IIT Madras

BUSINESS DATA MANAGEMENT

CAPSTONE PROJECT {Proposal}

NAME - ANAY

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SOLVING PROBLEMS FACED BY RASTOGI MOTORS

EXECUTIVE SUMMARY

The proposed project aims to address the challenges faced by automobile spare parts shop. The project will involve the collection and analysis of data related to the shop's inventory management, sales performance and other relevant factors. The project's objective is to identify areas of improvement and recommend solutions to enhance shop's profitability. The project involves collecting data that will be analyzed using statistical tools to identify trends and patterns. Based on the results solutions will be presented to shop owner. Solutions will include inventory management, pricing strategy and customer service.

In summary the project's recommendations will be based on data-driven insights. The proposed project will have a positive impact on the shop's profitability and customer satisfaction.

ORGANIZATION BACKGROUND

Rastogi Motors is an automobile spare part and service provider located in **Delhi, Kashmiri Gate**. **Shyam Rastogi is** the proud owner of the shop. Although he rarely visits the shop due to his old age and all the management is done by his son **Himanshu Rastogi.** When a customer visits the shop with their specific issues such as a broken part or a malfunctioning system in their vehicle the technician performs an initial inspection of the car to diagnose the problem and recommend the appropriate course of action. Then the customer is provided with an estimate of the cost of the repair or replacement and an estimated timeline for completing the work. While the shop is over **27 years old,** they are facing some unique challenges due to cut throat competition and growing EV market. Despite the shop's long-standing reputation, it is facing several challenges that have affected its profitability and customer satisfaction. This resulted in a decline in sales for the shop. Another issue is the shortage of skilled labor in the industry. Finding qualified laborers to work at the shop has become increasingly difficult, making it challenging to keep up with demand and maintain satisfactory customer service.

PROBLEMS

PROBLEM-1

INVENTORY MANAGEMENT - The shop facing issues such as uncertain demand patterns, inaccurate inventory forecasting. As a result, shop is experiencing issues such as stockouts, excessive inventory, low turnover rates, and increased costs. Additionally, these inventory management problems have a negative impact on the revenue as dissatisfied customers may switch to other competitors in the vicinity with better inventory management.

BACKGROUND: -The shop lacks effective systems for analyzing sales data, market trends, and customer behavior to forecast demand. The shop owner does not fully realize the significance of implementing these crucial steps in inventory management.

SOLVING APPROACH - Sales data will be collected and analyzed to understand the demand patterns for various products. This will help identify high-demand and low-demand products and the inventory levels will be adjusted accordingly.

1) **Line chart:** line chart to track inventory levels for each product over a specific time period. This will help in identifying patterns in demand and the inventory will be adjusted accordingly.
   (The x-axis of the line chart represents time and the y-axis represents the inventory level) Inwards/Outwards and closing balance inventory data of 3 months is collected for this purpose

2) **Forecasting model**: After making line chart, forecasting model will be made to predict future inventory levels based on the data. Forecasting tools such as moving averages or exponential smoothing will be used according to the line chart formed. The forecasting model will help in identifying potential stockouts or excess inventory and stocking will be adjusted accordingly.

(Moving average of inventory levels will be calculated by taking the average of the previous time duration of inventory levels. This moving average and adding trend factor to the moving average will give the forecast of inventory.)

PROBLEM-2

Workforce Capacity and Demand- The most important thing after the inventory is service provided by the shop. Due to cutthroat competition and uneven demand pattern of skilled workers leads to waiting time and eventually bad customer experience or the hired workers are free for most of the time of the day which is wastage of resources. Aim here is to manage of the workforce available such that it maximizes the output with minimum of workforce.

BACKGROUND: -The shop's workforce management issues are mainly from unpredictable demand, skill gaps and intense competition. These factors lead to customer dissatisfaction. Owner is aware of the problem but is unable to resolve it.

SOLVING APPROACH – Data of daily wages given to workers will be analysed. Fixing appointments to maximize the output in work time of the worker. Work available in shop against the people required to do it within required time will be analysed.

