Developing a Database of Light Engineering Enterprises:

A developing database survey on light engineering sector was completed by the LEPBPC with the cooperation of Research and Policy Integration for Development (RAPID). The objective of the study was to develop such a database and analyse the current trends in production, product composition, exportable items, and potential major destination markets. It also assesses the bottlenecks to promotion of the sector and provides evidence-based policies for export promotions.

The study draws a set of specific recommendations for the light engineering sector to overcome the challenges and promote export competitiveness.

Promoting Exports of Light Engineering Products

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Acronym

BBS	Bangladesh Bureau of Statistics
BSCIC	Bangladesh Small and Cottage Industries Corporation
BEIOA	Bangladesh Engineering Owners Association
BITAC	Bangladesh Industrial Training and Assistance Centre
BIDA	Bangladesh Investment Development Authority
CFC	Common Facility Centre
EPB	Export Promotion Bureau
FGDs	Focused group discussions
ISC	Industry Skills Council
IFC	International Finance Corporation
KIIs	Key informant interviews
LDC	Least Developed Country
LEIs	Light Engineering Industries
SME	Small and Medium Enterprise
SMEF	Small and Medium Enterprise Foundation
VAT	Value Added Tax

Executive Summary

Background

The light engineering sectorhas been playing an important role in the economy by producing essential products and raw materialsfor other established industries, supplying agricultural equipment and construction materials, assisting with import substitution, and promoting industrial growth. The domestic market size of the sector stood at around Tk. 25,000 crores per year, with an annual growth rate of 20 to 25 percent prior to the pandemic. It contributes 2.5 per cent to GDP and around 10 per cent to manufacturing GDP. Total exports of these items exceeded half a billion in FY2021, achieving a staggering 80 percent growth. Approximately 10 million people work in this industry.

Despite the fact that the country has a high potential for export, there is a lack of information on potential and existing exporters, exportable items and their characteristics, existing export markets of light engineering industry. While the Export Promotion Bureau (EPB) does provide an aggregate snapshot of LEI product exports, data at the disaggregated level is largely missing. This frequently serves as a deterrent to attracting higher FDI. In this context, a database of light engineering manufacturers and potential exporters is required to develop evidence-based policies for developing LEI product export marketing initiatives. The objective of the study is to develop such a database and analyses the current trends in production, product composition, exportable items, and potential major destination markets. It also assesses the bottlenecks to promotion of the sector and provides evidence-based policies for export promotions.

To attain the research objectives, the study team utilizes a mixed method research approach. As a part of the quantitative research method, a questionnaire survey through in-person interview was administered with 500 light engineering firms across 18 districts in Bangladesh. Along with the firm-level surveys, the research team has conducted 25 focused group discussions (FGDs), five key informant interviews, and two case studies to get further insights into the whole scenario of the light engineering industry.

Major findings

The study findings indicate that the firms' location and specialization depend on the availability of raw materials and local demand. The most popular ownership structure is found to be sole ownership for livelihood maintenance purpose. Due to lack of technical knowledge and capital, the LE firms are found to be widely involved in contract manufacturing and repairing services. The firms produce and supply machinery and spare parts for different types of industries and provide repair services as well. Around 60 per cent of surveyed firms produce agricultural machinery and spare parts, while 40 per cent are serving construction sector by producing machinery and parts. 35 per cent surveyed firms

produce and repair spares for motor and maritime transports, 28 per cent supports textile sector, 26 per cent produce food processing spares, and around a quarter is involved in molding. The major products of the surveyed firms have been liner, pinion, and tea processing machine, bush, shaft, gear, and mould. The produced major products widely contribute to the agricultural, transportation, textile, construction, and tea industries.

The LE firms are found to operate with small number of workers. This study finds that, more than two-third of the firms have 10 workers or less, while a quarter has 11-30 workers. Around 85 per cent of the workers are permanent, and 88 per cent of the workers are employed for manufacturing purposes. There is little representation of female workers in the light engineering sector due to the nature of the job; which requires hard labour; and there is no specific working hours for the employees. More than 90 per cent firms have no female workers.

The light engineering firms mostly use domestic raw materials rather than imported raw materials. This study finds that 94 per cent of the surveyed firms use domestic raw materials, whereas only 6 per cent use imported raw materials. The survey data suggest that the surveyed firms use scrap metal from ship breaking industries, aluminum, brass, iron, copper, etc., from domestic sources. Due to tariff implications, VAT and other taxes, the light engineering firms are less likely to use the imported raw materials. Imported raw materials include roller chain, V-Belt, nut-bolt, cast iron and different types of iron/aluminum steels. India, China, Germany, Holland, Japan, Republic of Korea, Taiwan are major sources of imported raw materials.

The LE firms mostly use conventional machines such as lathe, boring, milling, shaping, drilling, grinding, and honing rather than advanced technologies such as Computer Aided Numerically Controlled (CNC) machine, Computer Aided Design (CAD), heat treatment facility and testing machines. This study finds that, relatively high price, lack of working capital, and shortage of skilled labour to operate modern machinery are major reasons for not using advanced technologies in the sector. This study also revealed that, the LE firms rarely replace their machineries. Most of the machines are old, and average age of the conventional machines ranges 12-21 years. Many firms are found to use second-hand machines. Use e of conventional and old machine is accountable for the low productivity of light engineering workshops.

Around 98 per cent of surveyed firms are found to be concentrated in meeting the domestic demand due to the huge domestic market, limited production capacity, lack of knowledge about exports, lack of marketing, low quality products, lack of working capital and difficulties in access to finance etc. Less than 2 per cent of the firms are currently exporting. Major exports of the surveyed firms include fertilizer mixers, thresher machines, dredging machines and spare parts, head gaskets, mixer machine, pump, and parts, washing machines etc. The exporters reported that India, China, Japan and the United States are the major export markets.

Around 16 per cent of surveyed firms think that they have high export potential. Proportionately medium to large-sized firms plans to explore export markets for their products. The LE firms want to export agricultural machinery and parts, thresher machines, liner and piston, tube wells, mixers, pumps, drill machines, body and parts of motor vehicles etc.

Challenges of the light engineering sector

This study also reveals that, despite having enormous growth potential, the light engineering sector is facing significant challenges. It is found that the use of outdated technology, low productivity of the workers, poor quality of the products, lack of access to finance, lack of industrial facilities, high price and unavailability of quality raw materials, and lack of policy support are some of the major challenges that LE firms are struggling with. It is observed that most conventional machines used by the manufacturers are too old. Some machines are found to be used more than 30 years with average age being around 20 years.

The LE industry falls short of ensuring quality, primarily because of substandard raw materials, outdated equipment, untrained labour, and poor quality designs. They frequently rely on readily available, inexpensive domestic raw materials. The raw materials are mostly recycled metals acquired from ship breaking, with no testing record or certification. Additionally, studies show industries sacrifice product quality and are still learning the value of quality.

According to a field study, nearly all LE enterprises think that they have restricted access to funding. About 30 per cent of respondents believe that interest rates for bank financing is quite high, and another 12 per cent think that banking processes is very challenging. It is also observed that majority of LE sector employees lack formal technical education or training. Some businesses were unable to adopt new technologies including CNC machines owing to a shortage of trouble-shooters. The industries are found to operate in small premises with limited access to utilities. There are inadequate supplies of power, gas, water, and sewage systems. In this environment, the cost of conducting business is very high.

Moreover, the sector has not developed a marketing strategy due to its small-scale of operation and culture of on-demand manufacturing. There is no company branding the industry. As a result, the sector has little control over sales, mostly in the international market. Frequent fluctuations in raw material prices are also affecting the production and sale of LE industry. The ongoing Covid-19 crisis and Russia-Ukraine war have aggravated the problem as the prices of pig iron, hard coke, limestone and ferroalloys, ferromanganese etc., increased in the international market. Due to the increase in raw materials prices, the light engineering manufacturers are facing hurdle in production. This study also finds that the owners of LE industries believe they are being ignored due to the small size of their industries. According to the owners, local producers of LE industries are expected to pay

15% VAT as well as income tax. The customs charge on raw materials for LE machines is around 32-35 per cent, whereas the tariff on imported LE items is close to 1 per cent. The study's findings indicate that the government's support for LE policy is inadequate.

Way forward

The LEI industry in Bangladesh is one of the most fundamental subsectors in terms of its contribution to socioeconomic development, employment generation, and the fight against poverty. Given its strong links to nearly every sector, this business is already recognized as a critical area for ongoing development. The study draws a set of specific recommendations for the light engineering sector to overcome the challenges and promote export competitiveness. The major suggestions include:

- Ensuring the effective implementation of the policies (the Light Engineering Industry Development Policy 2022 and Export Roadmaps for Light Engineering Sector) will help overcome the ongoing challenges of the light engineering industry, andpromote productivity and exports.
- Effective utilisation of the firm-level database will help boost exports and attract investment.
- Improving product quality is critical for export success.
- Skills development of workers should be a priority for the success of the light engineering sector in Bangladesh.
- Using modern and cutting-edge technologies is essential for boosting productivity and ensuring product quality.
- Establishing common facility centers in all light engineering clusters can help facilitate industry growth.
- Adequate policy support from the government should be provided to the light engineering industry

In order to survive and thrive, the sector must achieve global competitiveness by adopting appropriate technologies, upgrading skill sets, shifting to need-based products, improving product quality, achieving scale economies through specialization, and fitting into market-based financing mechanisms.

I. Introduction

Background

The Light Engineering Industry (LEI) is recognised as one of the key industries that would significantly contribute to the economy. This sector actsas the foundation for many other manufacturing industries, such as textiles, paper, cement, jute, sugar, railway, and food processing;and has been termed as the "mother of all sectors" (Majumder & Dey, 2021). Therefore, this is a sub-sector that supplies basic capital machinery, spare parts, and accessories to all major industrial sectors (Chakma, 2018). Bangladesh has been highly concentrated on apparel products for exports – comprising more than 80 per cent of total exports. The apparel export success story largely depends on the LDC-specific trade preferences and privileges that Bangladesh currently enjoys. As the country is set to graduate from the group of LDCs in 2026, the duty-free market access preference is expected to be eroded in most important export destinations, including the EU, Canada, Japan, the Republic of Korea, China, India, etc. However, the continuation of export success based on single products will be highly difficult in the post-graduation period. The country is in dire need of export diversification, and the government has given adequate focus on diversifying the export basket.

The light engineering sector is considered as one of the thrust sector and is recognised as the highest priority sector in the Export Policy 2021-24. The sector has high potential for export diversification and export promotion due to labour abundance of the country and high export growth in the past few years. The development of the sector can also facilitate export promotion of other forward linkage sectors, including RMGs, textiles, construction, transport, gas transmission and distribution, heavy vehicles, electrical products, processed agricultural products, printing and packaging etc. Therefore, the promotion of light engineering sector can build a strong backward linkage to other sectors and promote export diversification to sustain economic growth.

Over the last few decades, the light engineering industry has made significant contributions to the economic growth of Bangladesh by a) reducing poverty through creating jobs, b) producing import substitute products, and c) supplying necessary items to other sectors (Hasan, 2021). Moreover, the sector provides import substitute products with an annual turnover of US$200 million (BIDA,2021).The agro-machinery sector is also rapidly expanding, with 32% of the demand being met by the light engineering industry (USAID, 2019). The LEIs have immense potential to contribute to the economic development of Bangladesh, particularly because of having a large domestic market with a growing middle-income class; growing manufacturing industries; and duty-free market access for exports,.

Despite having a high potential for exports, there is a lack of information on potential and existing exporters, exportable items and their features, existing export markets, etc. While the Export Promotion Bureau (EPB) provides an aggregate snapshot of the exports of LEI

products, there is a serious lack of data at the disaggregated (firm) level. Currently, there is no record of not only exported items but also of the existing LEI products. Often, this issue acts as a constraint in attracting foreign direct investment (FDI), as potential in vectors cannot properly assess the capacity of the LEI firms because of the unavailability of relevant data. In this context, there is a need for constructing light engineering manufacturers and potential exporters' database. The database might serve as a platform to generate evidence-based policies to formulate LEI product export promotion strategies.

