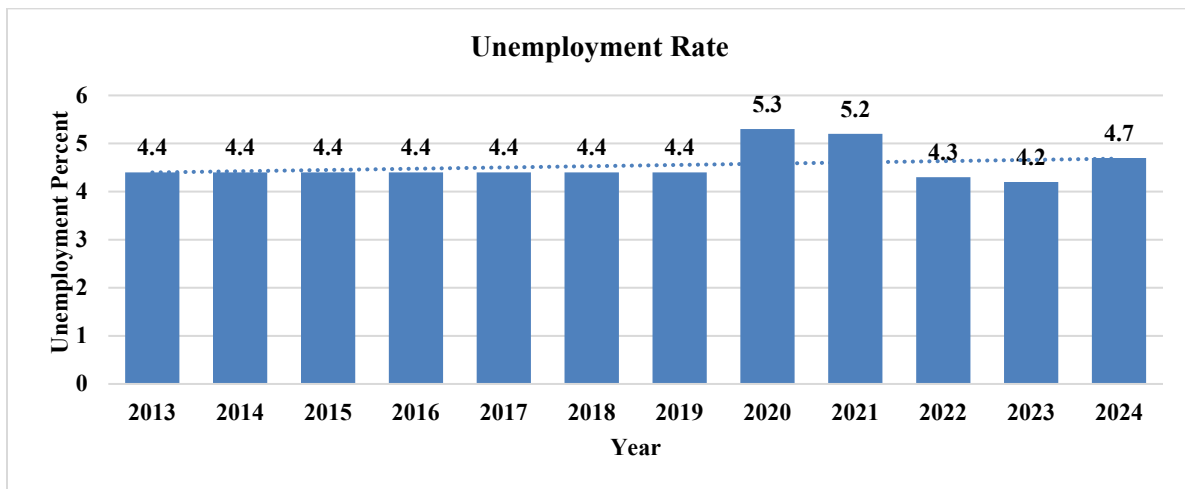


Figure 1. Unemployment Rate in Bangladesh

## 2. Objectives

The objective of this study is to conduct a comprehensive evaluation of Bangladesh’s Light Engineering sector by examining its major export items, export volume, and growth trends over a multi-year period. The study aims to generate a data-driven understanding of how different product categories such as bicycles, engineering goods, and electronics have contributed to the sector’s overall export performance. In addition, the research seeks to identify the structural strengths and weaknesses of the industry and assess the external opportunities and threats that influence its competitiveness in both domestic and global markets. By integrating quantitative export data with sectoral analysis and strategic insights, the study intends to provide evidence-based recommendations that can guide policymakers, industry leaders, and SMEs in advancing technological capability, improving product quality, and strengthening the long-term growth potential of Bangladesh’s Light Engineering industry.

## 3. Literature Review

The light engineering (LE) sector is widely recognized as a foundational or “mother industry,” as it supports almost all other industrial activities by supplying machinery, equipment, spare parts, accessories, and various import-substitute items. In Bangladesh, the sector plays an essential role in promoting industrial development through its contribution to manufacturing capacity and technological upgrading (Quadir & Mahamud, 2009). Despite its importance, the sector faces multiple challenges that hinder its growth, including limited access to modern technology, inadequate financial support, and insufficient collaboration among firms. These factors collectively slow down innovation and restrict competitiveness in both domestic and international markets. Recent studies have emphasized that the light engineering industry continues to struggle with issues related to productivity, worker skill shortages, and inconsistent quality standards, which ultimately increase production costs and reduce market efficiency (Majumder & Dey, 2020). Furthermore, the informal nature of many LE clusters contributes to operational inefficiencies and creates barriers to scaling up production capacities. Addressing these long-standing challenges through improved technology adoption, stronger institutional support, and enhanced collaboration among firms would significantly strengthen the

sector's ability to contribute to industrial growth and economic diversification in Bangladesh.

