Optimizing Inventory Management and Asset Utilization for Rental Business

A Mid-term report for the BDM capstone Project

Submitted by

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Executive Summary

The project focuses on a small B2B rental shop located at Hanumangarh town, Rajasthan owned by 'Mr. Sanjeev Kumar', specializing in providing shuttering and formwork systems to construction firms. The business provides scaffolding, concrete formwork, and other essential rental equipment for construction projects.

The company is currently facing challenges with inventory management and equipment utilization. A large rental inventory results in significant capital being locked in underutilized stock. Additionally, the business struggles with inefficient tracking of equipment usage resulting in excess inventory and stockouts. This situation negatively impacts profitability and cash flow.

To resolve these issues, the project will implement data-driven solutions to optimize inventory and rental operations. Analytical approaches like demand forecasting, rental cycle analysis, and asset utilization tracking will be employed to better predict equipment needs and reduce idle stock. The expected outcome is a more efficient rental process, aligning inventory with actual demand. This will reduce storage costs, improve cash flow, and increase profitability. By maximizing asset utilization and improving equipment availability, the company can enhance customer satisfaction and drive sustainable growth.

2 -Proof of originality of the Data

● Business Name: Gupta building material

● Address: new Loha market, shop no 24, near uno bank, Hanumangarh town, Rajasthan

● Owner's Name: Mr. Sanjeev Kumar

To establish the authenticity of the data, the supporting evidence as listed below:

 1. Letter from the Organization: Access to the letter can be obtained through the G-Drive link: link

 2. Images of rental data snapshot and organization overview: These images are included in Appendix A, located on page 10. They can also be accessed through the G-Drive link: link

3. Images of Organization: These visuals are enclosed within Appendix B, which can be found on page

4. interaction video with business owner:link

3. Metadata and Descriptive Statistics

Metadata:-

● Data Format: CSV (Comma-Separated Values) and Excel/Sheets (XLSX)

● Range: October 1, 24 to November 30, 24

● Business Closed: The business was closed on Sundays.

● Units of Measurement for Features involving Money: Indian Rupee (₹)

The business owner utilizes two primary methods for Recording Data:

1. Laal Kahta Book: Used at the owner's residence for recording detailed inflow and outflow of items by each customer data every few days. this includes advance deposit amount, rental start day and return date

2. Daily Notebook: Used to record the inflow and outflow of items on daily basis.

Information about the rental data:

Link: Rental Data

Variable Name	Description	Relevance
Customer Name	Name of the customer renting the equipment.	Identifies high-value customers and their preferences.
Items Taken	Type of equipment rented (e.g., Taak, Phati, Plate, Gadar).	Tracks rental patterns by equipment type.
Quantity	Number of units rented.	Measures demand for specific equipment.
Rate (INR/day)	Rental rate per day for the equipment.	Determines revenue generation potential.
Rental Date	Date when the equipment was rented.	Identifies peak rental periods.
Return Date	Date when the equipment was returned.	Calculates rental duration and idle time.
No. of Days	Duration of the rental (in days).	Measures utilization and identifies underutilized assets.
Total Cost (INR)	Total revenue generated from the rental.	Tracks revenue by equipment type and customer.

DESCRIPTIVE STATISTICS:-

After processing and cleansing the data, here is a summarized overview using descriptive statistics. The key insights have been condensed to emphasize the most relevant descriptive statistics for both sales and inventory data.

Descriptive statistic measure	Descriptive statistic definition
Sum	The total value
Mean	The average value
Standard Error	The variability of mean, across multiple samples drawn from the same population.
Median	The middle value when arranged in ascending order.
Standard Deviation	The measure of spread of values from mean in single sample.
Minimum	The smallest value.
Maximum	The largest value.

For Overall Rental Data (October 24 and November 24):

Descriptive Statistic	Quantity	Total Revenue (INR)
Sum	17,256	5,76,434.60
Mean	81.3962264	2,719.03
Standard Error	4.02577295	97.7272957
Median	59.5	2,510
Standard Deviation	58.6161389	1,422.93
Minimum	12	384

Maximum	248	6,380.00

Category-Wise Descriptive Statistics:

Category	Sum (Revenue)	Mean (Revenue)	Percentage Revenue
Taak	77,043.00	1,712.07	13.37%
Phati	1,36,023.60	2,305.48	23.60%
Plate	1,64,768.00	2,995.78	28.58%
Gadar	1,98,600.00	3,747.17	34.45%

Category-Wise Descriptive Statistics based on Quantity:

Category	Sum (Quantity)	Mean (Quantity)	Percentage Quantity
Taak	2,007.00	44.60	11.63%
Phati	8,845.00	149.92	51.26%
Plate	4,326.00	78.65	25.07%
Gadar	2,078.00	39.21	12.04%