Objective of the study

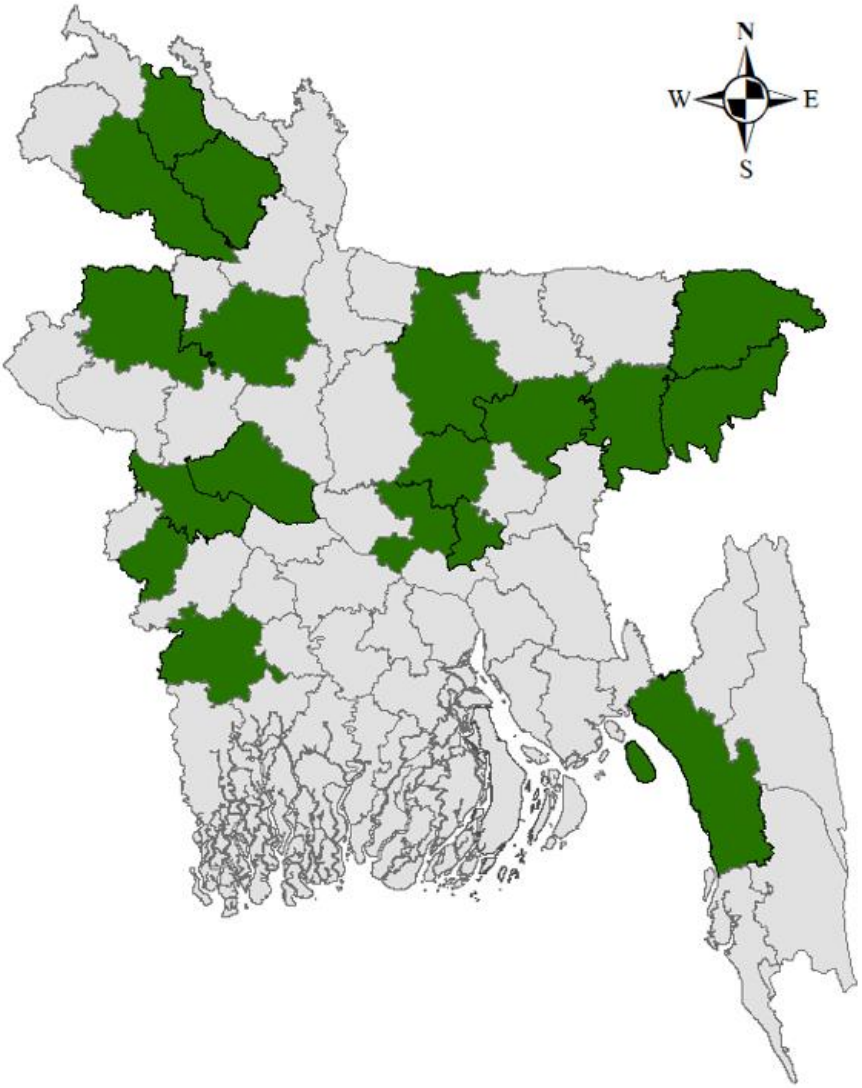
In the above context, the is to generate a database of light engineering manufacturers and potential exporters. The database of LEIs might be use das an authentic source of relevant information for potential buyers. Once the buyers have access to the processed database, then it would be easier for them to assess the capacity of LEIs efficiently. The database would have the potential to unlock information about the LEIs to the large audience at low cost. Also, the data base might be used to develop the quality of products and services, and to identify the challenges for export promotion Based on the database and secondary literature, the stud analyses the current trends in production, product composition, exportable items, and potential major destination markets. It also assesses the bottlenecks to promotion of the sector and provides evidence-based policies for export promotions.

Methodology of the study

To attain the objective, the study utilises a mixed-method research approach. The use of mixed methods research is very prevalent, particularly when finding solutions to problems for policymakers. Mixed methods research takes advantage of the strengths of both qualitative and quantitative approaches. In many cases, quantitative data may not be available, and experiments to generate information may be impractical. Interviews and discussions, such as key informant interviews (KIIs) and case studies, are now commonly used to supplement quantitative findings. The mixed-method approach generally requires careful synthesis and consistency checks to generate insights that can be used for policy purposes.

As a part of the quantitative research method, the study team conducted a firm-level survey to gather detailed information about the light engineering firms. Aquestionnaire survey through in-person interview was administered with 500 light engineering firms across 18 districts in Bangladesh (Figure 1). The cluster and firms were selected from a list of firms provided by the Bangladesh Engineering Industry Owners Association (BEIOA).The research team collected the list of light engineering firms to conduct the firm-level surveys. The survey was administered with the owners/managers of the selected firms. Table A1 shows the number of firms surveyedin different light engineering clusters across the country.The survey areas have been Dhaka, Narayangonj, Gazipur, Bogra, Dinajpur, Nilphamari, Pabna, Rangpur, Naogaon, Hobigonj, Moulavibazar, Sylhet, Kishoreganj, Mymensingh, Chuadanga, Jessore, Kushtia, and Chittagong.

Figure 1: Survey area coverage



For the firm-level survey, a structured questionnaire was developed with a set of questions including both open-ended and close–ended ones. In consultation with BEIOA, the questionnaire was designed to collect detailed information about the light engineering firms, which can be categorised into three broad themes: (a) firm-specific information, (b) production and sales, and (c) exports of light engineering products.

Along with the firm level surveys, the research team has conducted 25 focused group discussions (FGDs), four (4) key informant interviews, and collected two (2) case studies to get further insights into the whole scenario of the light engineering industry. The KIIs have been conducted with two owners of light engineering industry and two representatives of the Bangladesh Engineering Industry Owners Association (BEIOA). A semi-structured questionnaire was developed to conduct the KIIs with the relevant stakeholders. The FGDs and KIIs have highlighted the challenges and future prospects of the light engineering industry.

Moreover, the research team conducted in-depth desk research to review and analyse the secondary data and information, different policies concerning the light engineering sector, reports, and other secondary literature. The secondary data and information were collected from the Export Promotion Bureau (EPB), Bangladesh Bureau of Statistics, International Trade Centre (ITC) trade mapetc. The study team reviewed, among others, the Industrial Policy 2016, Export Policy 2015-18, 2018-21, and 2021-24, and the Eighth Five Year Plan to understand the relevant policies that exists for promoting production and exports of light engineering industry. Although the findings are mainly based on the data collected through the firm-level survey, the researchers use qualitative information to supplement the survey findings.

Organisation of the paper

The paper is organised as follows: after this brief background and methodology, section II highlights the salient features of the light engineering industry – history, value chains, contributions to GDP and employment, and exports. Section III provides major findings from the firm-level survey. Section IV outlines major initiatives and policies of the government to promote the industry; section V assesses the existing and potential bottlenecks of the sector, with a special focus on exports. Finally, section VI provides a set of policy recommendations for export promotion of the sector.

II. Light Engineering Industry: Some Salient Features

Historical background

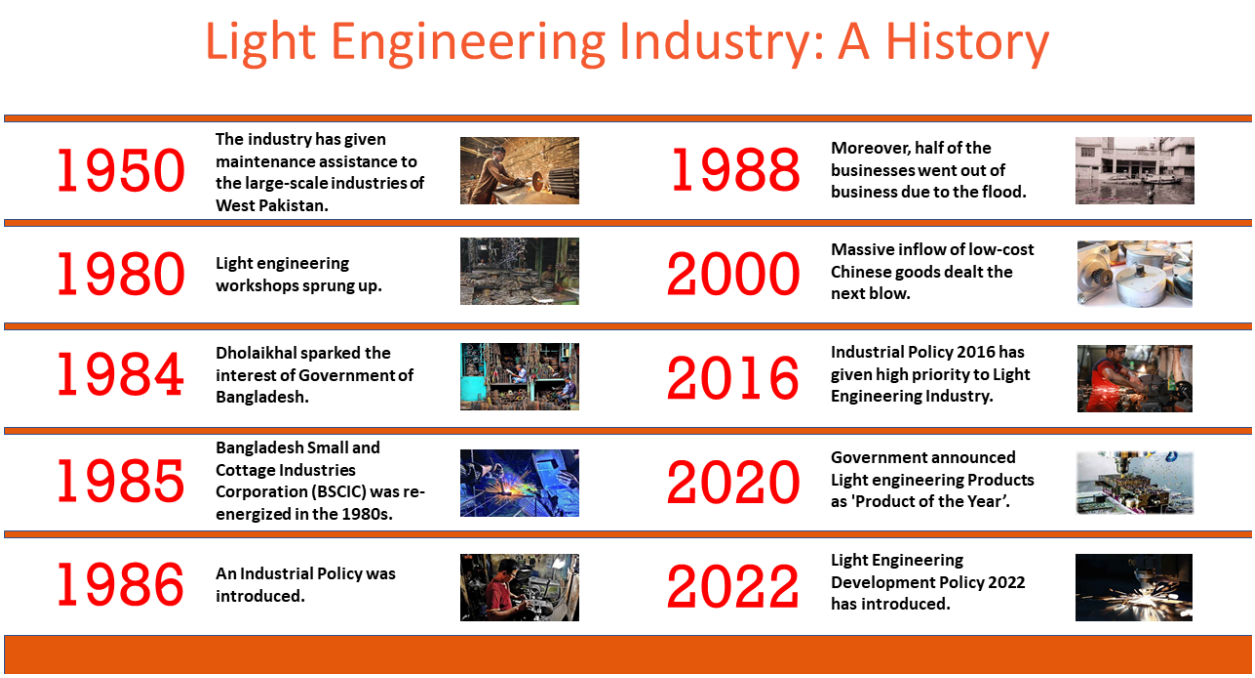
The light engineering sectorhas been playing an important role in the economy by producing essential products and raw materialsfor other established industries, supplying agricultural equipment and construction materials, assisting with import substitution, and promoting industrial growth (Quadir&Mahamud, 2009).While there is no historical reference concerning the LE business in Bangladesh, the conventional saying is that the industry began by providing maintenance assistance to large-scale industrial facilities in the 1950s in Bangladesh (then East Pakistan). Thesectorgained momentum and experienced accelerated growthafter1985 due to the industrialization of other manufacturing industries. In the1980s, indigenous light engineering workshops sprung up near Dholaikhal, Jinjira, Mirpur, and Syedpur, among other places. In 1984, Dholaikhal sparked the interest of the government. Although the LE workshops had commendable potential, they could not produce quality products because of the lack of contemporary technology; a consistent demand; and workers with appropriate technical qualifications(Talukder& Jahan, 2016).

It was predicted that establishing capital-intensive facilities with government assistance would revitalise a change. The Bangladesh Small and Cottage Industries Corporation (BSCIC) was re-energized in the 1980s to provide engineering-based small industry with the necessary banking support.

The following are some of the favourable policies of the government in the eighties:

- No permission is required from any authority to establish an industry (Industrial Policy, 1986). Experts believe that this deregulatory policy was the most important in boosting small businesses.
- A subcontracting arrangement was developed in which small workshops could supply required spares to textile, jute, railway, gas, and other sectors controlled by government or semi-government bodies while receiving preferential treatment.
- Local industries were given preferential treatment in government or semi-government procurement policies. They were supposed to procure local engineering products if they were of adequate quality, even if the quoted price was 15% to 20% higher than the quoted lowest price of a similar imported product.

Figure 2: History of the light engineering industry in Bangladesh



Source: Majumder & Dey, (2021).

The BSCIC provided low-interest loans to LE businesses for the purchase of machinery and operating capital. To increase the demand of locally produced LE products, the government issued a circular to instruct the heavy industries or other sectors to use domestically produced spare parts rather than imported ones. Consequently, the LE enterprises spread throughout the nation, including districts, sub-districts and development centres and the industry received a significant boost.Although the loan payback was satisfactory, but the sector experienced one of the most rigorous calamities in 1988, when a flood caused numerous machineries to fail in Dholaikhal and Jinjira companies. As a result, about half of the businesses went out of business. After 2000, the inflow of low-cost Chinese goods dealt the next blow. Due to a lack of demand, a substantial number of companies went out of business. Those who were able to weather the impact of cheap Chinese supplies after 2000 are still in business, but with minimal demand (Talukder& Jahan, 2016).

The LE sector hasbeen revitalised and given high priority in the current National Industry Policy (2016). This sector has been given favourable incentives and facilities in the Export Policy 2021-24 and is regarded as the heist priority sector due to its high export potential. Considering the important role of light engineering sector in the industrial development and socio-economic development of the country, the government has formulated theLight Engineering Industry Development Policy- 2022to provide all possiblesupport for the development of this sector. Moreover, the government has intended to establish ten dedicated light engineering industrial parks in Dhaka, each with common service facilities requiredforthe manufacture of LE goods (BIDA, 2021).

Number of firms and location

There is a wide gap in the number of light engineering firms in the existing literature. The LE firms are found in every city, town, and growing area. Most of the time, such firms are concentrated in certain regions but not as large as clusters. As a result, there is no scientific estimate or census of the number of LE businesses in Bangladesh. The Bangladesh Bureau of Statistics (BBS) does not have an accurate figure of LE firms in Bangladesh since it does not have a composite category for the LE sector in its industrial statistics.According to BEIOA (2011), there are 40,000 LE firms in Bangladesh.[1] However, research undertaken bythe International Finance Corporation (IFC)revealed that there are roughly 7,200 firms in the LE sector.In 2013, The Asia Foundation mapped 34light engineering clusters with around 7,500 firms in 18 districts of Bangladesh (SMEF, 2013).LEIs are mostly concentrated in the industrialised areas of Bangladesh. The clusters of LEIs are based on Dhaka, Chattogram, Narayangonj, Gazipur, Bogura, Natore, Pabna, and Jashore. The cottage and micro-segment account for the lion's share of LE enterprises.

Light engineering products

Throughout the country, the subcontractors and manufacturersof the light engineering sectorhave created a variety of spare parts locally. These spare parts are commonly used in rail engines, rail lines, automobiles, machine tools, jute and textile, tea processing, chemical industries (such as fertilizer, cement, and so on), sugar and food industries, water transport, pharmaceutical industries, gas line fittings, bathroom fittings, electronic accessories, electrical accessories, agro-support and agro-processing, telecommunication, electrical pole fittings, water supply and irrigation, and so on (Figure 3).

[1] . EU- INSPIRED, Light Engineering Sector.

Figure 3: Machineries, spares, and accessories produced in LE firms

 Agro-support and Agro-processing	Sprayer, Weeding Machine, Power Tiller, Hydro Tiller, Foraging Machine, Threshing Machine, Rice Mill, Rice Boiler, Rice Dryer, Low Lift Pump, Deep Tube Well, Deep Well Turbine Pump, Low and Medium Pressure Centrifugal Pump, Sluice Gate, and Other Equipment
 Tea Processing Plant	CTC Machine (Single, Duplex, and Triplex), Rotor Vane Machine, Barbara Leaf Conditioner, Green Leaf Sifter, Mackintosh Sorting Machine, Middleton Stalk Extractor, Trines Sorter, Slow Speed Fibre Extractor, Tea Sorting Machine, Rolling Table, Trough Weathering Unit, Miracle Mill, Ball Breaker, Duplex Tea Packer, and so on.
 Food Processing	Flour Mill, Spice Grinding Machine, Oil Expeller, Biscuit and Bakery Plant, Vermicelli and Noodles Making Machine, Sugar Cane Juice Extractor, Liquid Filling Machine, Bottle Sealing Machine, and so on.
 Pharmaceuticals	Emulsifier, Ball Mill, Vacuum Emulsifier, Tablet Making Machine, Blister Making Machine, etc.
 Jute and Textile	Spinning Machine, Industrial Sewing Machine, Softener Machine, Power Loom, Twisting Machine, Doubling Machine, Scroll Roller, and so on.
 Water Transport	Engine-powered local boats, such as launches, steamers, trawlers, barges, and dredgers.
 Road Transport	Bus and truck body construction, improvised transport known locally as Bhotbhoty, and so on.
 Construction	Crane, Road Roller, Grand Roller, Floor Polishing Machine, Metal Doors and Windows, Roof Hoist Machine, Brick Making Machine, etc.
 Furniture	Metal Furniture of various types both for household and office, various types of equipment
 Electrical and ElectronicAppliance	Humidifier, Dehumidifier, Water Heater, Ceiling Fan, Wires and Cables, Power Transformers, Voltage Stabilizer, IPS, ECS, and so on.

