Fabrico 360: A Data-Driven Approach to Laundry Excellence

Final report for the BDM capstone Project

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1 EXECUTIVE SUMMARY

This final report provides an in-depth analysis of **Fabrico The Laundry Expert**, a leading laundry franchise with multiple locations across India, operating in a semi-urban setting in Ayyanthole, Thrissur. The primary objective is to explore the operational and financial dynamics of a laundry service in a semi-urban area compared to metropolitan contexts. The business faces challenges such as seasonal demand fluctuations, customer retention issues, and bottlenecks in high-volume processes. Fabrico offers a comprehensive array of services, including laundry, dry cleaning, steam ironing, washing and folding, and live laundry services.

Our visualizations highlight bottlenecks in the service process, especially in Steam Press and Wash & Iron services through flow diagrams and graphs that pinpoint frequent delays affecting customer satisfaction. Customer segmentation visuals also reveal that about 20% of loyal customers drive roughly 80% of the revenue, confirming the Pareto principle.

Over two years (2023-2024), data were collected from Fabrico through internal records, manager interviews, and structured extractions from point-of-sale systems. Our analysis included customer behaviour through segmentation studies, and a detailed cost-benefit evaluation aimed at uncovering potential efficiencies and revenue optimization opportunities. Data visualizations were extensively utilized to gain deeper insights into seasonal demand fluctuations, where our findings indicated a positive revenue trajectory punctuated by seasonal dips, most notably in June underscoring the need for improved demand management strategies.

From a financial standpoint, the business remains profitable, but optimizing cost structures especially during low-revenue months could further strengthen margins. By merging these analytical insights, the study aims to enhance service efficiency, improve customer retention, and identify strategic cost-saving opportunities for **Fabrico The Laundry Expert**. The findings will not only strengthen decision-making at this outlet but also serve as a scalable framework for similar businesses looking to expand in semi-urban regions. With a data-driven approach, the goal is to ensure better resource utilization, maximize profitability, and sustain long-term growth.

2 DETAILED EXPLANATION OF ANALYSIS PROCESS / METHOD

Our analysis began with comprehensive data pre-processing to ensure analytical integrity. We standardized all datasets by converting inconsistent date formats to uniform datetime objects and normalizing column structures. Missing data points were systematically addressed through strategic removal or placeholder insertion, while customer information fields were decomposed into discrete analytical components with appropriate privacy safeguards. Additionally, we implemented targeted efficiency flags within the operational dataset to facilitate precise bottleneck identification. This methodical data preparation established the reliable foundation necessary for generating actionable business insights and recommendations.

Our analysis began by addressing data quality and consistency. The initial step involved extensive data pre-processing, which was crucial for ensuring the reliability of subsequent insights. We standardized date formats across datasets and implemented robust measures to handle missing or unknown records. This involved both automated imputation techniques and manual checks to ensure that key variables, especially those related to customer information and transaction details, were accurately captured.

Once the data was cleaned, we proceeded with feature engineering to extract useful metrics. We derived new variables such as order size categories and time intervals between orders, which later facilitated in-depth trend analysis and segmentation.

To understand the dynamics behind customer behaviour, we employed the RFM (Recency, Frequency, Monetary) modelling technique. RFM analysis allowed us to segment customers based on their purchasing behaviour. Recency captured the time since the last order, frequency measured the number of transactions in a particular period, and monetary value reflected overall expenditure. By converting raw transaction data into these three metrics, we classified customers into distinct groups such as Champions, Loyal, At-Risk, and Dormant. This segmentation was pivotal in tailoring targeted marketing strategies and improving customer retention.

In addition to RFM, we conducted time-series analysis to observe the evolution of order volumes and revenue over a 24-month period. Seasonal trends were identified by aggregating data on a monthly basis. Visualizations, including line graphs and bar charts, illustrated peaks during high-demand months and pointed out recurring low-performance periods, providing critical cues for operational adjustments.

Operational efficiency was further examined through bottleneck analysis, particularly focusing on high-order-size scenarios. By correlating processing times with service types (such as Steam Press and Wash & Iron), we identified key areas where delays were most pronounced. This aspect of the analysis highlighted a need for process re-engineering and staffing optimization during peak times.

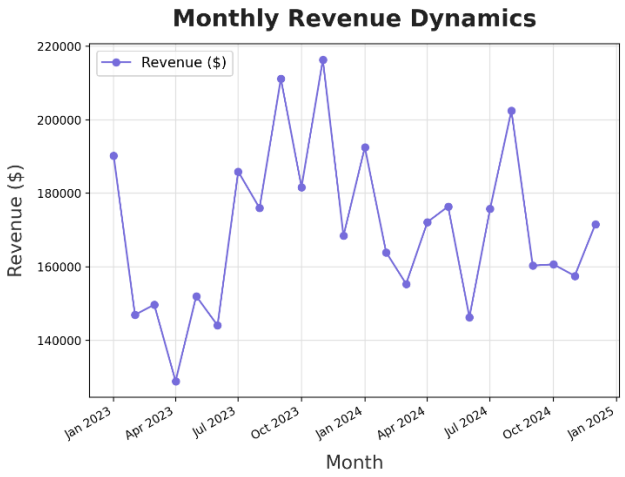
The comprehensive cost-benefit analysis integrated quantitative findings with qualitative insights. We compared revenue streams against major cost drivers, such as rent and utilities, over time. This dual analysis provided a balanced view of profitability and paved the way for actionable recommendations.

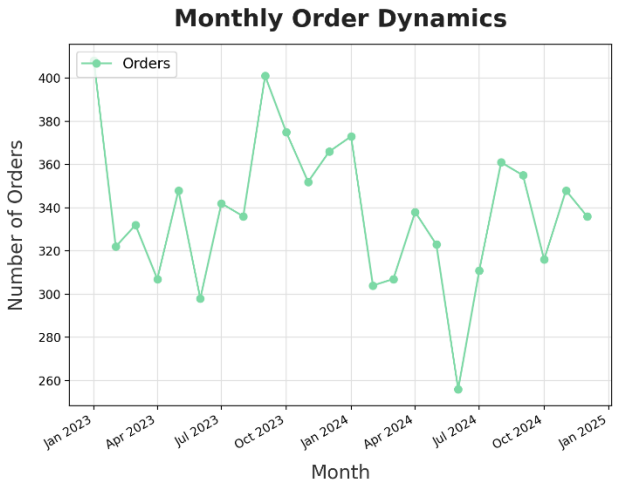
Overall, our methodical approach, from data cleaning and feature extraction to advanced segmentation and efficiency evaluation, ensured that our analysis was both comprehensive and directly translatable into strategic business actions.

