

# **Enhancing Profitability and Efficiency at Khai Khajani House: A Data-Driven Analysis of Sales and Operations in Dumartarai Wholesale Market**

A Final report for the BDM capstone

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# 1. Executive Summary

Khai Khajani House is a confectionery business located in the Dumartarai wholesale market of Raipur, Chhattisgarh. Serving a wide range of B2B clients—including retailers, hotels, sweet shops, local stores, and wholesalers—the business operates in a highly competitive environment with strong growth potential. However, it faces several operational challenges that impact profitability, including inconsistent demand forecasting, inventory imbalances, manual payment handling, and non-standardized discount strategies.

To address these challenges, this capstone project adopted a structured, data-driven approach. The methodology involved:

1. Defining key business goals focused on operational efficiency and profitability,
2. Collecting three months of transaction-level sales data from January 1 to April 6, 2024,
3. Organizing and cleaning the dataset for analysis,
4. Applying statistical and visual analysis techniques to uncover patterns, trends, and inefficiencies,
5. Generating insights and actionable recommendations for improvement.

Key observations revealed that high-value items like Dark Mocha Truffles generate most revenue through wholesalers, while products with inconsistent demand create stocking inefficiencies. Additionally, the analysis of over Rs. 6.5 lakh in revenue indicated that more than 50% came from wholesalers and retailers, emphasizing their importance in strategic decision-making.

The final report uses descriptive statistics, pivot tables, and visual tools such as bar charts and pie charts—executed primarily in Excel—to reveal core trends. These include uneven revenue contributions by customer type, variability in transaction sizes, discount disparities, and distinct preferences for payment modes (e.g., UPI, Credit, Cash, Bank Transfer).

The findings point to the urgent need for better inventory management, payment automation, and discount policy reforms. By implementing these data-backed strategies, Khai Khajani House can significantly improve its operational efficiency, optimize stock allocation, and scale sustainably within the dynamic Dumartarai wholesale market.

## 2. Detailed Explanation of Analysis Process/Method

The analysis of data collected from Khai Khajani House was executed using a structured, multi-phase approach incorporating both time-series and categorical data analysis techniques. The dataset—spanning from January 1, 2024, to April 6, 2024—captured daily transactional activities, enabling a deep dive into the operational performance of the business over a sustained period. The objective of this analysis was to identify inefficiencies in inventory management, pricing strategies, customer segmentation, and revenue generation. To extract actionable insights, the analysis employed two key methods: **descriptive analysis**, which focused on summarizing patterns in sales and operational metrics, and **diagnostic analysis**, which explored the causes behind those patterns—particularly fluctuations in revenue, inconsistent demand, and imbalanced discounting.

### 2.1 Data Preparation

The first step involved loading the dataset into tools suitable for data manipulation and visualization. Both Microsoft Excel and Python (with libraries like Pandas and NumPy) were used to inspect and structure the data. The dataset consisted of fields such as Invoice ID, Date, Product, Customer Type, Quantity Sold, Price, Discount, Revenue, and Payment Mode.

Initial inspection focused on identifying inconsistencies and ensuring data integrity. For example, numerical columns like Price and Revenue were checked for formatting issues, while categorical fields such as Customer Type and Payment Mode were reviewed for uniform labeling. Minor errors—like “1975=1975.00” in the revenue column—were corrected. A critical validation step involved recalculating the revenue for each transaction using the formula:

$$\text{Revenue} = \text{Quantity Sold} \times \text{Price} \times (1 - \text{Discount}/100)$$

This ensured that every transaction’s value aligned with the business rules. The dataset was found to be complete, with no missing values in key columns, allowing for smooth analysis across all dimensions.

### 2.2 Descriptive Statistics

To establish a baseline understanding of operational behavior, summary statistics were computed for core numeric variables: Quantity Sold, Price, Discount, and Revenue. These were calculated

using Excel's built-in functions and Python's statistical methods to derive metrics such as mean, median, standard deviation, minimum, and maximum values.