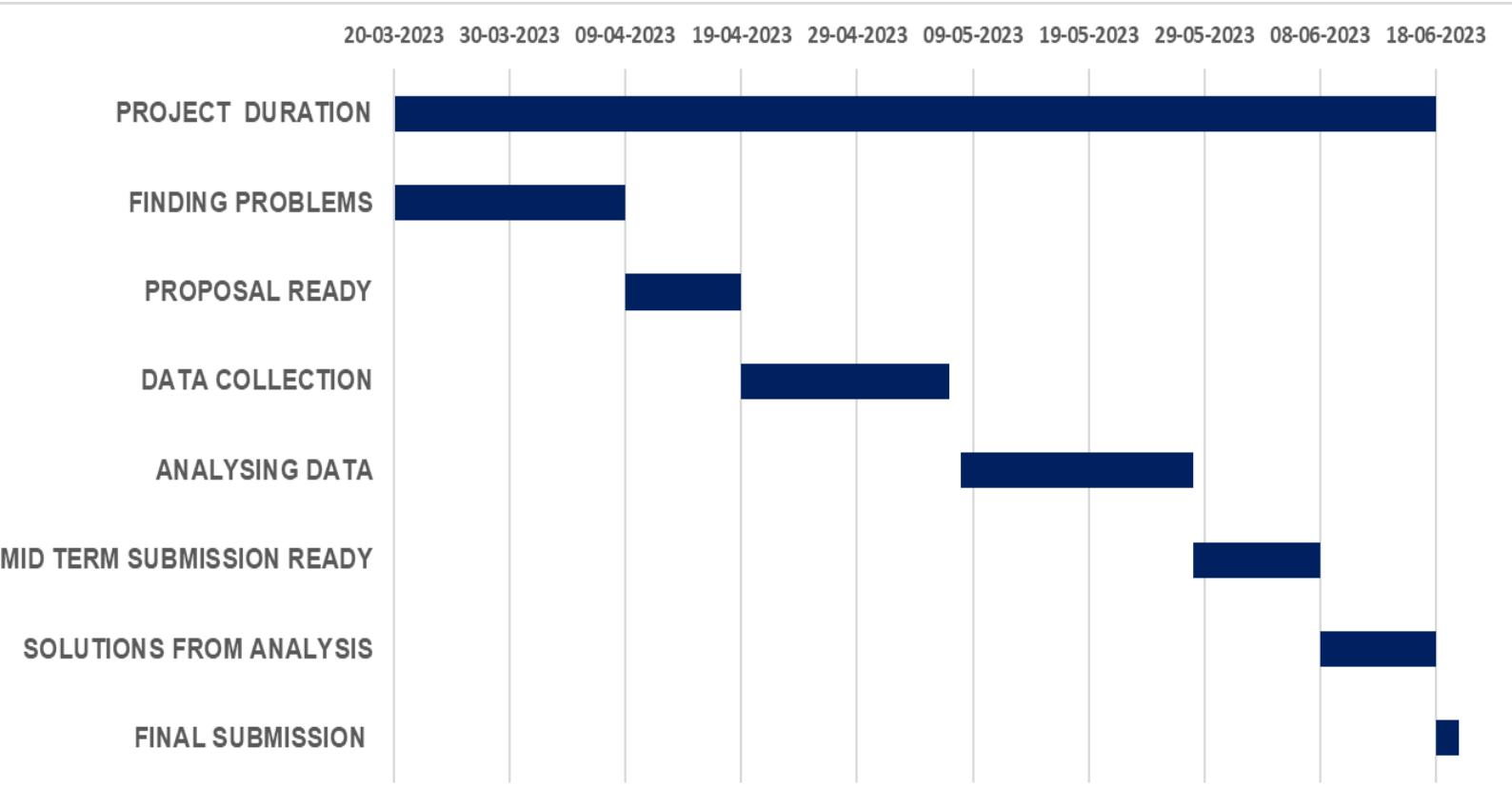
1)Scatter Plots - Scatter plots will be used to analyze the relationship between workforce capacity and demand. This will help identify periods with over capacity or under-capacity and adjust the workers needed accordingly. (The x-axis of scatter plot will represent the number of workers available during a given time period. The y-axis will represent the number of customers in same time period.)

Data of number of customers per month with additional workers hired in every month and wages given to them (for 6 months) will be collected for this solution.

2)Solver-Solver will be used to optimize problem of workforce capacity and demand. It will help to find the optimal staffing levels at different periods of time while considering various factors

Optimization model will be set by defining the decision variables that includes number of additional workers hired during each time period. The objective is the labor cost, which will be calculated based on the number of permanent workers and the number of additional workers hired. Results will be used to identify periods of high demand and adjust staffing levels accordingly.

GANTT CHART



WORK BREAKDOWN STRUCTURE

SOLVING PROBLEMS FACED BY

RASTOGI MOTORS

IDENTIFYING THE PROBLEMS

By talking to the concerned people and shop visit

DATA COLLECTION

All data required for solving problem

DATA ANALYSIS

By statistical tools to identify trends and patterns

INTERPRETING AND PUBLISHING RESULTS

We got from data analysis

SOLUTION OF PROBLEMS FOUND

Suggest them to owner

EXPECTED OUTCOME

With proper statistical tools and analyzing data, **INVENTORY** will be made more accurate to demands which will avoid overstocking or understocking of goods. This will help to improve cash flow.
Optimizing the workers time and removing extra people will ensure that employees are being used in the most effective way possible. This will reduce wastage of resources and improve overall efficiency.