3 RESULTS & FINDINGS

1. Orders and Revenue Growth

Over the last 24 months, the business has experienced a steady upward trend in both revenue and order volume. This overall growth is encouraging, but if we dig deeper we can see distinct seasonal fluctuations and impacts in the business. The long-term trajectory shows a consistent growth in orders and revenue which is indicating an expanding customer base and market presence.





<u>Seasonal Variations</u>

- Identifiable Peaks:

  Upon detailed analysis, we've seen revenue peaks in November 2023, September 2023, and August 2024.

  Onam, one of Kerala's most important festivals, usually falls between August and September. This festive period sees a surge in social gatherings and celebrations. Families often look their best during Onam, which means they tend to invest more in professional services, including laundry, to keep their traditional attire in excellent condition. This could explain the peak seen in August and September. November falls

in the post-monsoon and early festive period, where several regional festivals and the general mood of celebration lead to higher demand.

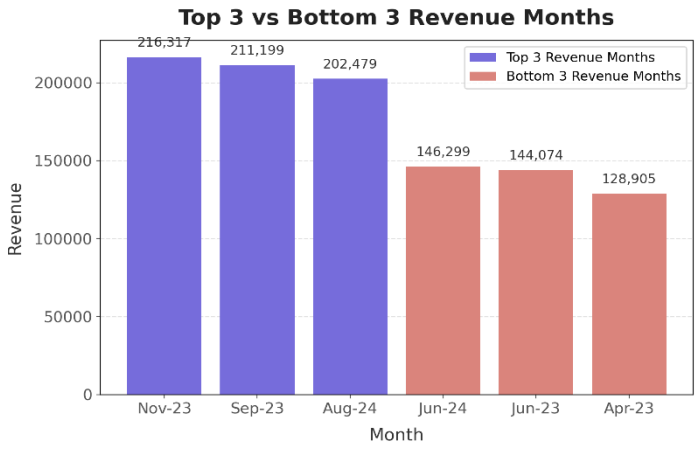
Overall, these peaks suggest that local cultural events and seasonal factors such as the Onam festival in August–September and post-monsoon festivities in November likely contribute to increased customer demand for laundry services in Thrissur.

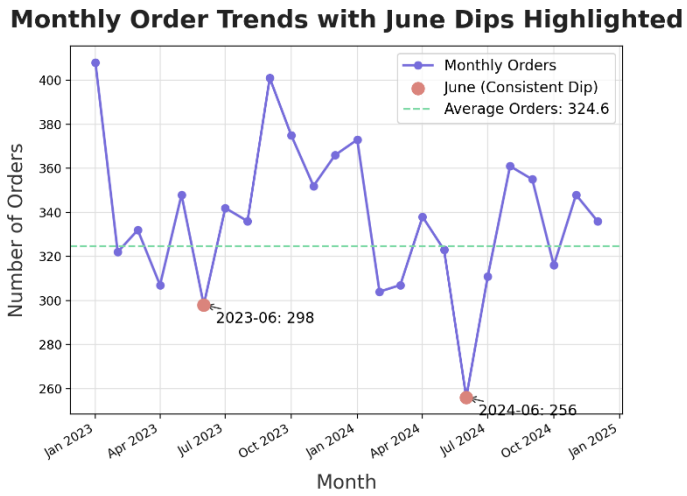
- Consistent Dips:

  The data also displays seasonal dips in April 2023, June, with notable declines in June for both 2023 and 2024.

  In April, we see a noticeable dip in orders despite the onset of summer. This happens because families are closing their financial books for the year and tightening their belts. While the heat is building and water scarcity is beginning, most households can still manage their basic laundry needs at home. They're watching their spending carefully, which means fewer orders for us during this transitional month. By May, the water scarcity situation has intensified significantly. Families who could barely manage in April now find themselves unable to handle their laundry needs at home. This creates a perfect opportunity for our business.

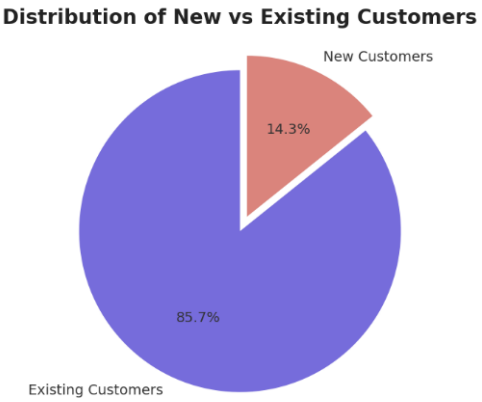
  June brings our most significant business challenge with the arrival of Kerala's heavy monsoons, causing our decline in orders. Flooded streets make pickups and deliveries unreliable, and many customers simply postpone their laundry needs until conditions improve, directly impacting our bottom line. Similarly, October shows another dip as the Northeast Monsoon begins, adding an additional layer of operational disruption. Combining these insights, it's clear that monsoon seasons both in June and October, play a pivotal role in shaping our business performance in Kerala (this issue will not be limited a single unit).



