Research Report on
Foundry and Light Engineering Industries of Bogura: Present Scenario and Future Challenges

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Ministry of Industries
Uttara, Dhaka-1230

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Acronyms or Abbreviations

DFID	:	Department for International Development
BSCIC	:	Bangladesh Small and Cottage Industries Corporation
EPSCIC	:	East Pakistan Small and Cottage Industries Corporation
GDP	:	Gross Domestic Product
GOB	:	Government of Bangladesh
IE		Industrial Estate
IFC	:	International Finance Corporation
LE	:	Light Engineering
LEI	:	Light Engineering Industry
MDGs	:	Millennium Development Goals
MoI	:	Ministry of Industries
SME	:	Small and Medium Enterprise
JICA	:	Japan International Cooperation Agencies

Introduction

Foundry and Light Engineering (LE) is an important industry in Bangladesh in terms of its contribution to growth and poverty reduction. Foundry and LEI sector has a very significant role in the socio-economic development of the country. Last few decades, the industry has been contributing considerably to GDP of Bangladesh, reducing the poverty level through employment generation, producing import substitute products, and supplying necessary items for other sectors. The foundry and LEI sector has the ability to produce a wide range of diversified products. While the international Foundry and LEI sector are using hi-tech machinery, most of the Bangladeshi foundry and LEIs have been using outdated conventional technologies and indigenous machinery through unskilled and semiskilled workers. Most of the LEIs have lack of modern technologies like modern heat treatment, material testing, magnetic crack tester, etc. and the common use of machineries in each of the industry are lathe machine, grinding machine, shaper, planner, milling, etc. (Uddin, 2010). In consequence, LEIs capability and the products quality have not yet been able to meet the competitive challenges that come from the global market (ADSL, 2007).

A study by Japan International Cooperation Agencies (JICA) has shown that there are a total of 40,000 small-scale light engineering enterprises in Bangladesh producing around 10,000 different types of items for construction, agriculture and other industries. Another study, conducted by the International Finance Corporation (IFC) in partnership with the UK's Department for International Development (DFID) and the Norwegian government, shows that this sector employs around 600,000 people who are involved in 50,000 micro enterprises, and 10,000 small and medium enterprises. The study conducted by the Bangladesh University of Engineering and Technology (BUET), however, estimates that the sector comprises of around 40,000 enterprises, employing some 800,000 people. These figures are different because of the methodological variations in the studies. However, given this information, it is quite ironic how the LES draws such little attention from policy makers. This is especially alarming as it has emerged as a potential cost cutting sector by producing at least 50% the items which can be applied as import substitutes. The SME Foundation has identified 31 light engineeringvclusters located in 18 districts of Bangladesh with aboutb7500 enterprises. LE enterprises are scattered throughoutbBangladesh, which implies employment generation in a wider span of areas. Most of the industrial units are located in Dhaka, Chittagong, Narayanganj, Bogra, Gazipur and Kishorganj.

Bogura is a major hub of foundry and light engineering industries. At least 85% of agricultural machinery, including 350 different types of motor engine-based filters, tube-wells, lathe machines, sawmills, flour mills, machinery for textile and jute mills, centrifugal pumps, spare parts for agricultural machinery, and grinders, are made here. This industry has created jobs, contributed significantly to the national income, and exported goods. Each year, Bogura's foundries and light industries produce 2,000–3,000 different finished goods valued at more than Tk 500 crore.

The foundry industry has been identified as a major thrust area with significant export potential. Bogura's foundry industry has the potential to employ thousands of unemployed people, earn a lot of foreign currency, and generate significant revenue for the government.

Bogura's foundry and light engineering industries are currently facing several challenges. Locally, foundry and light engineering industries are available, and their quality has improved; however, further improvement is required. Nonetheless, in light of globalization and liberalization, there is no problem with transferring technology from the Western world to help reduce development time and sell our castings to them at competitive prices while meeting international quality standards.

The foundry industry of today has recognized that it operates in a global economy. To compete in a global economy, it is critical to conduct an in-depth study on the feasibility, problems, and prospects of Bogura's foundry and light engineering industries. However, research in this field is extremely limited. In this regard, the study will help in the expansion of Bogura's foundry and light engineering industries.

Under the Ministry of Industries, the Bangladesh Small and Cottage Industries Corporation (BSCIC) is a statutory body (MoI). It was established in 1957 with the goal of assisting the nation's cottage and small businesses. A parliamentary act created BSCIC, formerly known as East Pakistan Small and Cottage Industries Corporation (EPSCIC), in 1957. BSCIC was founded with the goal of fostering the growth of the nation's small and cottage industries to spur industrial growth (BSCIC Act, 1957). The creation and maintenance of industrial estates, which were built at various points in history and various parts of the nation, is one of the main focuses of BSCIC activities. The entrepreneurs in BSCIC estates receive several advantages, including land allocations at discounted rates, initial tax exemptions, and infrastructure.

The government has the policy to create BSCIC industrial estates in every administrative district, and as a result, 74 estates have been created so far in 58 districts, except three (Magura, Khagracho0ri, and Narail). Some recent estates are ongoing. The estates that have already been established have helped to produce jobs and hence, reduction of poverty in rural areas. to offer assistance to small business owners BSCIC has a single head office in Dhaka, four regional offices, 64 district offices, industrial service center offices, 15 Skill Development Centers, and office buildings on industrial estates at various locations across the nation.

