# Pizza Business Performance Analysis and Growth Strategies

**Prepared For: Data-Driven Decision Makers**

**Prepared By: Phan Chenh**

**Date: October 2024**

**Executive Summary**

This report analyses sales trends, product performance, customer behaviour, and ingredient usage to identify key opportunities for revenue growth and operational efficiency. The analysis reveals that:

- Sales Trends: Revenue peaks in July and November, driven by major holidays, while Sundays and Mondays consistently underperform. The highest sales occur between 11 AM–1 PM and 5 PM–7 PM, with early openings (9–10 AM) yielding minimal revenue.
- Product Performance: Supreme and Classic pizzas are top performers, while items like Big Meat S and Brie Carre show potential for expansion into additional sizes.
- Customer Behaviour: Evening sales are dominated by multi-orders, indicating a preference for group dining, while individual-sized pizzas perform well during lunch hours. Cross-selling opportunities exist, such as pairing Big Meat S with larger pizzas.
- Ingredient Usage: Garlic, tomatoes, and red onions are highly utilized and should be emphasized in new recipes or promotions. Pizzas with 5–6 ingredients perform best.

Key recommendations include optimizing pricing strategies with dynamic pricing for popular items, adjusting operational hours to focus on peak periods, refining the menu by expanding high-potential products, and introducing customer-focused promotions like combo deals. Implementing these strategies can maximize revenue, improve customer satisfaction, and reduce operational inefficiencies.

**Table of contents**

## I.   Introduction

**Background:**

This report leverages a comprehensive analysis of sales trends, product performance, customer behaviour, and ingredient usage to identify key opportunities for revenue growth and operational efficiency. The dataset used for this analysis was sourced from publicly available online datasets and incorporates various metrics, such as sales volume, order quantity, peak times, and customer preferences. The business is seeking to optimize operations, enhance its product offerings, and improve overall revenue generation, particularly by aligning strategies with customer demand patterns and peak performance periods.

**Purpose:**

The primary purpose of this report is to provide actionable insights and recommendations that will help the business maximize revenue, optimize operations, and refine its product offerings. This analysis focuses on identifying areas for improvement, such as adjusting operational hours, refining the menu, implementing dynamic pricing strategies, and utilizing promotional efforts during high-demand periods. The report aims to support decision-making and guide the business in aligning its strategies with customer preferences and peak sales periods to ensure sustained growth and operational efficiency.

## II.   Methodology

1. Dataset:
- Based on a publicly available dataset.
- Explored metrics such as sales volume, order quantity, peak times, ingredient usage, and customer preferences.
2. Data Analysis:
- Python was used for data processing, uncovering patterns, and identifying correlations.
- Power BI was employed for data visualization to gain actionable insights.

## III.   Findings and Analysis
### A. Sales trend analysis
### 1. Descriptive Metrics
- Total Sales: $817.86K
- Total Quantity Sold: 49,574 units
- Total Orders: 21,350
- Average Sales:
  - Per Month: ~$68.2K
  - Per Week: ~$15.4K
  - Per Day: ~$2.2K
  - By Weekday: ~$116.8K
### 2. High-Performance Periods
- By Month:
  - July: ~$72.6K, driven by Independence Day activities.
  - November: ~$70.4K, coinciding with Thanksgiving and Black Friday.
  - May and March also show strong performance due to holidays like St. Patrick's Day and Cesaz Chavez Day.
- By Week:
  - Week 48 (November): ~$19.2K, corresponding with Black Friday.
  - Week 27 (June–July): ~$17.5K, around Independence Day.
- By Weekday:
  - Highest sales on Fridays (~$136.1K), followed by Thursdays and Saturdays.
### 3. Low-Performance Periods
- By Month:

- o   October: ~$64K, impacted by consistent closures on Mondays.
- o   September: ~$64.2K, affected by Yom Kippur closures.
- o   December: ~$64.7K, affected by Christmas closures.
- o   February: ~$65.2K, shorter month with fewer sales day
- **-   By Weekday:**
  - o   Lowest sales on Sundays (~$99.2K).