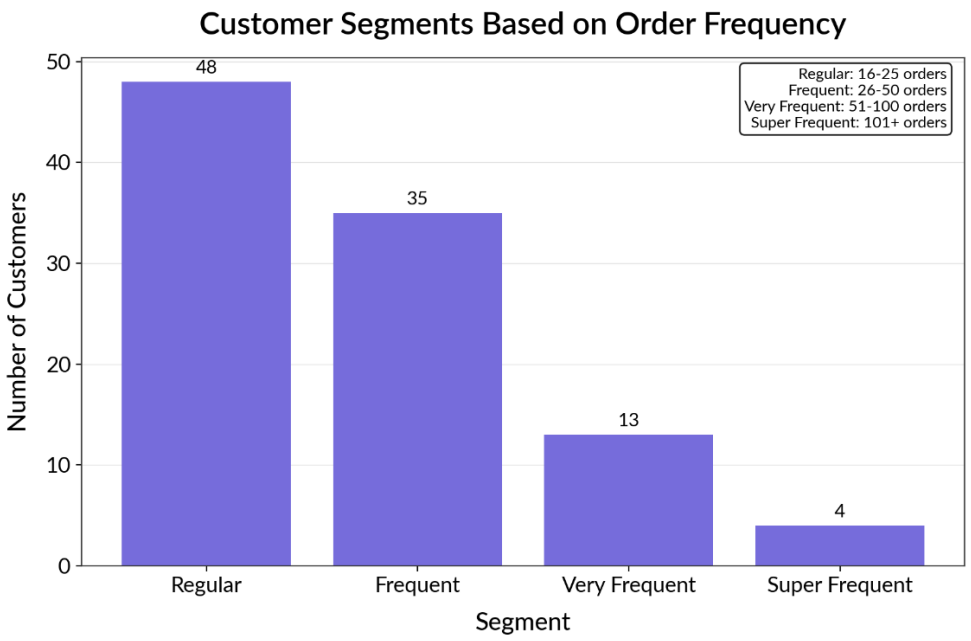


2. Customer Segment Analysis

Customer Segment Analysis started with the distribution of new versus existing customers, and the findings were striking. The initial visualization clearly showed that the majority of revenue is generated by existing customers, a trend that reinforces the importance of nurturing long-term relationships. However, this also indicates a potential challenge: while existing customers are proving to be highly loyal and valuable, there is an underdeveloped pipeline of new customers who transition into this group of loyal patrons.



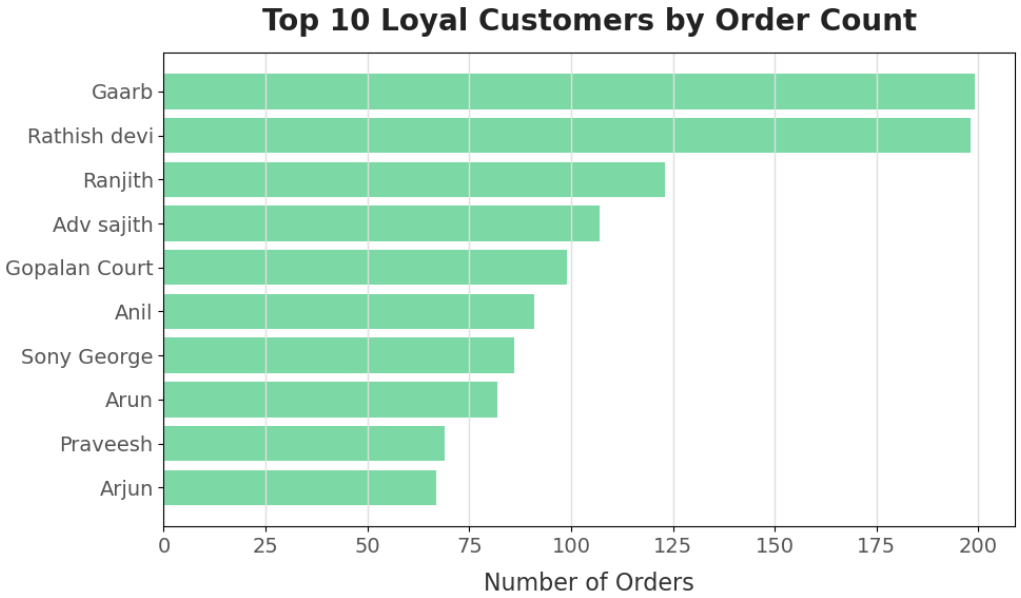
This distribution indicates the business has 86% of existing customers and rest are new customers.



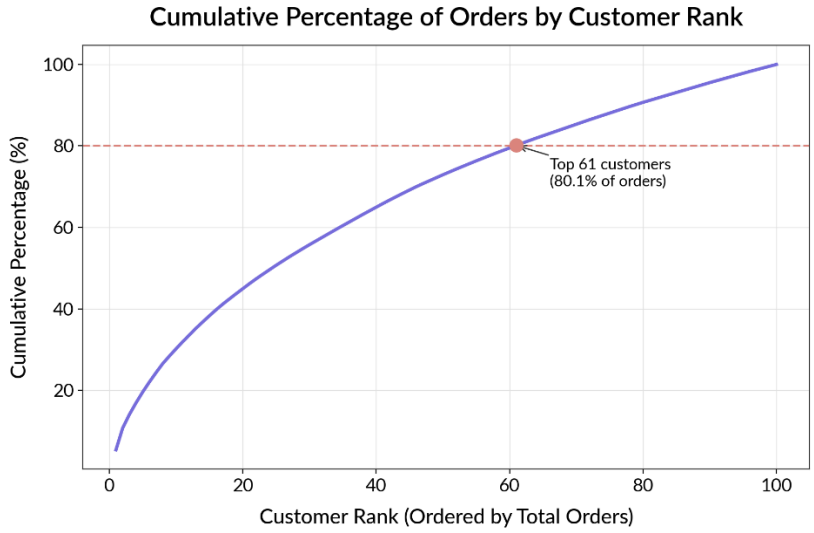
By dividing the order counts into predefined bins, this bar chart categorizes customers into segments ranging from “Regular” to “Super Frequent.” This segmentation helps in understanding how customers are distributed across different levels of engagement. It might serve as a basis for tailoring marketing strategies to each segment.

