Finding Out the Issues Behind Predicament of Sugar Industry in Bangladesh: A Case Study on Rajshahi Sugar Mills

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Abstract

The sugar industry in Bangladesh, historically a linchpin of its economy, has confronted significant challenges in recent years, experiencing sustained losses that affect its ability to contribute substantially to the nation's burgeoning economic landscape. This study is a dedicated effort to dissect the root causes of the sector's current predicament, utilizing robust research methods. Primary data and information have been meticulously gathered from Rajshahi Sugar mills, forming the basis for a thorough analysis employing statistical tools such as fishbone diagrams, Pareto charts, and 5 why root cause analysis. The results of this analysis unequivocally point to a pervasive lack of raw materials as the primary culprit behind the sector's downturn. Additionally, the application of these analytical methods has unearthed other contributing factors that compound the challenges faced by the sugar industry in Bangladesh. Beyond merely highlighting these issues, the study takes a proactive stance by recommending specific corrective actions to address the identified problems. By presenting a comprehensive picture of the sector's struggles and proposing tangible solutions, this research aims to catalyze the revitalization of the sugar industry in Bangladesh. The proposed measures, rooted in a thorough understanding of the statistical analyses, aspire to position the sector for renewed growth and a more substantial role in the nation's economic narrative.

Keywords
The root cause, Fishbone Diagram, Pareto Analysis, 5 why Analysis.

1. Introduction
Bangladesh has been growing sugarcane since very ancient times to produce sugar. In the 16th century, Bengal was widely recognized for its high-grade sugar. Every year, the East India Company exports significant amounts of sugar from Bengal. In 1795, the volume was 32807.44 metric tons, and in 1805, it was 132966.72 metric tons. The sugar industry started in Bangladesh in 1933, and 17 sugar mills were developed between 1933 and 2004. Bangladesh Sugar and Food Industries Corporation (BSFIC), which reports to the Ministry of Industries, oversees the sugar sector. A few years ago, sugar industries played a vital role in the national income of Bangladesh. But now the industries are running with losses. For this reason, recently the government shut down some sugar mills and the rest of the mills are running poorly. BSFIC Chairman Sanat Kumar Saha noted that the mills had been losing money for a long period due to a variety of factors, including decreased sugar mill output capacity. As a result, the factories are being closed for the time being as part of an effort to 'reform and modernize' industry. Speaking with a few managing directors, it was discovered that the letter ordering the shutdown of sugar mill output made no mention of any intentions for reform or modernization. They believe that even if production is suspended, they can avoid losses worth 'crores of takas' by retaining the current compensation structure. Fifteen state-owned sugar mills have been losing roughly Tk 10 billion per year due to a variety of factors such as excess personnel, decaying machineries, a lack of raw materials, rising interest rates on long-term bank loans, and the suspension of production for nearly 10 months of the year. For these reasons, white sugar produced in private refineries sells for Tk 60 to Tk 80 per kg, whereas sugar produced in government mills sells for Tk 250 to Tk 300 per kg. As a result, the indebted firms are having difficulty repaying their

loans to sugarcane farmers on time. The sugar mills lost Tk 9.7 billion in fiscal year 2019-20, according to BSFIC. The total loss over the last five years was Tk 39.76 billion which is a massive loss.

Sugarcane is grown in huge amounts in Rajshahi, making it a widely available material in the area, prompting the establishment of a sugar mill. Since 1965-66, the sugar mill has contributed significantly to the country's national GDP. But now the mill is facing a huge loss. As a result, confusion has risen about Rajshahi sugar mill either the mill has reached its maturity stage and is ready to enter the decline stage or the mill is facing a lack of facilities and necessary steps. There must be several factors which are responsible for this situation. To optimize the revenues of this sugar mill, it is necessary to analyze the situation better and try to find out the factors as well as the main cause behind it then appropriate techniques must be implemented.

Ideally, Sugar mills in Bangladesh can reach their best condition by using all resources properly. Having all resources in place and handsome management of them can set a pillar in this desired path. In reality, the sugar mills have been facing a massive loss for some years. It seems like the industry has reached its maturity period and only decline remains. There must be a lack in sectors such as man, machine, material, method, management, and many more. A suitable investigation of the reasons under the above sectors for which the industry has faced problems and profit declines and some new strategies to cope with can help this out.

1.1 Objectives

This study is a bi-objective statistical analysis of the problems faced by sugar industries in Bangladesh. The study intends to explore the complex problems that have been hindering the sugar business, carrying out an extensive analysis to identify the different obstacles it faces. The report aims to shed light on the complex web of issues facing the business by carefully examining these concerns. The research next attempts to determine the underlying cause or fundamental cause that serves as a pivotal point in intensifying the difficulties that have been detected via the application of rigorous investigative procedures. The two objectives are unfolded like this.

a) To find out the problems that the sugar industry faces.
b) To identify the root cause among them.

