



Restaurant Sales Performance & Operational Optimization Analysis

Sector Name: Food & Beverage / Hospitality Analytics

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Context & Problem Statement

- **Sector Context:** The restaurant industry faces **high operational costs** and **fluctuating demand**. Success depends on **maximizing revenue per table, menu engineering, and customer retention**.
- **Problem Statement:** The restaurant is generating significant **revenue (\$180k+)** but suffers from a low average **customer rating (2.98/5)** and uneven menu performance (high variance between top and bottom items).
- **Objective:** To utilize sales data to identify revenue drivers, optimize the menu mix, and improve customer satisfaction strategies to boost repeat business.

Data Engineering (Source to Sink)

Source:

- **Dataset:** Restaurant_Sales_Data_Raw
- **Dimensions:** 10,000 Rows, 11 Columns.
- **Period:** Transactions spanning 2022-2023.
- **Link:**
<https://www.kaggle.com/datasets/ahmedmohamed2003/restaurant-sales-dirty-data-for-cleaning-training>

Cleaning Actions (from Cleaning Log):

- **Handling Nulls:** Removed rows where 'Item' was blank (985 rows). Filled missing 'Payment Methods' with Mode (Cash). Filled missing 'Ratings' with Median (3).
- **Standardization:** Standardized text casing (e.g., "beverages " to "Beverages") using PROPER(TRIM()).
- **Type Conversion:** Converted Price, Quantity, and Order Total from Text to Numeric for calculation.

Dictionary:

Key columns selected for analysis include Category, Item, Order Total, Payment Method, Rating, and a derived Month-Year column for trend analysis.

\$180,124.50

Total Revenue

9015

Total Orders

101

Total Customers

2.98

Average Rating

\$19.98

Avg. Order Value

KPI & Metrics Framework



Primary KPIs (Financial Health):

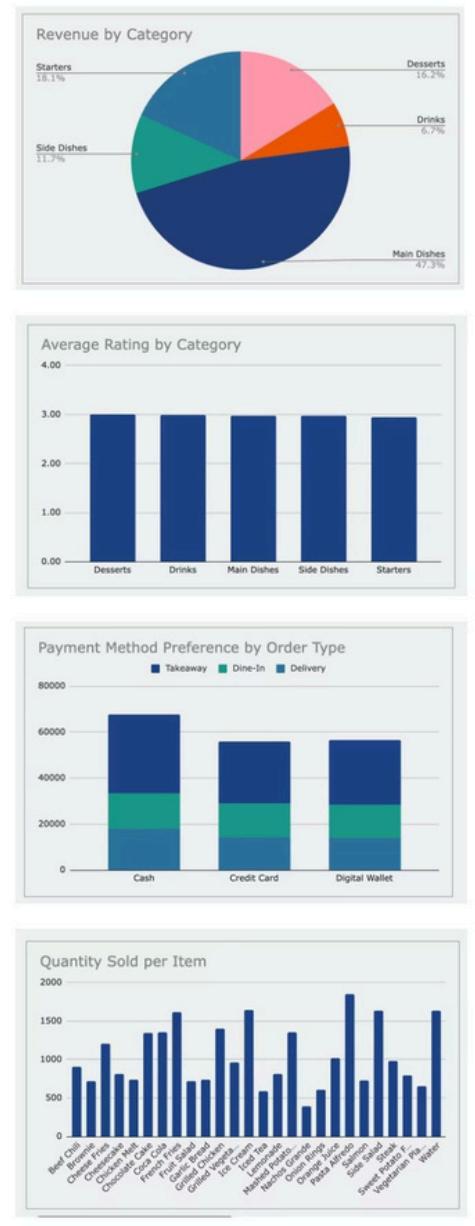
- Total Revenue:** \$180,124.50 – Measures overall business scale.
- Avg Order Value (AOV):** \$19.98 – Benchmarks consumer spending power.



Secondary KPIs (Operational & Satisfaction):

- Total Orders:** 9,015 – Measures volume and kitchen load.
- Average Rating:** 2.98 / 5 – Critical indicator of customer sentiment (currently underperforming).
- Top/Bottom Sellers:** Most Ordered (**Pasta Alfredo**) vs. Least Ordered (**Nachos Grande**) – Guides inventory planning.