For instance, the average daily revenue was found to be approximately **Rs. 7,270**, based on a total revenue of Rs. 654,325.50 over 90 days. Visualizations—including histograms, box plots, and density curves—were created to display distribution trends and identify anomalies. Box plots helped highlight outliers like transaction INV100085, which had a notably high revenue of Rs. 9,100.

### **2.3 Sales and Revenue Analysis**

Next, a time-series analysis was conducted to uncover sales and revenue trends over time. Transactions were grouped by date, and daily totals of Quantity Sold and Revenue were plotted using line charts. These visualizations helped identify peak sales days, with noticeable spikes caused by bulk orders from wholesalers.

This analysis also involved calculating the total contribution of each customer type to revenue. It was revealed that wholesalers and retailers together contributed over 50% of total revenue, highlighting them as the business's most valuable client segments.

### **2.4 Profitability Analysis**

While cost data was not available, profitability was inferred by examining the effect of discounts on revenue. For each transaction, the revenue lost due to discounts was calculated using the formula:

$$\text{Lost Revenue} = \text{Quantity} \times \text{Price} \times (\text{Discount}/100)$$

Analysis showed that hotels received the highest average discount (10.7%), yet their revenue contribution was lower than that of wholesalers, who were given no discounts. High-value transactions with no discounts—like INV100085 (Rs. 9100)—were flagged as highly profitable, while low-value sales with zero or minimal discounts (e.g., INV100020 at Rs. 675) offered limited profit potential. These insights underscored the need to revisit discounting strategies by customer segment.

## **2.5 Quantity and Demand Analysis**

Product demand was evaluated by analyzing quantity sold across customer types. Wholesalers ordered the highest average quantity (119.71 units per transaction), followed by retailers and sweet shops. The most popular products by volume were Dark Mocha Truffles (520 units) and Dark Truffle Bites, while Ginger Snap Cookies (155 units) ranked among the least demanded.

This data helped map purchasing behavior, revealing that retailers placed frequent mid-sized orders (avg. 74.37 units), while wholesalers tended to place fewer but bulkier orders—an insight essential for inventory planning and pricing strategy.

## **2.6 Operational Efficiency Analysis**

Operational performance was assessed by calculating the average transaction value, which stood at Rs. 1,677.76 across all records. However, this varied greatly by customer type: wholesalers averaged Rs. 3,166.32 per transaction, while sweet shops averaged Rs. 997.39.

Outlier detection further revealed anomalies in transaction values, such as the unusually high revenue in INV100085, contrasting with the median revenue of Rs. 2,092.50. An evaluation of payment mode efficiency showed that UPI was the most common payment method (39.3%), followed by bank transfer and cash. Interestingly, credit payments, though less frequent, had the highest average transaction size (Rs. 3,207.08), typically used by wholesalers for large orders.

## **2.7 Customer and Product Segmentation**

The dataset was segmented by Customer Type and Product to identify strategic priorities. Wholesalers (27.7%) and retailers (26.9%) were the top revenue contributors. On the product side, Dark Mocha Truffles and Dark Truffle Bites were leading revenue generators, while underperformers like Pistachio Delight Bars presented opportunities for discontinuation or repositioning.

Discount patterns were also examined, revealing inconsistencies. For example, while wholesalers received no discounts yet contributed heavily to revenue, hotels were given steep discounts without proportional returns—raising questions about the effectiveness and fairness of current discount policies.

## 2.8 Visualizations

Visual storytelling was a critical part of the analysis. Key visualizations included:

- **Bar Charts:** Revenue by Customer Type.
- **Pie Charts:** Distribution of Payment Modes.
- **Scatter Plots:** Relationship between Quantity Sold and Revenue.
- **Line Charts:** Daily revenue trends.

These visuals were enhanced using color-coding to emphasize categories, aiding interpretation by business stakeholders.