In Bangladesh, the Light Engineering (LE) sector contributes significantly to economic growth and the eradication of poverty. LE businesses can significantly contribute to both economic and technological progress, as well as provide numerous prospects for job creation. By offering various kinds of equipment, replacement parts, and maintenance services, the industry has been assisting in the expansion of numerous other sectors.

Bogura continues to lag well behind Chattogram, the nation's commercial capital, in terms of industrial growth. Even yet, it may take pride in what it has accomplished over the past two

decades, particularly in the light engineering and foundry industries. In the past 24 years, investments totaling at least Tk40,000 crore have been made in a variety of businesses, including agro-based industries, light engineering industries, tiles, paper mills, glass, and ceramics.

A good number of LE companies are situated inside the BSCIC Industrial Estate and BSCIC is playing vital role for the development of that sector. Bangladesh Small and Cottage Industries Corporation (BSCIC) provided targeted low interest loans to foundry and LEIs to purchase machinery and as working capital. To address continuity of demand government passed a circular making it mandatory for sector corporations to purchase local spare parts if available. BSCIC enlisted the foundry and LEIs with product category so that the industrial buyers including government sector corporations could get access to the LE producers. BSCIC is committed to unfold all the opportunities for foundry and LE entrepreneurs. In order to find out the potentials of foundry and light engineering industries and to overcome the problems of this sector BSCIC authority decided to carry out the study. This study will provide an overview of Bogura's foundry and LE sector, focusing on the performance of various foundry and LE enterprises based on their size.

1.1 The objective of the Study

The general objective of the study is to investigate the problems and opportunities in the Bogura district's foundry and light engineering industries. To attain the broad objectives the researcher has determined the following specific objectives:

1. To explore the present scenario of foundry and light engineering industries of Bogura district;
2. To identify the problems of foundry and light engineering industries of Bogura district;
3. To explore the opportunities of foundry and light engineering industries;
4. To explore the ways to overcome the problem; and
5. To help in policy making regarding foundry and light engineering industries for BSCIC.

1.2 Methodology of the Study

The study was exploratory in nature. Social Survey method was used to carry out the research. Sampling technique was used to collect data from the population as per requirement. A total number of 49 respondents were included as sample for the study and they were selected through purposive sampling method. Both primary and secondary data has been used in the present study. Sample Survey was conducted for collecting Primary data from industry owners through face-to-face interviews. Structured questionnaires were used for conducting interviews. Among the 49 respondents, 35 of which were the representative of light engineering organizations and 14 of which were from foundry industries. Secondary data was gathered through reports, Publications, Articles, Govt. reports, etc. After collecting data, it was analyzed through different computer programs like SPSS and Microsoft Excel, etc.

1.3 Limitations of the Study

This study is comparatively a new field of industrial research in Bangladesh. The study seeks to explore the problems and opportunities in the Bogura district's foundry and light engineering industries. There were also some limitations of this study. The sample size was not sufficient in relation to its population due to time constrain. Moreover, additional efforts were required on the engineering aspect and some tools and techniques of material science had to be applied. The researcher faced problem in this regard and had to rely on existing literature. Though, literature regarding foundry and light engineering industries is available in the global context, literature in this regard on Bangladesh is very few. As there was not sufficient study regarding this issue in Bogura District, the researcher failed to make comparisons with others.

Findings and Discussions

2.1 Ownership Pattern:

Most of the foundry and light engineering industries of Bogura was started by personal effort of the entrepreneur. That's why ownership pattern of most of the factories is sole proprietorship.

Table 1: Ownership Pattern of the Foundry and LE Industries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sole Proprietorship	42	85.7	85.7	85.7
	Joint Venture	4	8.2	8.2	93.9
	Limited Company	3	6.1	6.1	100.0
	Total	49	100.0	100.0	

From the study findings we it is seen that among the 49 organizations 42 are sole proprietorship, 4 are joint venture companies and only 3 are limited companies.

2.2 Production and Sales:

Foundry and LEI sector produces spare parts, small machinery, repair services for cement, paper, jute, textile, sugar, food processing, railway, shipping, garments manufacturing sectors. The sector produces three types of products/ services: complete machinery, spare parts and repair service. In Bogura 2,000-3,000 types of finished products like centrifugal pump, liner-piston, various spare parts of power tillers and agricultural machinery and jute mills, tube well, lathe machine, 350 types of motor engine-based filters, food items and potteries are produced in foundry and light engineering industries. So, it can be said that, wide and diversified items are produced in Bogura.