The dual objectives are designed not only to provide a holistic understanding of the issues plaguing the sugar industry but also to isolate the pivotal factor that, once addressed, could potentially pave the way for effective and targeted solutions, fostering the revitalization of the sector.

2. Literature Review

Deregulation of the sugar industry in Australia could be seen as part of a process in which government policies helped facilitate capital accumulation by large transnational firms and large land-based enterprises (Robinson, 1995). Restructuring of the industry, partly in response to deregulation and partly through the continuing international farm crisis, is seen as favoring large growers. The examination of the management practices in Kenya's sugar industry focuses on the politics that pervade the entire system. It concludes by appointing industry managers based on patron-client relationships. This breeds graft and inefficiency (Wanyande 2001). The internal authorities should focus on improving the management capacity of the factories. An innovative approach to 'whole of business' analysis has resulted from an eight-year partnership between the Bureau of Sugar and Resource Consulting Services Pty Ltd (Hanlon1 & Mcmahon2 2001). Traditional benchmarking (or comparative analysis) in the sugar industry has been confined to cost-generally stopping at gross margin analysis. The study identifies major problems faced by the Fiji sugar industry and proposes solutions to them. Internal and external issues such as declining productivity both in the field and the factory are considered (ReddyN2000.).

The paper proposes that the best solution out of the six is to implement the sugar industry's strategic plan developed in 1997. The researchers worked on 'unity of purpose' because they found conflict over land in the Fiji sugar industry. Actually, the conflict has escalated due to misinformation, incomplete information, as well as political expediency between the stakeholders. That is why they tried to provide methods for reducing the conflict (Lal & Reddy 2003). The study includes the problems of both the sugar mills and sugarcane growers of Bangladesh. It mainly focuses on the major problems mentioned by the growers, which are the corruption of mill staff and the delay in taking delivery of canes at the mill gate (Zaman et al. 2006). The paper has given many solutions, but none of them are final or prioritized, so it fails to give a definite solution. The competitiveness of the sugar industries in Pakistan is analyzed in a study which concludes that the sugar industry of Punjab had the advantage in the quantity of sugar production (Khushk, 2015). The sugar industry of Sindh had the highest advantage in the Effective Tax Rate (ETR) of sugar per

ton of sugarcane. The study suggests combined efforts of the government and sugar mills are needed for the adoption of high sucrose recovery varieties. In this article, an idea about how the coconut industry could be developed is tried to be represented here. The Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is used to give the recommendations (Abidin Umar, 2000.). For the internal environment industry, strength and weakness are found, and for the external environment industry, opportunity and threat are found as strategic factors. The study attempts to examine the present status of the sugar industry in Punjab. It also attempts to identify the key challenges facing the sugar industry (Randhawa & Gupta, 2014). The study is based on secondary sources of data from various sources, including government reports, industry publications, and socio-economic surveys. Profitability ratios are useful measures of the overall efficiency of a business.

The analysis also reveals whether the financial position of the company has been improving or deteriorating over time. A profitability ratio analysis will not be complete by computing return on equity (ROE) but must examine factors that have an impact on ROE (Praveena et al., n.d.). An analysis of the Cuban sugar industry has shown that there are good technical, economic, and environmental indicators for it to become a viable business opportunity in the country (Suárez Erenio et al., 2016). It has been designed and plotted a diagram to apply as a Heuristic Evaluation Procedure to business proposals in the sugar sector. For the Swazi sugar industry, a study has found that smallholders do not get the opportunity so they can produce sugarcane. For these reasons, they were affected badly in producing sugar, and Swazi faced a huge loss. The study suggests that smallholders should get support from the state to achieve a good economy of scale (Terry & Ogg, 2017). Kenya's sugar industry has seen repeated problems with the management of liquidity and corporate governance (Waswa et al. 2018).

Aggressive liquidity management is associated with higher corporate value. When a firm is unable to pay its debts, it is illiquid, i.e., unable to move in or out of business. In the study of Hasanuddin University in Indonesia, they identified the main problems in the sugar industries of their country as reduced sugarcane field areas and productivity, lack of quality varieties, and farm efficiency (Sulaiman et al. 2019). The main problems they find are reduced sugarcane field areas and productivity, a lack of quality varieties and farm efficiency. Sudan could lead the African continent with the expansion of its sugar industry. The factors that have stunted the pace of its development are its lower production and poor waste management. This study is aimed at identifying the factors that affect sugar productivity and its impact on the environment (Ibrahim, 2020). The main cause being investigated for the low level of productivity of the sugarcane industry is the lack of employee engagement. The authors tried to work on the factors that affect employee engagement in order to increase productivity (Moletsane et al. 2019).