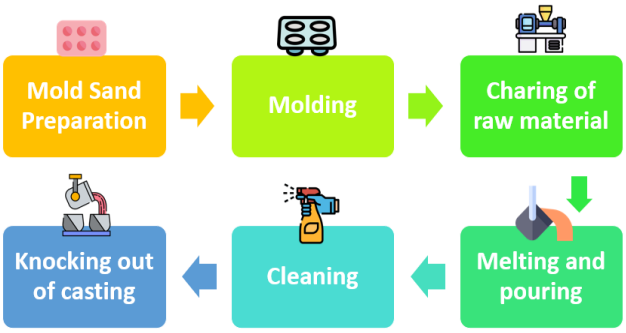
Source: Based on Hasan (2021)

Production process of LE industry

The production of light engineering itemsinvolves multiple stages. The production process varies depending on the final products they produce. In general, a composite factory is fully equipped with machinery such as a furnace, an induction furnace, various types of dice, a lathe machine, and so on. The big manufacturers have a complete setup, from raw materials melting in a furnace to finished products. Only a few of these firms use CNC (Computer Numerical Control) machines for precise finishing. Many people involved in this industry do not have a factory equipped with a furnace and dices. They generally source unfinished products from factories and finish them in their workshop, which is primarily equipped with

several lathes and grinding machines. The capacity of the furnace is the primary determinant of production capacity. The production process of a composite light engineering firm is provided in Figure 4 and Table 1.

Figure 4: Production process of the LE industry



Source: Hasan, (2021)

Table1: Production process of light engineering industry

Mold Sand Preparation	Green sand is made by combining fresh sand with bentonite and other additives. Sand mixers and sieves are commonly used in plants for the preparation of mold sand.
Molding	Mold sand can be started pressing manually or with pneumatic machines on a pattern to prepare molds, though most LE enterprises make molds by hand. The mold is divided into two halves, the upper and lower halves, by a parting line. Both mold halves are contained within a box known as a flask, which is also divided along the parting line. The mold cavity is created by packing sand around the pattern (which is a replica of the casting's external shape) in each half of the flask.
Charging of raw material	The raw materials, such as pig iron, scrap, foundry returns, and other alloys, are weighed and charged into the furnace for melting.
Melting and Pouring	The operator visually checks the condition of the molten metal before starting the pouring process. Metal and coke charging continues in a systematic manner. Melting in an induction furnace is done in batches, with each batch typically taking 40-60 minutes, depending on the size of the furnace. After melting, the molten metal is manually transferred and poured into the molds using ladles. Molten metal is poured in induction furnace-based foundries using a monorail system or overhead cranes.
Cleaning	Cleaning involves removal of sand, scale and excess metal from the casting. Burned on sand and scale are removed to improve the surface appearance of the casting.
Knocking out of castings	The molds are allowed to cool for a period of time before the castings are knocked out of the mold manually or using a vibratory knock-out machine.

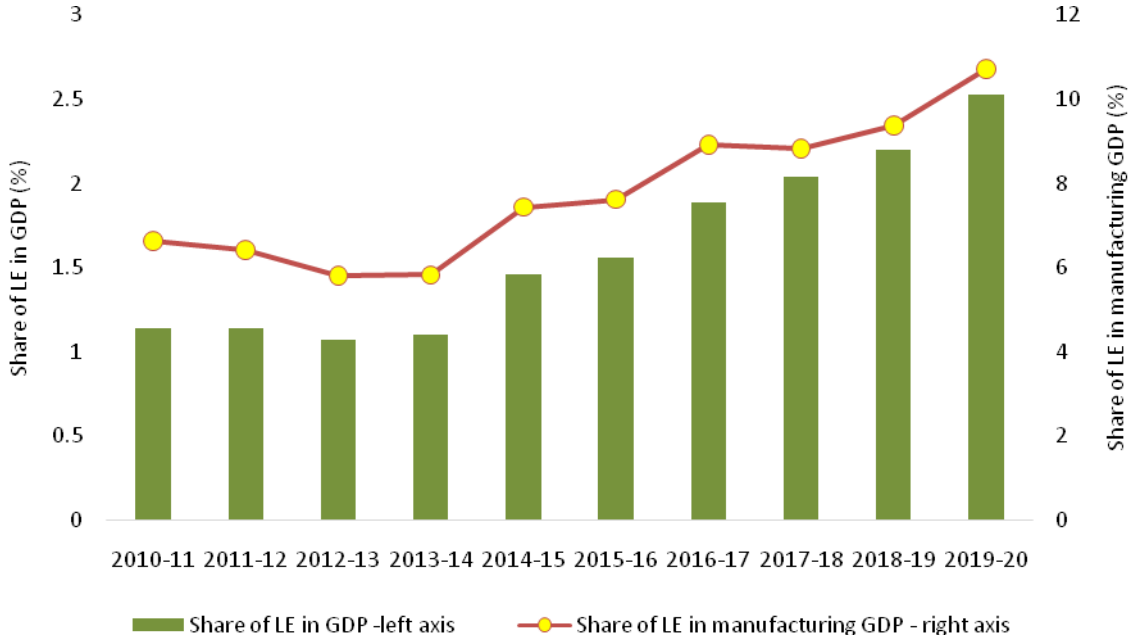
Source: Based on Hasan (2022).

Domestic market size and production

The light engineering sector has emerged as the cornerstone of economic growth and development in Bangladesh. It is playing a significant role in economic development by providing technological support to industrial growth, with a vast scope for employment generation and prosperity. The domestic market size of the sector stood at around Tk. 25,000 crores per year, with an annual growth rate of 20 to 25 percent prior to the pandemic (Hasan, 2021). The sector contributes 2.5 per cent to GDP and around 10 per cent to manufacturing

GDP (Figure 5). Although local production is increasing rapidly, it can only meet half of the domestic demand.

Figure 5: Contribution of LEI to GDP (%)



Source: Authors' computation based on BBS.

Light engineering firms are micro, small, or medium-sized enterprises that use engineering or technology processes to manufacture or repair metallic parts, equipment, tools, or sanitary ware for industrial, agricultural, or vehicular machinery.It has a high potential to contribute to economic development and create large-scale employment (Haque, 2014). Currently, approximately 10 million people work in this industry, but itsillhas immense potential to create significantly more employment opportunities, thereby assisting our country in reducing poverty and improving labour market efficiency (Hasan, 2021).

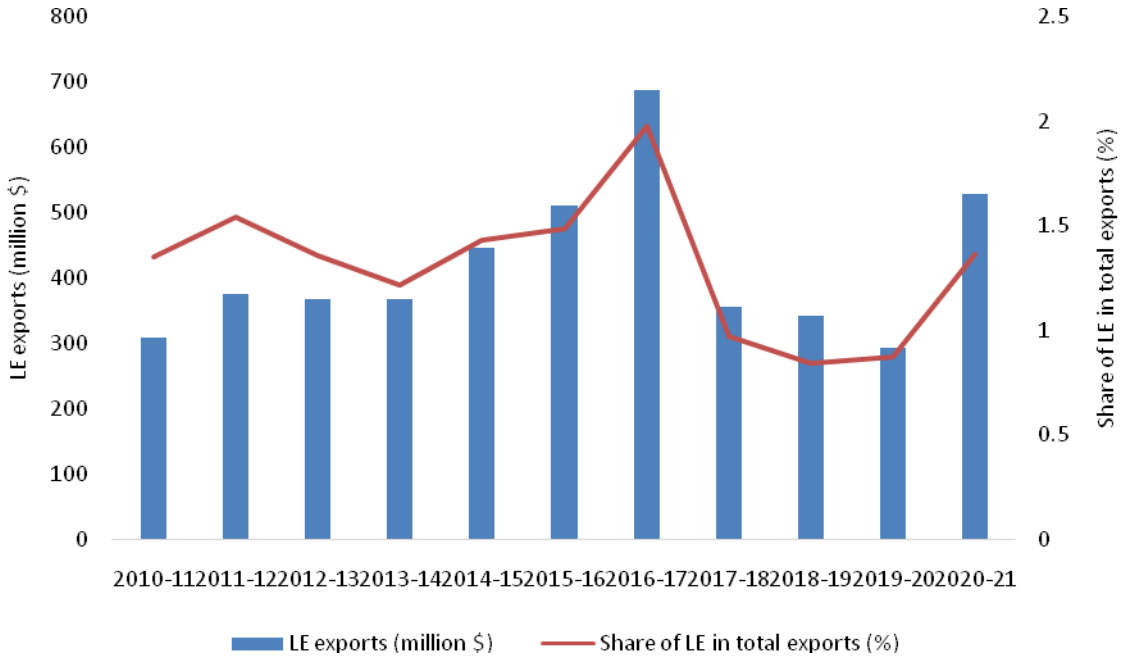
Trends in the Light Engineering exports

It is important to define the light engineering exports. There is no specific definition of light engineering products and exports. The Export Promotion Bureau of Bangladesh classified 2-digit harmonised systems (HS) products codes 72-87 as engineering products, which are referred as light engineering exports. These include, among others,ironand steel (HS72-73), copper wire (HS74), stainless steel ware (HS82), engineering equipment (HS84), electric products (HS85), and bicycles (HS8712). At the disaggregated product level, the LE exports include paper and cement mill spare parts, fancy light fittings, construction equipment, batteries, voltage stabilizers, iron chain, cast iron articles, carbon rod, automobile spares, electronics, stainless steel wares, and so on.

The light engineering industries have the potential to increase their slim export basket. However, exports of light engineering products experienced fluctuations over time. Total exports of these items exceeded half a billion in FY2021 (Figure6). After experiencing

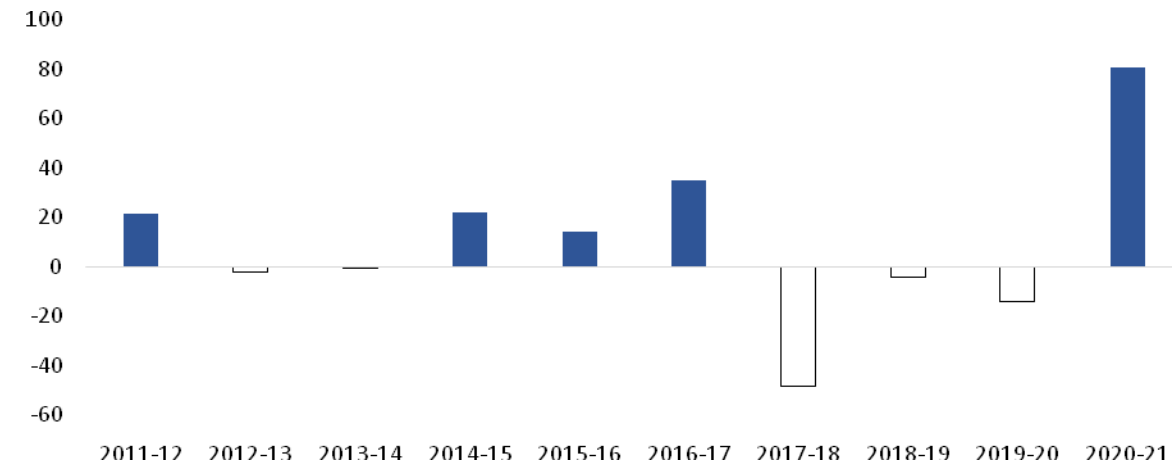
negative growth for three consecutive years, ,the light engineering sector achieved a remarkable growth of 80 percent in 2020-21 (Figure7). The government's policy support and 10 per cent cash incentives for exports of light engineering products helped the rise in exports. Despite having high export potential, the share of LE products in total exports remained at around one per cent.

Figure 6: Exports of light engineering products



Source: Authors' presentation based on data from the Export Promotion Bureau (EPB).

Figure 7: Light engineering exports growth (%)

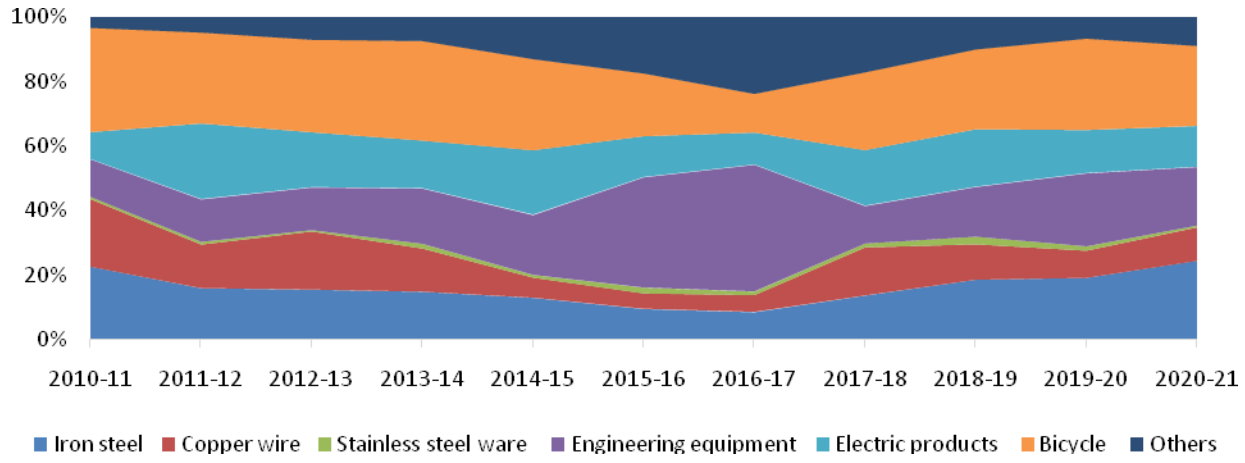


Source: Authors' presentation based on data from the Export Promotion Bureau (EPB).

