

Optimization Analysis for Vendor Delivery Services

A Proposal report for the BDM capstone Project

Submitted by

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Declaration Statement

I am working on a Project titled "Optimization analysis for vendor delivery services". I extend my appreciation to Shree Sai Facilities, 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 from primary sources and carefully analyzed 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 principles 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 understand that all recommendations made in this project report are within the context of the academic project taken up towards course fulfillment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.

Signature of Candidate: **(Digital Signature)**



Name: Bhavya Saxena

Date: 4th October, 2023

1 Executive Summary and Title

In this project we have focused on a vendor company associated with Blue Dart Couriers Ltd. located in New Delhi. The business is B2B and deals in the segment of courier delivery services across India.

The major business issues that the organization is facing are related to a very nominal profit due to inefficient analysis of the correlation between employees hired and packets received per branch resulting in less profit than which can be obtained.

The issues will be addressed by analyzing the data via different analytical approaches to obtain a fruitful outcome. (Describe some of the approaches that you are planning to replicate in your project.)

The Issues in this project focuses on the optimization to achieve a proper co-balance between the number of employees assigned to a specific branch and the number of packets needed to be delivered on that site and will be addressed by analyzing various data sets and data provided by the organization using different analytical approaches to obtain a more profitable outcome.

The expected outcome helps the organization increase its efficiency and hence helps increase the overall profitability of the organization.

2 Organization Background

The organization I'm working with is Shree Sai Facilities, A service provider company whose major client is Blue Dart Express limited. It is an Indian based organization started in 2012 and head quartered in New Delhi which has branches all over India such as Jaipur, Ajmer, NCR region. The organization sources/recruits man power and manages payrolls, legal compliances of the staff for Blue Dart in of its various branches for delivery services. The employees are hired on salary basis in contrast to per packet hiring (another common hiring strategy among delivery service sector), the company also hire one supervisor in each of its branches to manage, collect data and report to the higher ups of the organization.

3 Problem Statement

- 3.1 Problem statement 1: To research/analyze and get an optimized solution to maintain a good enough balance of employee hiring in a particular branch with respect to packets being assigned resulting in maximization or increase of the profit.
- 3.2 Problem statement 2: To provide a template along with an understanding to the organization for calculating how many employees should be sufficient on basis of packets being assigned to that branch depending upon various factors such as route difficulty, weather conditions specific to that branch.

4 Background of the Problem

The organization currently has hundreds of employees scattered among various branches on basis of that branch's need and the employees in total deliver nearly thousands of courier packets on daily basis all over India. The organization currently estimates the need of employees in a specific branch by taking an estimated average number of packets being delivered by any given employee in that branch and multiplying it with number of working days in month (to get total number of estimated packets) and dividing this from number of packets needed to be delivered in that month:

$$\frac{\text{packets assigned to that branch in one month}}{\text{Estimated average number of deliveries} \times \text{Total number of working days in a month}}$$

For a better understanding you can go through the following example:

Say, packets assigned to that branch in one month – 30000

Total number of working days in a month -25

Estimated average number of deliveries in a day by any given employee – 60

So, the estimated packets delivered in a month will be

“Estimated average number of deliveries” X “Total number of working days in a month” = **25 X 60**

Now using this data, the number of employees needed will be packets assigned to that branch divided by estimated packets delivered in a month: **30000/ (25 X 60) = 20**,

Hence, at least 20 employees will be kept in that branch and along with these the company keeps 2-3 employees as backup in case of holidays taken by the staff , however the organization is finding this method as obsolete and less efficient as the estimated average number of deliveries will not be met by each of the organization's employees including the supervisor affecting the profit as each extra employee in that particular branch leads to extra cost whereas he/she can be shifted to other branches where an increase in number of employees would result to greater profit.

This problem restricts the organization in achieving its full potential and efficiency in terms of maintaining stability across all of its branches. The organization has also faced losses in the past due to this problem and are currently in need of a solution.

By analyzing and finding a solution we will be helping the organization in cost cutting and increasing the profit and efficiency of the organization helping them to reach a step higher to their targeted goals.