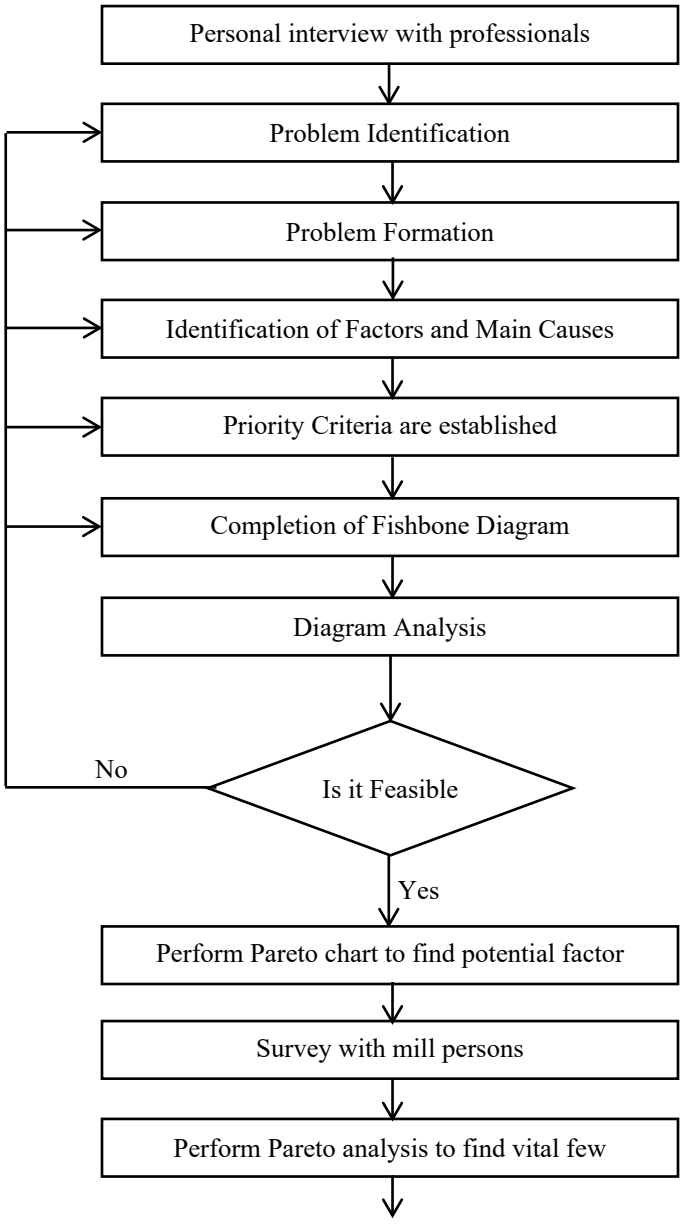
3. Methods

Cause effect analysis or fishbone diagram, Pareto analysis and 5Why analysis are the three methods that have been used to obtain the given objectives.

Visiting the problem field ‘Rajshahi Sugar Mills’ physically and performing a personal interview round with the experts regarding sectors such as production, operations, and management unit, Workers, and Farmers. After listing their valuable opinion, we have categorized the information to construct a fishbone diagram. Then a table is created with the ‘5Ms’ used in the fishbone diagram to make the diagram easy to understand. The number of causes under each factor is counted and a Pareto analysis to find out the most dominant factor among the ‘5Ms’. The most dominant factor in determining. A survey question is created with the causes under the most dominant factor to find out the main cause. The survey responses are collected from people directly related to sugar production. After getting the responses from the person-to-person survey, the results are listed in an Excel sheet to do further calculations. With the data, again a Pareto analysis in conducted to find out vital few from the causes, and the root cause is also determined**.** At last, a 5why root cause analysis is performed into three segments to check the feasibility of the findings; some corrective activities are also suggested.

The whole process from data collection to obtaining the final result is summarized in the following steps and the help of a flowchart:

a) Visiting the problem field 'Rajshahi Sugar Mills' physically and perform a personal interview round with the experts of regarding sectors such as production, operations and management unit, Workers, Farmers.
b) After listed their valuable opinion, we have categorized the information in order to construct a fishbone diagram.
c) Then a table is created with the '5Ms' used in the fishbone diagram to make the diagram easy to understand.
d) From the number of causes under each factor is counted and perform a
e) Pareto analysis to find out the most dominant factor among the '5Ms'.
f) From the most dominant factor in determined.
g) A survey question is created with the causes under the most dominant factor to find out the main cause. The survey responses are collected from people directly related to sugar production.
h) After getting the responses from the person-to-person survey, the results are listed in an Excel sheet to do further calculations.
i) With the data again a Pareto analysis in conducted to find out vital few from the causes and the root cause is also determined.
j) At last, a 5why root cause analysis is performed into three segments to check feasibility of the findings; some correctives activities are also suggested.



5why analysis with corrective action

Figure 1. Solution Flow Chart

4. Data Collection

In order to comprehensively understand the challenges facing Rajshahi Sugar Mills, an inclusive approach was adopted through personal interviews with various stakeholders, encompassing the production unit, management, operations, suppliers, workers, and farmers. This multifaceted engagement aimed to gather necessary data by delving into the diverse perspectives associated with the sugar mill. Following these interviews, a meticulous process of data organization ensued, leading to the categorization of identified issues into the renowned "5Ms" framework: Man, Machine, Method, Management, and Material. This structured approach facilitated the construction of a Fishbone diagram Figure 2, providing a visual representation of the interrelated factors contributing to the challenges faced by Rajshahi Sugar Mills.