Light engineering requires a strong element of local engineering capability in the design or manufacturing of a product, meaning that indigenous technical skills and engineering knowledge play a significant role in its development. The major processes involved in this sector include cutting, blending, machining, shaping, milling, rolling, extruding, drawing, and sawing, among others (Rabbani, 2005). The demand for optimized workflows and minimized production delays has become essential for apparel and garment manufacturing industries that are facing competitiveness and resource constraints. The garment industry in Bangladesh is the biggest contributor to the national economy, contributing over 80% of the country's export revenue and employing a large number of workers, primarily women (Chowdhury et al., 2014). However, this sector faces significant productivity challenges due to inefficiencies and bottlenecks in production lines. Previous studies highlighted that these issues cause avoidable inefficiencies in the production line, which collectively lead to reduced lead times and production costs (Tareque et al., 2020). Furthermore, occupational health and safety concerns, particularly following the Rana Plaza tragedy (Bossavie et al., 2023), have further worsened the productivity situations that contribute to high turnover rates and worker absenteeism (Akhter et al., 2019; Yuan et al., 2022). Studies have emphasized that line balancing can streamline production by reducing idle times and redistributing tasks (Islam & Halim, 2022), positioning line balancing as an effective strategy to mitigate productivity losses (Julie et al., 2024). According to recent trade statistics, shown in the Figure 2 that Bangladesh relies heavily on imported raw materials such as cotton, machinery, and mineral fuels to sustain garment production (Trading Economics, n.d.). Therefore, addressing the productivity pitfalls and eliminating them through a balanced assembly line would benefit any sewing or other apparel production processes.

After 1980, indigenous light engineering workshops emerged around Dholaikhal, Jinjira, Mirpur, Syedpur etc. And later on Jashore, Bogura to provide the spare parts to supply the local demand. In 1984, Dholaikhal caught the attention of the Government. It was felt that although the LE workshops had praiseworthy skills, they could not make quality parts due to a lack of modern machinery, continuity of demand, and staff with formal technical qualification.