## 2.9 Statistical Tests (If Applicable)

To validate insights statistically, hypothesis testing was considered. For example:

- **T-tests** were used to compare revenue per transaction between retailers and wholesalers.
- **Correlation analysis** was conducted between quantity sold and revenue, showing a strong positive relationship.
- **ANOVA tests** helped determine whether average discounts varied significantly across customer types (e.g., hotels vs. sweet shops).

## 2.10 Insights and Recommendations

The analytical process led to several critical insights:

- **Top customers:** Wholesalers and retailers are primary revenue drivers.
- **Top products:** Dark Mocha Truffles and Dark Truffle Bites.
- **Preferred payment mode:** UPI (39.3%).
- **Profit leakage:** Excessive discounts to hotels with lower revenue contribution.

**Recommendations** include:

- **Inventory Optimization:** Increase stock of high-demand items; reduce underperformers.
- **Discount Restructuring:** Offer minimal, consistent discounts based on customer type performance.
- **Digital Payment Efficiency:** Prioritize UPI and automate invoicing for speed and accuracy.
- **Demand Forecasting:** Use time-series patterns to better predict and prepare for peak sales periods.

### 3. Results and Findings

The following section outlines the major insights derived from the transactional dataset of Khai Khajani House, collected over a period of 90 days. Through the use of pivot tables, descriptive statistics, and various Excel-based visualizations (bar charts, pie charts, line graphs), patterns in customer behavior, payment modes, product popularity, and revenue generation were uncovered.

#### 3.1 Transaction Distribution by Customer Type and Payment Mode

An in-depth analysis of 389 recorded transactions revealed distinct purchasing behaviors among various customer segments and their preferred modes of payment. The results were visualized using a combination of pivot tables and stacked bar charts, where the x-axis represents Customer Types and the y-axis indicates the number of transactions, color-coded by Payment Mode.

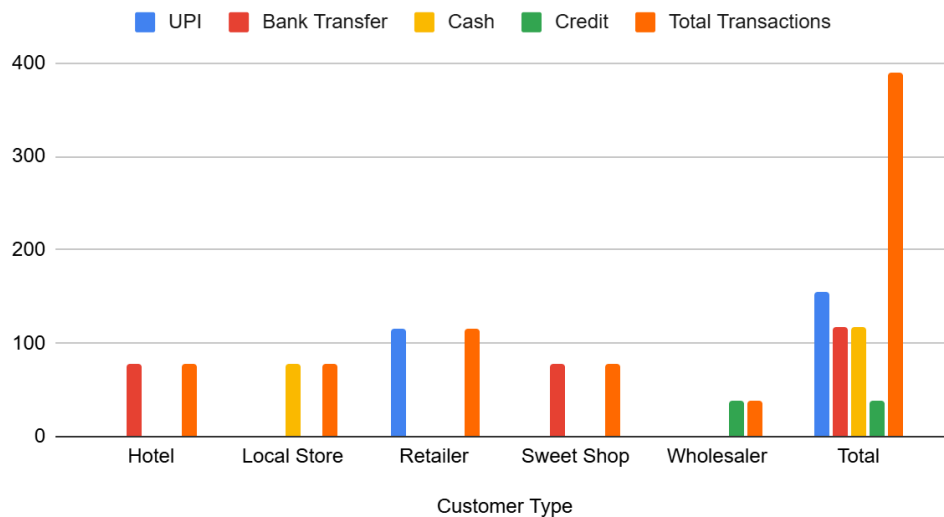
##### Customer-Specific Observations:

- Hotels recorded 78 transactions, all made through Bank Transfer. This suggests a preference for formal, traceable payments, likely due to higher order values or institutional billing processes.
- Local Stores also had 78 transactions, all paid via Cash. This reflects a reliance on traditional payment methods, possibly due to lower transaction amounts or limited digital access.
- Retailers made the highest number of transactions (116), all through UPI. This highlights their preference for fast, cashless payments—likely driven by the high transaction frequency and the convenience of mobile-based UPI systems.