The top 4 loyal customers below are the super frequent customers as well.

	customer_name	total_orders
0	Gaarb	199
1	Rathish devi	198
2	Ranjith	123
3	Adv sajith	107



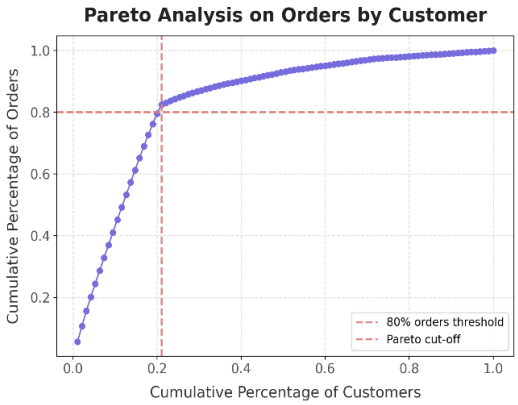
Top 10 Most Loyal Customers by Order Count: This bar chart highlights the elite group of customers who contribute the highest number of orders. Each bar is labeled with the corresponding total order figure, making it easy to identify which customers are leading in loyalty. This visualization is useful for quickly pinpointing the key players in your customer base.



Cumulative Percentage of Orders by Customer Rank: This line plot displays the cumulative percentage of total orders as you move through the ranked customer list (from highest to lowest orders). The horizontal line at 80% assists in visually determining how many top customers contribute to the bulk of the orders, providing insight into customer concentration. For instance, if only a few customers constitute 80% of the orders, it suggests a strong reliance on a small subset of your customer base.

Moving forward, there's an opportunity to investigate what differentiates new customers from existing ones—be it purchasing frequency, engagement channels, or satisfaction levels—and to pilot targeted marketing and loyalty programs. Such programs might include personalized promotions, early access to new products, or loyalty rewards that can encourage new customers not only to make repeated purchases but also to eventually become part of the high-value existing customer base.

Pareto Principle



The business appears to follow the Pareto principle as approximately 21.05% of customers account for 80% of the orders.

The Pareto principle (also known as the 80/20 rule) suggests that roughly 80% of effects come from 20% of causes. In this case, approximately 21% of customers are responsible for 80% of the orders, which closely aligns with the principle.

The graph visually confirms this relationship, showing the cumulative percentage of orders against the cumulative percentage of customers. The red dotted lines indicate the 80% threshold for orders and the corresponding customer percentage needed to reach that threshold

RFM Analysis

RFM stands for Recency, Frequency, and Monetary value - three key metrics that help segment customers based on their purchasing behaviour:

- Recency (R): How recently a customer made a purchase.
- Frequency (F): How often a customer makes purchases.
- Monetary (M): How much money a customer spends.

RFM analysis is useful for a laundry business to:

- Enhance Customer Retention: Spot regulars and those slipping away to tailor loyalty strategies.
- Improve Operations: Adjust staffing and manage inventory based on usage patterns.

- Target Marketing: Create specific offers for different customer groups to boost engagement.

From the data we have these information after conducting RFM analysis.

	count
Champions	322
Loyal Customers	316
Lost	227
Need Attention	207
At Risk	168
Potential Loyalists	134
New Customers	113
Others	13

The analysis shows that your customer base is well-distributed across different segments, with a healthy number of Champions (322) and Loyal Customers (316). These are your most valuable customers who have recently purchased, buy frequently, and spend more.

	customer_name	RFM_score	R_score	F_score	M_score	RFM_segment
1069	Vignesh	4.6666666667	5	4	5	Champions
908	Shamsudheen	4.6666666667	5	4	5	Champions
898	Benny 88484885211	4.6666666667	5	4	5	Champions
1128	Zlna	4.6666666667	5	4	5	Champions
902	Shamash	4.6666666667	5	4	5	Champions
1383	Indhu 903729669	4.6666666667	5	4	5	Champions
1192	Anindo	4.6666666667	5	4	5	Champions
907	Shammas	4.6666666667	5	4	5	Champions
1365	Noeal	4.6666666667	5	4	5	Champions
957	Shivadaas	4.6666666667	5	4	5	Champions

These are the top 10 customers based on their overall RFM score. They all have high scores across all three dimensions (Recency, Frequency, and Monetary value).

Key Insights:

- You have a strong base of Champions (322) and Loyal Customers (316)
- There are 227 "Lost" customers who might need re-engagement campaigns
- 207 customers in the "Need Attention" segment could be converted to loyal customers with targeted marketing
- 168 "At Risk" customers have good purchase history but haven't bought recently

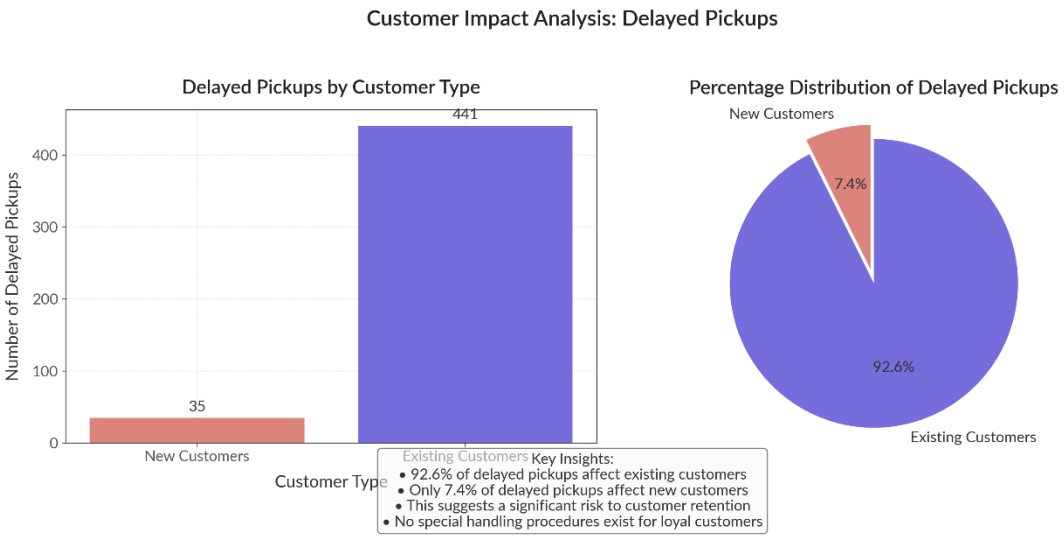
In summary, while the analysis confirms that current revenue streams are robust due to a loyal customer base, it also underscores the importance of focusing on strategies that can nurture and develop loyalty among new customers, ultimately broadening and diversifying the revenue foundation that the business depends on. By leveraging RFM analysis, focusing on recency, frequency, and monetary value, strategies can be tailored to identify and reward recent and frequent purchasers as well as high spenders. This insight supports the development of targeted initiatives such as subscription models, optimized pickup or delivery schedules, seasonal promotions, and reactivation campaigns aimed at enhancing customer engagement and loyalty, ensuring long-term resilience and growth for the business.