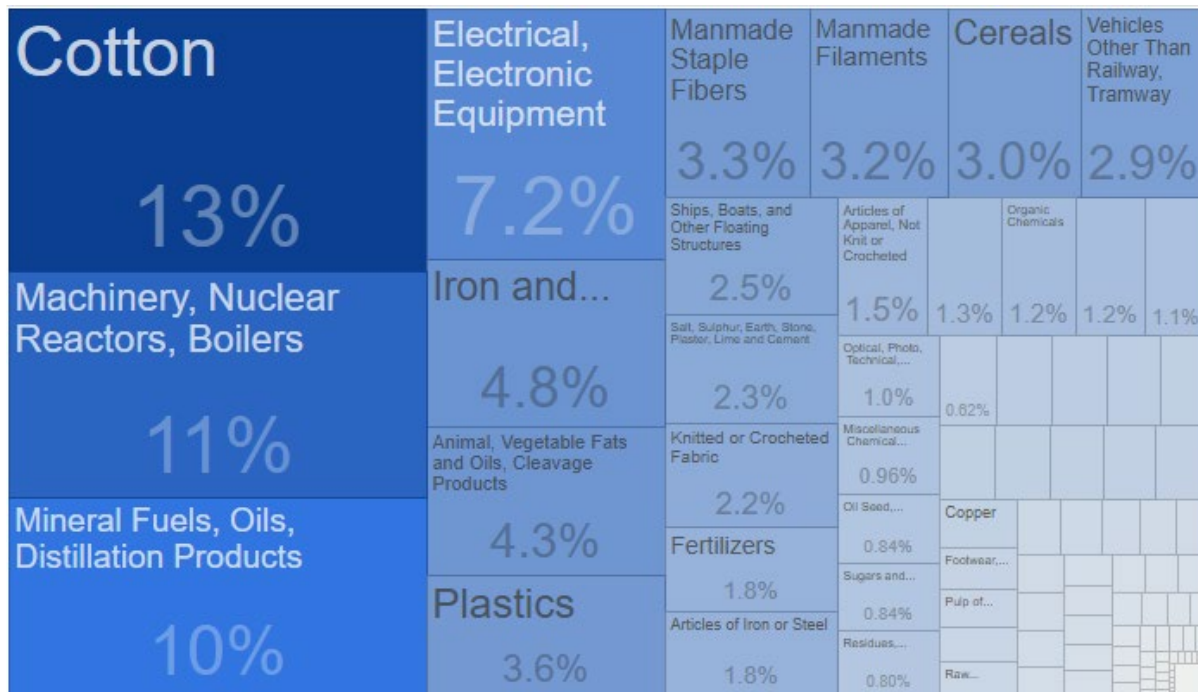


Figure 2. Bangladesh Imports by Category

The sector produces three types of products/services: complete machinery, spare parts, and repair service. Integrating all the above attributes, the Light Engineering (LE) sector can be defined as “small firms employing engineering or technological processes that produce small machinery, equipment, tools, metallic household appliances or sanitary

ware, and electrical, electronic, electromechanical, or mechatronic products, mainly by metals; the Light Engineering sector produces spare parts for different types of industrial, agricultural, automobile, and small machinery and provides repair service” (Majumder & Dey, 2020). In consequence, enterprises' capabilities and quality have not yet been able to meet the competitive challenges that come from the global market.

Bangladesh is a developing country in South Asia where the light engineering sector has been playing a very significant role in socio-economic development. The sector has a notable contribution to economic growth and poverty reduction in the country (Ahmed & Bakht, 2010).

Most of the light engineering enterprises lack modern technologies like modern heat treatment, material testing, magnetic crack tester, etc., and the commonly used machinery in each enterprise of the industry includes lathe machines, grinding machines, shapers, planners, and milling machines (Uddin, 2010).

Even the light engineering enterprises are micro and small in size and have limited capacity to upgrade their condition (Ahmed & Bakht, 2010). Thus, the industry is very much locally focused, and the current capabilities are not sufficient to meet the local demand. So, light engineering enterprises have to upgrade significantly to meet local demand and to catch up with the global market.

#### **4. Present Situation of Light Engineering Sector**

Light Engineering (LE) industry is a very significant sector in Bangladesh. There are generally two types of light engineering industries based on the production process and the value addition.

##### **Foundries**

This is where iron pig, scrap irons, are used to melt until it liquidities, and is then pured into a mold to cool down and solidify. The cast iron comes out in the shape of the mold, which needs further processing to get the finished product. Products such as metal casting of pumps, liners of engines, different components of engines, pumps, power tillers parts, tube wells, rice hullers, oil expellers, paddy threshers, small spare parts for different engines, including automobiles and different types of stop cock, as shown in Figure 3.



Figure 3. Foundry Work

##### **Maintenance and Finishing Workshop**

Industrial machinery components often require repair work that is done by the repair shops. The work involves manufacturing spare parts, repairing old spares, and assembling. Finishing units generally comprise of lathe, drill, and cutting machines to finish the cast irons from the foundry unit. Finishing of separate units of a product, as well as assembling of separate parts, is done here. These finishing units generally deal with genetic products that can be sold to wholesalers and retailers quickly, sample shown in Figure 4.



Figure 4. Maintenance and Finishing Workshops

### **5. A Glimpse of the Light Engineering Sector of Bangladesh**

The light engineering sector has emerged as the foundation of development, providing the platform for industrial growth, enhancement of trade, economic prosperity, and employment prosperity. The light engineering industries have the potential to play a significant role in technological and economic development around the country. In Bangladesh, over 90% of light engineering industries serve the local needs of the people.

There are strong backward and forward linkages between the light engineering industries and other sectors such as agriculture, automobile, and transportation in the economy of Bangladesh. The light engineering products can be categorized by the following application areas (both complete and spare parts), such as the Automobile, Railway, Bicycle and Rickshaw, Machine Tools, Jute & Textile, Chemical Industries, Sugar and food Industries, Pharmaceutical Industries, Engineering and metal Industries, Ship industries, Agricultural sector, Oil and gas line fittings, Telecommunication etc.

