

Identifying Problem and Analyzing Business Scenario of Bangladeshi Light and Medium Industry: A Lean Kaizen-Based Approach

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Extended Abstract

Light Engineering (LE) sector is one of the promising sectors in Bangladesh. Jashore LE sector consists of 256 workshops and serves as a key industrial hub in southwestern Bangladesh with an annual turnover of approx. 5500 million BDT. This sector manufactures a wide range of machinery and tools including stone crushers, chaff cutters, and agricultural equipment, which were previously imported. However, it currently faces several quality-related challenges. Although several studies have explored the challenges and growth potential of Bangladesh's LE sector, few have addressed its current challenges related to forward market linkages and high-quality product manufacturing concerning Industry 4.0 [1, 2]. This study aims to capture a big picture of Jashore LE sector employing comprehensive survey data from 256 workshops with a set of structured questionnaires. Based on the data, this sector was divided into three main subsectors-Foundry, Agricultural and Food Processing Machinery, and Special Purpose Machinery-for detailed analysis. This analysis included value chain assessment, SWOT analysis, and a competitiveness review using Porter's Diamond model to identify growth opportunities and lean-kaizen-based actionable insights for development. Research results revealed that the Jashore light engineering sector relies heavily on reverse engineering, while slow technology adoption and a lack of expertise in critical areas such as testing and productivity impede its growth which is a great concern considering I4.0. Thus, strategic actions, such as improving business functions and leveraging competitive advantages, are essential for fostering the sector's development, achieving its full potential and better competitive advantages.

As Bangladesh gradually moves from an agriculture-based economy to a manufacturing and services-based industry, understanding and improving the casting industry's role and challenges is a burgeoning concern. According to the survey data, Fig. 1 illustrates that only 6 industries utilize traditional cupola furnaces, 6 operate induction furnaces, and 3 use crucible furnaces, while none employ the advanced Electric Arc Furnace, which raises concerns regarding the production of high-quality products. Additionally, Fig. 2 indicates a shortage of skilled workers (only 30% are efficient) and educated personnel, which hampers the sector's

efficiency. It also demonstrates that the industry is not yet prepared to adopt the latest technologies, even if provided by the government or foreign companies. Fig. 3 shows the value chain of this sector, highlighting Chittagong’s shipbreaking yard as a key raw material source, chemicals from Dhaka and India, and sand sourced from Sylhet. In the production phase, essential actors include pattern makers, production workers, and consultants, and quality testing is conducted by KUET, BUET, and JUST. Forward linkages involve transportation services, wholesalers, retailers, and end users, such as agricultural machinery manufacturers and farmers, who manage the distribution of foundry products.

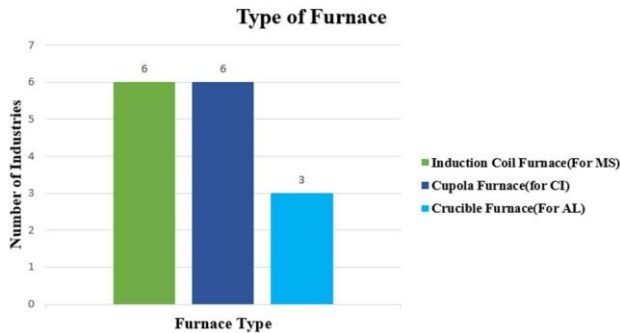


Figure 1: Current Scenario of Jashore LE industry.

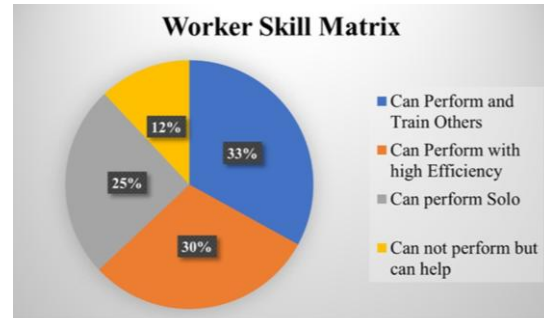


Figure 2: Current Scenario of Jashore LE industry.

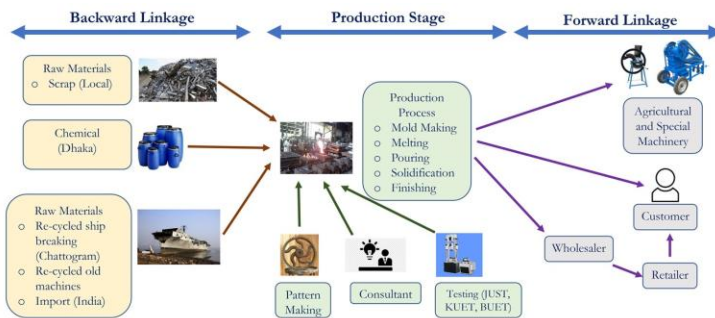


Figure 3: Current scenario analysis with value chain map.

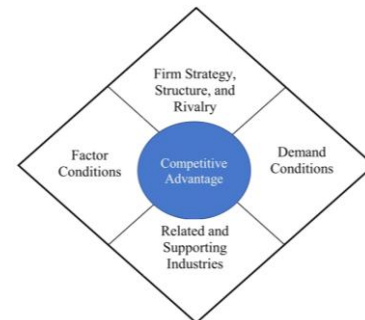


Figure 4: Current scenario analysis with Porter's Diamond Model.

From the SWOT analysis, Strengths include high demand and local availability of raw materials. Weaknesses involve a lack of skilled pattern makers, testing facilities, and marketing. Opportunities exist in developing skilled labor and improving quality for exports, while threats include scarcity of high-grade steel, high employee turnover, and lack of expertise. Though Jashore Light Engineering Cluster holds significant potential, the adoption of new technology is slow. The workforce primarily relies on outdated methods and lacks knowledge in testing, heat treatment, and productivity enhancement. Moreover, there has been little effort to explore new markets or products. This study aims to identify technology and skill gaps while offering recommendations with various lean-kaizen-based approaches to address them and unlock the cluster’s potential.

References

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