5 Problem Solving Approach

The problem defined in the above section affects the per month profit of the organization regarding to specific branches therefore also resulting in the overall total profit and efficiency of the organization to take a hit as well, the problem is mainly due to the current but obsolete method of finding out how many employees are needed in that particular branch but can be due to other unidentified reasons as well. However, an insight in this as well as a recommended solution could boost the organizations capacity. To Start with the resolution of this problem we would be needing the past data of the organization of at least 6 months including the following variables –

- how many employees were there in each month,
- packets assigned to branch,
- actual number of packets delivered in that month,
- profit incurred from that branch.

Extra data would also be welcome as it would provide further insights to the resolution of the problem, data for the duration of 6 months or more will be required from the organization. The organization has agreed to share their data but there will be a requirement of contacting each branch's supervisor for the data and further insights, which could lead to further understanding of the problem and its causing factors, Analysis on this data using different graphs and tical methods taught to us in this course can help us to analyze different issues and factors causing this problem and help us in understanding the problem and leading us to build a prominent solution. With insights in the business data such as profit made in each branch and above-mentioned variables, we can make different types of graphs and do analyze them to find a correlation between them enabling us to get a better understanding. Furthermore, once the analysis has been done and if suitable according to the data analysis done, certain kinds of Data science and ML algorithms can be used to create a prediction model to accurately determine the best ratio between number of employees hired and packets assigned to specific branches and would be quite useful to not only Shree Sai Facilities but many more organizations as well which follow a similar model, such as food delivery companies to identify the riders to be assigned in an area based on how many orders are coming from that region on a daily basis with data given.

6 Expected Timeline

6.1 Work Breakdown Structure:

The work will be broken down into week wise sections so that it is easy to determine how much progress have been reached at that point.

- The starting weeks will be given to talk to the organization and hopefully get some data and understanding from them as well.
- The following week will be given to data organizing and cleaning.
- After that we will analyze the data using graphs and prepare mid-term submissions
- Once the midterm has been approved, we would need to analyze further to find the best method or solution
- Once the solution has been found out we would gather the information in presentable manner in order to create the final solution document.

- Post Document creation we would perform final touches and follow the procedure to submit the final document, then wait for approval.

6.2 Gantt chart

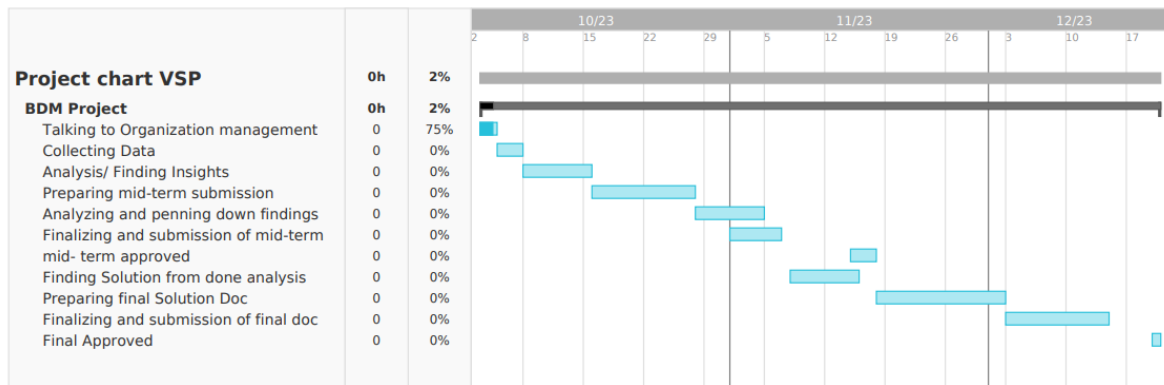


Figure 1 Expected timeline for completion of project.

7 Expected Outcome

Once the analysis and research has been done, we would be able to get a good understanding and insights of the working of each of the branches and also the correlation between the number of employees stationed at that branch and packets being assigned in different months and of different branches, hence we would be able to find the different factors affecting the profit and will also hope to find a better method to devise an accurate ratio model between our two main variables employees in that branch and packets assigned. We would also be identifying which of their branches are leading to more profit and have more potential in the future and will continue to provide insights to the organization. By providing these insights and solution to the organization we hope to see growth in the organizations profit and income structure throughout the months, also we would be keeping in touch with the organizations supervisors and managers to keep in check how well our analysis and solution has proved out to be.