The light engineering industries of Bangladesh is currently producing more than 10000 types of quality machinery, spare parts, and accessories. The consumers of light engineering products and services are both the public and private sector. Major public sector consumers are the sugar and food industries corporation, BCIC, Bangladesh Railway, BRTA, BRTC, BIWTA, Port Authority, WASA, T&T, PDB, Public Health Engineering, Civil Aviation, Bangladesh Biman etc.

A number of potential export quality light engineering products are going to the foreign market on direct and subcontracting means. These are spare parts of paper mills, bicycles, fancy light fittings, construction equipment, carbon rods, automobile spares, and Stainless-steel wares.

The labor costs are comparatively lower than in other countries as such the sector shows high potential of growth and development.

### **6. Export Scenario of the Light Engineering Product Sector**

The export scenario of Bangladesh's Light Engineering sector demonstrates a dynamic yet fluctuating performance over the seven-year period from FY 2013–14 to FY 2019–20. As shown in Table 1, total export earnings experienced substantial growth in the early years, rising from USD 366.63 million in FY 2013–14 to a peak of USD 688.84 million in FY 2016–17. This upward trend was primarily driven by significant expansion in engineering products and steady contributions from bicycle exports. However, the sector faced a marked decline after FY 2016–17, with total exports falling to USD 292.92 million by FY 2019–20, reflecting challenges in global demand, production capacity, and competitiveness. The detailed breakdown across bicycles, engineering products, and electronics illustrates both the potential and the volatility characterizing the sector's export performance. Table 1 shows the export scenario of the light engineering sector (Million US Dollar) (BBPC, n.d.).

Table 1. Export Scenario of the Light Engineering Product Sector

| Sector  | Fiscal Year |         |         |         |         |         |         |
|---|-------------|---------|---------|---------|---------|---------|---------|
|   | 2013-14     | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 |
| Light Engineering Products (Export Performance Total) | 366.63      | 447.04  | 510.08  | 688.84  | 355.96  | 341.3   | 292.92  |
| A. Bicycle  | 112.89      | 126.06  | 99.15   | 82.46   | 85.73   | 84.24   | 82.84   |
| B. Engineering Products                               | 63.06       | 83.03   | 174.80  | 271.09  | 147.48  | 161.68  | 151.19  |
| C. Electronics and Electrical Products                | 190.68      | 237.95  | 236.13  | 335.29  | 122.75  | 95.38   | 58.89   |

## 7. SWOT Analysis of the Light Engineering Sector

A SWOT analysis is presented below Table 2 to evaluate the internal drivers and external challenges that shape the Light Engineering sector's performance and long-term growth potential.

Table 2. SWOT Analysis

|  |  |
|--|--|
| <p><b>STRENGTH</b></p> <ul style="list-style-type: none"> <li>a. Availability of trainable labor at competitive cost in Bangladesh.</li> <li>b. The government has imposed a minimum duty on basic raw materials used in this sector.</li> <li>c. Generally light engineering sector developed area-wise wise such as Dhaka, Jashore, Bagura, that is why it is easy to develop vendor development and clustering.</li> <li>d. 10% cash incentive for light engineering product export from Bangladesh.</li> </ul> | <p><b>WEAKNESS</b></p> <ul style="list-style-type: none"> <li>a. Production facilities and technology are not modernized.</li> <li>b. Production management skills, including TQM, are at a low level now.</li> <li>c. Die-making technology is not yet updated in Bangladesh.</li> <li>d. Technical institutions like metal testing, R&amp;D, and quality assurance support are not sufficient.</li> <li>e. Marketing ability is insufficient for export promotion.</li> <li>f. Poor quality of products</li> <li>g. Lack of Financial Access</li> <li>h. Lack of marketing</li> <li>i. Price fluctuations and availability of quality raw materials</li> </ul> |
| <p><b>OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>a. Market size is huge in view of import substitution for industrial machinery and spare parts necessary for the present industry.</li> <li>b. Huge export potential as the country presence in between India and China.</li> <li>c. The government has been emphasizing the industries' growth.</li> <li>d. With future industrialization, the unemployment problem can be reduced radically.</li> </ul>                                       | <p><b>THREATS</b></p> <ul style="list-style-type: none"> <li>a. The domestic market becomes reluctant to buy domestic products due to quality issues.</li> <li>b. No international quality and testing laboratory.</li> <li>c. Little care is taken to address environmental hazards and human safety aspects at unorganized ship breaking yards from where raw materials are procured.</li> </ul>   |