To augment the insights gained from interviews, a broader survey was conducted, involving 115 participants both inside and outside the mill. This survey aimed to supplement the qualitative data obtained from interviews with quantitative perspectives, thereby offering a comprehensive understanding of the issues at hand. The combined findings from interviews and surveys serve as a robust foundation for strategic analysis and potential solutions, fostering a holistic approach to address the identified challenges within Rajshahi Sugar Mills.

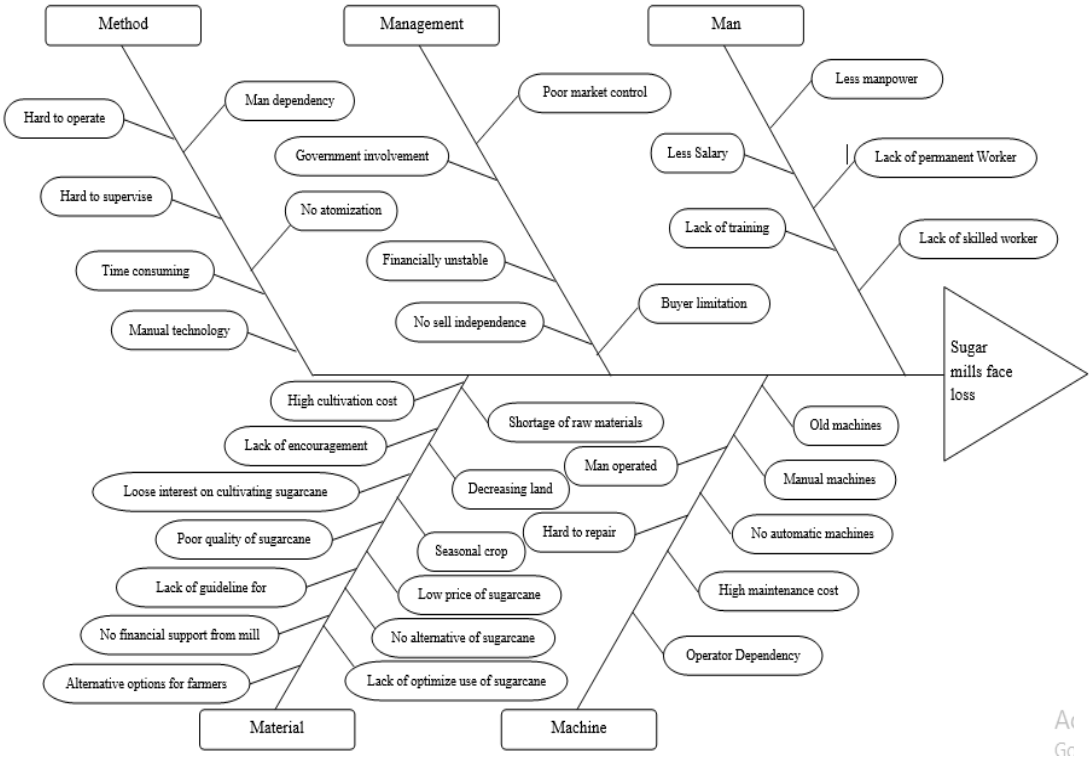


Figure 2. Fishbone diagram

5. Results and Discussion

This section contains data that are collected through personal interview round with the professionals of Rajshahi sugar mills. The data are summarized in a fishbone diagram. Then with the help of fishbone diagram, Pareto chart as well as a 5why analysis, the solution has been obtained.

5.1 Numerical Results

In this study, the reasons for facing loss of sugar industry in Bangladesh for some years have been found. Here three root cause analysis techniques are used to determine the vital issues. The fishbone diagram has determined the most dominant factor 'Material' among the 5 factors. Then with the help of Pareto analysis four major causes such as shortage of raw material, sugarcane being the only raw material and also a seasonal crop, as well as low price of sugarcane are detected having a percentage of 17,16,13 and 11 respectively. The 'shortage of raw material' is defined as the main cause for having the largest frequency of 17%. To check result accuracy 5why root cause analysis with three questions or Why is tried and it also ended up showing shortage of raw material as the root cause of the problem. Some corrective actions are also suggested from the root cause analysis.

5.2 Graphical Results

After knowing the factors and relative causes from Figure 1 that are responsible for the losses in Rajshahi Sugar Mills, the next step is to find out the potential or dominant factor among the five M factors. To do this a Pareto analysis is performed with the categories of fishbone and their relative quantity of causes. The Pareto chart in Figure 2 shows that the most potential and dominant factor is "Material". "Material" is the highest cause of facing loss with 36%, followed by machine, method, man, and management with 19%, 17%, 14%, and 14% respectively.

According to Pareto chart theory, the first 80% means the causes of the problem. In this case, the first 80% of losses are caused by material that indicates this category needs improvement.