4. **Operational Patterns**
   - **-   Peak Hours:**
     - o   11 AM–1 PM: Sales peak at ~$87.6K.
     - o   5 PM–7 PM: Consistent strong performance ~$82.7K.
   - **-   Lowest Sales Hours:**
     - o   Early hours (9–10 AM) generate minimal revenue (~$83 for 9AM, ~$303 total across 7 days at 10 AM).
   - **-   Closures:**
     - o   Days off (e.g., 25/12/2015 for Christmas, 24–25/9/2015 for Yom Kippur).
   - **-   Irregular Openings:**
     - o   Opening at 9 AM or 10 AM results in negligible sales increases.
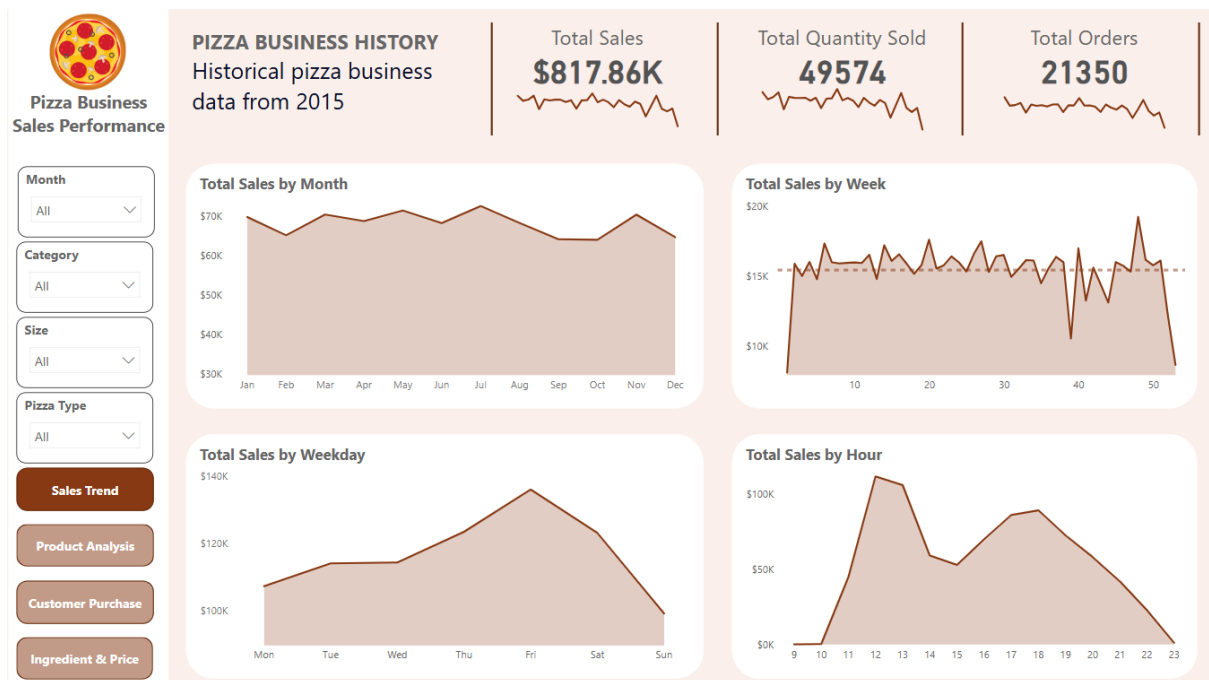


Figure 1: Sales Trend Analysis

## B. Product performance analysis

### 1. Overview of Product Portfolio
- Pizza Categories: Classic, Supreme, Chicken, Veggie
- Number of Pizza Types: 32
- Pizza Size-Types: 91 unique combinations

### 2. Category Performance
- Top Categories: The classic and supreme categories rank highest in both sales and quantity, with classic consistently leading across both metrics.
- Chicken and Veggie: While chicken slightly outperforms veggie in sales, veggie surpasses chicken in terms of quantity sold, indicating balanced customer demand for both price and volume.

### 3. Performance of 32 Pizza Types
- High Sales, Low Quantity: Pizzas like **California Chicken** and **Spicy Italian** generate high sales but have relatively low quantity sold, suggesting a premium pricing strategy that appeals to a smaller, more targeted audience.
- Low Sales, High Quantity: **Hawaiian** and **Pepperoni** are sold in large quantities but generate relatively lower sales. This could indicate customer preference for lower-priced, higher-volume pizzas.

