Strategic Workforce Development: Analysis for Addressing Labour Shortage

A Proposal Report for the BDM Capstone Project

Submitted by

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Declaration Statement

I am working on a Project Title "**Strategic Workforce Development: Analysis for Addressing Labour Shortage**". I extend my appreciation to Quality Instruments and Equipments for providing the necessary resources that enabled me to conduct my project.

I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered through primary sources and carefully analysed to assure its reliability.

Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

I am dedicated to adhering to the information of academic honesty and integrity, and I am receptive to any additional examination or validation of the data contained in this project report.

I understand that the execution of this project is intended for individual completion and is not to be undertaken collectively. I thus affirm that I am not engaged in any form of collaboration with other individuals, and that all the work undertaken has been solely conducted by me. In the event that plagiarism is detected in the report at any stage of the project's completion, I am fully aware and prepared to accept disciplinary measures imposed by the relevant authority.

I agree that all the recommendations are business-specific and limited to this project exclusively, and cannot be utilized for any other purpose with an IIT Madras tag. I understand that IIT Madras does not endorse this.

Signature of Candidate:

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Date: 01/08/2024

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1. **Executive Summary**

    Quality Instruments and Equipments is a company based in Kudal, Maharashtra engaged in the production of pharmaceutical and lab instruments like heaters, dryers, ovens, etc. The company operates in the B2B segment of the manufacturing industry making products tailored to the requirements specified by the users.

    Although currently profitable, the company faces an issue of labour shortage. The company has seen a surge in demand after the pandemic, however, lack of manpower is hindering its ability to produce at a faster pace. A number of orders cannot be produced within the time limit which reduces customer satisfaction. "Skilled" labour shortage makes it challenging for the company to cater to the demand of the pharma industry, suppressing its aspiration to expand into other segments like automobile industry.

    Shortage of skilled and unskilled labour has become an industry wide challenge after the pandemic. Hence, addressing this problem for the long run is essential. Optimizing the internal procedures for example- production, employee training, employee productivity can help tackle the problem. Productivity analysis will be used to identify how efficiently the labour input is being converted to outputs. Additionally, cost benefit analysis will be used to compare and understand the best approach between hiring skilled workers and introducing employee training in the organization. For projecting the future labour needs of the company, regression and time series analysis will be used. The project aims to discover methods which can help the company to boost employee productivity and maximize the output of available manpower in a cost-efficient manner.

2. **Organizational Background**

    Quality Instruments and Equipments, established in 1989, is engaged in the production and export of different kinds of pharmaceutical and laboratory equipment. The owner, Mr. Gaurav Mestry, along with his team is engaged in providing high quality products to the consumers. Some of the key SKU's include Cashew Nut processing equipment, industrial dryers, laboratory incubators, blowers, heating plates, etc.

    The company has two manufacturing units, one in Goregaon, Mumbai and the other one in Kudal, Sindhudurg. The unit in Mumbai has a team of 4 people who work with the clients to create the prototype of the product that suits their requirements. The prototype is then sent to Kudal for manufacturing of the end product. The team in Kudal consists of 13 permanent employees whereas some others are hired on a daily wage.

The company operates daily but the functioning hours depend on the numbers of orders to be produced. The company has gained a huge customer base over the years by ensuring quality, durability and better performance of the products. The annual turnover of the organization is around 2-5 crores. Major clientele of the company includes Pharma Industries, Laboratories and agro-processing industries in India as well as in Dubai and Africa.

3. **Problem Statement**

   3.1 Labour Shortage- There is a shortage of skilled and unskilled labour in the industry which hampers the production process. Analysis of the production process would give helpful insights for efficient resource planning.

   3.2 High Costs of Skilled Labour- Due to this industry wide shortfall of labour, hiring skilled labour comes at a very high cost reducing the profitability. Analysis of the productivity i.e. output per worker would be required in order to maximize the profits from available inputs.

   3.3 Employee training Vs Skilled Employee Recruitment- The company seeks to understand whether it is beneficial to provide skill training to employees or hire skilled employees from the market. A comparative analysis between the costs incurred and risks associated with both the approaches would be conducted.

4. **Background of the Problem**

The company specializes in producing on demand products adhering to the unique specifications of each customer instead of bulk production of sell-standard products. All the components required for manufacturing the finished product are made inhouse. Hence the production process is extensive and requires manpower in large amounts. The company sees a surge in demand during the months of June, July, August. But the shortfall of labour makes it difficult to fulfil all the orders on time.

The labour supply in the manufacturing industry has seen a decline after the pandemic due to the gap between skills of available workers and skills required to adapt to the changing technology. Understanding and catering to the particular requirements of each customer requires advanced expertise in the field. Availability of such skilled workforce has reduced after the pandemic. Hence, hiring has to be done at a much higher cost than before. Moreover, the daily wage workers tend to leave during the months of monsoon to tend to

agricultural activities in their native places. They also exit the organization if they receive a higher wage rate at a different manufacturing unit. This exacerbates the problem further. Upon having a talk with the owner, the organization was ambivalent between two decisions for addressing the labour shortage issue- Hiring new skilled employees at a higher cost or incurring costs to provide skill training to the existing workforce. The organization wants to understand which approach could prove more profitable as both the approaches have potential risks associated with them.

5. **Problem Solving Approach**

A problem-solving approach that primarily focuses on addressing the labour shortage problem is essential to overcome the issues faced by the Quality Instruments and Equipments.

Methods used for Analysis:

1. Productivity Analysis- One of the objectives of the business is to maximize the productivity of the existing workers. Hence, conducting a productivity analysis will prove useful in understanding the output produced by the current workers. A productivity analysis report measures the efficiency of an organization with respect to inputs such as labour, capital and material. This will help identify whether the current workforce is being utilized to its maximum potential.