Figure 1: Number of Produced Items/Products

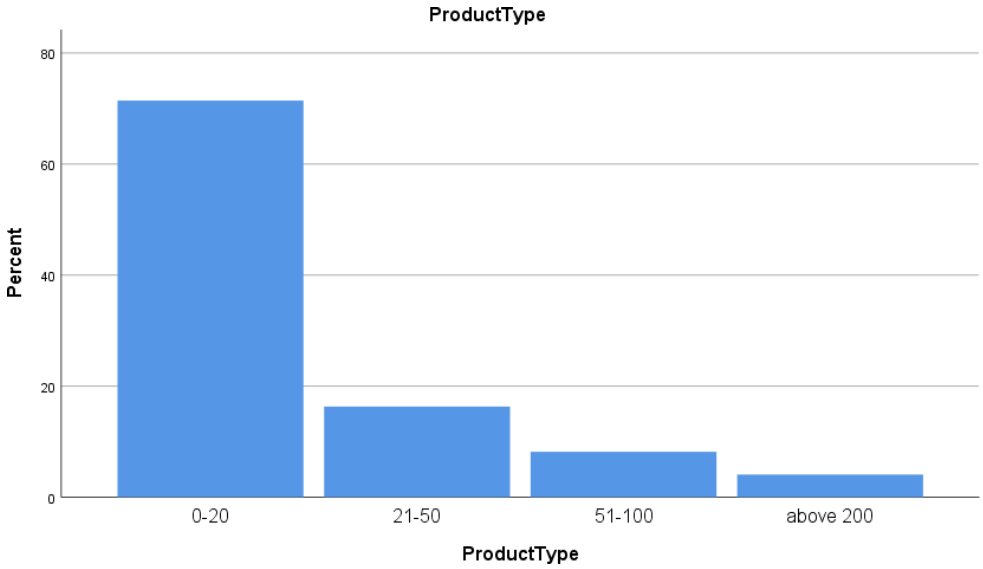


Table 2: Number of Produced Items/Products

No of produced items in the factories					
No of Items		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-20	35	71.4	71.4	71.4
	21-50	8	16.3	16.3	87.8
	51-100	4	8.2	8.2	95.9
	above 200	2	4.1	4.1	100.0
	Total	49	100.0	100.0	

From the above chart, we can see that 71.4 percent of the companies produce 1 to 20 types of products, 16.3 percent of the companies produce 21-50 types of product, 8.2 percent of the companies produce 51-100 types of product and 4.1 percent of the companies produce above 200 types of product.

Table 3: Yearly production of the foundry and LEs

Production Range (in Tons)	No of Organization	Percentage	Average Production (in tons)	
0-100	9	18%	Foundry	1118.33
101-200	4	8%		
201-300	9	18%		
301-600	7	14%		
601-1000	10	20%	LEs	560.06
1001-2000	6	12%		
>2000	4	8%		
	49	100%		

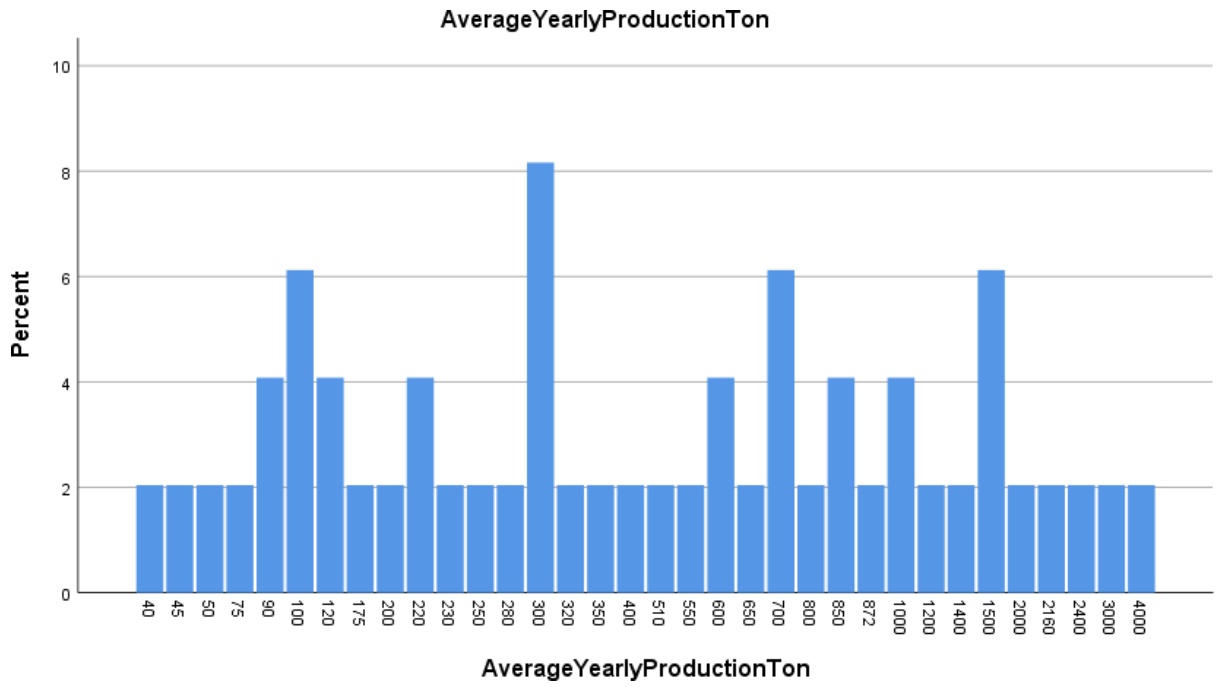


Figure 10: Average of yearly production of different industries

In the perspective of Bangladesh Light Engineering (LE) enterprises are micro, small and medium sized firms that produce parts for industrial machinery, heavy equipment, automobiles and appliances; and tools, small machinery, equipment and appliance or sanitary ware mainly by

metals through engineering and technological processes (Uddin, 2009). For these reason, the production of foundry and light engineering industries of is not so high. Analyzing the production related data it is seen that only 8 percent factories produce more than 2000 ton products in a year, 18 percent produce less than 100 tons and a good number of factories (20%) produce 6001-1000 ton.

Table 3: Yearly Sales of different industries

Sales Figure (in Lakhs)	No of Factory	Percentage	Average Sales (In Lakh Tk.)	
0-100	9	18%		
101-200	8	16%		
201-300	7	14%		
301-600	12	24%	Foundry	395
601-1000	4	8%		
1001-2000	7	14%		
>2000	2	4%		
	49	100%	LE	426.18

Foundry and light engineering industries of Bogura manufacture 2,000-3,000 types of finished products worth of more than Tk. 500 crore a year (The Daily Star, 23 January 2020. From the study findings it is seen that 24 percent of the industries sale 301 -600 Lakhs Taka in a year, 18 percent of the industries sale less than100 Lakhs Taka in a year and only 4 Percent industries sale more than 2000 lakhs taka in a year. Average yearly sales of LEs is 426.18 Lakhs taka and 935 lakhs taka for foundry industries.