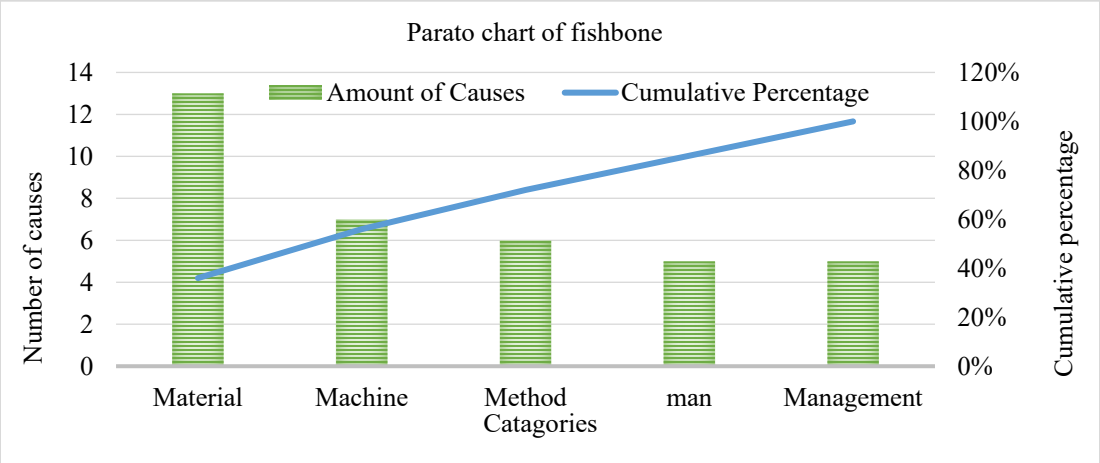


Figure 3. Pareto chart for determining dominant factor

After the identification of 'Material' as the most dominant factor, it is time to