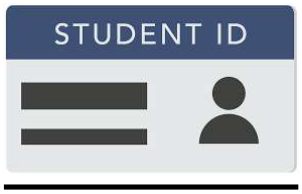
Capstone Project

Mid-Term Submission:

Strategic Solution for Dish Washing (Scrubber) Business problem

Himanshu Choudhary



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1. Executive Summary

SLR Scrubber Sales Company (Wholesale Shop), a private scrubber sales business based in Jaipur District, Rajasthan, India. The company has been operating successfully for three years, leveraging a robust business model in the B2B (business-to-business) market.

SLR specializes in the distribution of scrubber products manufactured by third-party suppliers, which are branded with the SLR logo. The company supplies these products to shop owners, offering a range of options to cater to their varied preferences. The main product offered by SLR is the Steel Scrubber, while additional variants such as Plastic Scrubbers, Foam Scrubbers, Steel Foam Scrubbers, and Green Scrubber pads provide customers with a diverse selection.

Under the leadership of Mr. Suraj Mal, SLR focuses on penetrating different villages and towns to establish business relationships with shop owners. In addition to regular sales, Mr. Suraj Mal also handles pre-orders from customers. With an average monthly turnover of approximately 1.5 lakh INR, SLR has demonstrated a consistent level of business performance and customer satisfaction.

Challenges Arising from Extensive Village Distribution and Optimal Product Inventory Management. In the context of our business operations, one of the significant hurdles we face relates to the extensive number of villages requiring product delivery. The vast geographical distribution of these villages presents logistical and operational challenges that need to be effectively addressed to ensure efficient product delivery.

To deal with the problems mentioned above we will be approaching the problems as described below:

Data is collected from the owner's notebook and stored in Excel and CSV files. Cleaning involves filling missing numerical values with column averages. The "Places" column represents multiple places separated by '+'. A new column, "Total Number of Places," counts '+' signs and adds 1. Metrics like net profit, total revenue, and fuel expenditure are divided by the total number of places. Python and Excel are used for analysis.

Some datasets to be collected will help us to understand the problem, perform statistical and mathematical analysis and reach our expected outcome by using MS Word, Excel, Python, SQL, etc.

2. Proof Of Originality of The Data

Proof of Authenticity

Letter of Data Access Authorization

I, Manish, on behalf of SLR, am writing to provide authorization for data access to support the academic pursuits of Himanshu Choudhary. This letter confirms thatHimanshu, who claims to be a student of the Indian Institute of Technology, Madras, has been granted access to a specific subset of our sales data.

The purpose of granting this data access is strictly for academic use, as assured by Himanshu. The provided data is genuine and accurate to the best of my knowledge. It is essential to emphasize that any use of this data beyond academic boundaries lacks credibility and will not be attributed to our organization.

We trust that Himanshuwill handle the data responsibly and maintain its confidentiality. They have assured us that the data will be used solely for academic purposes and will not be shared with unauthorized individuals or used for any unauthorized activities.

This authorization does not constitute an endorsement or authorization for any other use of the data beyond the specified academic purpose. It is granted solely to support Himanshu's academic endeavors.

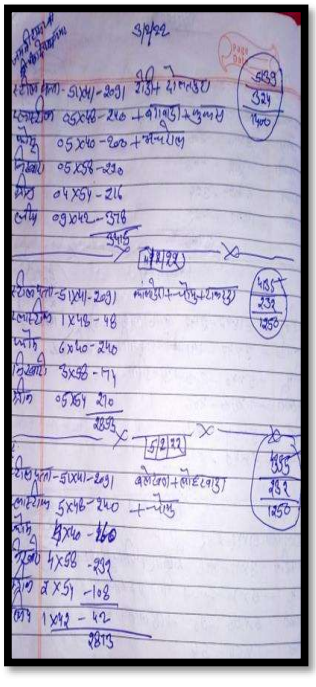
Please be aware that Himanshu is responsible for complying with any applicable laws and regulations regarding data protection and privacy. Any misuse or unauthorized disclosure of the provided data will be the sole responsibility of Himanshu.