3. Bottleneck Analysis

Our analysis of operational data has uncovered significant bottlenecks in our order processing and delivery systems. These inefficiencies are particularly pronounced when handling larger orders (25+ items) and during peak seasonal periods. The “Process” Steam Press (SP) and Wash & Iron (WI) emerged as the most requested, but they also represent the primary bottlenecks due to their high demand.

3.1 Customer Impact Analysis

Our existing customers are disproportionately affected by service delays. A staggering 92.6% of all delayed pickups occur with repeat customers, which presents a significant risk to customer retention and lifetime value. While new customers experience fewer delays (only 7.4% of total), the impact on existing customer satisfaction cannot be overstated.



When I spoke with the operations team, they confirmed that no special handling procedures exist for loyal customers, which may explain why our most valuable customers are experiencing the same or worse service levels than new acquisitions.

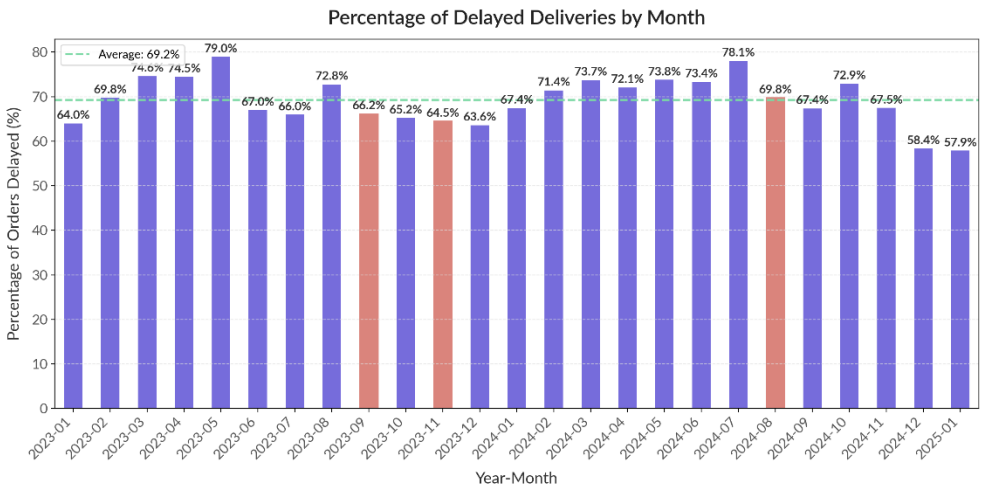
3.2 Order Size Bottlenecks

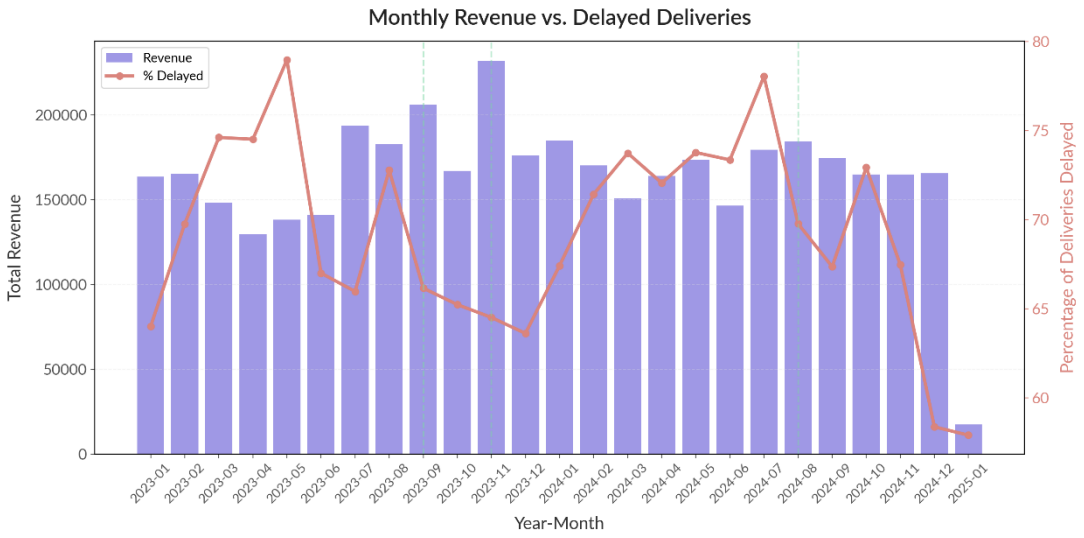
The data reveals a concerning pattern regarding larger orders:

Delivery Status Summary:

- Total orders with both dates recorded: 7972
- Orders delivered on time or early: 2428 (30.5%)
- Orders delivered late: 5544 (69.5%)

This shows that among orders where both assigned delivery date and actual delivery date were recorded, 69.5% were delivered late (after the assigned delivery date).
Here's a visualization of the percentage of delayed deliveries by month





Delivery Performance for High Revenue Months:

- Month: November-2023
- Revenue: 232,126.00
- Delayed Deliveries: 64.5%
- Average Delay Duration: 10.8 days

- Month: September-2023
- Revenue: 206,064.00
- Delayed Deliveries: 66.2%
- Average Delay Duration: 9.6 days