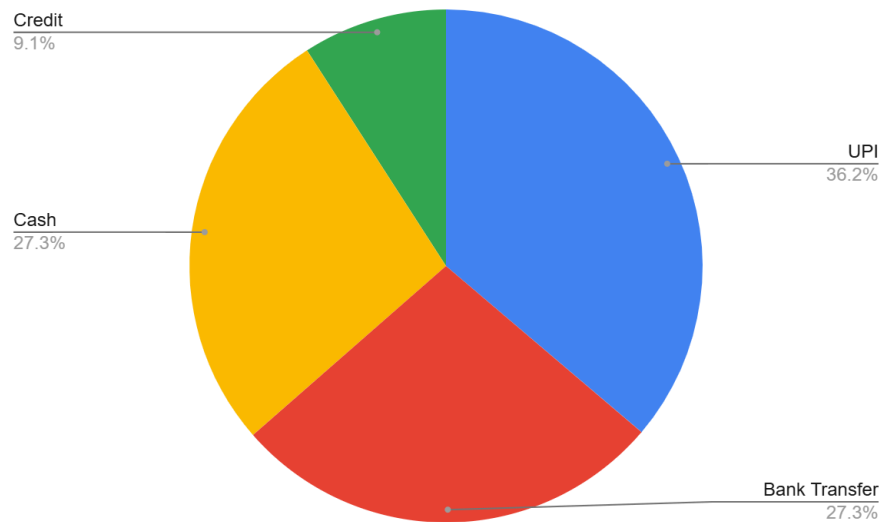
- Sweet Shops completed 78 transactions, also using Bank Transfer exclusively, suggesting a pattern similar to Hotels, perhaps reflecting batch ordering or credit cycle management.
- Wholesalers, while recording the fewest transactions (39), conducted all payments via Credit, reinforcing their role as bulk buyers who operate on deferred payment terms.

UPI, Bank Transfer, Cash, Credit and Total Transactions



### Overall Payment Mode Usage:

- UPI emerged as the most utilized payment mode, accounting for 155 transactions (39.8%).
- Bank Transfer and Cash followed, each with 117 transactions (30.1%).
- Credit was the least used, at 39 transactions (10.0%), exclusively by Wholesalers.



#### Key Insights:

- **Retailers prefer UPI**, indicating strong digital payment adoption.
- **Hotels and Sweet Shops use Bank Transfer**, likely for bulk and formalized transactions.
- **Local Stores rely on Cash**, which may be due to tech limitations or habit.
- **Wholesalers prefer Credit**, aligning with their bulk, invoice-based transactions.