We appreciate your understanding and cooperation in ensuring the proper use and security of our sales data.

Manish

Himanshu
Student Sign

SLR
Kishanpura, Jaipur
Organisation Head



Description on Originality of Data

The data collection process for this project involved Mr. Manish, the son of the owner Mr. Suraj Mal, who demonstrated exceptional cooperation and support. Both Mr. Suraj Mal and Mr. Manish actively participated in multiple meetings, ensuring the accurate collection of business information. Mr. Suraj Mal himself verified the data, further enhancing its reliability and credibility. Their invaluable assistance greatly contributed to the accuracy and comprehensiveness of the collected data.

3. Metadata

Language

- Bilingual Approach: During the data collection meetings, both Hindi and English languages were utilized to facilitate effective communication and gather accurate information. This bilingual approach ensured that all participants could express themselves comfortably and contributed to a comprehensive understanding of the business.

- Language of the Project: It is important to note that the project itself is written entirely in English, adhering to the chosen language for documentation and analysis purposes.

- Data from Owner's Notebook: The owner, Mr. Suraj Mal, provided the data for the project directly from his notebook. This source served as the primary reference for collecting relevant information regarding the business operations and performance

Nature & Organizational Background

SLR, a local distributor in the Dish Washing (Scrubber) Industry, operates in the villages and towns of select districts in Rajasthan State. It follows a Business-to-Business (B2B) model, providing scrubber products to shop owners. The primary focus of the company is to ensure easy access to Steel Scrubbers for its customers, the shop owners.

Established in May 2021 by Mr. Suraj Mal, SLR has successfully operated for nearly three years and continues to thrive due to its efficient business model. The company is located in Jaipur District, Rajasthan. With an average monthly turnover of approximately 1.5 lakh INR, SLR has demonstrated consistent performance in the market.

Initially established with self-debt, SLR has gradually become debt-free, reflecting the successful establishment and growth of the business. While Steel Scrubbers remain their main product, SLR has expanded its offerings by introducing four additional scrubber variations for customer preference and product variety.

Under Mr. Suraj Mal's management, SLR engages in direct sales activities, visiting different villages and towns to sell scrubber packets to shop owners. In addition to regular sales, the company also receives pre-orders from customers, further expanding its reach and customer base.

Problems Associated

- Mr. Suraj Mal is currently encountering challenges in efficiently delivering his products, due to the extensive number of villages he serves. As the sole manager of his business, he finds it increasingly demanding to handle the operational demands on his own. However, Mr. Suraj Mal is constrained by his preference not to hire additional personnel or involve others in his business.

  Nevertheless, his primary objective remains centered on maximizing profitability. In light of this, he seeks viable solutions to optimize his product delivery process and enhance overall business efficiency. By addressing these challenges, Mr. Suraj Mal aims to streamline operations and ultimately achieve his desired profit margins.

- Mr. Suraj Mal is currently faced with the challenge of determining the optimal quantity of each product he should carry in order to ensure successful sales and sufficient product availability for his customers. It is crucial for him to strike a balance, ensuring that he neither carries an excessive inventory nor falls short of meeting the demands of his customer base.

4. Descriptive Statistics

Sells Price

The selling price (scrubber packets) of SLR sales company, a wholesale shop, is subject to variation region wise as it is influenced by several factors, including:

1. Connectivity: The price is impacted by the accessibility of a particular place from the city.

2. Market Competition: The presence and availability of other companies or wholesale shops in the region also affect the selling price.

3. Distance: The distance of a specific region from the city plays a role in determining the selling price.

4. Demand and Usage: The utilization of the product, particularly by establishments, within that region, influences the price.

S. No.	Product Name	Selling Price Range (₹)
1	Steel Scrubber	₹60 - ₹70
2	Plastic Scrubber	₹60 - ₹70
3	Foam Scrubber	₹55 - ₹65
4	Steal Foam Scrubber	₹70 - ₹80
5	Green Scrubber Pads	₹65 - ₹75

Financial Data Tracking

- Owner of SLR has requested to keep the financial records confidential, so some financial other figures are not directly mentioned.