2.3 Main Market:

It is also observed from the study that they have a little bit knowledge of marketing and calculating unit cost. They are being faced with challenge to handle big order and heavy industries. It is true that the foundry and LEI sector has not established marketing mechanism with the small scale of operation and culture of on-demand production. There is no branding of foundry and LE products or industries in Bangladesh. So, they are being faced with challenge to sale their product in domestic and international market.

Table 3: Main Market of the Products

Main Market of the Products					
Main Market		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Local Market	5	10.2	10.2	10.2
	Whole Country	40	81.6	81.6	91.8
	Foreign country/ Abroad	3	6.1	6.1	98.0
	Both home & Abroad	1	2.0	2.0	100.0
	Total	49	100.0	100.0	

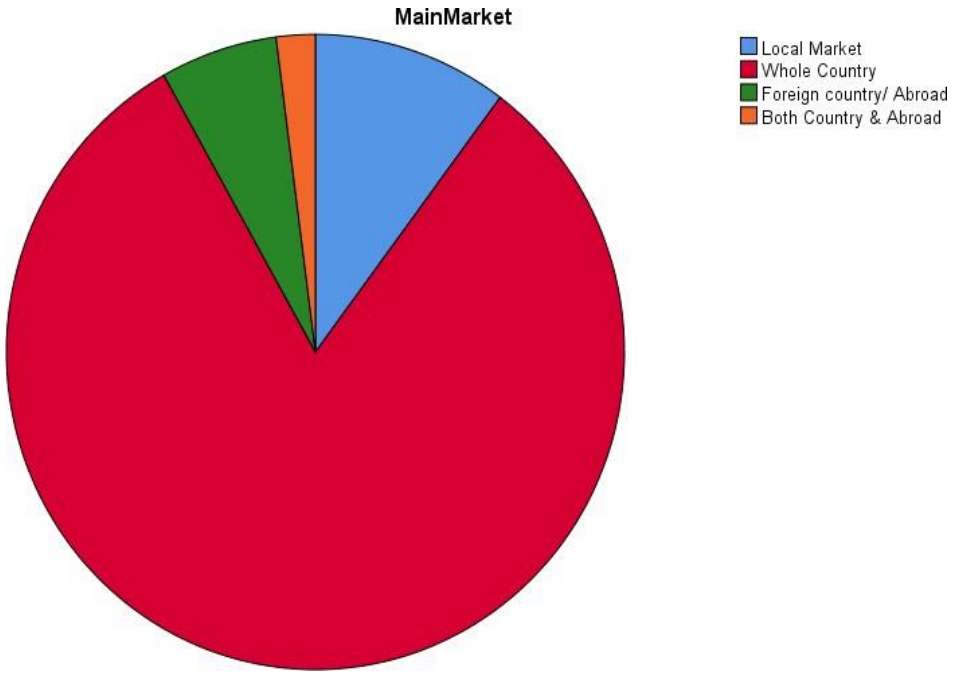


Figure 2: Main Market of Produced Products

From the above table and pie chart it is seen that 91.8 percent industries sell their products in local and home market and only 6.1 percent factories sell their product in international market. Most of owners and managers in this sector have no formal financial and managerial training. They do not have any knowledge of the modern market system or mechanism. The term "value chain" is completely unknown to them while people with knowledge of the sector are asking the local LEI sector to align with the global value chain (Ahmad & Jahan, 2017). Most of owners and managers in this sector do not have any modern marketing capability either. The LEIs lack contacts with foreign companies or international R&D firms which is necessary for technical improvement and for seeking export markets (Ahmad & Jahan, 2017).

2.4 Raw Material:

Lack of quality raw materials and poor quality of product is one of the greatest challenges in the foundry and LEI sector of Bogura as well as Bangladesh. All the respondents reported that they faced challenge due to low quality of raw materials. They informed that near about 85% to 90% raw materials come from inside the country. A few amounts of raw materials are exported from China and India.

Table 4: Sources of Raw Material

Location		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bogura	9	18.4	18.4	18.4
	Import	5	10.2	10.2	28.6
	Other Area Except Bogura	35	71.4	71.4	100.0
	Total	49	100.0	100.0	

From the above table it is seen that, most of the industries collect raw materials from outside of Bogura. 10 percent of them import raw materials from the international market and 71.4 percent of total industries collect their raw material other areas except Bogura.

Table 5: Type of Industry and Source of Raw Material

		Source of Raw Material			
		Bogura	Import	Other Location Except Bogura	Total
Type of Industry	Foundry	1	3	10	14
	Light Engineering	8	2	25	35
Total		9	5	35	49