Experts argue thatthe exports of LE products fluctuate due to the lack of utilisation of modern technology, low quality of raw materials and lack of policy support, and frequent changes in raw materials prices (Tahsin, 2020). Despite having huge potential, the LEIs are struggling with a lack of funds and skilled labour to upgrade the country's light-engineering sector, resulting in lower export growth (Kabir, 2021).

The export composition of light engineering products changed over the past decade. Bicycle exports have seen a consistent rise since 2015-16. Bicycle, and iron and steel products comprise half of the light engineering exports. Among others, engineering equipment constitutes 18 per cent,electric products 13 per cent, and copper wire 10.4 per cent. Stainless steel ware, engineering equipment, and electric products experienced a staggering 25 per cent annual growth rates during the past decade.

Figure 8: Light engineering export composition



Source: Authors' presentation based on data from the Export Promotion Bureau (EPB).

Table2:Light engineering exports and growth by subsectors

	Exports (million $)	Average annual growth, 2011-

	2010-11	2013-14	2016-17	2020-21	21 (%)
Iron and steel products	69.8	54.3	58.8	128.9	11.9
Copper wire	65.0	49.2	36.1	55.2	8.2
Stainless steel ware	2.4	5.4	7.8	3.0	28.1
Engineering equipment	36.0	63.1	271.1	96.3	27.6
Electric products	26.1	54.6	68.9	67.5	26.5
Bicycle	99.8	112.9	82.5	130.9	4.5
Others	10.4	27.2	163.6	47.2	36.6
Total	309.6	366.6	688.8	529.0	10.4

Source: Authors' presentation based on data from the Export Promotion Bureau (EPB).

At the harmonised systems (HS) 6-digit level, bicycle (HS 871200) is the largest exports,capturing a quarter of light engineering exports. It is followed by copper waste and scrap (HS 740400) 1 per cent, semi-products of iron/steel (HS 720711) 8 per cent, waste and scrap of stainless steel (HS 720421) 6.4 per cent, lead-acid accumulators for starting piston engines (HS 850710) 5 per cent and articles of iron or steel (HS 732690). The major 20 light engineering export items are provided in Table 3.

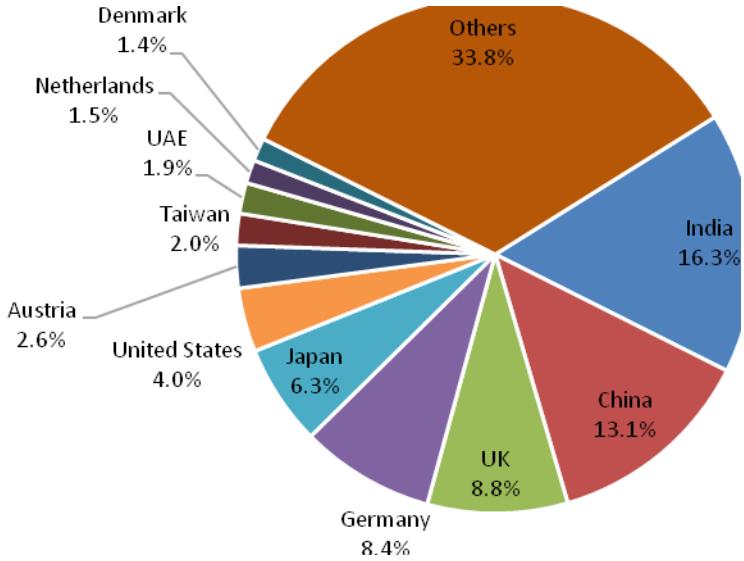
Table3: Major export LE products at HS 6-digit level, 2020-21

HS code	Product description	Exports (million $)	Share of total LE exports (%)
871200	Bicycles and other cycles, not motorized	130.89	24.76
740400	Copper waste and scrap	53.77	10.17
720711	Semi-products of iron/steel, <0.25% carbon, of squarish section	43.76	8.28
720421	Waste and scrap of stainless steel	33.85	6.40
850710	Lead-acid accumulators for starting piston engines	26.95	5.10
732690	Articles of iron or steel	17.33	3.28
845221	Automatic sewing machines	16.19	3.06
870324	Vehicles with spark-ignition engine of cylinder capacity =3000cc	14.30	2.71
848790	Machinery Parts other than ships' or boats' propellers and blades therefore	12.54	2.37
841810	Combined refrigerators-freezers, with separate external doors	10.64	2.01
847690	Parts for automatic goods-vending machines	9.61	1.82
871499	Parts and accessories of cycles	7.93	1.50
721420	Iron/steel bars & rods, hot-rolled..., twisted, or with deformations from rolling process	7.18	1.36
845229	Sewing machines of industrial type (excl. automatic units)	6.61	1.25
720430	Waste and scrap of tinned iron or steel	6.55	1.24
852872	Other Reception apparatus for television, Colour, CKD	6.42	1.21
850440	Static converters	6.01	1.14
854140	Photosensitive semiconductor devices; light emitting diodes	5.83	1.10
841510	Window or wall air conditioning machines, self-contained	3.90	0.74
790200	Zinc waste and scrap	3.62	0.69

Source: Authors' presentation based on data from the Export Promotion Bureau (EPB).

The export markets for LE items are quite diversified. India is the largest destination, comprising 16.3 per cent of total LE exports, followed by China (13.1 per cent), the United Kingdom (8.8 per cent), Germany (8.4 per cent), Japan (6.3 per cent), the United States (4 per cent), Austria (2.6 per cent), Taiwan (2 per cent) and the United Arab Emirates (19 per cent) (Figure 9).

Figure 9: Major export destinations of LE products, 2020-21



Source: Authors' presentation based on data from the Export Promotion Bureau (EPB).

Bangladesh's presence in the global LE market is negligible. The world's import of LE products, as defined by the EPB, stood at over $9 trillion (Table 4). The share of Bangladesh in the world market is just 0.006 per cent. Bangladesh captures 1.1 per cent of the global bicycle market. Given the huge demand for LE goods, there is a huge potential for boosting exports from Bangladesh, which can contribute to export diversification.

Table4: World LE products market size and Bangladesh's position

Products	Bangladesh's exports in 2020-21 (million $)	World imports, 2021 (million $)	Share of Bangladesh in World imports (%)
Iron and steel products (HS72-73)	128.86	879,469.9	0.015
Copper and articles (HS74)	55.24	216,110.6	0.026
Stainless steel ware (HS82)	3.03	72,647.2	0.004
Engineering equipment (HS84)	96.31	2,519,119.5	0.004
Electric products (HS85)	67.48	3,518,283.1	0.002
Bicycle (HS8712)	130.89	11,452.1	1.143
Others	47.19	1,916,117.6	0.002

Source: EPB and ITC trademap

III. Findings fromthe Firm-level Survey

Production, ownership, and employment

The firm-level survey was conducted in all regional production hubs throughout the country. The light engineering industries in Bangladesh are located in industrial zones to meet the demand of local industries. The location of the firms and their specialisation also depends on the availability of raw materials and labour. The Dhaka-Narayanganj-Gazipur LE hub is specialised in producing capital machinery and equipment for heavy industries; for example - transportation, construction, and textile industriesand spare parts for agro-processing industries and bicycles. Due to the availability of raw materials, the Chattogram LE

manufacturing hub is a shipbuilding and breaking hub for related spare parts and machineries. The specialisation of LE manufacturing hubsis provided in Table5.

Table5: LE cluster and their specialisation

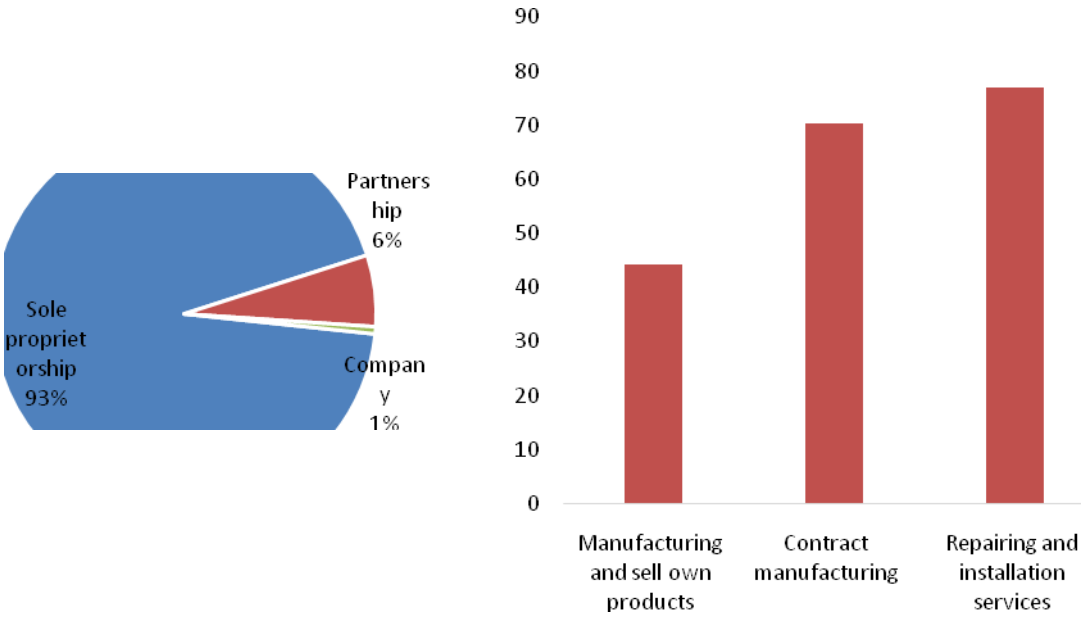
Hub of LE firms	Focus of Production
Dhaka, Narayanganj, Gazipur	Spare parts and capital machinery for transportation, construction industry, textile industry, cottage industry, agro-processing and bicycles.
Bogura, Pabna, Naogaon	Spare parts foundry,agro-machineries, transportation industry, construction industry and cylinders.
Dinajpur, Nilphamari, Rangpur	Spare parts forautomobiles, railways, mills, factories, and agriculture
Hobigonj, Moulavibazar, Sylhet, Sreemangal	Spare parts for agro-machineries, tea industry, food industry, mills, and factories.
Kishoreganj, Mymensingh	Spare parts for agricultural industry, construction industry, food industry.
Chuadanga, Jessore, Kushtia	Spare parts for mills, motor car, pharmaceutical industry, food industry, kitchen and bathroom fittings, agriculture industry, and construction industry.
Chittagong	Ship-breaking linked factories that are concentrated on transportation industry, food industry, construction industry.

Source: RAPID firm-level survey of LE sector, 2022

The ownership structure of the surveyed firms shows that more than 90 per cent factories are sole proprietorship and 6 per cent are operating under partnership (Figure 10). Less than one per cent of the firms are conducting under a company. The sole proprietorship is established with the purpose of livelihood maintenance. Therefore, this kind of ownership is popular in the light engineering sector. The surveyed LEIs have their own engineering aspects in the designing and making of a product. Due to a lack of technical knowledge and capital, LE firms are found to be widely involved in contract manufacturing and repairing services. Around 70 per cent of of the firms are engaged in contract manufacturing, and more than three-quarter are involved in repair and installation activities(Figure 11). Around 44 per cent of surveyed firms manufacture and sell their own products.

Figure 10: Ownership structure of the firm (% of firms)

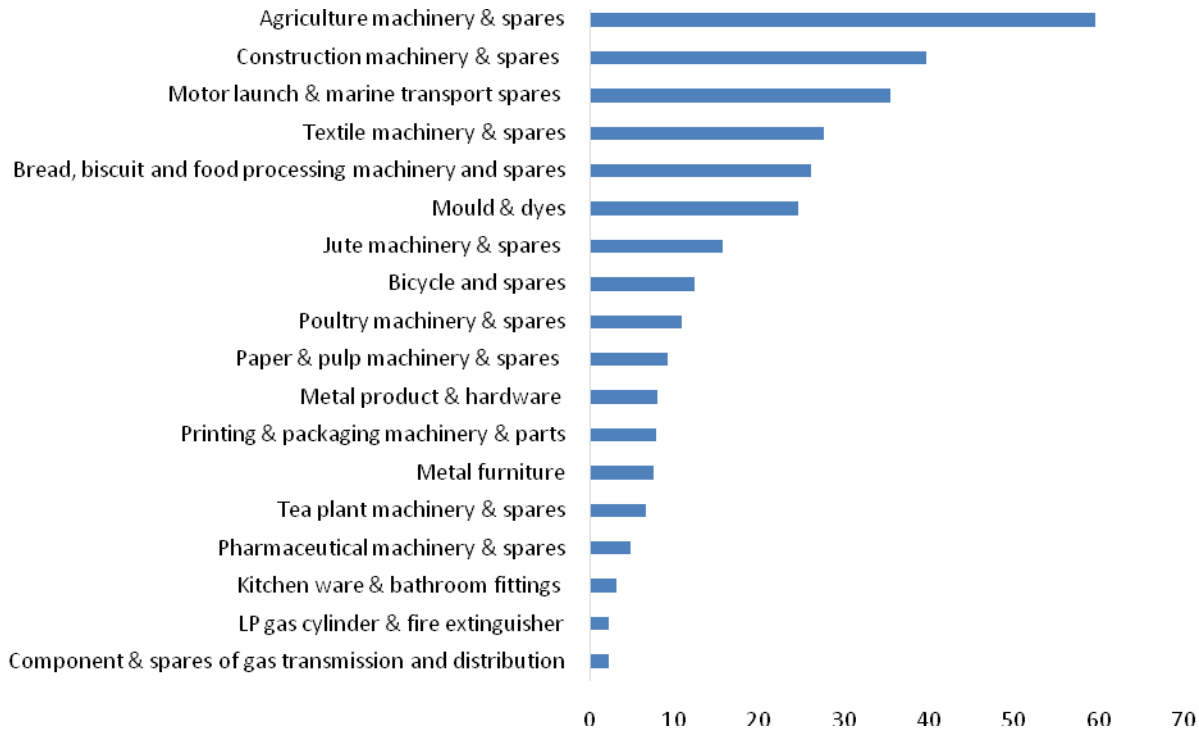
Figure 11: Primary mode operation of the firms (% of firms)



Note: The statistics on the mode of operation of the firms is based on multiple response meaning that a firm operate in multiple modes.
Source: RAPID firm-level survey of LE sector, 2022

LE firms produce and supply machinery and spare parts for different types of industries and provide repair services. They provide support to the automobile, industrial, agricultural, and construction sectors by supplying low-cost spare parts, castings, moulds and dices, oil and gas pipeline fittings, light machinery, and repair services (Figure 12). Same LE firmsare involved in producing different products and supports multiple sectors. Around 60 per cent of surveyed firms produce agricultural machinery and spare parts, while 40 per cent serve the construction sector by producing machinery and parts. 35 per cent surveyed firms produce and repair spares for motor and maritime transports, 28 per cent support the textile sector, 26 per cent produce food processing spares, and around a quarter involve in moulding. Other activities of LE firms are manufacturing machineries for jute industry, poultry, paper and pulp, printing and packaging, tea industry etc.