### 4. Pizza Size and Sales Performance:
- General Trend: Large (L) pizzas dominate sales across categories, followed by medium (M) and small (S).
- Category-Specific:
  - Chicken, Veggie, and Supreme: L > M > S reflects a preference for sharing-sized options.
  - Classic: Small (S) leads, followed by large (L), medium (M), XL, and XXL, suggesting individual or small-group consumption.
- XL and XXL Sizes: Only available in the classic category, they underperform due to perceived value or portion size mismatch.
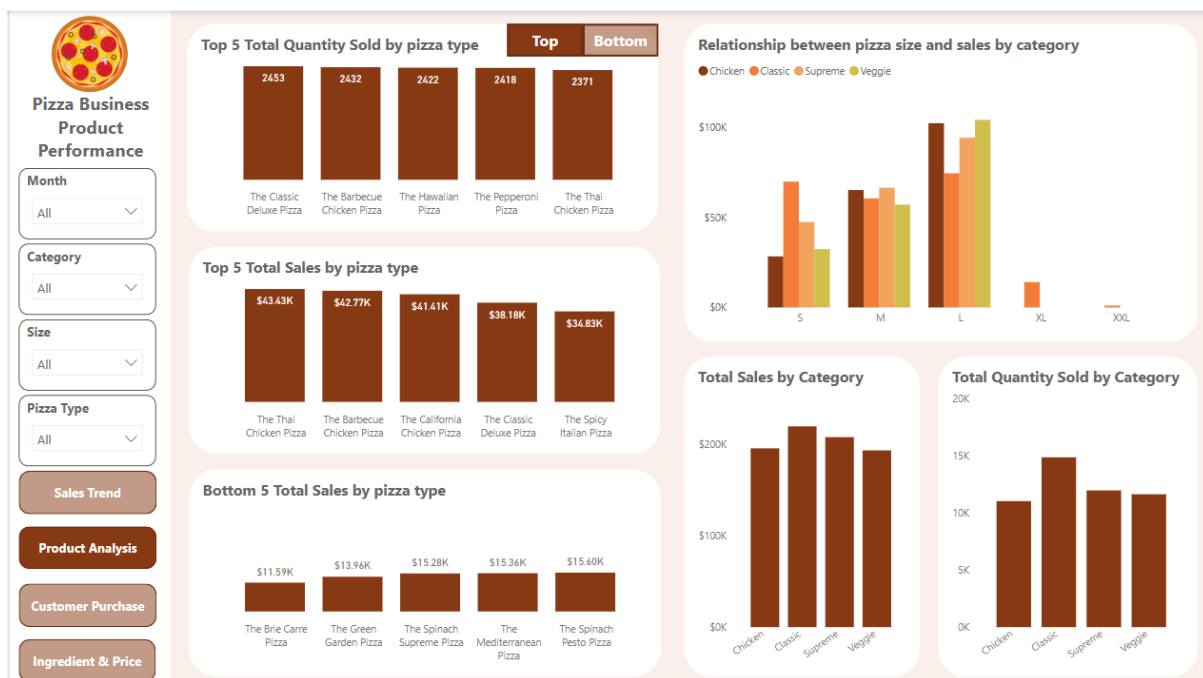


Figure 2: Product Performance Analysis

**C. Customer purchase analysis**

**1. Orders behaviour and peak time insights**

- Customers prefer multi-orders (61.6%) over single orders (38.4%), indicating that groups or families are a key customer segment
- The restaurant experiences two distinct peak times, each with different customer behaviours:
  - First Peak Time (e.g., lunch breaks): Single orders dominate, indicating that these customers are likely individuals looking for quick meals, such as during work or lunch breaks.
  - Second Peak Time (e.g., evening family dinners): Multi-orders dominate, suggesting that group dining or family dinners are more common during this time, where customers order multiple pizzas to share.

**2. Pizza size preferences**

- From Small to Larger sizes (S, M, L) are the preferred choice across all 4 categories, indicating they are popular for group or sharing situations.
- Bigger sizes (XL, XXL) in Classic underperforming. This may be due to perceived value or portion size mismatch for this pizza type.

**3. Performance of 91 Pizza Type-Size Combinations**

- Pizzas like **Five cheese L**, **four cheese L** and **M**, **big meat S** generate high sales but only has a few sizes. Get to know customers preference and their portion to add more size. Adding sizes might attract customers looking for personal portions or a lower price point. This could increase overall sales if there's demand for these sizes.
- Pizza like **Greek pizza** with XXL has low sales but other sizes sales not bad.
- **Green Garden pizza**: Despite offering three sizes, **Green Garden** has weak overall sales. Focus efforts on promoting the size S, which leads in demand.
- **Brie Carre**: Despite being available only in size S, it has achieved strong sales (~$11.6K). This suggests potential for expansion to larger sizes (M, L) to increase overall sales.