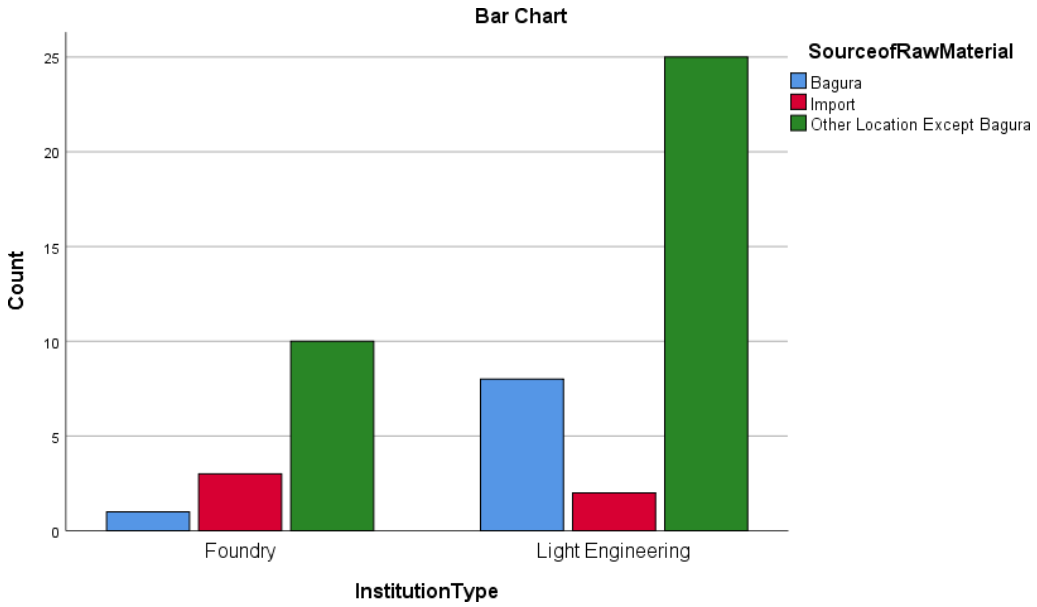


Figure 3: Type of Industry and Source of Raw Material

In our previous discussion it has said that data has been collected from two types of Industry i.e.; Foundry Industry and Light Engineering Industry. From above table it is seen that both the foundry and light engineering industries gather raw materials from all over the country except Bogura. The only exception is the percentage of foundry industries that import raw materials are greater than the light engineering industries, whereas the percentage of light engineering industries collecting raw materials from local area of Bogura is higher than the foundry industries.

2.5 Training requirement:

Most of the foundry and LEIs are micro and small, self-financed and employing about 05 (five) persons and managed by the owners. Input of human capital comes mainly from the families and surroundings of clusters. These workers are completely unskilled initially. Over years of work, they gain skills and in many case later forms independent shops themselves (Ahmad & Jahan, 2017). They do not receive formal education and training but they feel that training is necessary for their self-development and to survive in this sector.

Table 6: Training requirement and Type of industry

Training requirement and type of industry				
Whether training needed		Industry Type		Total count
		Foundry	Light Engineering	
	Yes	13	31	44
	No	1	4	5
Total		14	35	49

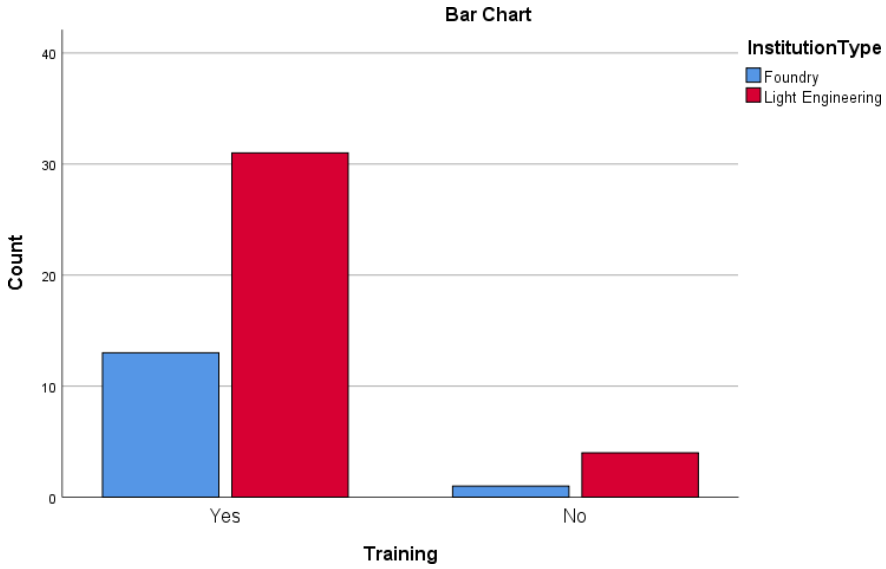


Figure 4: Training requirement and type of industries

From the survey findings, it was observed that most of the respondent (44 respondent) do think that proper training is required for them and their worker. They especially emphasize skill development training.

Table 7: Type of training required by different industries

Type of Training		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Managerial Development	1	2.0	2.0	2.0
	Skill Development	37	75.5	75.5	77.6
	"Both"	11	22.4	22.4	100.0
	Total	49	100.0	100.0	

Most of owners and managers in this sector have no formal skill development and managerial training. Training is necessary for the development of the sector. From the study findings it was seen that Almost 76 percent of respondents think that they need skill enhancement training and 22 percent of them think that they need both managerial and skill development training.

2.6 Design availability of the Products:

Foundry and light engineering industries of Bogura produce wide variety of products. They produce some of the products using their own design and some of the design they collect from the buyers.