The data is diligently recorded on a daily basis in a dedicated notebook, encompassing a span of approximately 3.5 months. These records are extracted from the notebook as a reliable source of information.

```
[15] data = pd.read_csv('/content/Project--.csv')
```

```
a = data.head()
a.transpose()
```

	0	1	2	3	4
Date	03-02-2022	04-02-2022	05-02-2022	07-02-2022	09-02-2022
Steel Scrubber	51	51	51	51	51
Plastic Scrubber	5.0	1.0	5.0	5.0	5.0
Foam Scrubber	5	6	4	2	4
Steel Foam Scrubber	5.0	3.0	4.0	3.0	5.0
Green Scrubber pads	4.0	5.0	2.0	0.0	5.0
Total Revenue	5139	4135	4355	4220	4832
Fuel Expenditure	324	232	232	265	281
Net Profit	1400	1250	1250	1400	1500
Places	Daulatpura+Kukas	Kaladera+Chomu	Loharwada+Chomu	Chomu	Harota+Samod

- Two places are separated by “+” sign

Data Attributes:

Date: The specific date on which scrubber packets were sold.

Steel Scrubber: The number of packets sold from the steel scrubber category.

Plastic Scrubber: The number of packets sold from the plastic scrubber category.

Foam Scrubber: The number of packets sold from the foam scrubber category.

Steel Foam Scrubber: The number of packets sold from the steel foam scrubber category.

Total Revenue: The overall revenue generated on the given day.

Fuel Expenditure: The expenditure incurred on fuel for the corresponding day.

Net Profit: The net profit obtained on the particular day.

By using describe function in python we get statistical summary that includes the count, mean, standard deviation, minimum, quartiles, and maximum values for no. of category of items, Total Revenue, Fuel Expenditure, and Net Profit.

```
[20] b = data.describe()
     b.transpose()
```

	count	mean	std	min	25%	50%	75%	max
Steel Scrubber	92.0	49.728261	7.123870	24.0	51.00	51.0	51.00	86.0
Plastic Scrubber	91.0	3.879121	1.800217	0.0	2.00	5.0	5.00	10.0
Foam Scrubber	92.0	4.380435	1.643117	0.0	3.75	5.0	5.00	10.0
Steel Foam Scrubber	89.0	4.719101	1.802705	0.0	4.00	5.0	5.00	10.0
Green Scrubber pads	89.0	3.303371	1.854996	0.0	2.00	3.0	5.00	8.0
Total Revenue	92.0	4355.989130	678.511193	2620.0	4081.25	4389.0	4739.25	6433.0
Fuel Expenditure	92.0	247.750000	59.792613	114.0	219.00	242.5	271.75	421.0
Net Profit	92.0	1178.369565	239.827214	560.0	1000.00	1200.0	1312.50	1800.0

- The 25th percentile (first quartile), 50th percentile (median or second quartile), and 75th percentile (third quartile) all being the same value of 51.

❖ **Top 5 Profitable Destinations in 3.5 months**

Places	Profit
Khatushyamji	₹12,850
Renwal	₹9,300
Reengus	₹7,047
Chomu	₹5,442
Pachar	₹4,575

❖ **Top 5 Revenue Generating Destinations in 3.5 months**

Places	Profit
Khatushyamji	₹50,897
Renwal	₹42,366
Reengus	₹35,516
Chomu	₹34,198
Kaladera	₹27,942

- **Synergy of Profitability and Revenue Generation:** Top 4 Overlapping Destinations
- The Pearson correlation coefficient between Total Profit and Net Profit over the given 3.5-month period is calculated to be 0.821, indicating a strong positive correlation between the two variables.

5. Detailed Explanation of Analysis Process/Method

After collecting the data from the owner's notebook, it is entered into Excel and CSV files. The data cleaning process is initiated, where missing numerical values are filled with the average of other entries in the respective column, ensuring the data is ready for analysis.

In the dataset, there is a column named "Places" that represents multiple places for certain rows. Multiple places are denoted by a '+' sign between them. For example, if the places in a row are 'a', 'b', and 'c', they are represented as 'a+b+c'.