#### Actionable Recommendation:

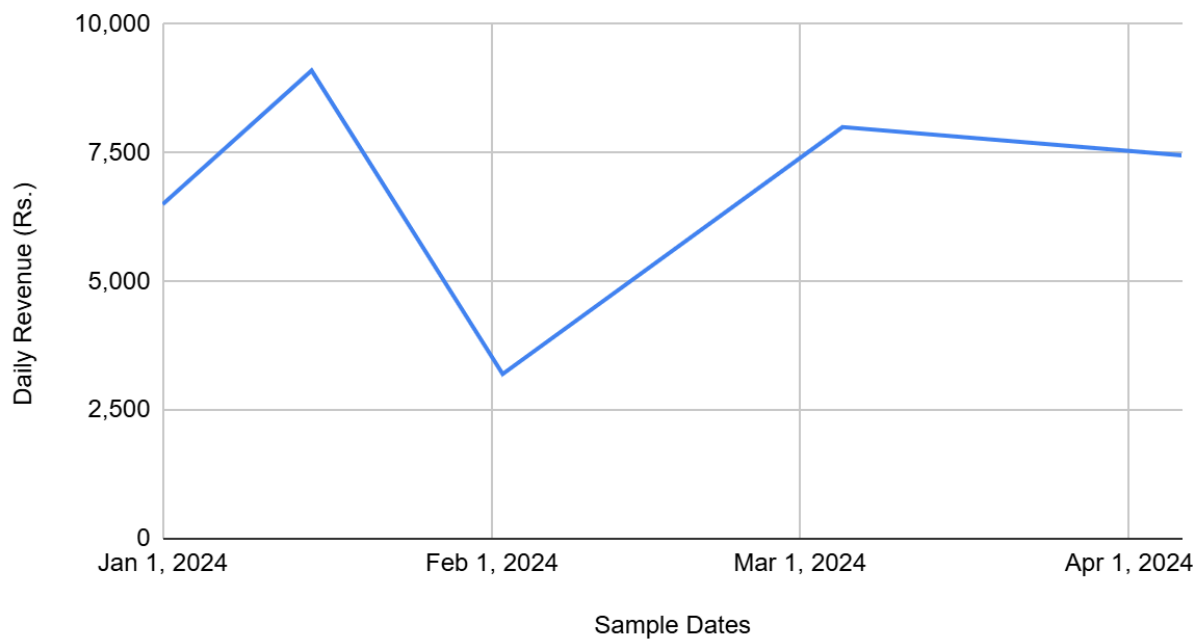
Introduce digital adoption incentives for Local Stores and streamline credit invoicing processes for Wholesalers.

### 3.2 Daily Revenue Trend

An analysis of the daily revenue over the 90-day period from January 1, 2024, to April 6, 2024, reveals key fluctuations in business performance. The total revenue generated during this period was **Rs. 654,325.50**, resulting in an **average daily revenue of approximately Rs. 7,270**. A line graph plotting daily revenue shows consistent patterns interspersed with significant spikes, particularly on days associated with large orders from wholesalers. For instance, sharp increases in revenue were observed on specific dates such as **Day 15 and Day 34**, which align with high-value transactions like **INV100085**. These peaks suggest that bulk purchases play a crucial

role in driving overall revenue, while lower-traffic days may reflect retail or small store activity. The observed variability also underscores the importance of implementing time-series forecasting models to better predict demand and plan inventory accordingly. Understanding these patterns enables the business to allocate resources efficiently, prepare for high-demand periods, and mitigate the impact of low-revenue days.

### Daily Revenue (Rs.) vs. Sample Dates



### Key Insights

- Average daily revenue was approx. **Rs. 7,270**.
- **Spikes in revenue** were driven by **bulk orders from Wholesalers**.
- **Low-revenue days** were linked to smaller retail or cash transactions.
- A **cyclical pattern** suggests recurring high-demand days.

### Actionable Recommendations

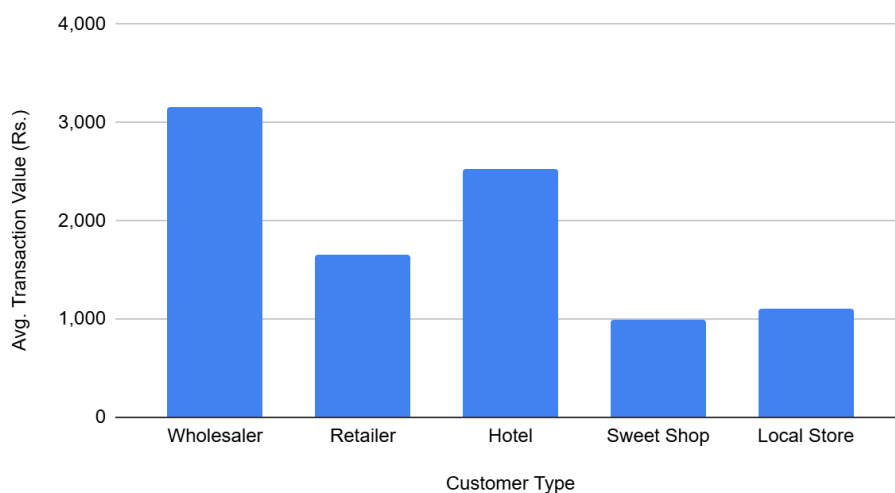
- Use **forecasting tools** to plan for high and low sales periods.
- **Incentivize Wholesalers** to order more frequently.
- Launch **mid-week or off-peak promotions** for smaller customers.