*Revenue stability contrasts with low customer sentiment.



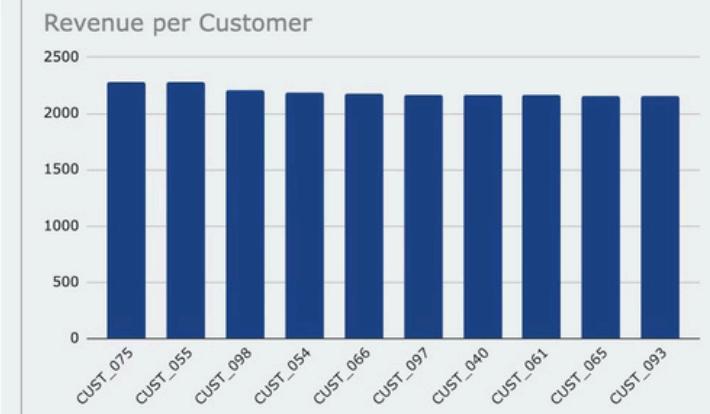
Key Insights (EDA)

- Revenue Concentration:** The "Main Dishes" category drives the bulk of the revenue, anchored by the popularity of *Pasta Alfredo*.
- Customer Sentiment Alert:** The average rating is critically low at 2.98. A significant portion of orders are rated neutrally or poorly.
- Payment Behavior:** "Cash" is the preferred payment method, indicating a need for better cash handling processes or incentives to move users to digital wallets for faster checkout.
- Menu Polarization:** There is a stark contrast between winners (*Pasta Alfredo*) and losers (*Nachos Grande*), suggesting wasted inventory on unpopular items.

Advanced Analysis

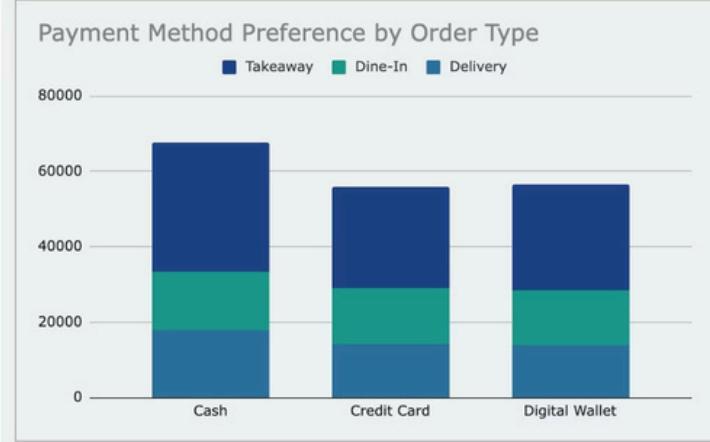
Customer Segmentation (Valuation):

- Identified **CUST_075** as the "Most Valuable Customer" with **\$2,283** in revenue.
- Insight:* A small percentage of customers are driving outsized revenue. A loyalty program targeting these "Whales" is missing.