To facilitate analysis, a new column called "Total Number of Places" is created. It counts the number of '+' signs in the "Places" column for each row and adds 1 to account for the total number of places mentioned.

During the analysis phase, when calculating metrics like net profit, total revenue, or fuel expenditure for a specific place, the respective value is divided by the total number of places if that place's name appears in the "Places" column of the corresponding row. It is assumed that the net profit, total revenue, and fuel expenditure are equal for all places of that row if places in that particular is more than one.

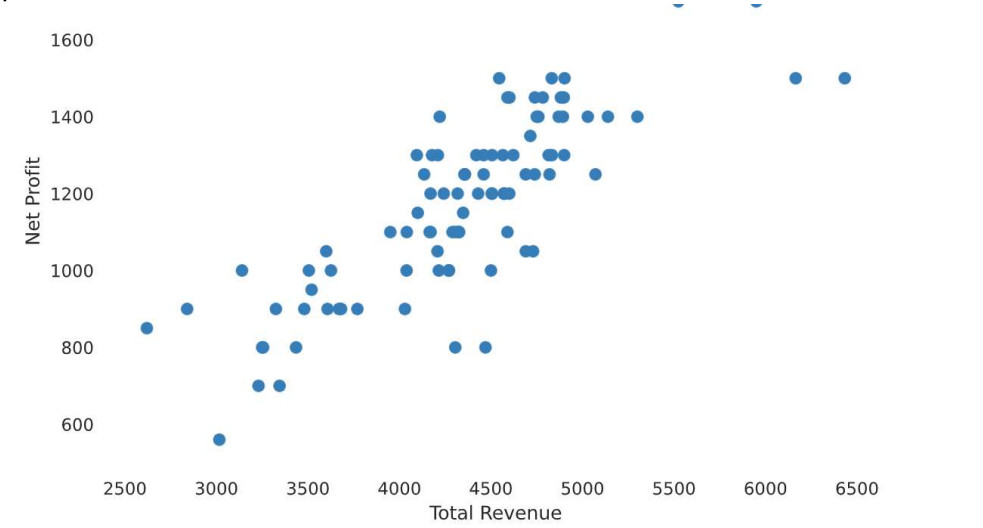
Python and Excel are the primary tools utilized for conducting the analysis.

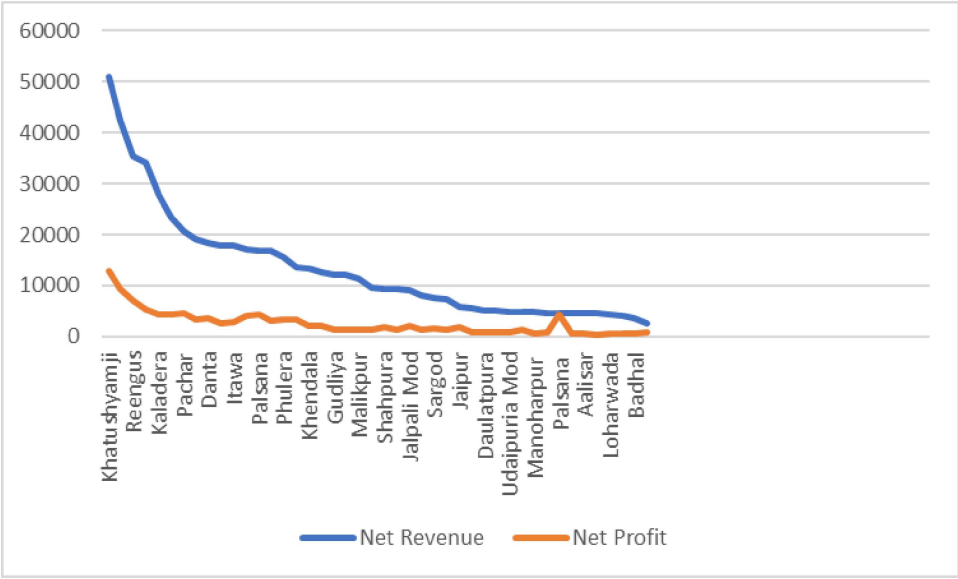
In a short way:

1. Data is collected from the owner's notebook and saved in Excel and CSV files.
2. Missing numerical values are filled with the column average for data cleaning.
3. The "Places" column contains place names separated by '+' symbols.
4. A new column, "Total Number of Places," is created by counting the '+' signs in the "Places" column and adding 1.
5. When calculating net profit, total revenue, or fuel expenditure for a specific place, the value is divided by the total number of places if the place name is present in the "Places" column.