find out the 'vital few' causes among the 13 causes included in material section shown in Figure 3.

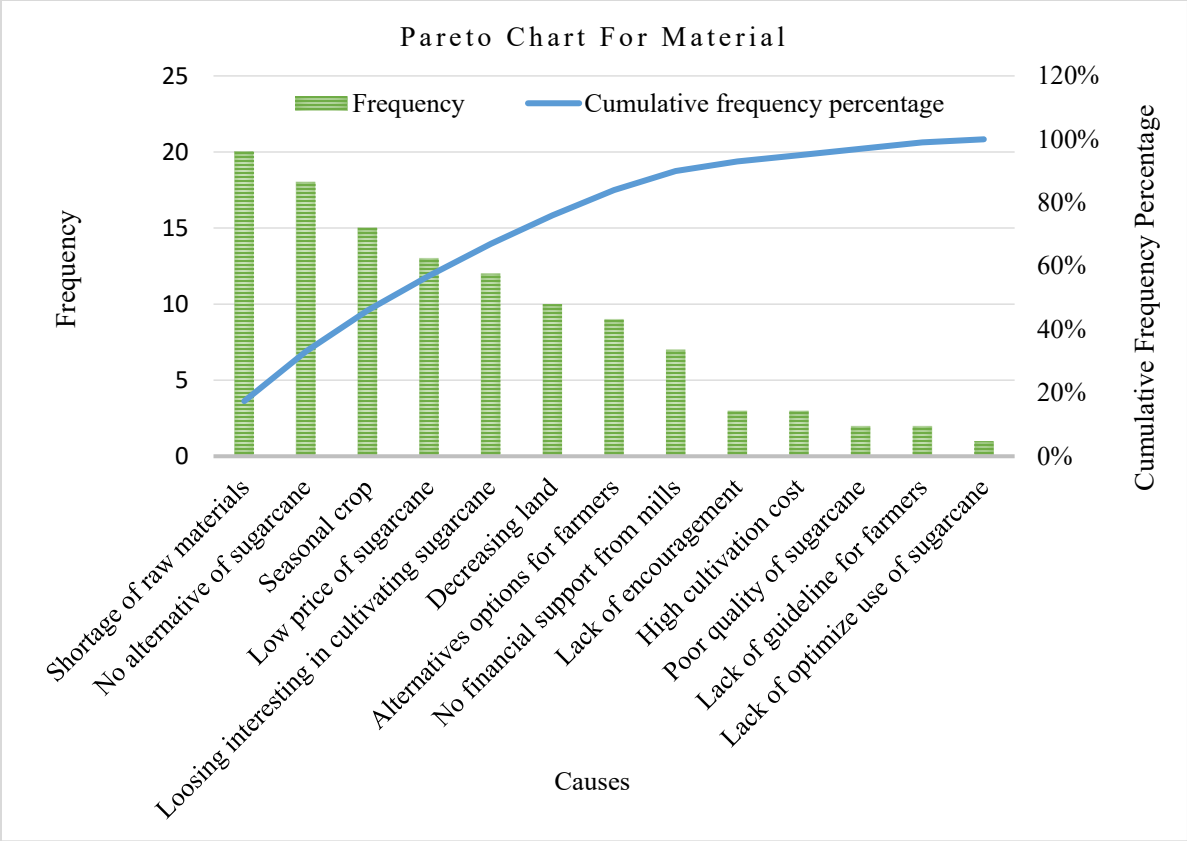
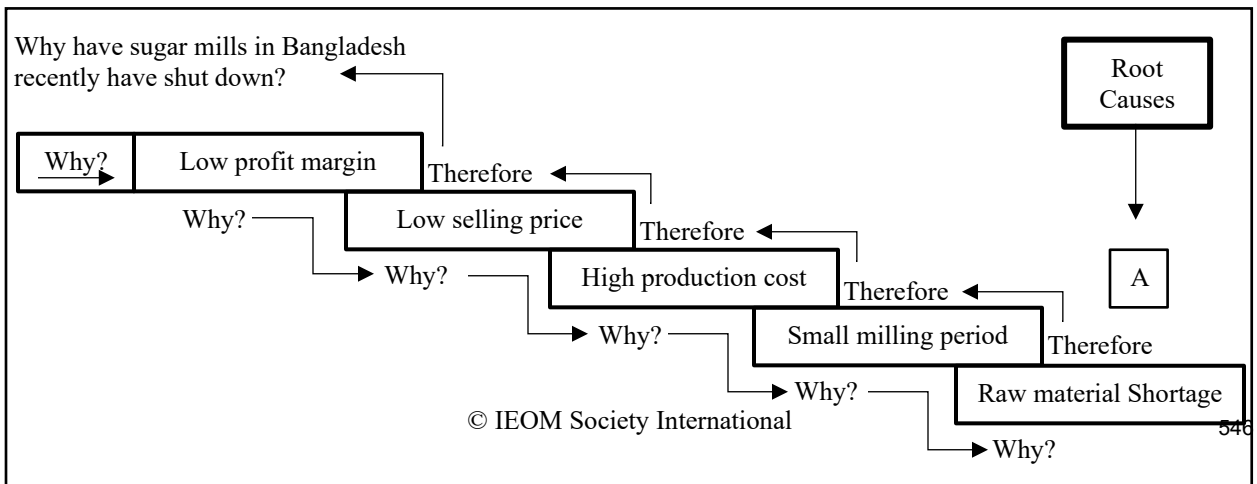