Pie-chart representing category-wise Quantity percentage:
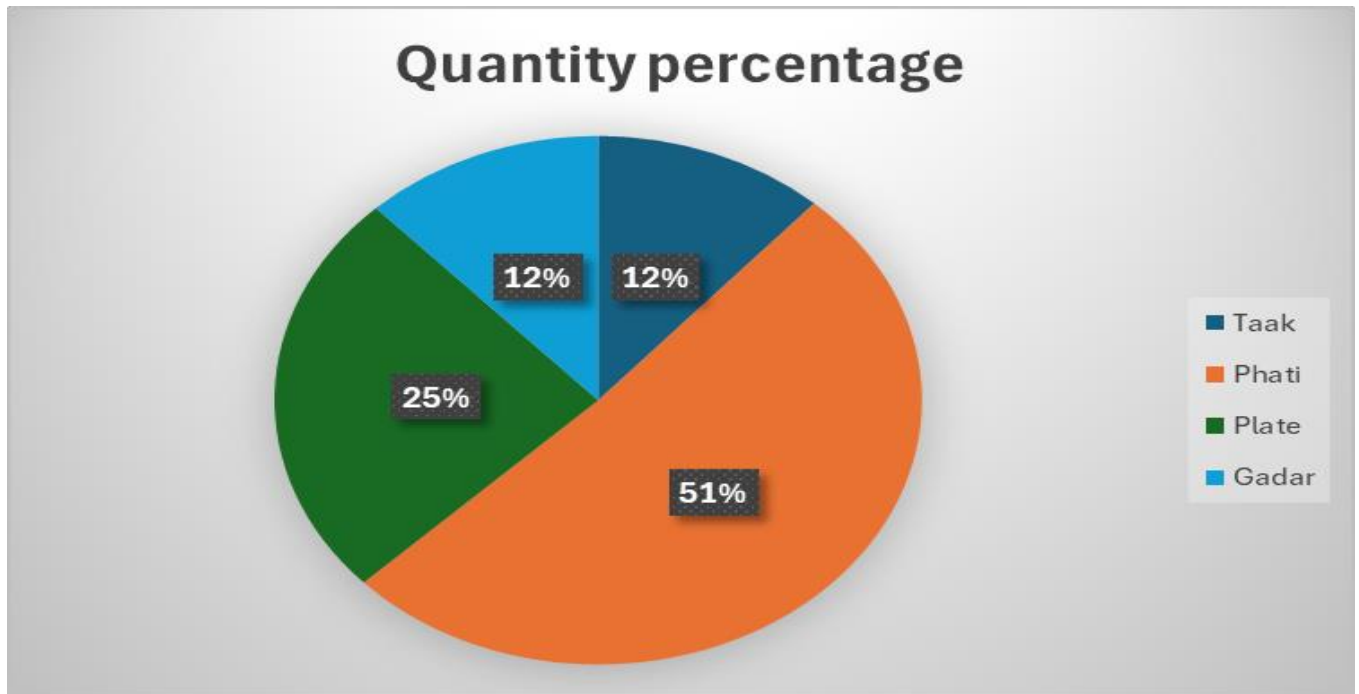
Pie-chart representing category-wise Revenue percentage:
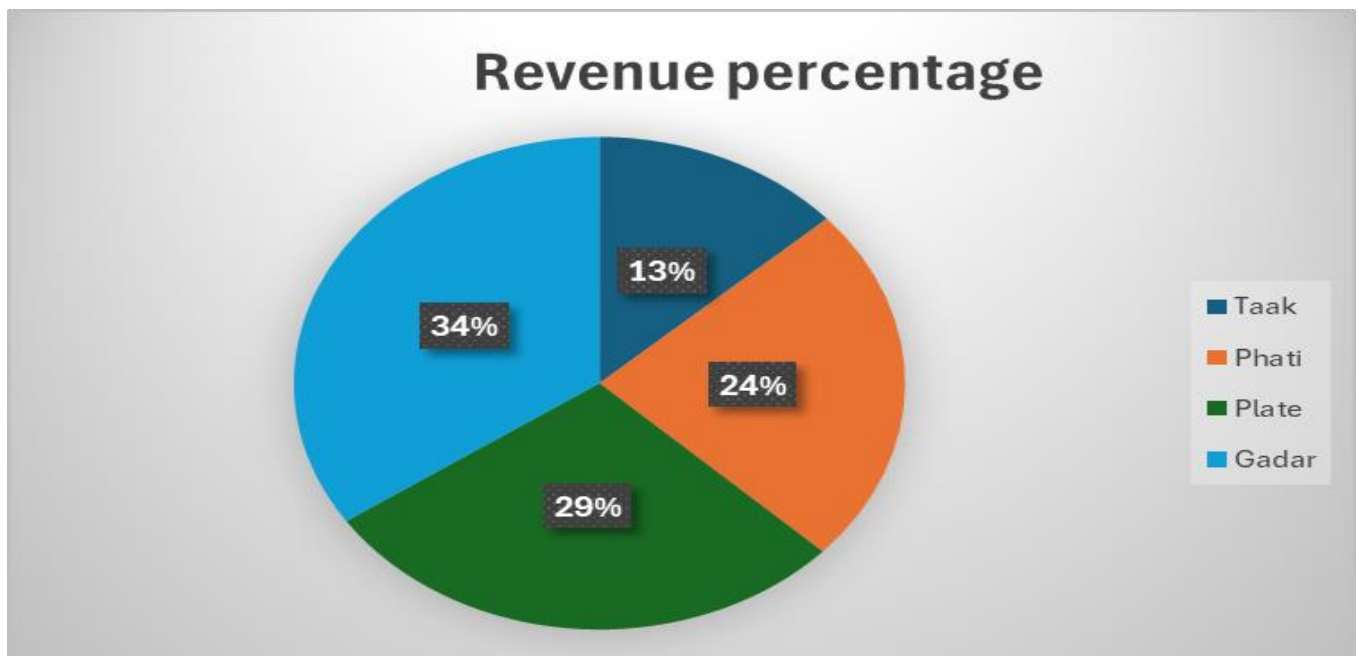
Analysis processes and methods