6. Results and Findings

- The Pearson correlation coefficient between Total Profit and Net Profit over the 3.5-month period is 0.821, indicating a strong positive correlation. This suggests that increasing Net Revenue is likely to result in an increase in Net Profit. The data can be graphed to visualize the trends over the 3.5-month period.

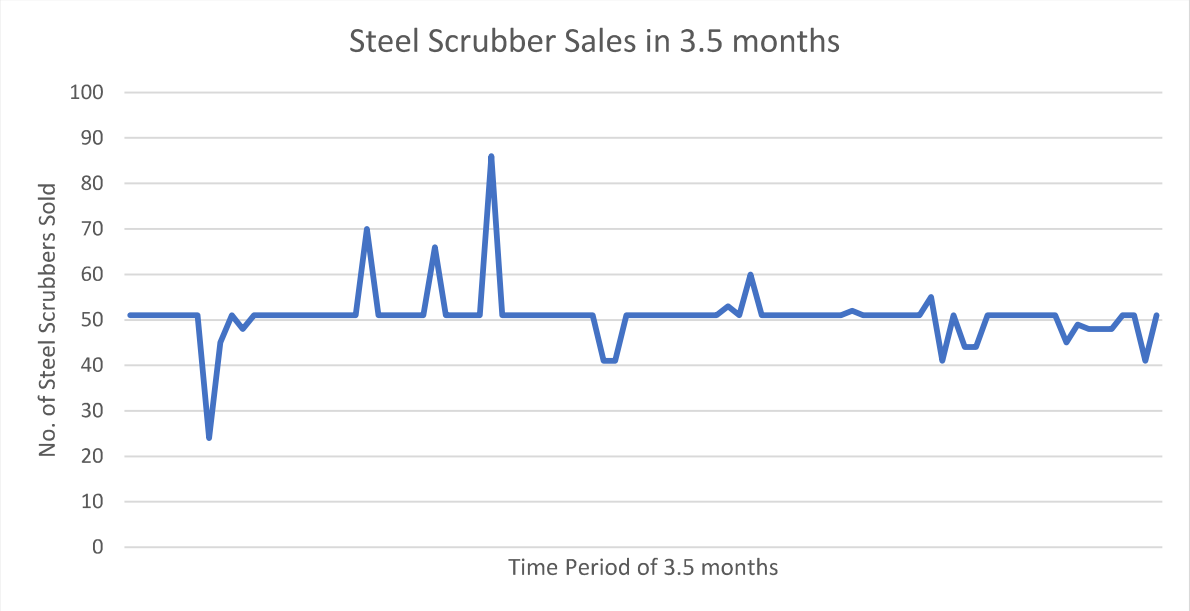




Based on the data analysis, the owner can prioritize focusing on the places that generate higher revenue as they also tend to yield more profit. By allocating resources and efforts towards these high-revenue places and potentially minimizing attention to places with lower revenue, the owner can enhance their ability to deliver products efficiently.

- The dataset has a symmetrical distribution in sales of Steel Scrubbers in a day, as indicated by the 25th percentile (first quartile), 50th percentile (median or second quartile), and 75th percentile (third quartile) all being the same value of 51.

  The sales of steel scrubbers in a day are mostly around 51 units, with some potential outliers.



It is observed by the data that the owner can carry around 51 packets of Steel, which is a significant product for their business. This implies that the carrying capacity aligns precisely with the quantity of Steel scrubber packets, ensuring optimal utilization without any excess or shortage.