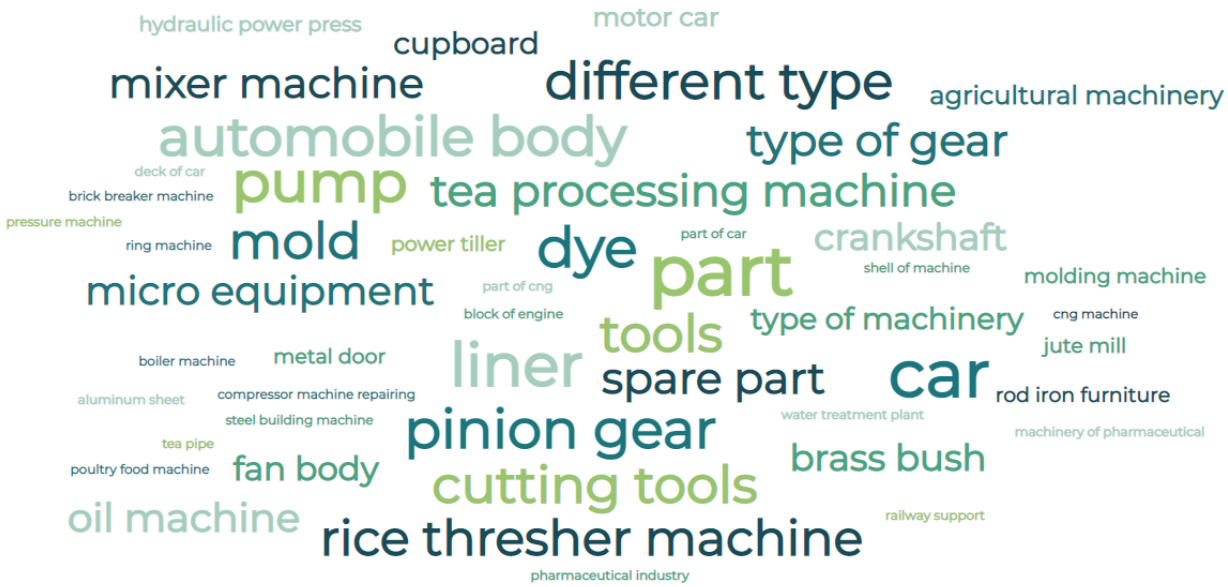
Figure 12: Operational activities of the surveyed firms (% of firms).



Source: RAPID firm-level survey of LE sector, 2022.

The major products of the surveyed firms are liner, pinion, tea processing machine, bush, shaft, gear, mould, mixer machine, rice thresher machine, automobile body and parts, cutting tools, oil machine, crankshaft etc.The major production items are provided in Figure 13.

Figure 13: Major products of LE firms



Source: RAPID firm-level survey of LE sector, 2022.

Majority of the surveyed LE firms are relatively small and operate with less than 10 workers. Onaverage, each firm has 14 workers. More than two-thirdsof thefirms have 10 workers or less, while a quarter has 11-30 workers. Less than 2 per cent of surveyed LE firms have more than 100 workers in their factories. Around 85 per cent of workers are permanent in nature, and 88 per cent of workers are employed for manufacturing purposes. There is little representation of female workers in the light engineering sector due to the nature,which requires hard labour; andthere is no specific working hours. More than 90 per cent firms have no female workers. The share of female workers in this sector is less than 5 per cent.

Figure 14: State of employment in LE industry

Source: RAPID firm-level survey of LE sector, 2022.

Table 6: Firm size and average number of workers

No. of workers	Percent of firms	Average number of workers	Avg. share of female workers
1 to 10	68.74	5.4	0.3
11 to 30	24.25	17.2	4.2

30 to 100	5.21	51.8	6.5
More than 100	1.8	175.3	7.8

Source: RAPID firm-level survey of LE sector, 2022.

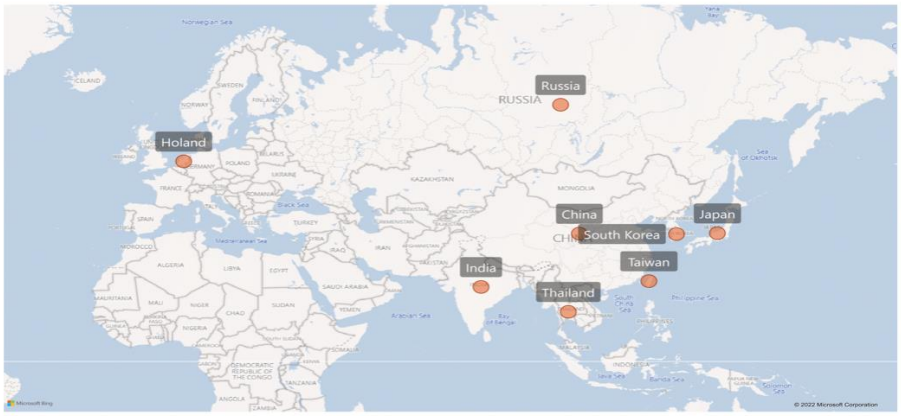
The light engineering firms in Bangladesh mostly use domestic raw materials for their production. It is found that around 94 per cent of firms use domestic raw materials and the remaining 6 per cent use some imported inputs. Firms that use imported raw materials have a share of such inputs of around 40 per cent.The major inputs from the domestic sources for the LE products are scrap materials of ships, aluminium, brass, iron, rod, different types of sheets, coke, limestone, ferrosilicon, ferromanganeseetc. Around 90 per cent of the raw materials are procured from the ship breaking industry (Hasan, 2022). The surveyed firms use scrap metal from ship breaking industries, aluminium, brass, pig iron, cast iron, etc., from domestic sources.

Figure 15: Sources of raw materials

Source: RAPID firm-level survey of LE sector, 2022.

Due to import tariff, VAT and other taxes, light engineering firms are less likely to use the imported raw materials. Aluminum, roller chain, V-belt, nut-bolt, iron, casting iron, S.S and M.S steel, ferromanganese,graphite, filter paper etc. are major imported raw materials. Major imported raw materials also includeroller chain, V-Belt, nut-bolt, cast iron and different types ofiron/aluminium steels. India and China are major sources of imported raw materials. Other source countries include Germany, Holland, Japan, the Republic of Korea, Taiwan etc.

Figure16: Sources of imported raw materials for LE firms



Source: RAPID firm-level survey of LE sector, 2022.

The LE firms mostly use conventional machines such as lathes, boring, milling, shaping, drilling, grinding, and honing rather than advanced technologiessuch asComputer Aided Numerically Controlled (CNC) machines, Computer Aided Design (CAD), heat treatment facilities, and testing machines. The usage of machine depends on the product they produce. The firm-level survey shows that almost all firms use drill machine, around 90 per cent use lathe, honing, and welding machines. 20-30 per cent of light engineering factories use boring, milling, and shaping machines (Figure 17). On the other hand, only a limited number of light engineering manufacturers bought CNC machine. Most of the firm owners reported that, backdated machineries are sufficient for serving the domestic market. Theindustry insidersthink that the relativelyhigh price, lack of working capital, and shortage of skilled labour to operate modern machinery are major reasons for not using advanced technologies in the sector. Most of the surveyed firms are found to operate two or three machines, doing work for local small shops.

This study also revealed that the LE firms rarely replace their machineries. Most of the machines are old and average age of the conventional machines ranges from 12 to 21 years (Figure 18). Many firms are found to use second-hand machines. The usages of conventional and old machinesare accountable for the low productivity of light engineering workshops. China, India, Japan, Taiwan and Pakistan are major sources of machines used in the LE sector. However, the majority of firms use planer, honing and welding machines made in Bangladesh.

Figure 17: Share of firm using different types of machines

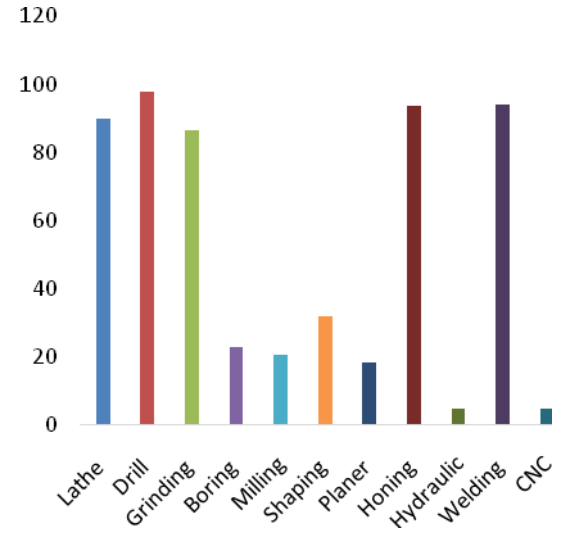
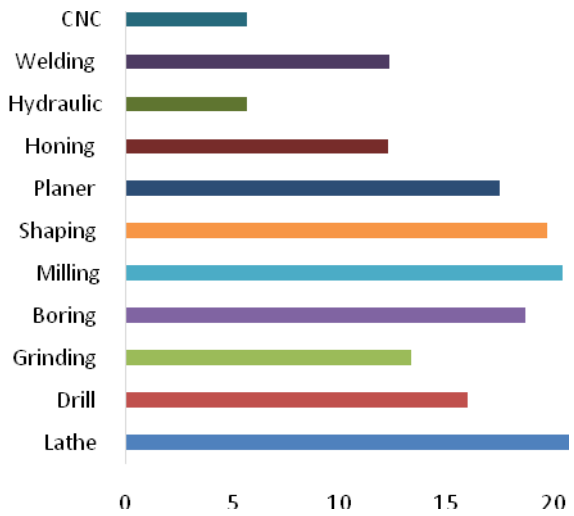


Figure 18: Average age of the machine used by LE firms



Source: RAPID firm-level survey of LE sector, 2022.

Table7: Number of machines used per firm, by employment size

Name of the machine	1-10 employees	11-30 employees	31-100 employees	More than 100 employees	All firms	Major Sources of machine (% of firms reported)
Lathe	2.4	4.4	8.4	21.8	3.58	India (54%), China (17%), Pakistan (16%), Japan (12%), Bangladesh (11%)
Drill	1.8	3.0	5.4	9.3	2.38	China (53%), India (22%), Bangladesh (17%), Japan (5%), Pakistan (4%)
Grinding	2.0	4.2	6.5	8.1	2.90	China (56%), India (22%), Bangladesh (13%), Japan (5%)
Boring	1.2	2.0	2.3	2.3	1.62	China (52%), India (26%), Pakistan (10%), Bangladesh (4%)
Milling	1.3	1.5	2.0	1.3	1.41	India (22%), China (18%), Japan (15%), Taiwan (11%), Sweden (6%), USA (5%), Bangladesh (4%)
Shaping	1.1	1.3	3.8	2.0	1.46	India (37%), Japan (16%), China 12%), Taiwan (12%), Germany (7%)
Planer	1.6	2.3	5.4	3.5	2.24	Bangladesh (43%), India (14%), China (13%), Japan (8%), Pakistan (7%), Taiwan (3%)
Honing	2.0	4.4	7.7	14.8	3.03	Bangladesh (58%), China (32%), India (11%), Japan (3%)
Hydraulic or Ball Press	2.4	2.3	4.0	2.0	2.30	China (61%), USA (17%), Taiwan (13%), India (9%)
Welding	1.9	4.4	7.7	14.8	3.03	Bangladesh (58%), China (31%), India (11%)
Computerized and Numeric Controlled (CNC)	2.4	2.3	4.0	3.0	2.30	China (57%), USA (17%), Taiwan (13%)

Note: The average is calculated for the firms those use the machine, rather considering all sample.
Source: RAPID firm-level survey of LE sector, 2022.

Export potential of LE firms

Most of the LE firms in Bangladesh cater to the domestic market only. Among the surveyed firms, more than 98 per cent operate in the domestic market only. This is due to the huge

demandlimited production capacity, lack of knowledge about exports, lack of marketing, low quality products, lack of working capital and difficulties in accessing finance etc.