Table: 8 Design availability of the Products

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Design by the owner	36	73.5	73.5	73.5
	Provide by Buyer	10	20.4	20.4	93.9
	Both	3	6.1	6.1	100.0
	Total	49	100.0	100.0	

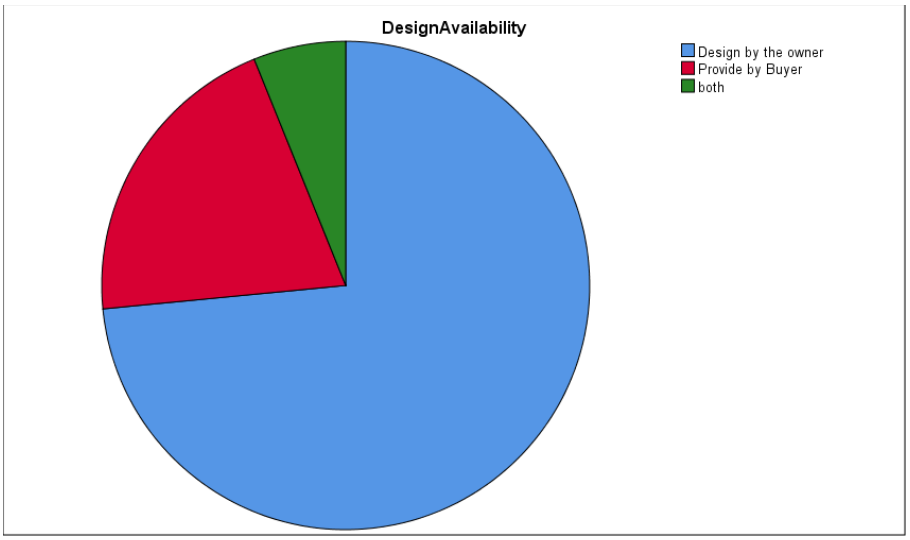


Figure 5: Percentage of sources of design of different industries

From the survey and the above chart, it was observed that most of the industries designed their product on their own which stands for approximately 73.5 percent. In 20.4 percent of cases, the design was provided by the client or buyer.

2.7 Marketing Approach:

Most of the foundry and LEs do not have any knowledge of the modern market system or mechanism. The term "value chain" is completely unknown to them while people with knowledge of the sector are asking the local foundry and LEI sector to align with the global value chain (Ahmad & Jahan, 2017). They follow traditional marketing system.

Table 9: Marketing Approach of the Foundry and LEs

Marketing approach		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Buyers Communicate with the factory	33	67.3	67.3	67.3
	Advertisement in TV/ Papers	1	2.0	2.0	69.4
	Appoint Sells Representative	15	30.6	30.6	100.0
	Total	49	100.0	100.0	

From the study findings it was observed that most of the buyers communicate with the factory for buying products. Very few of them published advertisements on paper or telecast advertisements on different media. Among the factories 67.3 percent of the total industries depends on buyer's communication to sell their product and 30.6 percent factories appointed sales representatives for marketing their products.

Table 10: Quality control statistics of different industries

Examine Quality					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	46	93.9	93.9	93.9
	No	3	6.1	6.1	100.0
	Total	49	100.0	100.0	

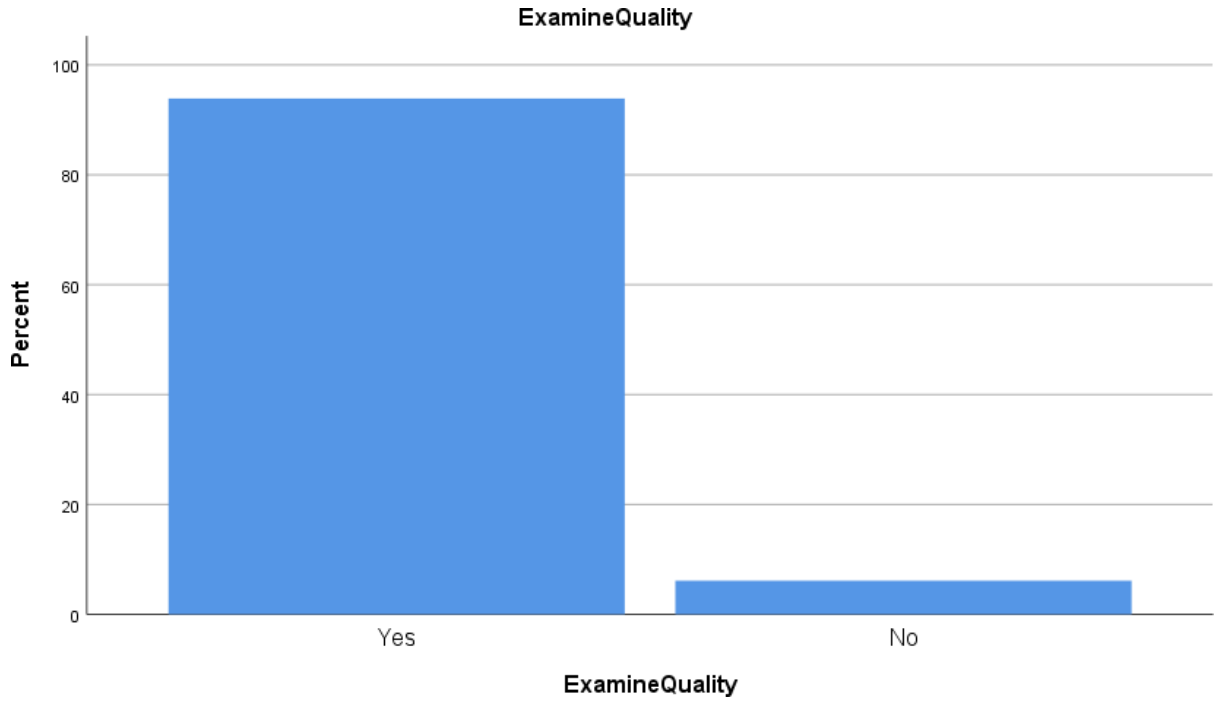


Figure 6: Percentage of different industries who conduct quality test

2.8 Quality Control:

From above chart we can conclude that most of the industries expressed that they conduct quality test of the product which stands for 94 percent. Out of 49, 46 industries said that they examine the quality of the product.