## 8. Initiative of the Bangladesh Government to Develop Light Engineering Sector

The Government of Bangladesh has declared the sector as a most priority sector in its export policy 2003-2006 and thrust sector in its industry policy 2005. The exporters of light engineering products are enjoying 10% cash incentive to boost the export earnings. The government has also taken the following initiatives to develop the

industry:

- Concentration on spare parts production of automobiles, railway, mills, factories, industries, and maintenance work, etc.
- Concentration on capital machinery, bicycles, construction equipment, etc.
- Concentration on foundry, agro-machinery and spare parts mills, LPG cylinders and maintenance work, etc.
- Concentration on the activities of ship breaking
- Exemption from customs duty on capital machinery.
- Initiative to set up a modern light engineering part with coordination with the Bangladesh small and Cottage Industries Corporation (BSCIC) and the Bangladesh Engineering Industry Owners Association (BEIOA).

## 9. Key Recommendations for The Development of the Light Engineering Sector

- Effective implementation of polices for developing the light engineering industry
- Need to establish a light engineering industrial zone, as an Export Processing Zone (EPZ)
- Need to establish raw material and finished product testing facilities near the industrial zone
- Good relationships need to be developed with foreign countries to export products.
- Loan facilities should be given easily to the entrepreneurs who are going to start the light engineering industry.
- The low cost of imported raw material should be ensured.
- Availability of data about the industry must be ensured to make strategic decisions, research, and development.
- Foreign Direct Investment in Bangladesh increased by 1697 USD Million in 2024. Foreign Direct Investment in Bangladesh averaged 1200.04 USD Million from 2002 until 2024, reaching an all-time high of 2650.00 USD Million in 2019 and a record low of 276.00 USD Million in 2004 in Figure 5(Trading Economics, n.d.).

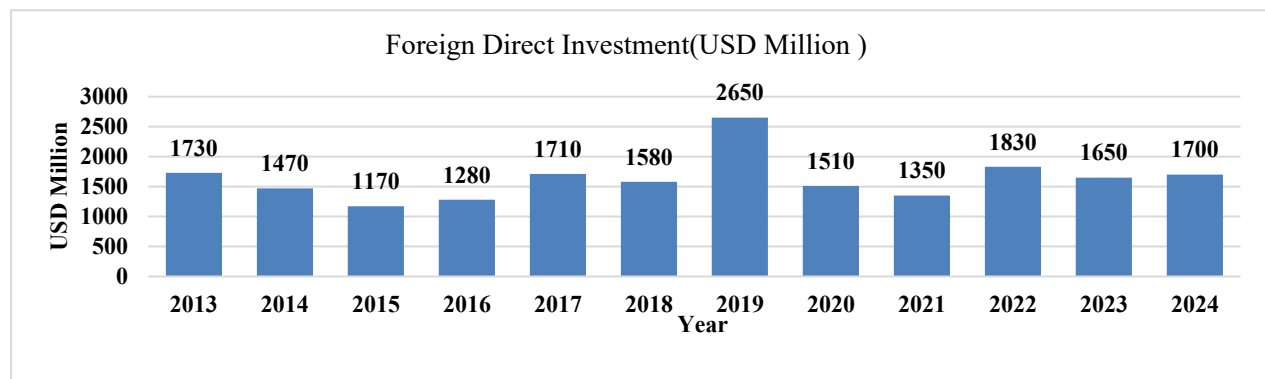


Figure 5. Foreign Direct Investment in Bangladesh

## 10. Discussion

The analysis of Bangladesh's Light Engineering sector reveals several important patterns across export items, export volume, and historical growth performance. The export data presented in the paper show that engineering products and bicycles remain the two most dominant contributors, jointly accounting for approximately 65–72 percent of total recorded export earnings in most years observed. For example, during FY 2016–17, engineering products alone contributed nearly 38 percent of the sector's export earnings, while bicycles contributed another 34 percent, signaling significant product concentration within the export basket.