The survey shows that less than 2 per cent of the firms are currently exporting. However, these firms are also selling their products in the domestic market (Figure 19). Small-sized firms have less capacity and are almost absent in the export market. About 8 per cent of firms having employees 31-100 are currently exporting their products. The corresponding figure is 22 per cent for large firms with more than 100 workers. The exporting firms earn more than $ 300,000 per annum on average by shipping their products (Figure 20).

Figure 19: Share of firms currently exporting

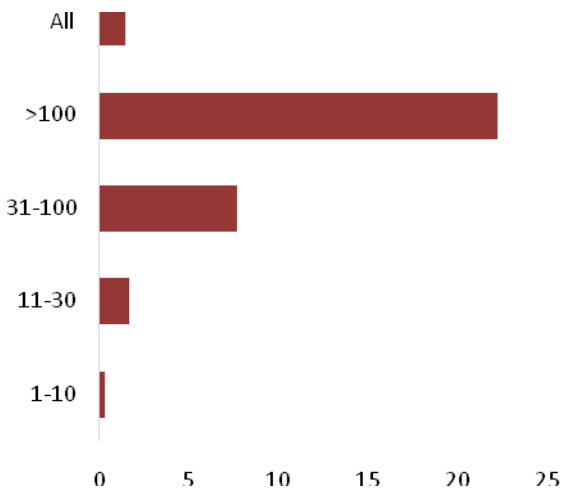
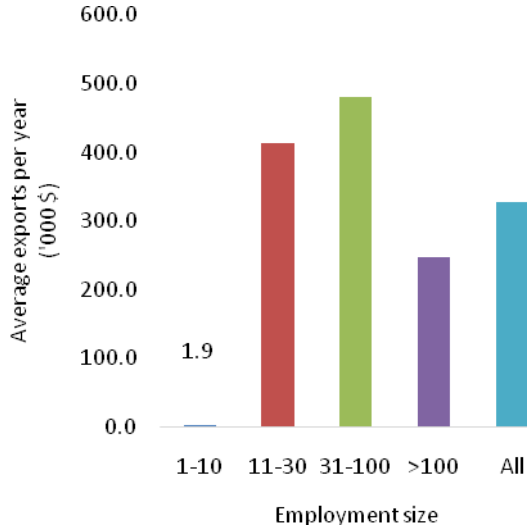


Figure 20: Average exports per firm by employment size



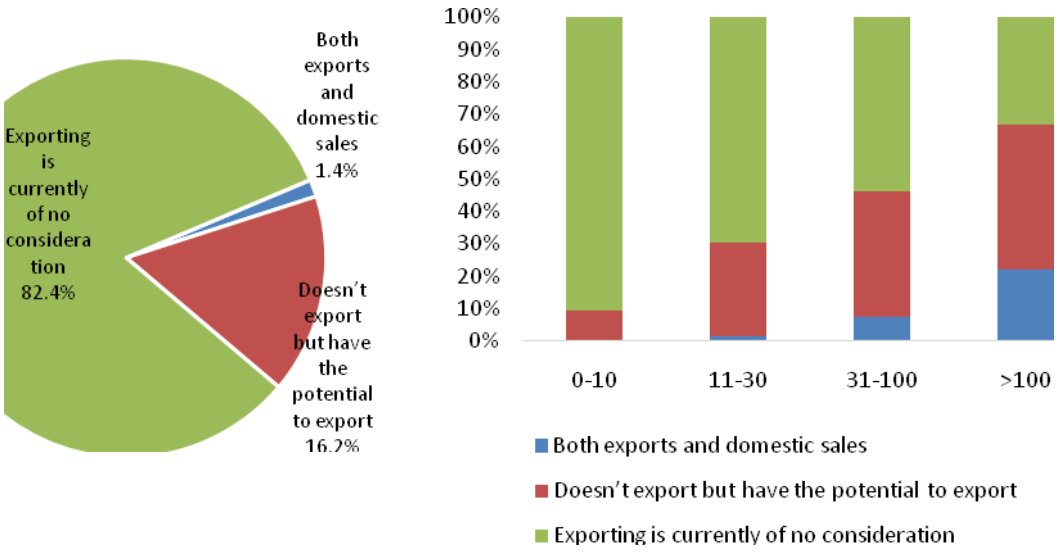
Source: RAPID firm-level survey of LE sector, 2022.

Major exports of the surveyed firms include fertiliser mixers, thresher machines, dredging machines and spare parts, head gaskets, mixer machine, pump, and parts, washing machinesetc. The exporters reported that India, China, Japan and the United States are the major export markets.

Around 16 per cent of surveyed firms think that they have high export potential. Proportionately, medium to large-sized firms plan to explore export markets for their products (Figure 21). The LE firms want to export agricultural machinery and parts,thresher machines, liner and piston, tube wells, mixers, pumps, drill machines, bodyand parts of motor vehicles etc. (Figure 22).

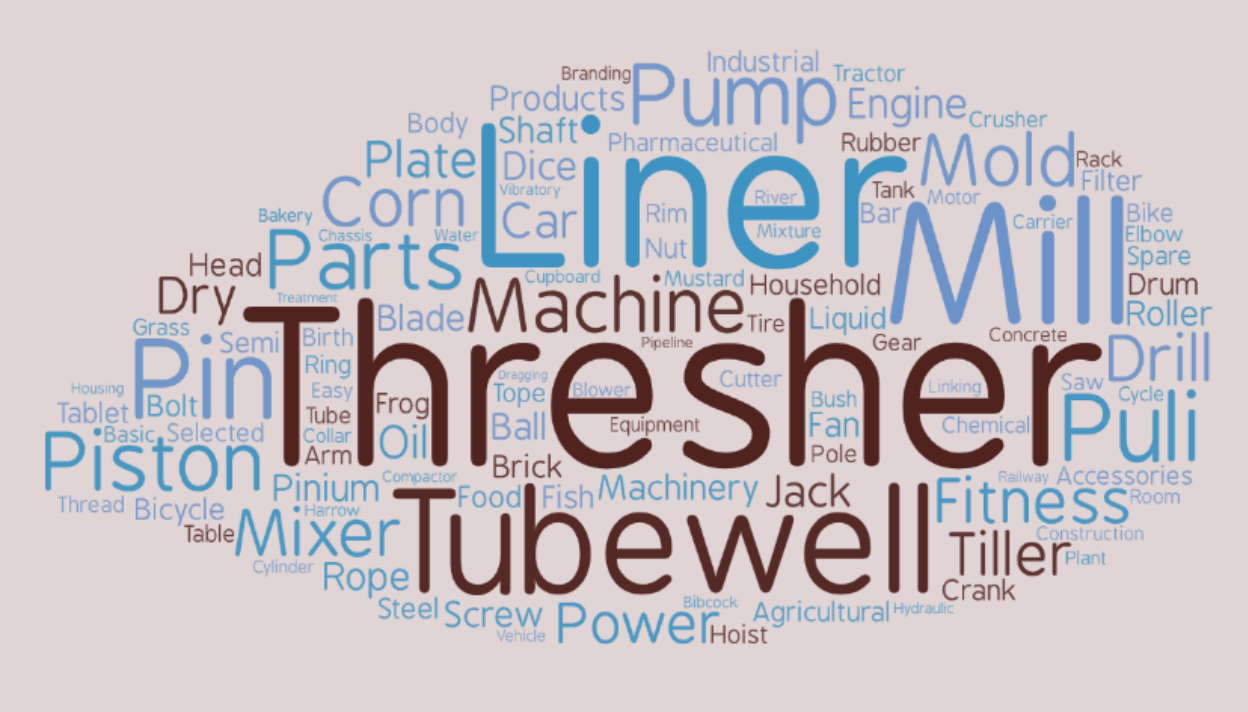
Figure 21: State of exports (% of surveyed firms)

Figure 22: Export status by firm size (%)



Source: RAPID firm-level survey of LE sector, 2022.

Figure 23: Major exportable items

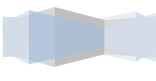


Source: RAPID firm-level survey of LE sector, 2022.

Table8: Major exportable items and sectors

Sectors	Products
Agricultural machinery and spare parts	Plow, liner, pump, mustard oil machine, roller pin, thresher machine, power tiller, brick crusher machine, grass cutter machine, vibratory plate
Food processing	Liquid mixing machine, chemical drum
Pharmaceutical'smachinery and parts	Tablet machine, ball mill
Motor and vehicles spare parts	Piston, parts of car, vehicle crankshaft, body of tractor, hydraulic jack, carrier of bicycle, railway screw, pole fittings, cycle rim, easy bike, pinion gear
Manufacturing of	Spares of metal products, industrial table, steel cupboard

Furniture	
Contraction	Drill machine, thread machine, tube printing machine, concrete mixer machine, rope hoist machine, compactor machine, pinion gear, pole fittings, shaft, spare parts of water treatment plant, river dragging spare parts, bulldozer machine
Bathroom fittings	Console bibcock, shower, pipeline
Others	Tube well, pole fittings, blade



IV. Government Initiatives to Support LE Sector

Recognizing the growth potential of the light engineering sector, the government of Bangladesh has given special attention. It has designated this sector as a priority sector in its National Industry Policy 2010. It has been recognised as the highest priority sectors in the Export Policy 2021-24; it was the special development sector in previous consecutive export policies. The government provides a 10 per cent cash incentive to export light engineering (LE) products. Over the years, Bangladeshhas come up with many supporting policies to encourage the sustainable flourishment of this sector. To support the growth, the light engineering goodswere announced as the 'product of the year'in 2020. In budget 2022-23, the Finance Minister announced that the manufacturer of light engineering products enjoy a 10 year tax holiday if they cater to factories with non-finished items or parts.The tax holiday is expected to attract investments for the local manufacturing of components of engineering industries such as automobiles, capital machinery, agro machinery, and electrical and electronic products.The government also waived VAT on light engineering product manufacturers. Exporters enjoys a 10 per cent cash incentive for exporting light engineering products. Some of the incentives are briefly explained in Box 1.

Box 1: Incentives for the light engineering sector

Reduced corporate income tax for 5 to 10 years depending on location for newly established industries engaged in production of automation and robotics design and/or manufacturing inc. parts/ components thereof, automobile parts and components, basic components of electronics (resister, capacitor, transistor, integral circuit, multilayer PCB, etc.), bicycle including parts thereof, boiler including parts and equipment thereof, compressor including parts thereof, electrical transformer, LED TV, mobile-phone, textile machinery. (The Income-tax Ordinance, 1984, 46BB)

The 10-year exemption of corporate income tax for newly established industries engaged in manufacturing of the following
(Effective from July 1, 2021-June 30, 2030):

- Parts and components produced by light engineering industry are used in industries. (SRO 166/Law/Income Tax/2021)
- Agricultural machineries (SR0 164/Law/Income tax/2021),
- Washing machine, blender, microwave, electronic sewing machine, induction cooker, knives. (SRO 167/Law/Income Tax/2021)
- Institutes providing technical/vocational training forengineering skills development (SRO 168/Law/Income Tax/2021)

- Import duty exemption on capital machineries.
- Reduced import duties on brass wire and copper plate (as inputs for mold fabrication (SRO 154-AIN/2019/23/Customs)
- Reduced import duties on raw materials, tools and equipment used for LE industries (SRO 133-AIN/2017/19/Customs).

For exporters:
- 50% of tax exemption for income derived from export.
- value added tax (VAT) exemptions on light engineering product manufacturers
- 10% cash incentive on export value of light engineering goods including accumulator battery.

Source: Adapted from BIDA, (2021).

Export Policy 2021-24

The role of export policy in developing the country's economic activities including bringing dynamism in export trade, increasing trade capacity is undeniable. With the aim of strengthening the position of Bangladesh in competitive world trade through continuous development of the desired export friendly environment, the government formulated theexport policy 2021-24. The Export Policy 2021-2024 aims to nearly double Bangladesh's export earnings over the period by facilitating shipments of diversified, non-traditional goods and labor-based products. In the Export Policy 2021-24 emphasis has been laid on processed food, leather and footwear products, light engineering products, pharmaceuticals, ICT services, tourism as most promising sector.

The government has given highest priority to the light engineering sector due to its high potential in diversifying the export basket of Bangladesh. The policy has been developed to address the challenges that will arise after the country's graduation from the least developed country category. Some of the key initiatives which have been taken to providing some key incentives to the light engineering sector in Export Policy 2021-24 are briefly highlightedin Table 10.

Table 9: Majorinitiative for light engineering sector in the Export Policy 2021-24

Several export benefits given from government of Bangladesh under Export Policy 2021-24.	
1.	"Light Engineering Cluster Village" will be set up near Dhaka to develop light engineering industry.
2.	Initiatives will be taken to set up state of the laboratories and common facility centres for quality testing of light engineering products. Research and development activities will be undertaken to develop light engineering products.
3.	Initiatives will be taken to increase the export of light engineering products in the international market through productivity enhancement and product development activities.
4.	The industry owners will be encouraged to qualify their industries as "Green" industries.
5.	Initiatives will be taken to provide loanss at low interest rates; and easy loan arrangements will be made for advanced technology in the light engineering industry
6.	Initiatives will be taken to develop the skills of the workers engaged in the light engineering industry.

Light Engineering Product Business Promotion Council (LEPBPC)

Recognizing the significance of the sector, the Ministry of Commerce established the "Light Engineering Product Business Promotion Council (LEPBPC)" on March 4, 2004, with the collaboration of the public and private sectors (BEIOA,2014). The main objective of establishing the council is to increase and facilitate the export of light engineering products and services in Bangladesh. Several initiatives have been undertaken under the LEPBPC to facilitate the development of light engineering products. This includes among others, establishment of common facility centre, promotion of LE business and marketing, product development and research and innovations.