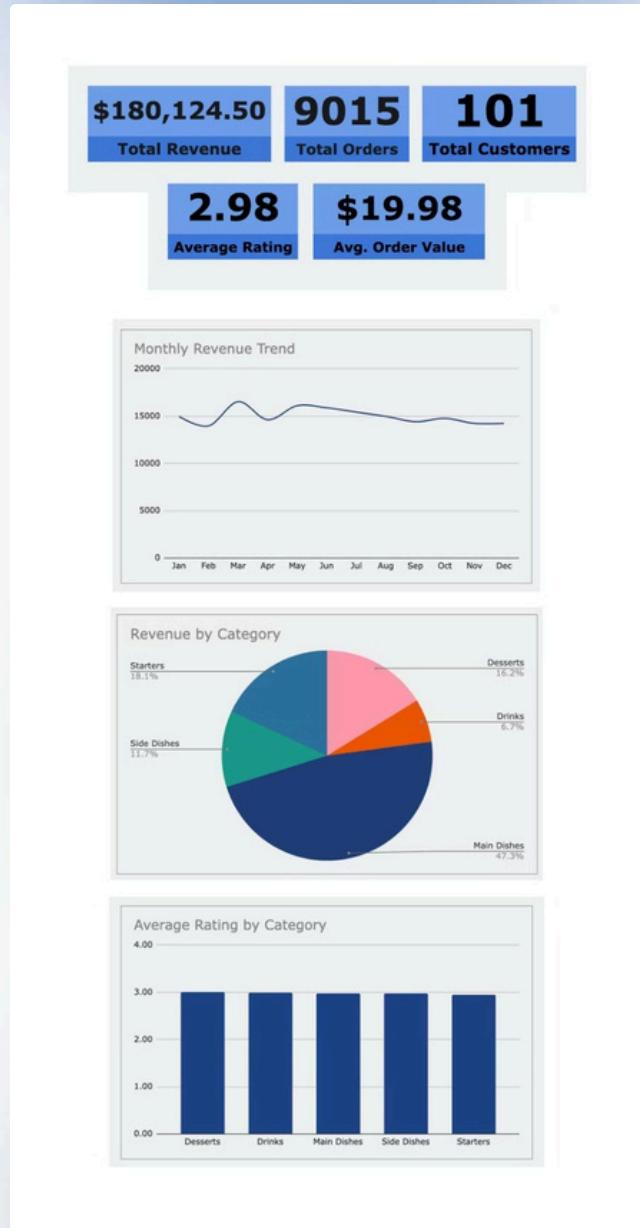
Payment vs. Order Type Correlation:

- Analysis of *Payment Method Preference by Order Type* reveals distinct behaviors between 'Takeaway' vs. 'Dine-in' vs. 'Delivery' customers.
- Insight:* Delivery and Takeaway orders have higher cash usage.



Dashboard Walkthrough

- **Executive View (Top Ribbon):**
 - Immediate visibility into the "Big Numbers": **\$180K Revenue, 9K Orders, and 101 Unique Customers.**
- **Operational View (Drill-Downs):**
 - **Sales Trends:** Monthly revenue graph (Pivot 5) to spot seasonality.
 - **Category Performance:** Bar charts comparing Revenue by Category (Pivot 1) to identify high-margin sectors.
 - **Satisfaction Meter:** Gauge chart tracking the 2.98 Average Rating to monitor service quality.



Recommendations

1. **Menu Engineering:** Retain and promote *Pasta Alfredo* (Star Item). Re-evaluate the recipe or pricing for *Nachos Grande* (Dog Item) or remove it to reduce waste.
2. **Service Quality Overhaul:** The **2.98 rating** is a red flag. Implement a post-meal feedback system to identify if the issue is food quality or service speed.
3. **Loyalty Program for Top Tier:** Create a "VIP Club" for customers like **CUST_075** (e.g., free dessert after \$500 spend) to protect the highest revenue stream.
4. **Digital Transition:** Since Cash is dominant, offer a 5% discount for "Digital Wallet" payments to streamline operations and capture better customer data.

Impact & Value

Revenue Growth:

Optimizing the menu (cutting "Dog" items) could reduce inventory waste.

Customer Retention:

Improving the average rating from **2.98** to **3.5** could statistically increase repeat visit rates.

Efficiency:

Converting cash users to digital payments will reduce checkout times during peak hours.

Limitations & Next Steps

Data Limitations:

- **High number of missing ratings (2042 rows)** required imputation (Median), which may mask true customer extremes.
- **Lack of "Cost of Goods Sold" (COGS) data** prevents true *Profitability* analysis (only Revenue is visible).
- **Lack of Granular Time Data:** The dataset records the Order Date but not the specific **Timestamp** (e.g., 7:30 PM). This makes it impossible to analyze "Peak Rush Hours," calculate table turnover rates, or measure kitchen efficiency (time from order to service).

Future Scope:

- Collect "Time of Day" data to optimize staffing for lunch vs. dinner rushes.
- Integrate food cost data to calculate Gross Margin per item, not just Revenue.
- **Market Basket Analysis (Affinity Analysis):** Future projects could analyze which items are frequently bought *together* (e.g., "Do customers who buy Pasta also buy Wine?"). This would allow the restaurant to create data-backed "**Combo Meals**" to artificially increase the Average Order Value (AOV).

Thank You

We appreciate your time and attention today.