Figure 4. Pareto Chart for root cause identification

After the identification of 'Material' as the most dominant factor the study wants to find out the 'vital few' causes among the 13 causes included in material section shown in Figure 1. By performing another Pareto analysis shown in Figure 3 four vital causes such as shortage of raw material, no alternative of sugarcane, sugarcane being a seasonal crop and low price of sugarcane are identified. Among the four causes shortage of raw material is considered as the most vital cause having a frequency percentage of 17% when the rest are 16%, 13%, and 11% respectively.

To make the observation more accurate another root cause analysis method has been performed method called "5Why" root cause analysis method shown in Figure 5. In this process, the full problem has been divided into three sections of questions. The first one is why sugar mills in Bangladesh is shutting down recently, the second one is why the selling price is low for brown sugar and the third one is why the production cost has become so high than before. After going through the five steps of question and answer finally the root cause for each section is detected which is a raw material shortage, lower selling price as well as high production cost respectively that are completely aligned with the result from Pareto analysis.



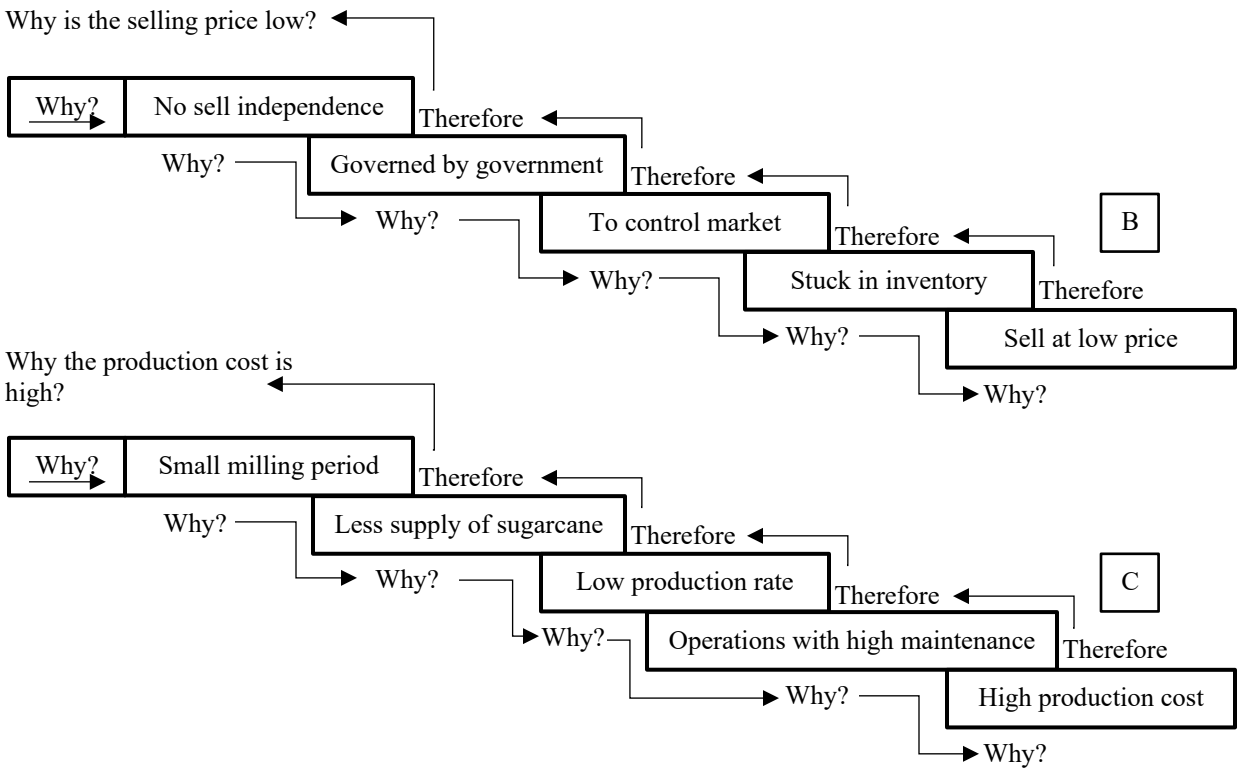


Figure 5. '5Why' root cause analysis

5.3 Proposed Improvements

Table 1. Proposed Improvement

A	B	C
• Take initiative encourage the farmers • Increase mill facilities • Try to invent alternative of sugarcane as it is a seasonal crop • Attempt to grow sugarcane in mill owned area • Provide new technologies and financial help to the farmers	• Should work on market strategy • Try to explore market share • Sell criteria should be improved and restructured	• Try to increase supply • Expand milling period • Reduce maintenance cost

The study has also proposed some improvement for this problem in Table 1. such as taking initiative to encourage the farmers for cultivating more sugarcane, increase mill facilities, try to invent alternative of sugarcane as it is a seasonal crop, attempt to grow sugarcane in mill owned area, provide new technologies and financial help to the farmers, should work on market strategy, try to explore market share, selling criteria should be improved and restructured and so on. The suggestions are quite specific and easy to understand which can make a difference in the present scenario.

5.4 Validation

The primary objective of this study is to unravel the underlying causes behind the recent shutdowns of sugar mills in Bangladesh, with a particular focus on Rajshahi sugar mills as a representative case study. The methodological

approach employed involves the application of statistical analyses, specifically utilizing tools such as fishbone diagrams and Pareto charts with the aid of Excel. Through these analytical techniques, the research aims to extract essential insights into the multifaceted challenges that have led to the downturn of the sugar industry in the country. Rajshahi sugar mills, chosen as a focal point for this investigation, serves as a microcosm for understanding the broader trends and issues afflicting the sugar sector in Bangladesh. By delving into the statistical intricacies of the industry using fishbone diagrams, the study seeks to identify the root causes of the financial losses incurred by sugar mills in recent years. This comprehensive analysis is poised not only to shed light on the current predicament but also to offer practical solutions that can potentially reverse the sector's declining fortunes. The reliance on statistical tools like Pareto charts adds a layer of granularity to the study, allowing for the identification of key factors that disproportionately contribute to the challenges faced by the sugar industry.

The Pareto principle, commonly known as the 80/20 rule, suggests that a significant proportion of effects often stem from a minority of causes. Through the application of Pareto analysis, the research aims to pinpoint these critical factors, providing a prioritized list of issues that demand immediate attention. The study maintains its significance as a potential catalyst for positive change in the sugar sector. The insights garnered from the statistical analyses, even within the confines of the current study parameters, are expected to offer a foundational understanding of the challenges faced by the industry. Moreover, the research endeavors to not only diagnose the issues but also prescribes corrective actions based on the findings. This study represents a concerted effort to bring clarity to the perplexing challenges plaguing the sugar industry in Bangladesh. By leveraging statistical methods and focusing on a specific case study, the research seeks to contribute valuable insights that can inform policy decisions and strategic interventions. Through transparency regarding the study's limitations and a forward-looking approach to future research enhancements, this endeavor aspires to play a pivotal role in the revitalization of the sugar sector, ultimately contributing to the economic growth of Bangladesh.