2. Cost Benefit Analysis- As the company wants to analyse the benefits and risks of two approaches- employee hiring vs employee training, a cost benefit analysis would be useful. A cost benefit analysis takes into account the potential benefits and risks of implementing one strategy against the other. This analysis helps conclude feasible solutions and the profitability of those solutions.

3. Regression and Time Series Analysis- Through a time series and regression analysis of trend of growth of the organization, it will become possible to estimate the future labour needs of the organization. This will take into account various factors like sales, production volumes, labour inputs as well as cyclical trends in the availability of labour.

Intended Data Collection

1. Data about Employees- The data pertaining to the existing employees would be required to conduct a productivity analysis. Since the formula for efficiency is Efficiency = Output/Input, the output data which includes production, sales and revenue data and the inputs which in this case is labour and raw material would be collected. The payroll data would also be collected.

2. Estimates regarding cost of skill training and hiring skilled workers- To conduct a cost benefit analysis, the data regarding the estimated cost of skill training programs for employees and cost of hiring skilled workers would be required. These estimates can be obtained from the past data of the company if it has implemented any of these strategies before. If not, an educated estimate of these costs can be taken from the owner. The demand of these skilled workers needs to be estimated to understand when the company needs more workers. This can be estimated with the help of the sales trend of the company.

Analysis Tools

1. Excel- As the data of the company is stored in Tally, it would be required to extract it into Excel in order to work with it. As measuring the efficiency of the organization can be solved as a linear programming problem, using the Excel Solver package is useful.

2. Pandas- Pandas is a great tool to transform and work with large datasets. Also, visualization of charts will be done with the help of seaborn library. Libraries like sklearn will be used to fit regression and time series models.
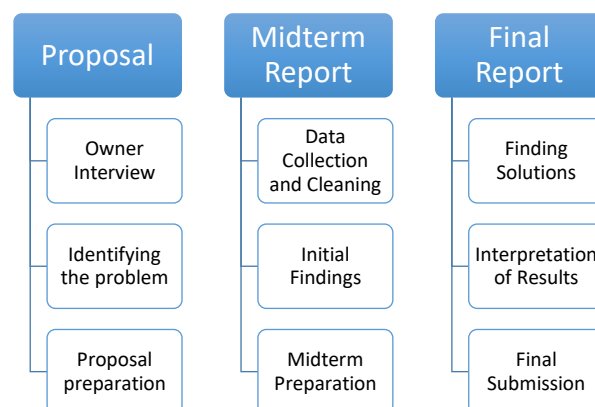
6. **Expected Timeline**

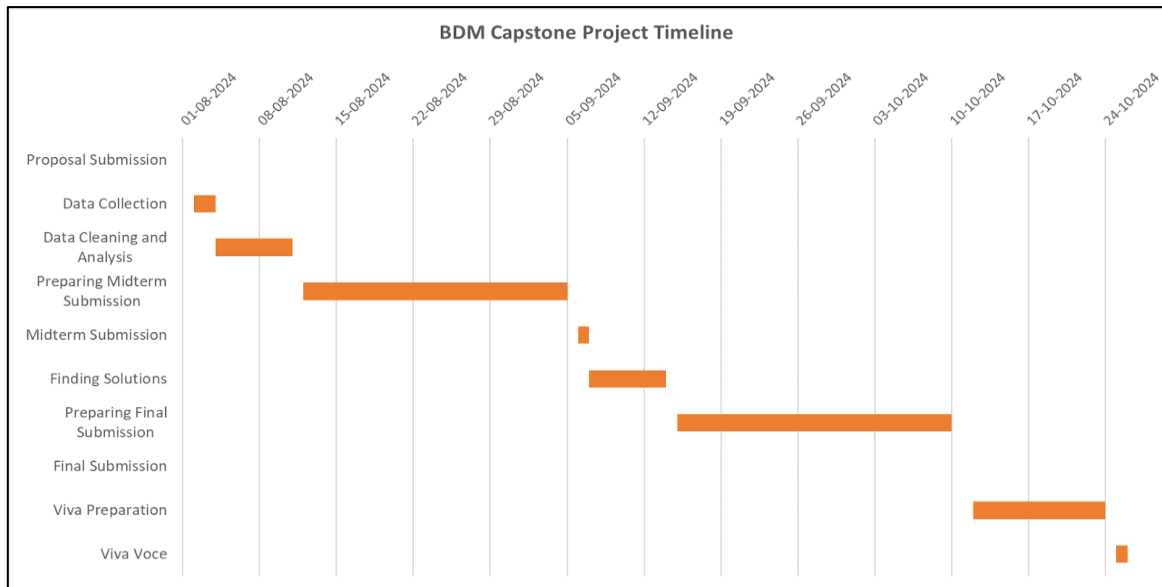| Proposal	Midterm Report	Final Report
Owner Interview	Data Collection and Cleaning	Finding Solutions
Identifying the problem	Initial Findings	Interpretation of Results
Proposal preparation	Midterm Preparation	Final Submission

Figure 6.1 Work Breakdown Structure

Figure 6.2 Gantt Chart

7. **Expected Outcomes**

7.1 Obtain a comprehensive understanding of the company's labour demand by analysing the timing and quantity of both skilled and unskilled labour required.

7.2 Assessment of the impact of labour shortage on the productivity and efficiency of the organization.

7.3 Choosing a cost-effective strategy between employee training and employee hiring in order to address the problem of labour shortage.

7.4 Estimating future labour needs of the organization based on sales trends and business growth.