Table 10: Key initiatives of Light Engineering Product Business Promotion Council

Initiatives	Description
Common Facility Centre	Establish a Common Facility Center for testing, training, standardizing, and certifying light engineering products and services.
Business Promotion	Modify, publish, and distribute business promotion journals, brochures, and sales materials.
Research and Development	Market research, export, joint ventures and collaborations, engineering consulting, and studies are encouraged.
Human Resource Development	Creating national and international links with various institutions/enterprises, encouraging participation, and assisting in the development of human resources required by the light engineering industries
Development of Products	Encourage and support the balanced development of light engineering products and services.

Some Key interventions of the government of Bangladesh

The government has taken several initiatives for theLEI sector in the 8th Five-Year Plan to increase investment including foreign direct investment (FDI), gain greater and easier market access, and facilitate technology transfer.

- **Light Engineering Cluster Village and a state-of-the-art laboratory and common facilities centre:**A plan has been developed to establish a 'Light Engineering Cluster Village' near Dhaka in order to develop the light engineering industry. In addition, a cutting-edge laboratory and common facilities centre will be built to help the light engineering sector grow (Mojumder& Dey, 2020).
- **Industrial Park:** The government decided to establish five industrial parks in Dhaka, Narayanganj, Jessore, Bogura, and Narsingdi. 200 acres of land has been allocated for the light engineering sector at the Narsingdi automobile industry park, which is currently under construction.
- **Industrial Zone:**In 2016, the government approved a light engineering industrial zone in Munshiganj district.

V. Challenges of the Light Engineering Sector

Despite having enormous growth potential, the light engineering sector is facing significant challenges. It is important to identify the challenges in order to design appropriate policies to facilitate growth of the sector. Some of the bottlenecks facedby the light engineering firms are discussed in this section.

Outdated technology and low productivity

A major challenge for LE industries is a lack of modern technological expertise and proper machinery to boost production and improve quality.[2] It is observed that most conventional machines used by the manufacturers are too old. Some machines have been used for more than 30 years with the average age being around 20 years. It is observed that many firms bought second-hand machines for their production. Due to a lack of modern technology, and usage of outdated machines, the productivity of LE firms remains low and quality products cannot be ensured (Sazzad, 2019).

The LE industry is capital intensive by definition, since it requires expensive machinery for manufacturing operations. However, the overall average investment in this sector is quite low. The firms manufacture their products using indigenous technologies. In the workshops, traditional lathes, boring machines, milling machines, shaping machines, drilling machines, and grinding machines are still used for production. They cannot determine the raw material's strength, and thus, they provide goods of either too much or too little strength. This not only reduces product quality but also reduces sector yield. Most industries do not employ Computer Aided Numerically Controlled (CNC) equipment, as well as Computer Aided Design (CAD), heat treatment, and testing machines, which are essential for the design and manufacturing of high-quality goods.

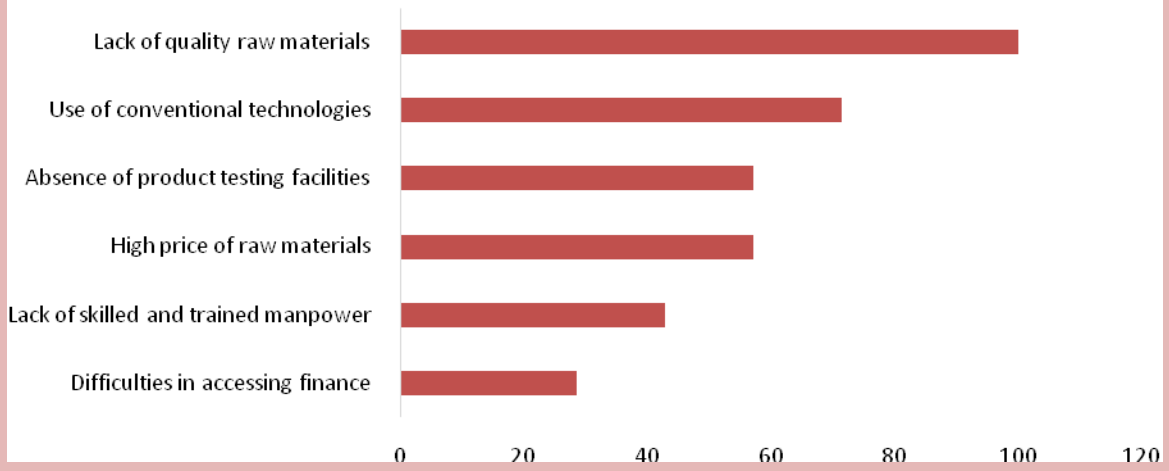
Steel re-rolling mills and foundries provide poor quality outputs and operate at extremely low efficiency for a variety of reasons, including antiquated technology and processes. Metal processors and assemblers of parts and finished products are similarly impeded by old and outdated equipment and processes, as well as inadequate testing, tooling, and designingfacilities. Except for restricted scopes in the Bangladesh Industrial Technical Assistance Centre (BITAC) and the Bureau of Research Testing Centre (BRTC) of Bangladesh University of Engineering and Technology (BUET), the firms lack access to contemporary testing facilities. There is an inherent lack of validity in reverse engineering-based reproduction of part designs.

[2]Majumder, S., & Dey, S. (2020). Light Engineering Industry Sector in Bangladesh: Challenges and Prospects. *The Cost And Management*, *48*(1), 46-57.

Box 2: Challenges faced by LE exporters

During the survey, all exporters highlighted that a lack of quality raw materials is the major problem for exporting light engineering products. More than 70 per cent of exporters reported usage of conventional and outdated technologies which are accountable for low quality production thus affecting competitiveness in export markets. Among others, absence of product testing facilities, high price of raw materials, lack of skilled workforce and access to finance are major factors affecting the export performances of light engineering firms.

Figure 24: Challenges faced by LE exporters (% of exporting firms)



Source: RAPID firm-level survey of LE sector, 2022.

Furthermore, due to the manual handling of settings, older machines and technologies require significantly more raw materials per unit of product. As a result, around 30-40 per cent of raw resources are wasted. As a result, the cost per unit product increases. The owners are not investing in new technologies because of the unpredictability of returns due to demand uncertainty, expensive financing costs, narrow profit margins, a lack of skilled labour, and so on.

As heavy machinery is only required occasionally and at specific phases, industries cannot afford to invest in it. The Common Facility Centre (CFC) is the best option for this industry since it invests in heavy machinery and provides specialised services to several businesses. But funding opportunities remain inadequate relative to the demand.

"Due to lack of finance, we cannot afford to buy modern machineries. I think manual machines are sufficient to meet the local demand. But we need to upgrade our machineries in order to enhance quality of our products"

- Owner of a light engineering workshop

Poor quality of products

Large buyers in the LE sector, mostly those that are heavy industries, require world-class quality replacement parts, tools, and other engineering items. However, they had to rely on imported parts due to low quality of domestically produced goods. Lack of quality raw materials is another challenge that is responsible for the low quality of the products. The LE industry frequently falls short of ensuring quality, primarily because of substandard raw materials, outdated equipment, untrained labour, and poor-quality designs.

This study shows that while a modest number of raw materials are imported, LEIs mostly utilise discarded materials from the ship-breaking sector. Most of the owner's favour using domestically produced raw materials over imported raw materials. They cannot afford the use of high-quality imported raw materials due to insufficient working capital. They frequently rely on readily available, inexpensive domestic raw materials. The raw materials are mostly recycled metals acquired from ship breakup, with no testing record or certification. Additionally, studies show industries sacrifice product quality and are still learning the value of quality.

Quality is a significant barrier for the LE products' export potential. Many policy experts have agreed that product quality is inappropriate for the export market due to scarcity of high-quality raw materials in the country. TOYOTA, HONDA, and other international engineering firms contacted certain LE companies regarding outsourcing parts procurement from Bangladesh. However, they were sceptical of the availability of high-quality raw materials, testing facilities, and worker skills in Bangladesh (Talukder& Jahan, 2017).

Lack of financial access

The light engineering sector is highly capital intensive. Setting up a workshop requires a huge one-off investment. Since most of the owners are sole proprietor of their workshop and operate with limited workers, they cannot afford the investment required for adopting technologies for their production. LEIs have restricted access and, in most cases, no access to finance because of high informality, unfavourable conditions, bank guarantees, and high interest rates etc. However, in order to attract investors and expand LEI areas, simple access to finance is required. According to BEIOA, the rules for getting funds are stringent, thus making them unavailable to small company owners (Banik& Swarna, 2018).

Commercial banks do not consider LE firms bankable since they lack professional employees to keep records.[3] Due to the substantial business risk of purchasing expensive machines, industries are hesitant to borrow a substantial amount of money from banks for machinery.

"The requirements for accessing finance are rigorous, making it inaccessible to small business owners. Financing challenges must be resolved in order to encourage investment in this sector."

- Owner of a light engineering firm

[3]Talukder, M. A., & Jahan, S. M. (2016). Light engineering business ecosystem in Bangladesh: A study on institutional preparedness. *IOSR Journal of Business and Management*, *18*(12), 16-26.

According to a field study, nearly all LE enterprises think that they have restricted access to funding. About 30 per cent of respondents think that interest rates for bank financing are quite high, while another 12 per cent believe that banking processes are very challenging. Most espondents stated that there is significant uncertainty over the return on investment. Furthermore, the study discovers that the difficulties in access to institutional finance, lengthy process, as well as a lack of venture capital are major challenges that are accontable for low investment in the light engineering industry.

Box 3: Saiful Engineering is facing multiple challenges to boost production and exports

Saiful Engineering was established in 1985 at Tipu Sultan Road, with a minimum starting capital. The business has grown significantly throughout past 35 years. Initially, they focused on the domestic market only. Now, the owner wants to establish a fully export-oriented light engineering industry. Although the industry started with only two or three products, they now have a more diverse product line. Furthermore, the company has been offering a variety of repair services. Their product quality has improved and they have earned a good reputation in the market. , The major products of this firm, are deep tube-well materials, liner of piston irrigation pump, and other agricultural equipment and machinery.

Although this engineering firm is growing over the years, still it is struggling due to some major challenges. The firm owner mentioned that unskilled workers, lack of capital investment, access to finance, lack of government support, price hike of raw materials, deficiency of power supply, low quality products etc. are some major challenges they are facing. Although the owner is working hard to build a specialized export-oriented sector of light engineering products, he lacks access to working capital to invest in his business. Due to the high interest rate, the owner is facing trouble to invest in cutting-edge technologies. The owner has mentioned that the VAT scheme places significant financial strain on their businesses. Since VAT must be paid within a month of the supply of a product, but payments are typically received much later. Consequently, there is pressure on working capital to pay VAT in advance of payment received for their products.

Scarcity of skilled workforce

The LE industryis experiencing a huge shortage of technical and skilled manpower. The majority of LE sector employees lack formal technical education or training. Some businesses could notadopt new technologies, including CNC machines, owing to athe absence of trouble-shooters.

It is observed that when a worker gains technical expertise and experience through working in a factory for a long time, he leaves his position to open his own independent factory. The factory owner then hires a new employee who lacks the requisite competence level and requires time to master new skills. As a result, industries frequently struggle to address the skill gap generated by the loss of key technical personnel. Aside from that, there is a severe scarcity of personnel trained in modern computer-aided numerical control (CNC) machinery and computer-aided design (CAD) technologies.

According to the findings of this study, workers are less productive due to the nature of their jobs, a lack of education, a lack of suitable training, and unattractive payment structure. In most cases, individuals quit their jobs due to low wages. Talukder and Jahan (2017) discovered that the sector is losing crucial new blood since the younger generation does not want to work in LE factories due to difficult job nature, low-paying jobs which is not

prestigious inthe society. The majority of the factories are operated by middle-aged individuals who began working in this industry 15-20 years ago.

The findings of thesestudies indicate that people in the LE industry lack the necessary formal technical education or training. Although there is a training facilities financed by the World Bank, the training provided is insufficient to boost workers productivity. Most workers are found to learn their tasks through on-the-job training rather than formal education.

Box 4: Light engineering firms have insufficient skilled workers to run advanced machines

Salma Engineering Workshop was established in 1980 by Md. Abdur Rahman. Different engine crack, grinding machine, liner, and other machinery are the primary products of the firm. Over the period, the company also introduced many new products to its product line to meet local customer demand. According to the owner, workers athis workers did not receive any institutional training. They accumulated some experience by working in workshop for a long period. Althoughthere is training facilities under the "Export Competitiveness for Job" project of the World Bank, the training provided under this is not sufficient to meet the industry requirement.According to the owner, the curriculum of this training scheme is outdated and inadequate to enhance the quality of the workers. He also mentioned that the firm had to compete with the imported cheap foreign products from China and India. However, the firm continued to use outdated technologies due to inadequate knowledge to operate advanced mechines, and insufficient working capital. They gradually added machinery and equipment to their production process, but most of them are self-made.

The owner noted that the workers lack the necessary knowledge and skills to adopt newtechnology and operate machines and equipment. As a result, there has been no notable process improvement in the industry. Unfortunately, the industry neither does not have any collaborative effort for quality improvement and developing new products.

Lack of industrial facilities and infrastructure

One of the major factors restricting the expansion of light engineering sector is the shortage of industrial infrastructure. The industries operate in small premises with limited access to utilities. There are inadequate supplies of power, gas, water, and sewage systems. In this environment, the cost of conducting business is very high.

The government must ensure the availability of all types of industrial facilities; including the supply of electricity, gas, water, and sewerage systems, as well as metal and heat treatment facilities, among other things..

Environmental concern

Recycling scrap steel and iron, which are the primary products of the shipbreaking business, is a sustainable practise since it lessens the need for mining to produce the raw materials. In terms of energy savings and CO2 emissions, steel manufacturing from scrap uses over five times less energy and emits less CO2 than steel production from iron ore.

However, there are concerns about the environmental hazards of the shipbreaking industry. Light engineering industries only generate solid waste. There is no standard operating

procedurein place for the proper disposal of this waste, which has a negative impact not just on the environment but also on working conditions and workers safety.