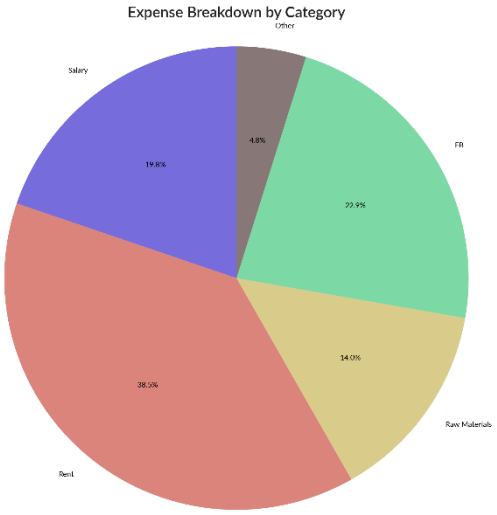
- Month: August-2024
- Revenue: 184,728.00
- Delayed Deliveries: 69.8%
- Average Delay Duration: 13.4 days

Interestingly, all three high-revenue months had significant percentages of delayed deliveries (64-70%), with August 2024 having the highest delay rate (69.8%) and longest average delay duration (13.4 days) among them. This suggests that even during months with high revenue, delivery performance remained a challenge.
Delayed pickups are not solely the result of internal inefficiencies—they also reflect challenges on the customer side. For example, when customers arrive later than scheduled, it creates a ripple effect that disrupts the entire pickup process. To address this, proactive measures, such as timely notifications and reminders, along with a clearly defined grace period, can help keep things running smoothly.

4. Cost-Benefit Analysis

We have data for 12 months from January 2024 to December 2024 covering the

following columns:
Month, Salary, Rent, Raw Materials, EB, Other (individual expense categories),Total Expenses, Orders, Revenue from Orders, Profit, and Profit Margin (%).

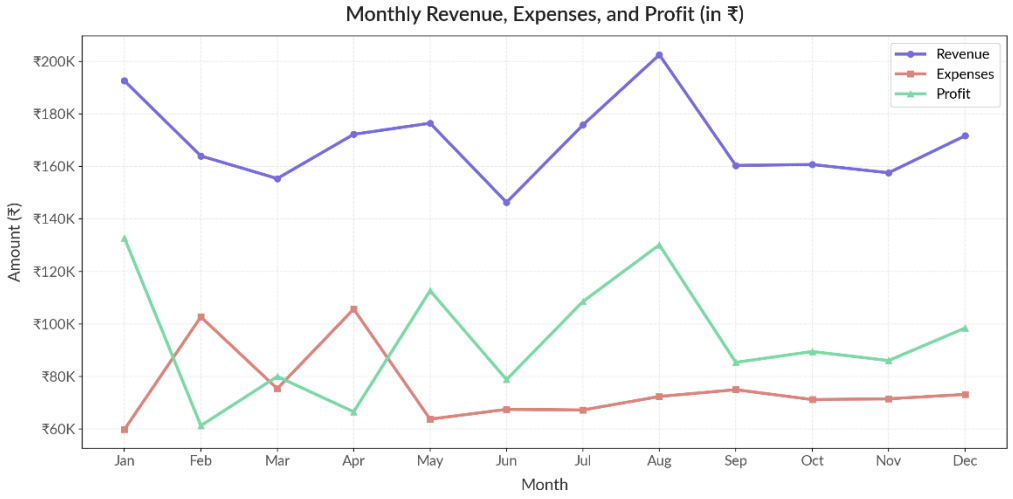


The financial performance, summarized, is as follows:

- Total Revenue: ₹2,035,244
- Total Expenses: ₹905,224.07
- Total Profit: ₹1,130,019.93
- Average Profit Margin: 55.09%

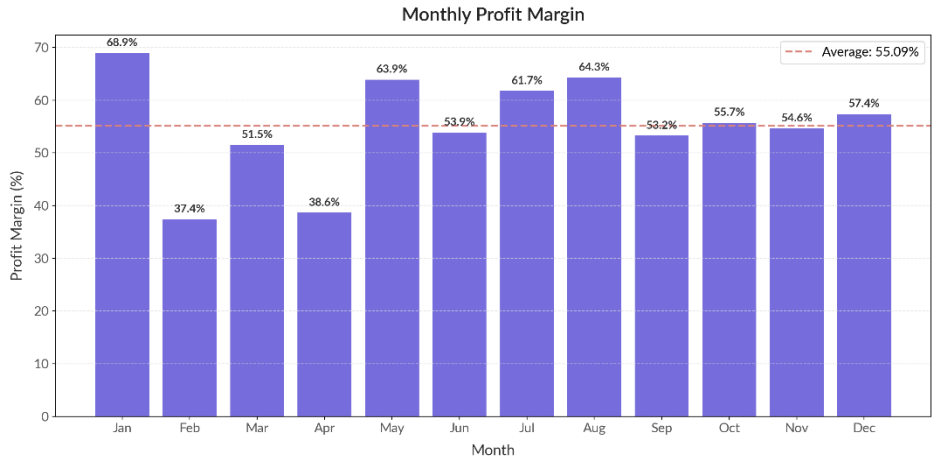
The distribution of expenses is:

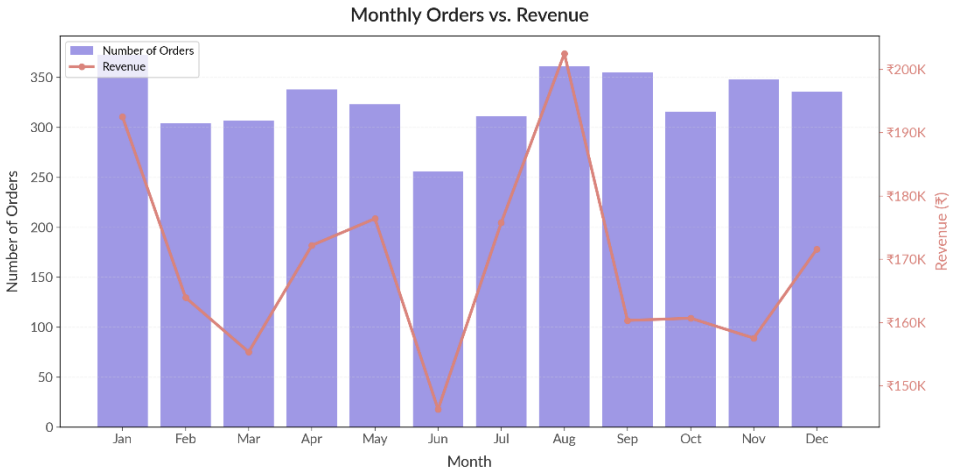
- Salary: 19.77%
- Rent: 38.47% (highest expense)
- Raw Materials: 14.00%
- EB: 22.92%
- Other: 4.84%