**4. Top 10 Common Pizza Combinations**

- **Big Meat S** consistently appears in the majority of top pizza combinations, indicates that customers are favouring it as a single pizza choice, especially when combined with larger-sized pizzas for group or family orders. However, Big Meat only has 1 size only, if it has more size then the revenue might increase since the demand is high.
- The consistent pairing of **Big Meat S** with **larger pizzas** (L and M sizes) suggests that customers often opt for a combination of individual servings (Big Meat S) along with larger pizzas for sharing.
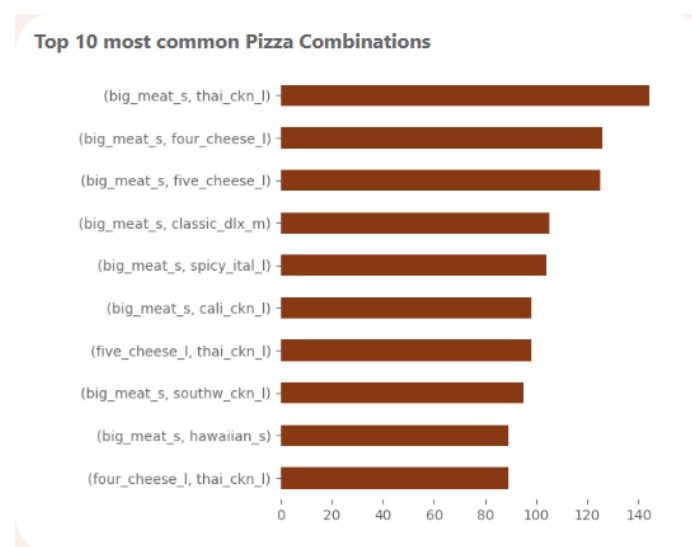


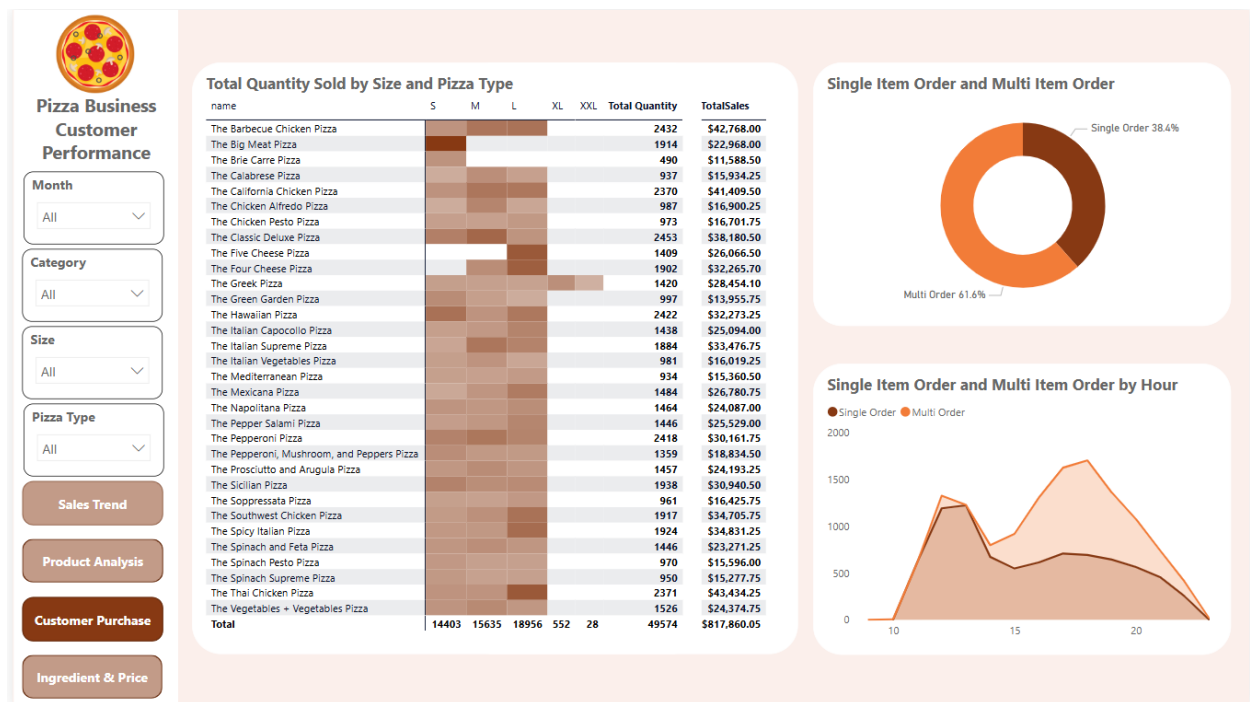Figure 3: Top 10 most common pizza combinations (graph from python code)