Lack of marketing

The LE producers have minimal knowledge about marketing their products. The sector has not developed a marketing strategy due to its small size of operation and the culture of on-demand manufacturing. There is no product or company branding in the industry. As a result, the sector has little control over sales, mostly in the international market.

"We have established a good relationship with our clients. So, whenever they need products, they communicate with us to order what they want. We do not need to operate any branding strategy to get orders. Moreover, we lack knowledge about marketing and do not have sufficient capital and staffs to handle any website or digital media"
- Owner of a light engineering firm

In Bangladesh, there is no branding of LE products or industries. As a result, they confront a hurdle in selling their goods in both the domestic and international markets. Due to lack of marketing, the LEIs are having difficulty securing large orders. According to the findings of this study, LEIs lack a marketing strategy and rely on on-demand manufacturing. The owners have acknowledged that they need marketing tactics, but they do not want to go after consumers; instead, they want purchasers to associate with them. Also, some business owners have failed to recognise the significance of marketing, viewing it as a "hassle." Due to a lack of marketing abilities, a hesitant or complacent mind-set, and uncertain demand, LEI owners prefer the safe route of on-demand low quantity manufacturing (Talukdar and Jahan, 2016).

There is no or low participation in e-commerce for selling light engineering products. While the world is moving towards e-commerce, the lack of participation of Bangladeshi firms in this trend is restricting their export prospects. The industry stakeholders acknowledge that lack of participation in online sales is one major factor affecting their export sales. Participation in trade fairs for branding LE products is also limited. Due to the lack of knowledge of the owners and directors of the firms, marketing in the international market remains unexplored.

Price fluctuations and availability of quality raw materials

Frequent fluctuations in the prices of raw materials is also affecting the production and sale of LE industry. The ongoing COVID-19 crisis and the Russia-Ukraine war have aggravated the problem as the prices of pig iron, hardcoke, limestone and ferroalloys, ferromanganese etc. have increased in the international market. Due to the increase in the prices of raw materials,light engineering manufacturers are facing a hurdle to production.

Majority of the LE firms use scraps from ship breaking units in Chattogram as the raw materials. However, due to quality concerns, most exporters rely on imported raw materials. Frequent fluctuationin the prices of imported raw materials is causing a major concern for the

industry. Besides, foreign sourcing of raw materials is also affected by lead-time, which is much higher for Bangladesh than many other comparators.

Lack of policy support

Due to the small size of the industry, the owners of LE firms believe that they are being sidelined while forming incentives for manufacturing sector. According to the industry stakeholders, the significance of the LE sectorin job creation and the provision of import alternatives are not taken into account by the government. The customs charge on raw materials for LE machines is around 32-35 per cent, whereas the tariff on imported LE items is close to 1 per cent. The local manufacturers pay VAT, increasing the price of their goods, while VAT on imported LE products is almost zero.[4] According to the owners, local producers of LE industries are expected to pay 15 per cent VAT as well as income tax. The absence of measures from the government and policymakers has caused the owners to express their dissatisfaction.

Policies should be consistent and constructed in a way that promotes the thrust sectors. The government offers a 10% cash incentive to this industry for exports, but in order to safeguard domestic companies, it also requires assistance in the form of taxes and higher import tariffs for light engineering items (BFTI, 2016). It is important to highlight that the government announced a 10-year tax holiday for light engineering machine parts manufacturers, anda value added tax (VAT) waiver on light engineering product manufacturers. The tax holiday and VAT waiver must help stimulate investment in this sector. Besides, SMEs within the light engineering sector are out of the income tax purview until their annual turnover crosses Tk. 50 lakh.

"Most importantly, the VAT scheme places significant financial strain on our businesses because VAT must be paid within a month of the supply of a product, but payments from dealers and retailers to whom the supply is made are typically received much later. As a result, we (small manufacturers) are under financial duress from all sides."
- Owner of a light engineering firm

The SME foundation claims that the Small and Medium Enterprise (SME) loans do not reach the LEI sector. Due to the inadequate definition of a SME, the SME loans distributed through commercial banks and financial institutions are instead going to other industries.

In response to the fallout of the COVID-19, the government announced a Tk. 20,000 crore stimulus for the Cottage, Micro, Small and Medium Enterprises (CMSMEs) businesses to recover from economic hardship. However, according to industry insiders, not more than 10 percent cent of the LE firms benefited from the stimulus loan support programme due to the sector's high informality andinability to fulfil stringent requirements.

[4]Talukder, M. A., & Jahan, S. M. (2017). Competitiveness and growth hindrances of light engineering industry of Bangladesh: A study on Micro, Small and Medium-Sized Enterprise (MSME) owners. *growth*, *7*(2).

Almost all of the surveyed firm's owners cited "lack of policy support from the government" as one of the major challenges to their existence. The government formulated the Light Engineering Industry Development Policy 2022 and is drafting the Export Roadmaps for theLight Engineering Sector. Effective implementation of these policies will help domestic production and exports.

VI. Conclusion and Way Forward

The LEI industry in Bangladesh is one of the most fundamental subsectors in terms of its contribution to socioeconomic development, employment generation and the fight against poverty. Given its strong linkages with nearly every sector, the light engineering sector is being recognised as a critical industrythat can contributely hugely to further economic development.The sector has been declared a thrust sector which can significantly contribute to export diversification. However, the progress in the LEI industry has been slow due to the multiple challenges faced by the manufacturers and exporters. This section draws specific recommendations for the light engineering sector to overcome the challenges and promote export competitiveness.

According to the findings of this survey, the majority of LE enterprises are small in size. These are primarily family-run and sole proprietorship businesses that were founded for livelihood and income generation.Due to their low production capacity, shortageof high-quality raw materials, use of antiquated equipment, unskilled labour force, and lack of working capital, these LE firmsoften focus on satisfying local demand. A diverse range of raw materials issourced from the ship breaking sector, whereas just a small percentage of raw materials are imported. Because of the high expenses, the owners of LEIs prefer to compromise on the usage of high-quality raw materials. In the workshop, the majority of LE industries use the obsolete traditional machinery. As a result, manufacturing capacity and product quality are often low.Most employees lack the formal technical knowledge or training necessary to operate modern technology machinery. This study also shown that LE enterprises failed to see the value of marketing since they are accustomed to producing on-demand. Unfortunately, there is no strategy in place to help LEIs improve their marketing abilities.

Ensuring the effective implementation of the policies will help overcome the ongoing challenges of the light engineering industry, promote productivity and exports.

The study's findings indicate that the government's support for LE policy is inadequate. The Light Engineering Industry Development Policy 2022 has been formulated in order to overcome the challenges and provide a clear road map for the sector to grow and thrive while contributing to the country's economic growth with the greatest consistency.Also, an export roadmapfor the Light Engineering Sector is being drafted. Effective implementation of these policies will help overcome the ongoing challenges of the light engineering sector and promote productivity and exports.

Effective utilisation of the firm-level databasewill help boost exports and attract investment.

Currently, there is no database of the light engineering manufacturing firms' products and export performances. Due to the absence of the database, it is sometimes difficult to assess the industry's export potential, and design specific policies and interventions for the sector. As a part of this study, a comprehensive database of 500 manufacturers has been developed. The database incorporates information on their business profiles, current specialization and produced items, usages and sources of raw materials, potential exportable items, and the challenges faced by the firms.

An effective implementation of this database can help promote the production and exports of the LE industry. This database canbe used by exporters, importers, potential investors and the policymakers. In most cases, importers ask to showcase what products are being produced and the quality of these products. This database can be utilised in an effective manner to identify potential exporters and export items. Besides, this database can be used to attract foreign direct investment in this sector. The policymakers can also determine the key areas for developing an effective set of policies with the efficient use of this dataset. The government can play a significant role in ensuring that stakeholders are harnessing the value of this information since the dataset has the ability to unleash innovation and gives a comprehensive understanding of this industry.

Improving product quality is critical for export success.

Product quality and standards are becoming more important for export markets. Consumers around the world are increasingly demanding high-quality products. Bangladesh's light engineering manufacturers are recognised to produce low-quality products using low quality inputs and conventional machinery, insome cases self-made technologies. As a result, they can meet the local demand for sub-standard products. Owing of the low quality of LE products, LEIs are unable to attract large investors.Consequently, they cannot utilise economy of scale compared to other large manufacturers in other competing countries.The government should take theinitiative to ensure the high quality of raw materials and facilitate to increase LE firm's productivity using modern technologies. One initiative could be lowering the VAT on imported raw materials in order to expand the supply and improve the quality of products. This will also help LEIs to save additional costs and encourage them to import high-quality raw materials. As a result, product quality will improve to meet global market demand.

As discussed earlier, there are few testing facilities for light engineering products. The government must also developsufficient testing facilities to ensure the quality of raw materials used in manufacturing and the quality of the products produced and exported. As quality raw materials are essential for producing and exporting quality products, certified metal testing for the inputs coming from the ship breaking sector should be ensured. Once domestic raw materials are certified, they will also satisfy the criteria for being referred to as quality raw materials to meet the demand in the international market.

Skill development of the workers should be a priority for the success of the light engineering sector in Bangladesh.

To resolve the scarcity of semi-skilled and skilled workers, the government and industry skills councils (ISC) must take thenecessary steps to educate the workers in the sector. The National Skill Development Authority (NSDA), and the respective ISC should develop and offer effective training programmes that are based on industry need. It will help industries receive competent labour to meet their needs. To enhance the skills of the workers involved in LEIs, an up-to-date curriculum should be developed, and training infrastructures must also be built.

To assist workers, enhance their skills, advanced technical skills development courses can be provided to new firms and youth. Like the skill development programmes in the information and communication sector, short-term training and diploma courses should be developed and offered free of costs, so that the whole sector benefitsfrom them and the full potential of the sector can be reached. Funding for advanced training programmes can be secured from different development projects. Development partners and NGOs/INGOs can also help in this regard.

Bangladesh's government must build additional training institutes and research laboratories with essential logistical assistance. Most significantly, the government can create strong connections between technical training institutes and light engineering industries in order to supply skilled workforce to LE firms.

Usingmodern and cutting-edge technologies is essential for boosting productivity and ensuring product quality.

The government must facilitate LEI firms to incorporate modern technology by offering adequate technical training as well as financial incentives. Even while SME Foundation provides a few institutions with a little loan, it is not enough to buy modern equipment. Since the LE sector needs technical upgradation,public institutions and authorities involved in this sector, such as theBangladesh Industrial Technical Assistance Centre (BITAC), NSDA, should be better equipped and staffed with technical experts to create a platform for LEI firms to have adequate access to all forms of technical and industrial assistance.

Access to finance for adopting modern technologies in the LE sector remains a major constraint. Due to small family-based businesses, high level of informality and inability to submit necessary documents for institutional loan, the light engineering firms become ineligible to get lfinance from the formal sector. The SME loans are also inadequate and requires long list of documentations and collateral for eligibility of loans. The eligibility criteria for micro enterprises in the light engineering sectors should be minimized to open door for adequate financing to adopt new technologies in the light engineering sector.

Establishingcommon facility centres in all light engineering clusters can help facilitate industry growth.

The LE industries cannot own all of the expensive machinery required for their work because the majority of them are only required for a section in the production process. In this case, a common facility centre can minimise the problem by offering all major operational facilities for all firms. All the expensiveequipment should be owned by a third party that will rent out

the services. The common facility centre can be established in all of the country's light engineering clusters to provide adequate support in production processandfor research and development infrastructure. Experts must be appointed to encourage product innovation in order to enhance the CFC's performance. CFCs can also help with product certification for light engineering, heat treatment, and metal testing. Moreover, these facilities must be made available to all small and medium-sized businesses at reasonable prices.

Adequate policy support should be provided to the light engineering industry

The government should provide adequate policy support to facilitate the growth of the light engineering sector. The first and foremost priority should be to ensure protection for domestic industries against imported goods through tariff and non-tariff mechanisms. The tariff and taxes on raw materials range from 32-35 per cent, while it is close to one per cent for imported light engineering products. This works as a major barrier for domestic production, as cost rises on domestically produced goods than on imports. Therefore, the tariff structure should be rationalised to provide incentives to domestic firms and protection against imports. To provide a business-friendly environment, the tax and VAT structure on imported raw materials, replacement parts, and other necessities used in light engineering industries must be reduced.

To reduce the barriers to finance, the government must ensure that Bangladesh Bank provides loans at low interest rates on favourable conditions. The collateral requirements should be relaxed.

To build a market connection both locally and globally, the government should take the initiative to create a forum of buying agents for the LEI industry, similar tothe one in garment exports. The government should consider protecting the LE manufacturers against imports.It should facilitate the light engineering firms participating in trade fairs to showcase Bangladeshi-made products. It can also host export fairs in the country for marketing LE products.

The government can also establish a Light Engineering Development Board (LEDB) to address specific needs and support light engineering sector of the country Industry associations including the BEIOA,Bangladesh Automobile Manufacturers and Assemblers Association (BAAMA) etc. should be recognised at all stages of policy planning to negotiate on behalf of LE industries with government institutions, international purchasers, and other stakeholders.

To sum up, in order tosurvive and thrive, the sector must achieve global competitiveness by adopting appropriate technologies, upgrading skill sets, shifting to need-based products, benchmarking with Chinese, Korean, and Taiwanese LE industries for quality, achieving scale of economies through specialization, and fitting into market-based financing mechanisms.

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Annex

Table A1: Number of firms surveyed, by cluster

Name of the cluster	Number of firmsurveyed
Bogura	47
Chittagong	20
Chuyadanga	15
Dhaka	142
Dinajpur	12
Gazipur	51
Hobigonj	18
Jessore	24
Kushtia	26
Kishorganj	19
Moulobhibazar	19
Mymensingh	12
Naogaon	18
Narayanganj	5
Neelphamari	23
Rangpur	18
Pabna	20
Sylhet	11
Total	500