6. Conclusion

In this comprehensive study, various statistical analysis tools are deployed with the primary objective of discerning the root causes behind the financial losses and subsequent shutdowns plaguing the sugar industry. The analytical framework included the construction of a fishbone diagram to systematically identify the predominant factors contributing to the industry's challenges. Subsequently, a Pareto chart is employed to highlight the critical few or root causes that demand immediate attention. To delve deeper into understanding these root causes, a 5 Why root cause analysis was conducted, unraveling the underlying issues and paving the way for targeted improvements. The research successfully pinpointed the fundamental reasons behind the industry's predicament, serving as the foundation for the proposed solutions. In addition to root cause identification, the study extends its contribution by recommending corrective actions aimed at ameliorating the overall situation. By combining these analytical tools, the research not only diagnoses the problems afflicting the sugar industry but also provides a roadmap for effective and sustainable solutions.

The identified root cause of the challenges faced by the sugar industry is the shortage of raw materials, which significantly affects the entire production process and subsequently drives up production costs. This shortage hampers the mills' ability to produce large quantities of sugar within a short milling period. Compounding this issue is the fact that the industry operates under government ownership, with the selling authority firmly in the hands of governmental entities. The government's intervention in market control further exacerbates the problem, as producers are directed to withhold their sugar stocks for extended periods, anticipating better selling conditions during challenging times. Consequently, when these sugar stocks are eventually released into the market, the oversupply results in a decline in selling prices. In contrast, during times of ample raw material availability in the past, mills could produce significant sugar quantities, enabling them to both store and sell the product at higher market prices. However, in the current scenario of raw material scarcity, the mills face a dual challenge of insufficient production to meet market demand and the inability to store surplus sugar for strategic selling. This intricate interplay of raw material shortages and government market control underscores the complexity of the issues confronting the industry, necessitating a multifaceted strategy to address both the immediate production constraints and the broader market dynamics shaped by government directives.

References

Abidin Umar, Z. The Development Strategy of Coconut Sugar Industry. In *The International Journal Of Engineering And Science (IJES),* (2000)

Hanlon1, D. W. G., & Mcmahon2, G. G. BUSINESS PERFORMANCE ANALYSIS IN THE SUGAR INDUSTRY-A NEW APPROACH. In *Proc. Int. Soc. Sugar Cane Technol* (Vol. 24), 2001.

Ibrahim, T. S. (2020). *LIFE CYCLE ASSESSMENT AND THE PRODUCTIVITY STUDY OF THE SUGAR INDUSTRY IN SUDAN*, 2020.

Khushk, A. M. *ANALYSIS OF SUGAR INDUSTRY COMPETITIVENESS IN PAKISTAN*,2015

Lal, P., & Reddy, M. PROPOSED SUGAR INDUSTRY RESTRUCTURING AND LAND CONFLICT IN FIJI Old wine in a new bottle? Proposed sugar industry restructuring and land conflict in Fiji. In *Pacific Economic Bulletin* (Vol. 18), 2003.

Moletsane, M., Tefera, O., & Migiro, S). The relationship between employee engagement and organizational productivity of sugar industry in South Africa: the employees' perspective. *African Journal of Business and Economic Research*, *14*(1), 113–134, 2019.

Praveena, S., Mahendran, K., & Samsai, & T. *An analysis of the financial performance of sugar industry AN ANALYSIS OF FINANCIAL PERFORMANCE OF SUGAR INDUSTRY IN INDIA*, 2002

Randhawa, G., & Gupta, A. Present Status and Challenges of Sugar Industry in Punjab. In *Prajnan* (Vol. 42, Issue 4), 2014.

Reddy, N. Survival Strategies for the Fiji Sugar Industry 265 Survival Strategies for the Fiji Sugar Industry. In *Fijian Studies* (Vol. 1, Issue 2), 2000.

Robinson, G. M. (n.d.). *Deregulation and Restructuring of the Australian Cane Sugar Industry*, 2010.

Suárez Erenio, G., Sanchez Amaury, P., Valdés Juan Esteban, M., Martínez Amaury, P., Olábazal, R., Suarez, G., Sanchez, P., Valdez, M., Esteban, J., & Martinez, P. (2016). Visión de Futuro. In *Volumen Nº* (Vol. 13), 1990.

Sulaiman, A. A., Sulaeman, Y., Mustikasari, N., Nursyamsi, D., & Syakir, A. M. Increasing sugar production in Indonesia through land suitability analysis and sugar mill restructuring. *Land*, *8*(4), 2019.

Terry, A., & Ogg, M. Restructuring the Swazi sugar industry: The changing role and political significance of smallholders. *Journal of Southern African Studies*, *43*(3), 585–603, 2017.

Wanyande, P. Management Politics in Kenya's Sugar Industry: Towards an Effective Framework. In *Afr.j.polit. sci* (Vol. 6, Issue 1), 2001.

Waswa, C. W., Mukras, M. S., & Oima, D. Effect of Liquidity on Financial Performance of the Sugar Industry in Kenya. In *International Journal of Education and Research* (Vol. 6, Issue 6), 2018.

Zaman, M., Hossain, S. M. I., Zaman, M. A., Rabbani, M. A., & Hossain, M. S. PROBLEMS AND PROSPECT OF SUGAR INDUSTRY IN BANGLADESH. *Progress. Agric*, *17*(1), 283–293, 2006.

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