Growth trends across the 10–12-year period examined present a mixed picture. Certain years demonstrated strong positive momentum; for instance, export earnings increased by nearly 15–18 percent during FY 2013–14 and FY 2014–15, driven largely by rising international demand for bicycle parts and general engineering components. However, this growth was not sustained. A subsequent decline of 6–10 percent in later fiscal years reflects continuing structural challenges such as inconsistent product quality, reliance on outdated machinery, and limited quality certification capabilities. Such fluctuations highlight the absence of steady capacity development across micro, small, and medium enterprises (MSMEs), which collectively represent more than 90 percent of sectoral activities.

The domestic importance of the Light Engineering sector remains significant. According to your earlier breakdown, more than 90 percent of total production is absorbed by local industries such as textiles, agriculture, construction, and transportation. This indicates strong backward and forward linkages but also reveals the sector's underutilized export potential. While the country imports more than USD 3–4 billion worth of machinery and spare parts annually, the LE sector captures only a fraction of this market due to technological limitations. In many product categories reviewed, domestic producers meet only 30–40 percent of potential local demand, indicating substantial room for expansion through modernization and skilled labor development.

The SWOT framework presented in the paper reinforces these patterns. The sector's strengths lie in its low production cost, skilled but informal workforce, and expanding domestic demand. Weaknesses such as lack of standardization, limited R&D investment, and insufficient testing facilities continue to impede global market access. Opportunities remain strong, particularly in import substitution and subcontracting for regional supply chains, which could boost export earnings by an estimated 25–30 percent within a few years if supported by proper industrial upgrades. Conversely, threats such as increasing international competition, rising compliance requirements, and inconsistent raw-material quality place the sector at continued risk of losing market share.

Overall, the analysis confirms that although the Light Engineering sector has shown measurable progress, its overall export contribution remains volatile and significantly below its potential. Strategic interventions, technological modernization, and improved institutional support are essential for ensuring sustainable growth and export competitiveness.

## **11. Conclusion**

The study concludes that the Light Engineering sector holds substantial potential for contributing to Bangladesh's industrial diversification and export competitiveness. Based on the data analyzed, export earnings from major product groups such as engineering parts and bicycles have achieved periodic growth rates of 12–18 percent, demonstrating the sector's inherent marketability. However, the subsequent decline in growth by 6–10 percent in later years underscores structural inadequacies that must be addressed through policy, investment, and modernization.

The heavy domestic reliance on LE products—accounting for more than 90 percent of annual output—shows the sector's indispensable role in supporting large industries including textiles, agriculture machinery, transport equipment, shipbuilding components, and construction tools. Despite this strong domestic foundation, export performance remains constrained by low technology adoption, weak quality control systems, and insufficient financial access for MSMEs. As a result, the sector currently captures only a small share of potential global demand, despite having the technical capability to expand output significantly.

To fully unlock this potential, coordinated interventions are required. Upgrading machinery, establishing certified testing laboratories, introducing skill-enhancement programs, and improving SME financing systems can collectively raise productivity and product standards. Policy measures such as export incentives, establishment of dedicated Light Engineering industrial parks, and promotion of foreign direct investment can further increase export volume and diversify the product portfolio. If these reforms are implemented with consistency, the sector could potentially increase its export contribution by 25–35 percent within the medium term, reduce import dependency, and strengthen Bangladesh's position in regional engineering supply chains.

In summary, the Light Engineering sector stands at a critical juncture: rich with opportunities but limited by structural barriers. With targeted investments, technology integration, and strong policy execution, the sector can evolve into a globally competitive industry, contributing substantially to national economic growth and export diversification.