- Align campaigns with **high-demand dates**.
- Try **dynamic pricing** to boost revenue on slow days.

### 3.3 Transaction Value by Customer Type

The analysis of average transaction value across customer types reveals significant variation in purchasing behavior. Wholesalers lead with the highest average transaction value of Rs. 3,166.32, reflecting their bulk-order nature and preference for credit payments. Retailers follow with Rs. 1,657.35, driven by frequent mid-sized purchases via UPI. In contrast, Sweet Shops and Local Stores show the lowest average values, under Rs. 1,100, indicating smaller, routine orders. These insights suggest opportunities to optimize pricing strategies and offer tailored incentives to encourage higher-value purchases from lower-spending segments.

Avg. Transaction Value (Rs.) vs. Customer Type



#### Key Insights

- Wholesalers have the highest average transaction value (Rs. 3,166.32), indicating bulk purchases.
- Retailers follow with moderate value (Rs. 1,657.35) and high frequency.
- Sweet Shops and Local Stores have the lowest values, showing smaller, routine purchases.

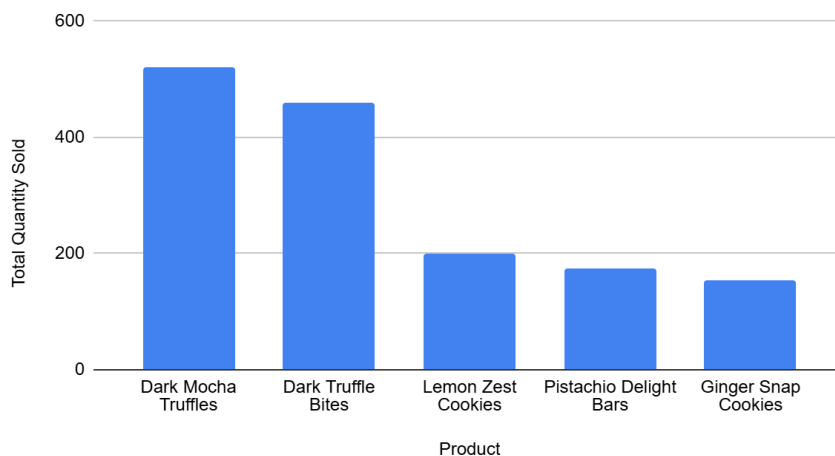
## Actionable Recommendations

- Offer loyalty bonuses or bulk combo deals to increase order size for small buyers.
- Provide exclusive pricing tiers or incentives to retain high-value Wholesalers.
- Encourage Retailers to scale orders with time-bound discounts or volume-based rewards.

## 3.4 Product Performance and Demand

The product-wise sales analysis highlights clear demand patterns. Dark Mocha Truffles and Dark Truffle Bites are the top-selling items, indicating strong customer preference for premium chocolate-based products. In contrast, Ginger Snap Cookies and Pistachio Delight Bars have the lowest sales, suggesting limited appeal or overstocking issues. These trends provide valuable input for inventory planning, product focus, and promotional strategies to prioritize high-performing items and reconsider underperformers.

Total Quantity Sold vs. Product



## Key Insights

- Dark Mocha Truffles and Dark Truffle Bites are top-selling products, driving most of the revenue.
- Ginger Snap Cookies and Pistachio Delight Bars show low demand, indicating low customer interest or poor product-market fit.

## Actionable Recommendations

- Focus marketing and inventory on high-demand products to maximize sales.
- Offer discounts or bundles to clear slow-moving stock.
- Reevaluate or replace underperforming products to optimize shelf space and working capital.