**Pizza Business Customer Performance**

Month: All
Category: All
Size: All
Pizza Type: All

Sales Trend
Product Analysis
Customer Purchase
Ingredient & Price

**Total Quantity Sold by Size and Pizza Type**

| name | S | M | L | XL | XXL | Total Quantity | TotalSales |
|---|---|---|---|---|---|---|---|
| The Barbecue Chicken Pizza | | | | | | 2432 | $42,768.00 |
| The Big Meat Pizza | | | | | | 1914 | $22,968.00 |
| The Brie Carre Pizza | | | | | | 490 | $11,588.50 |
| The Calabrese Pizza | | | | | | 937 | $15,934.25 |
| The California Chicken Pizza | | | | | | 2370 | $41,409.50 |
| The Chicken Alfredo Pizza | | | | | | 987 | $16,900.25 |
| The Chicken Pesto Pizza | | | | | | 973 | $16,701.75 |
| The Classic Deluxe Pizza | | | | | | 2453 | $38,180.50 |
| The Five Cheese Pizza | | | | | | 1409 | $26,066.50 |
| The Four Cheese Pizza | | | | | | 1902 | $32,265.70 |
| The Greek Pizza | | | | | | 1420 | $28,454.10 |
| The Green Garden Pizza | | | | | | 997 | $13,955.75 |
| The Hawaiian Pizza | | | | | | 2422 | $32,273.25 |
| The Italian Capocollo Pizza | | | | | | 1438 | $25,094.00 |
| The Italian Supreme Pizza | | | | | | 1884 | $33,476.75 |
| The Italian Vegetables Pizza | | | | | | 981 | $16,019.25 |
| The Mediterranean Pizza | | | | | | 934 | $15,360.50 |
| The Mexicana Pizza | | | | | | 1484 | $26,780.75 |
| The Napolitana Pizza | | | | | | 1464 | $24,087.00 |
| The Pepper Salami Pizza | | | | | | 1446 | $25,529.00 |
| The Pepperoni Pizza | | | | | | 2418 | $30,161.75 |
| The Pepperoni, Mushroom, and Peppers Pizza | | | | | | 1359 | $18,834.50 |
| The Prosciutto and Arugula Pizza | | | | | | 1457 | $24,193.25 |
| The Sicilian Pizza | | | | | | 1938 | $30,940.50 |
| The Soppressata Pizza | | | | | | 961 | $16,425.75 |
| The Southwest Chicken Pizza | | | | | | 1917 | $34,705.75 |
| The Spicy Italian Pizza | | | | | | 1924 | $34,831.25 |
| The Spinach and Feta Pizza | | | | | | 1446 | $23,271.25 |
| The Spinach Pesto Pizza | | | | | | 970 | $15,596.00 |
| The Spinach Supreme Pizza | | | | | | 950 | $15,277.75 |
| The Thai Chicken Pizza | | | | | | 2371 | $43,434.25 |
| The Vegetables + Vegetables Pizza | | | | | | 1526 | $24,374.75 |
| **Total** | 14403 | 15635 | 18956 | 552 | 28 | 49574 | $817,860.05 |

**Single Item Order and Multi Item Order**

Single Order 38.4%
Multi Order 61.6%

**Single Item Order and Multi Item Order by Hour**

Single Order  Multi Order

Figure 4: Customer Purchase Analysis

**D. Ingredients & Price analysis**

**1. Most Used Ingredients**

The top five most used ingredients, including **garlic**, **tomatoes, red onions, red peppers,** and **chicken**, are integral to our highest-performing pizza types across multiple categories.

**2. Least Used Ingredients**

The least used ingredients are predominantly found in **Brie Carre** pizza, which has the lowest sales and quantity.

**3. Popular Ingredient Configurations**

- 6 Ingredients (~18.2K orders): The most popular configuration, especially in Supreme pizzas. This balance between variety and simplicity makes it appealing to a wide range of customers.
- 5 Ingredients (~11.6K orders): A versatile configuration, popular across several categories, though it underperforms in Supreme pizzas.