The data analysis process includes defining the problem, collecting, organizing, cleaning, and transforming data, applying analytical techniques, and drawing conclusions. The initial phase of this journey was a demanding two-month effort dedicated to data acquisition, which proved to be the most challenging step. I engaged with approximately forty businesses and faced a mix of rejections and hesitations. Some were willing to discuss data verbally but reluctant to share raw records.. Eventually, a generous business owner agreed to provide the data, marking a significant milestone in the data analysis journey: successful data acquisition.

The next phase involved understanding the core aspects of the business to pinpoint specific challenges requiring attention. Upon acquiring the initial dataset detailing the business's key operations, it became clear that the owner was satisfied with inventory management and stock levels. As a result, the focus shifted toward analyzing the rental system. To prevent data loss or accidental deletion, precautionary steps were taken to back up the original files

The provided data consisted of a mix of clean and unstructured information, necessitating preliminary cleaning before analysis. While the rental data was mostly well-maintained, minor refinements and additional feature analysis were required. The data cleaning process involved confirming details with the owner to ensure the accuracy of inventory usage and storage facility availability.The analysis relied heavily on Microsoft Excel tools, including the Excel Data Analysis Tool Pak, Pivot Tables, Pivot Charts, custom formulas, and Excel add-ins. The foundational analysis provided valuable insights, and the descriptive statistics in this report are systematically structured to examine data within each category.

Results and Findings

Phati has the highest quantity rented (8,845 units), contributing 51.26% of total quantity.

Taak has the lowest quantity rented (2,007 units), contributing only 11.63% of total quantity.

Plate and Gadar have moderate quantities rented, contributing 25.07% and 12.04%, respectively.

Mean Quantity per Transaction

Phati has the highest mean quantity per transaction (149.92 units), indicating bulk rentals.

Taak has the lowest mean quantity per transaction (44.60 units), suggesting smaller, more frequent rentals.

Plate and Gadar have moderate mean quantities per transaction (78.65 and 39.21 units, respectively).

Key Insights:

Phati is the most demanded equipment type, likely due to its lower cost and versatility.

Taak and Gadar are rented in smaller quantities but may generate higher revenue per unit.

Utilization and Idle Time

Phati has the highest quantity rented but also the highest idle time (15 days), indicating underutilization.

Taak has the lowest quantity rented but the lowest idle time (10 days), indicating high utilization.

Gadar has moderate quantity rented and the lowest idle time (8 days), making it the most efficient asset.
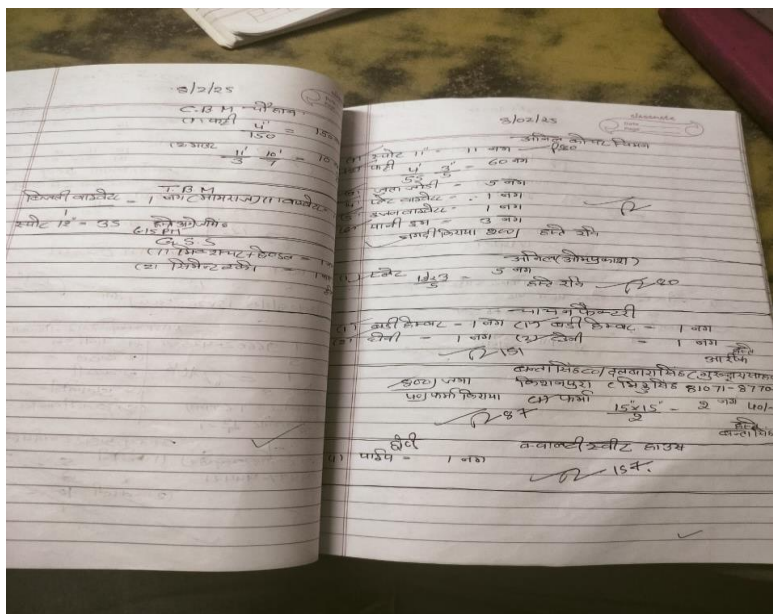
Key Insights:

Phati is underutilized despite high demand, suggesting inefficiencies in inventory management.

Taak and Gadar are efficiently utilized, contributing significantly to revenue despite lower quantities.

Appendix A: Proof of Originality

Images of Inventory snapshot and organization overview:

Appendix B: Images