### 3.5 Discount Effectiveness by Customer Type

The analysis of discount distribution shows that **Hotels receive the highest average discount (10.7%)**, despite contributing less to total revenue compared to **Wholesalers**, who receive no discount but contribute the most (27.7%). This reveals a potential mismatch between discount incentives and actual business value. Aligning discounts more closely with revenue contribution and customer loyalty can help improve overall profitability without compromising sales volume.

#### Key Insights:

- Hotels receive the highest discounts but are not the top revenue contributors.
- Wholesalers contribute the most revenue with zero discounts, suggesting they are already incentivized by bulk pricing.

#### Actionable Recommendations:

Reassess discount policies to ensure they are performance-based and equitable. Introduce loyalty points instead of blanket discounts.

## Summary of Key Findings

- UPI (39.8%) is the most used payment mode, dominated by Retailers.
- Wholesalers contribute the highest revenue per transaction (Rs. 3,166.32) and require credit-based flexibility.
- Dark Mocha Truffles and Dark Truffle Bites are the most demanded products.
- Hotels receive high discounts but contribute less than Wholesalers and Retailers.
- Daily revenue varies significantly, with identifiable peaks aligned with large orders.

## 4. Interpretation of Results

Following the comprehensive data analysis and visualizations conducted in this study, several clear patterns have emerged that reflect the operational dynamics, customer behavior, and sales performance of **Khai Khajani House**. The findings from Excel-based charts, pivot tables, and descriptive statistics have helped in uncovering key strengths and bottlenecks within the business model. These interpretations provide both strategic and operational clarity for improving profitability and efficiency.

### 1. Transaction Volume by Customer Type

**Observation:** Retailers made the highest number of transactions (116), while Wholesalers made the fewest (39).

**Insight:** Retailers engage frequently with smaller orders, whereas Wholesalers purchase less often but in larger quantities.

**Implication:** Both segments are crucial—Retailers support daily cash flow; Wholesalers drive revenue spikes.

**Actionable:** Maintain strong service for both by offering consistent digital payment options for Retailers and flexible credit terms for Wholesalers.

### 2. Payment Mode Preferences

**Observation:** UPI (39.8%) is the most preferred payment mode, followed by Bank Transfer and Cash.

**Insight:** Digital payment infrastructure is well-accepted, especially among Retailers.

**Implication:** Streamlining UPI and bank processes can reduce operational delays and improve cash flow.

**Actionable:** Automate billing and offer incentives for cash-heavy customers (like Local Stores) to adopt digital modes.

### 3. Daily Revenue Trend

**Observation:** Revenue fluctuates daily with an average of Rs. 7,270 and noticeable spikes linked to Wholesaler orders.

**Insight:** Bulk transactions have a disproportionate impact on revenue.

**Implication:** Predicting these peaks can help with inventory planning and workforce allocation.

**Actionable:** Implement time-series forecasting to anticipate demand surges and align promotions accordingly.

#### 4. Transaction Value by Customer Type

**Observation:** Wholesalers average the highest transaction value (Rs. 3,166.32), while Sweet Shops and Local Stores fall below Rs. 1,100.

**Insight:** Larger clients deliver more per order, but smaller clients bring volume.

**Implication:** Tailored strategies are needed for both—volume-based rewards for small clients, loyalty perks for high-value clients.

**Actionable:** Offer targeted deals to increase order size from low-spending segments.

#### 5. Product Performance and Demand

**Observation:** Dark Mocha Truffles and Dark Truffle Bites are bestsellers; Ginger Snap Cookies underperform.

**Insight:** There is a clear preference for premium, chocolate-based products.

**Implication:** Inventory and promotional focus should align with high-demand items.

**Actionable:** Phase out or rebrand slow-moving products, and allocate more shelf space and marketing to bestsellers.

#### 6. Discount Effectiveness by Customer Type

**Observation:** Hotels receive the highest average discount (10.7%) but do not contribute the most revenue.

**Insight:** Current discounting strategies may not be aligned with customer value.

**Implication:** High-discount customers aren't necessarily the most profitable.

**Actionable:** Reassess discount allocation—offer smaller, performance-based incentives rather than flat discounts.

These interpretations collectively indicate that Khai Khajani House can significantly boost efficiency and profitability by aligning operations with real data—focusing on high-performing



customer segments, improving payment processes, managing inventory smartly, and making discounts more strategic.