2.9 Location of the industries:

The survey was conducted in 49 industries. Among them, 19 industries (~39%) were in the BSCIC Industrial Estate (IE) and the rest 30 industries (~61%) were outside of the estate. Among the industries outside of the IE, 24 industries (80%) were keen to establish their industries in BSCIC IE and for that, the average land required was approximately 0.87 acres.

2.10 Furnace Type:

The light engineering industries do not require a furnace. But for the foundry industries, a furnace is a must. All the industries surveyed were using Cupola furnaces. For operation purposes, this is a simple and economical device. But one of the major drawbacks of this type of furnace is it is unable to maintain the close temperature required for production. It results in poor efficiency.

The introduction of induction or electric arc furnaces can solve the issue. But for that, an uninterruptible power supply must be ensured. Otherwise, it will cause a great loss in overall production.

2.11 Loan Requirement:

77.6% of the industries had loans from banks or other financial institutions. The whole scenario is shown in the following table.

Table 11: Whether have loan

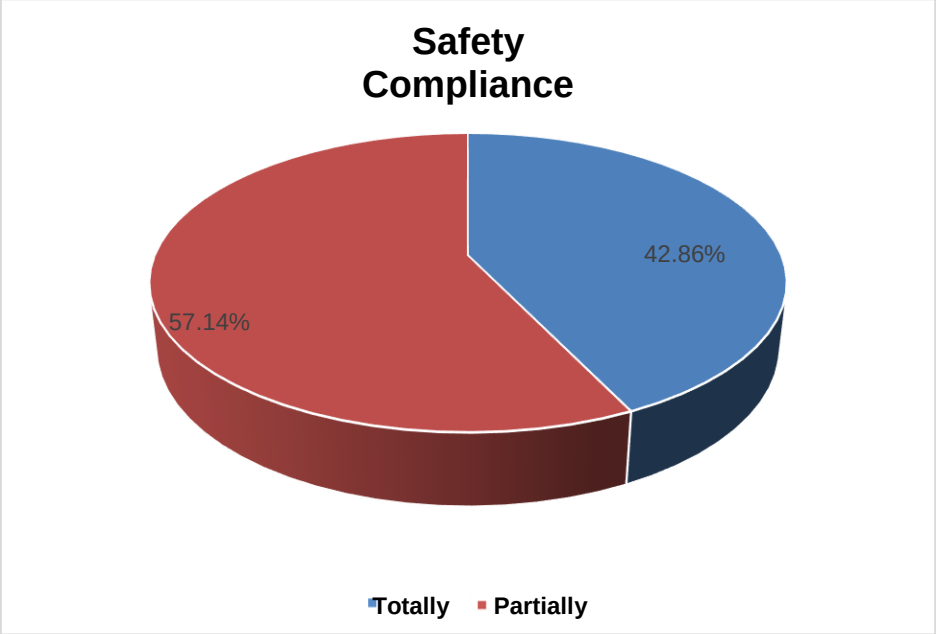
Whether have loan					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	38	77.6	77.6	77.6
	No	11	22.4	22.4	100.0
	Total	49	100.0	100.0	

2.12 Sub-contracting Linkage:

Only 8 of the 49 industries work on the subcontract. The average amount of the sub-contract linkage is 225.625 lakh taka.

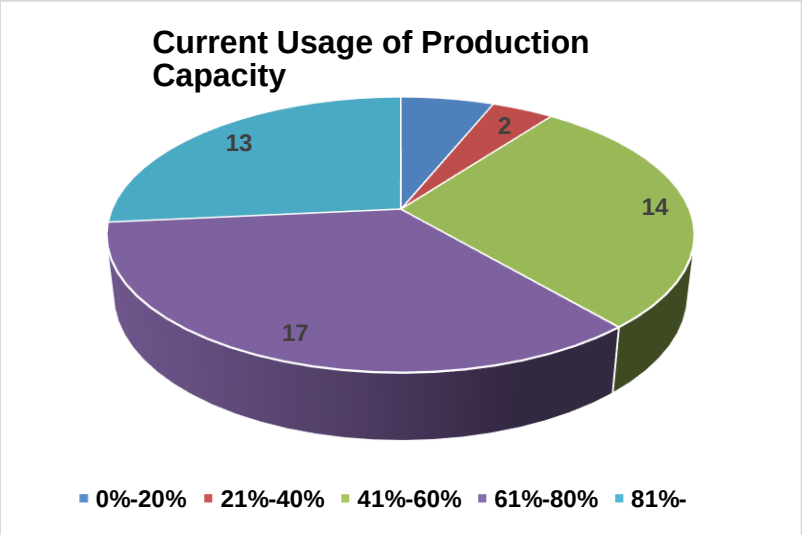
2.13 Safety Compliance:

57.14% of the industries were found to maintain partial safety compliance, while the rest of the industries were maintaining full safety compliance.



2.14 Current Usage of Production capacity:

The survey found the following result regarding the current Usage of Production capacity. Most of the industries were lagging at their full capacity. Only 6 industries, i.e., 12.25% of the industries were running in full swing.