The business shows strong overall performance with:

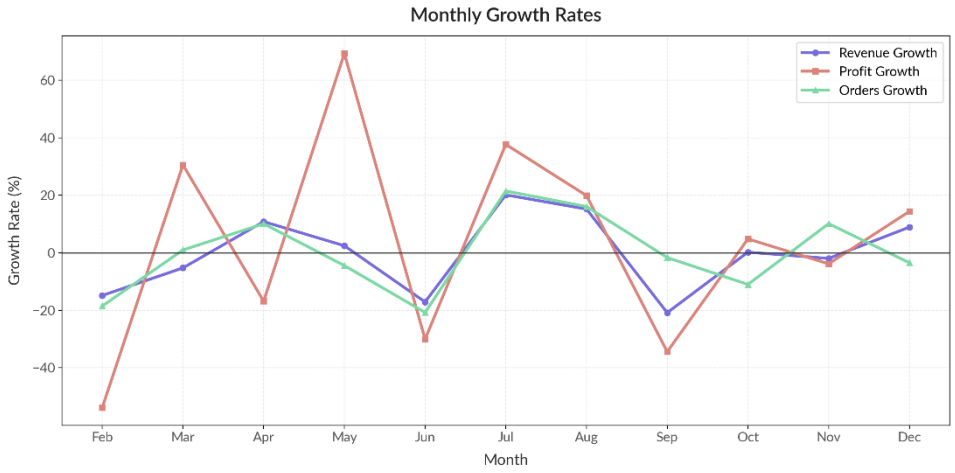
- Total Revenue: ₹2,035,244
- Total Profit: ₹1,130,020
- Average Profit Margin: 55.09%



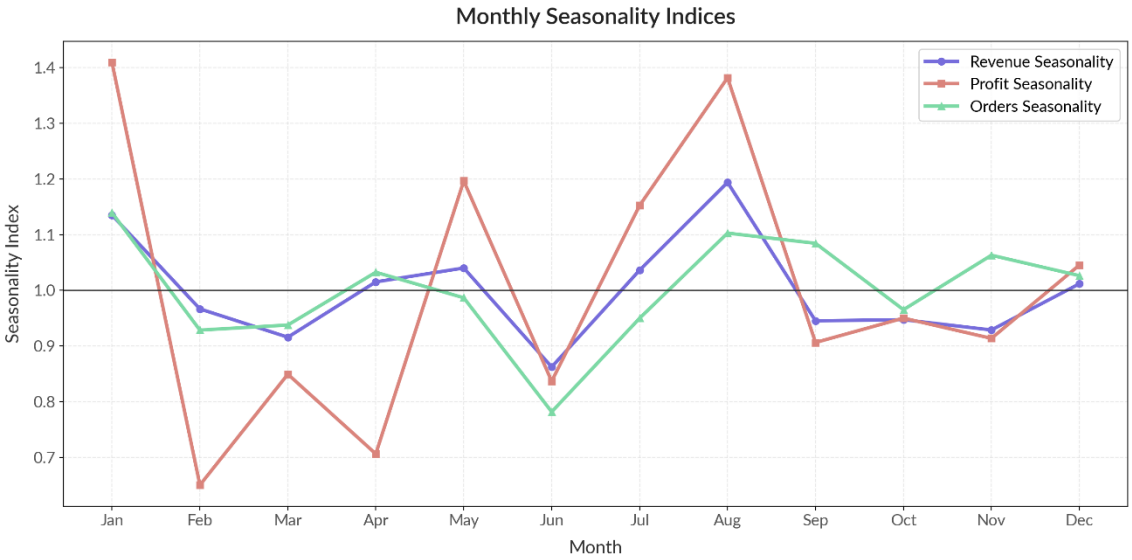


Key insights:

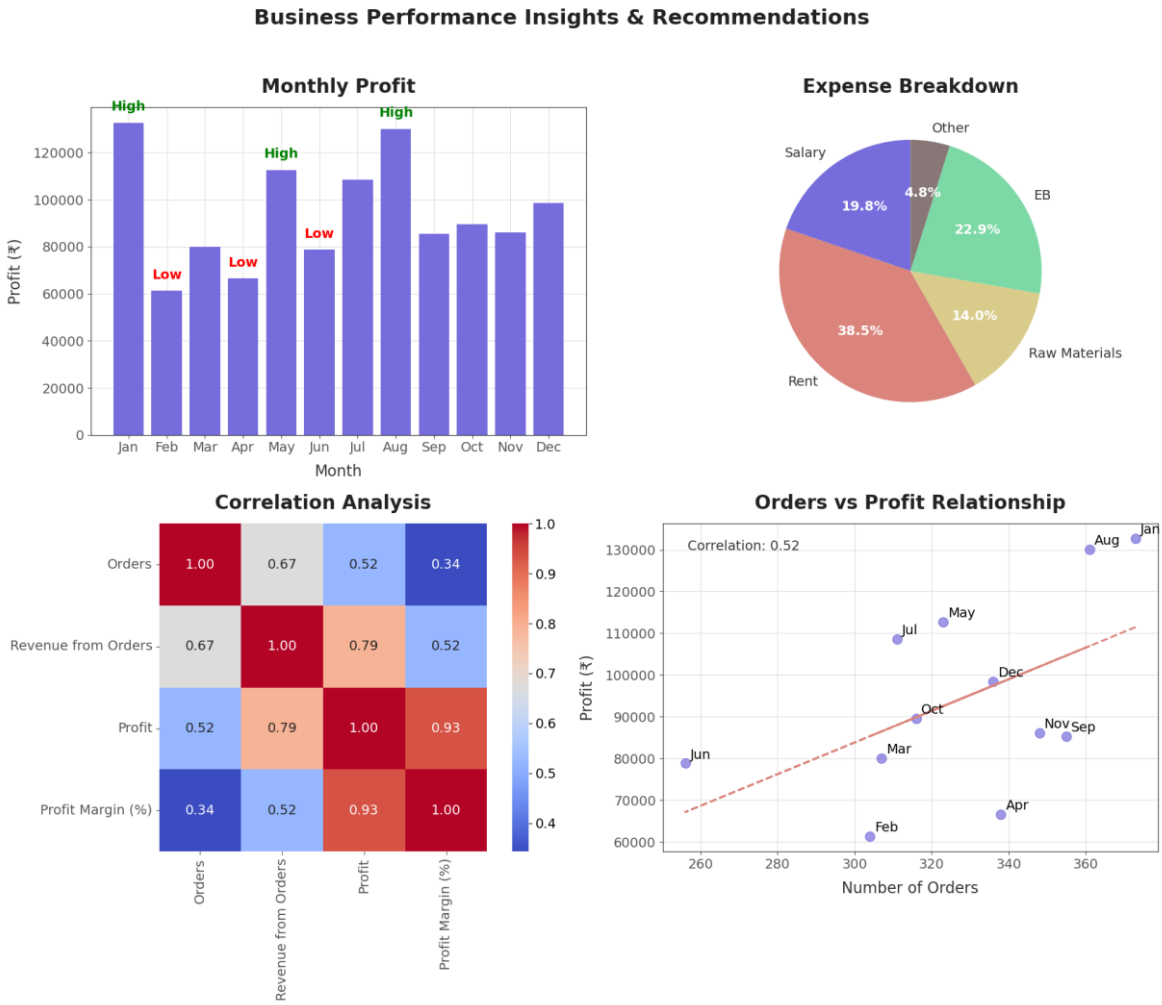
- Rent (38.47%) is the largest expense category
- Positive profit growth (3.43%) despite slight revenue decline (-0.20%)
- Strong ROI (124.83%) and benefit-cost ratio (2.25)
- Highest profit months: August 2024, January 2024, May 2024
- Lowest profit months: February 2024, April 2024, June 2024 & Sep 2024



Revenue growth revolves around 0% , profit growth peaks in May and drops during June.



August represents a strong month across all business metrics. All metrics experience a collective low point in June and partial recovery in December



Based on the comprehensive visualization of the business data, here are the key insights and recommendations:

Monthly Profit Analysis

- The bar chart clearly identifies January, May, and August as high-profit months
- February, April, and June show significantly lower profits
- This seasonal pattern suggests opportunities for targeted strategies during low-performing months

Expense Breakdown

- Rent is indeed the largest expense category at 38.5% of total costs
- Electricity (EB) is the second largest at 22.9%
- These two categories combined represent over 60% of expenses, making them prime targets for cost optimization

Correlation Analysis

- The heatmap confirms a moderate positive correlation (0.52) between Orders and Profit

- Revenue from Orders has a strong correlation (0.79) with Profit
- This validates the recommendation to focus on increasing order volume

Orders vs. Profit Relationship

- The scatter plot with trend line demonstrates the positive relationship between number of orders and profit
- The correlation coefficient of 0.52 indicates that while orders drive profit, there are other factors at play
- Month annotations on the scatter plot help identify which months perform better relative to their order volume

4. INTERPRETATION OF RESULTS AND RECOMMENDATION

4.1 ***Consistent June Dips***

- The data shows June had significant drop in 2023 & 2024 in both revenue and order volume from peak months.
- In Kerala, June typically marks as beginning of Monsoon, which could explain reduced laundry demand.

Strategic Suggestions

- Seasonal promotions for monsoon season for June to counteract the natural dip. Use the same low revenue month for staff training and equipment maintenance, plan inventory and supply orders accordingly.
- Shift the marketing budget (Social Media, Newspaper Ads) from June to other potential months.
- Consider offer incentives and subscription programs for customer retention

4.2 ***RFM Analysis and Strategic Suggestions***

- From RFM, recent customers should be incentivized with targeted discounts and special offers to encourage repeat business, while high-frequency customers can be rewarded through enhanced loyalty programs. At the same time, high spenders' merit premium services and personalized deals tailored to their preferences. By analyzing order histories, these customer segments can be accurately identified and engaged.

- Additionally, implement multichannel campaigns that reach customers across the spectrum from those at risk of churning to loyal champions which will strengthen overall engagement. Incorporate feedback

through reviews, surveys, and real-time insights which will further refine these marketing strategies, ensuring they resonate with each segment and drive sustained growth.

4.3 ***Cost Benefit Analysis***

- Rent constitutes of total expenses we can try for a lease renegotiation by approaching the landlords with data showing revenue rations in the industry. Offer long term contract in exchange for reduced monthly rates.
- Seasonal profits in November August and September while June and April lags significantly. So, we develop season specific promotions to address low profit months.
- With a moderate positive correlation (0.52) between Orders and Profit we can increase transaction frequency by introducing Customer Loyalty Program that helps in repeat customers particularly in low profit months.

4.4 ***Bottle Neck Analysis***

- To address operational bottlenecks and efficiency start implementing a two-track system which distinguishes between standard orders (less than 25 items) and bulk orders (25+ items). This could help in dedicating specific resources and materials for bulk orders.
- Allotting particular machines for bulk orders and standard orders, there by giving priority to bulk order items.
- During high demand months plan for temporary hires and overtime.
- Improve communication with customers by sending timely notifications and reminders to ensure they are prepared for pickups. Establishing a clear grace period could also mitigate cascading delays caused by late customer arrivals.

These strategic initiatives address the core challenges identified in the data analysis while building on existing strengths, creating a comprehensive approach to enhancing profitability across all operational dimensions.