**4. Pizza Type Performance Insights**

- Chicken Pizzas: Typically feature 5-8 ingredients, with 6 ingredients being the most common in high-performing options. This suggests that a balance of flavour complexity and ingredient cost drives success.
- Supreme Pizzas: These pizzas exhibit a variety of ingredient counts (3, 5, 6, 8), with 6 ingredients dominating sales. This reflects customer preferences for a balanced yet flavourful pizza.
- Veggie Pizzas: Perform best with 5 or 8 ingredients, with 5 being the most popular. Simple, well-balanced combinations are preferred by the audience for veggie pizzas.
- Classic Pizzas: Ranging from 2-6 ingredients, Classic pizzas are most frequently ordered with 5 ingredients, reflecting a preference for simplicity and variety.

**5. Price Sensitivity Analysis**

- Sales Trends:
  o Chicken, supreme, and veggie pizzas show increased sales at higher price points.
  o In contrast, classic pizzas experience reduced sales as prices rise.
- Quantity Trends:
  o Chicken pizzas exhibit higher quantities sold at increased prices.
  o Classic pizzas see a decline in quantity with rising prices.
  o Supreme and veggie pizzas maintain consistent quantities regardless of price changes.



Figure 5: Ingredients & Price Analysis

## IV.    Conclusions

In conclusion, the analysis has revealed several key opportunities to enhance business performance, focusing on optimizing pricing, refining the menu, and adjusting operations to align with customer demand. By implementing dynamic pricing for high-performing items and adjusting operating hours to focus on peak sales periods, the business can significantly increase revenue. Additionally, menu refinement and targeted customer promotions will help meet customer preferences and boost sales during slower periods.

## V.    Recommendations

1. Operating Hours Optimization:
   - Focus on peak sales times (11 AM–1 PM, 5 PM–7 PM). Open slightly earlier on Fridays, Saturdays, and holidays (10:30 AM). Reevaluate closures on Mondays and low-sales Sundays.
   - Preparing ingredients and staff at peak times and specific busy days.
   - Investigate local demographics to determine the relevance of closures for holidays like Yom Kippur. Adjust operations if significant customer demand exists during these periods.
2. Menu Expansion:
   - Offer additional sizes for popular items like Big Meat and Brie Carre to meet customer preferences and boost sales.
3. Marketing Strategies:
   - Promote large (L) pizzas in chicken, veggie, and supreme categories.
   - Use combo deals featuring top combinations (e.g., "Big Meat S + Four Cheese L") to attract group diners.
   - Enhance promotions for small (S) pizzas to appeal to individual diners.
4. XL and XXL Sizes:
   - Analyse barriers for XL and XXL sizes in the classic category and explore introducing them in other categories.
5. Price Testing:
   - Experiment with price elasticity for low-sales items like Hawaiian or high-sales, low-quantity items like California Chicken to optimize pricing strategies.
   - Supreme and Veggie pizzas likely have inelastic demand, suggesting customers are less sensitive to price changes. These products may be perceived as premium or essential, sustaining consistent sales even at higher price points.
   - Marketing or promotional strategies could also explain the stable performance of Supreme and Veggie pizzas, even with price increases.
   - For Classic pizzas, pricing strategies should carefully consider the sensitivity to price, as both sales and quantities are negatively impacted by higher prices.
6. Ingredient and Recipe Innovation:
   - Develop pizzas highlighting popular ingredients (garlic, tomatoes, red onions).
   - Focus on recipes with 5–6 ingredients for optimal sales performance.
7. Operational Efficiency:
   - Streamline kitchen processes for peak times and train staff to handle individual and group orders effectively.
8. Customer Engagement:
   - Introduce loyalty programs to incentivize repeat purchases and boost sales during slower periods.
9. Holiday Adjustments:
   - Review closures during holidays like Yom Kippur based on local demand.

Secondary recommendations that support long-term growth include:

- **Discounts or Promotions for Low-Demand Days**: Introduce discounts or bundle deals on Sundays and Mondays to boost sales during slower periods.
- **Cross-Selling and Combo Deals**: Offer meal bundles like "Big Meat S + Four Cheese L" to increase average order value.
- **Customer Loyalty Program**: Launch a rewards program to encourage repeat purchases, especially during low-sales periods.

By implementing these strategies, the business can enhance operational efficiency, improve customer satisfaction, and maximize revenue.