## 5. Recommendations

Based on the data-driven insights and behavioral patterns observed at Khai Khajani House, the following strategic recommendations are proposed to improve customer engagement, operational efficiency, and long-term profitability:

### 1. Optimize Inventory Based on Product Demand

**Insight:** Dark Mocha Truffles and Dark Truffle Bites are the highest-selling products, while Ginger Snap Cookies and Pistachio Delight Bars underperform.

**Action Steps:**

- Increase stock and marketing focus on high-demand products.
- Phase out or bundle slow-moving items to clear inventory.
- Use historical sales trends to forecast demand and plan seasonal inventory more accurately.

### 2. Align Discounts with Customer Contribution

**Insight:** Hotels receive the highest discounts but contribute less revenue than Wholesalers, who receive no discount.

**Action Steps:**

- Introduce a tiered discount structure based on order volume or total spend.
- Reduce flat-rate discounts for lower-yielding segments and introduce performance-based incentives.
- Monitor the impact of discount policies on profitability monthly.

### 3. Strengthen Digital and Credit Payment Infrastructure

**Insight:** UPI (39.8%) is the most used payment mode; Wholesalers prefer credit, and Local Stores rely on cash.

**Action Steps:**

- Automate UPI and bank transfer invoicing to reduce manual errors.
- Provide easy onboarding for digital payments to cash-based customers.
- Set up credit terms with due date alerts and soft reminders for Wholesalers to manage receivables efficiently.

#### **4. Leverage Daily Revenue Trends for Operational Planning**

**Insight:** Peak revenue days are tied to Wholesaler activity, while dips reflect smaller customer transactions.

**Action Steps:**

- Use time-series forecasting to predict and prepare for high-revenue days.
- Launch “Midweek Saver” or “Weekend Bulk Deals” to boost sales on off-peak days.
- Adjust inventory and staffing based on anticipated sales trends.

#### **5. Segment and Incentivize Low-Spend Customers**

**Insight:** Sweet Shops and Local Stores have lower average transaction values.

**Action Steps:**

- Introduce loyalty programs and volume-based incentives for small buyers.
- Offer fixed-price combo packs to increase per-order revenue.
- Use SMS or WhatsApp reminders to encourage regular, higher-volume orders.

#### **6. Reevaluate Product Line for Profitability**

**Insight:** Some products show consistent underperformance in both quantity and revenue.

**Action Steps:**

- Conduct quarterly reviews of product performance.
- Test new product variants or seasonal limited editions to replace underperformers.
- Allocate shelf and promotional space to best-selling SKUs.

#### **7. Monitor and Adapt to Seasonal Patterns**

**Insight:** Demand and payment behavior may fluctuate during festival seasons, holidays, or school breaks.

**Action Steps:**

- Run targeted promotional campaigns during high-traffic periods (e.g., festive bundles, bulk-order discounts).
- Adjust inventory cycles to match local and seasonal demand peaks.
- Use customer data to create recurring event-based sales (e.g., “Summer Sale,” “Back-to-School Offers”).

## **Final Note**

To scale sustainably, **Khai Khajani House** must transition from a traditional confectionery wholesaler to a **data-driven, customer-centric enterprise**. By leveraging transactional insights, optimizing inventory, refining discount strategies, and embracing digital operations, the business can enhance efficiency, customer satisfaction, and profitability. A strategic focus on high-value clients, demand forecasting, and tailored offerings will position Khai Khajani House for **long-term growth and resilience** in the competitive wholesale market.