Reasons for low efficiency in production

a) COVID-19: Due to COVID-19, the economic condition got worse and the foundry sectors of Bogura also suffered from this. The owners were compelled to run production below their full capacity.
b) Low order: There was low order from the marketplace. So, the industries were forced to run production below their full capacity.
c) The low market value of the products: Due to COVID-19 and cheap products from other countries, the market value of the foundry and light engineering products is low. So, the factories are not running in full swing.
d) Chinese product: Chinese foundry and light engineering products are cheap and available. So, the consumers are interested in those products. This results in the low efficiency in the production of Bangladeshi foundry and light engineering industries.
e) Lack of skilled manpower/technician: Due to the scarcity of skilled manpower, especially the technicians, the factory owners were compelled to decrease production.
f) Job switching tendency among the workers: There is a tendency of job switching among skilled workers and technicians. If they get a higher salary, they move into a new factory, which is quite normal. Owners were compelled to run production below their full capacity.
g) Electricity-based agricultural products: Previously there was a huge demand for foundry and light engineering products in the agricultural sector of Bangladesh. But now these products are replaced with electricity-based products. If there is a shortage of demand, production is forced to decrease.
h) Interruptible power supply: Continuous power supply is a must for foundry industries. If there is a power cut during the casting, the production is hampered and the loss is unbearable for the owners. This is another cause of low efficiency in production.
i) Price hike of the raw materials: The price of the raw materials of foundry industries, i.e., cast iron, coke, silicon, scraps, etc. becomes higher in recent years. But the price of the products does not. This means either loss or little profit for the owners. Consequently, the owners were compelled to run production below their full capacity.
j) Lack of new technology and machines: Most factories in Bangladesh are using older machines and technology. These result in lower production.

Services provided from BSCIC

a) Plot allotment: Bogura IE provides plots to the eligible factory owners. The factories outside BSCIC IE are also interested to come under the umbrella of BSCIC.
b) Industry Registration: BSCIC provides industry registration to the factories. They categorize the factories in terms of investments.
c) Training: BSCIC provides entrepreneurship development program (EDP) training and other training related to skill and human resource management. These trainings help the related personnel flourish in their business.
d) Loan from BSCIC: BSCIC provides loans to eligible entrepreneurs. These loans help the owners in running the factory.
e) No Objection Certificate (NOC) for a bank loan: Without the consent of BSCIC, no bank will provide loans to the factories. BSCIC provides NOCs for the industries.
f) Security: The area under BSCIC IE is very secured compared to the other foundry areas. As a result, many industry owners are keen to move to BSCIC IE.
g) Business plan: Sometimes, the owners are in a fix to choosing a business. In that case, BSCIC provides a business plan.
h) Infrastructures: BSCIC IE is responsible for the infrastructures, i.e., roads and drainage systems in BSCIC IE. Without these infrastructures, the smooth running of production is not possible.

Recommendations regarding foundry industries

a) Facilities should be equal to garments industries. The garments industries enjoy many facilities that the foundry industries don't. These make the industries lag.
b) The workers/technicians in the foundry sector are unskilled/semi-skilled. This causes low efficiency in production. So, it is recommended that the workers/technicians should be skilled. They must be aware of the new technologies and machines. For that, skill training related to a foundry should be introduced.
c) The infrastructures of the industrial estate should be developed. Poor infrastructures result in higher production costs and lower returns on equity. So, proper attention should be given to the roads and drainage system.
d) If a power cut happens during production, then it results in a huge loss. If the industries move to an induction furnace or electric arc furnace for greater production, then this loss will be greater. So, an uninterruptible power supply must be insured for the smooth running of the production.
e) If different service charges and VATs are high, the factory owners lose their motivation to run the industry. So, service charges, VAT, tax, and other charges should be minimized. This will encourage the entrepreneurs of the foundry sectors.
f) Most industries are eager to export their products. But due to some administrative issues, their products were not exported. So, the government should provide them with export facilities.
g) Access to finance is one of the most major issues for the foundry industry owners. Many of them couldn't expand their business due to financial bindings. Loans can promote their business. But loans should be given on easy terms and at a low-interest rate.
h) Delivery of certificates such as environment certificates, ERC, IRC, etc. should be fast and easy so that the industries run their business smoothly.
i) In this modern era, there is a continuous demand for new models and technologies. Otherwise, most industries won't be able to keep pace with the market demand. So, new technologies and machines like Computerized Numerical Control (CNC) machines should be introduced.
j) There is a variance in the product price in the market. This results in a loss for many factory owners. So, surveillance of the market price should be ensured.
k) Most industries can't afford a lab and training facilities of their own. Consequently, an inspection of the raw materials and final products is not possible. A multipurpose institution with training and lab facility in the industrial estate can mitigate the situation. So, a multipurpose institution should be established to ensure quality control of the product.
l) Almost all the industries face difficulties in paper works, i.e., obtaining different certificates, licenses, etc. If they get those documents easily, that will be a great opportunity for them. In that case, a one-stop service (OSS) can be a solution. BSCIC has an OSS platform. But it is not fully operating. So, we recommend that OSS be operated in full swing as soon as possible.
m) The whole survey was done in Bogura on a small scale. A further in-depth study should be carried out regarding these industries throughout the country to find the greater scope in this sector.

Conclusion

From the study, it was observed that the foundry and light engineering industries in Bangladesh have great potential. It is one of the burgeoning sectors of the country. It was also observed that there were many problems like lack of infrastructural facilities, scarcity of skilled workers, inadequate power supply, inability to explore the international market, etc. If these impediments are tackled with efficient strategic approaches, foundry and light engineering industries can play a vital role in the growth of our national economy. To do so, the above-mentioned recommendations should be implemented in a planned manner.

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Appendix-1
Selected Photographs of the Study Area