## **References**

- Ahmed, N. and Bakht, Z., Light engineering industry in Bangladesh: A case study, Institute of Development Studies, pp. 1–8, 2010.
- Bangladesh Blade & Plate Corporation (BBPC), Retrieved December 8, 2025, from <https://bbpc.portal.gov.bd/site/page/33411341-ca2a-4368-b409-2c6d7ea7db55/>.
- Majumder, S. and Dey, S., Light engineering industry sector in Bangladesh: Challenges and prospects, *Cost Manage.*,

vol. 48, no. 1, pp. 46–57, 2020.

Quadir, N. and Mahamud, R., Technology, innovation, and collaboration of firms: The case of light engineering clusters in Bangladesh, *Tech. Monitor*, vol. 26, no. 4, pp. 37–41, 2009.

Rabbani, K. E., Economic Policy Paper on Light Engineering & Electronics Enterprise in Bangladesh, Dhaka: Dhaka Chamber of Commerce and Industry (DCCI) & Center for International Private Enterprise (CIPE), 2005.

Tareq, A. M., Emran, T. B., Dhama, K., Dhawan, M. and Tallei, T. E., Impact of SARS-CoV-2 delta variant (B.1.617.2) in surging second wave of COVID-19 and efficacy of vaccines in tackling the ongoing pandemic, *Hum. Vaccines Immunother.*, vol. 17, no. 11, pp. 4126–4127, 2021, doi:10.1080/21645515.2021.1919478.

TradingEconomics, Bangladesh imports by category, Retrieved December 8, 2025, from <https://tradingeconomics.com/bangladesh/imports-by-category>.

TradingEconomics, Bangladesh: Foreign direct investment, Retrieved December 8, 2025, from <https://tradingeconomics.com/bangladesh/foreign-direct-investment>.

Uddin, K. M., Bangladesh's Light Engineering Industry, baseline, profile, performance and plans for upgrading, Center for Development Studies, SME Foundation, Dhaka, vol. 7, pp. 1–94, 2010.

Wang, D., Dawadi, B., Qu, J. and Ye, J., Light-engineering technology for enhancing plant disease resistance, *Front. Plant Sci.*, vol. 12, pp. 805614, 2022, doi:10.3389/fpls.2021.805614.

## **Biographies**

### **Md. Kamruzzaman Rasel**

Md. Kamruzzaman Rasel, currently working as a Scientific Officer at the Directorate of Continuing Education (DCE), Bangladesh University of Engineering and Technology (BUET), earned B. Sc. Engg. Degree in Industrial and Production Engineering from Khulna University of Engineering and Technology (KUET), Bangladesh and having more than 09 years of professional experience, of which 2 years of continuing education at DCE, BUET, more than 04 years of teaching experience as a Lecturer of Industrial and Production Engineering (IPE) at National Institute of Textile Engineering and Research (NITER), and almost 3 years of practical manufacturing working experience at Talisman Ltd. Situated at Dhaka Export Processing Zone (EPZ), where the latest designation was Senior Officer (Operations). Email: [kamruzzamanipe@gmail.com](mailto:kamruzzamanipe@gmail.com)

### **Proma Acharjee**

Proma Acharjee is currently working as a Lecturer in Industrial and Production Engineering at the National Institute of Textile Engineering and Research, a constituent institute of the University of Dhaka. Her research interests include production optimization, workflow efficiency, and data-driven decision-making, with a focus on applying analytical and modern computational techniques to improve industrial operations. She is presently pursuing her Master's degree in the Department of Industrial and Production Engineering at BUET, specializing in Advanced Engineering Management. Her professional career began at Soorty Textiles (BD) Limited, where she gained practical experience in the RMG sector. During her studies, she undertook internships at several renowned organizations, including HATIL Furniture, Khan Brothers Group, and Ragadi Textile Ltd. These internships allowed her to explore various departments such as planning, production, quality control, and finishing, providing valuable insights into industrial operations. Email: [pacharjee@niter.edu.bd](mailto:pacharjee@niter.edu.bd)