Optimizing Delivery for the Digital Diner

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For any queries & connections

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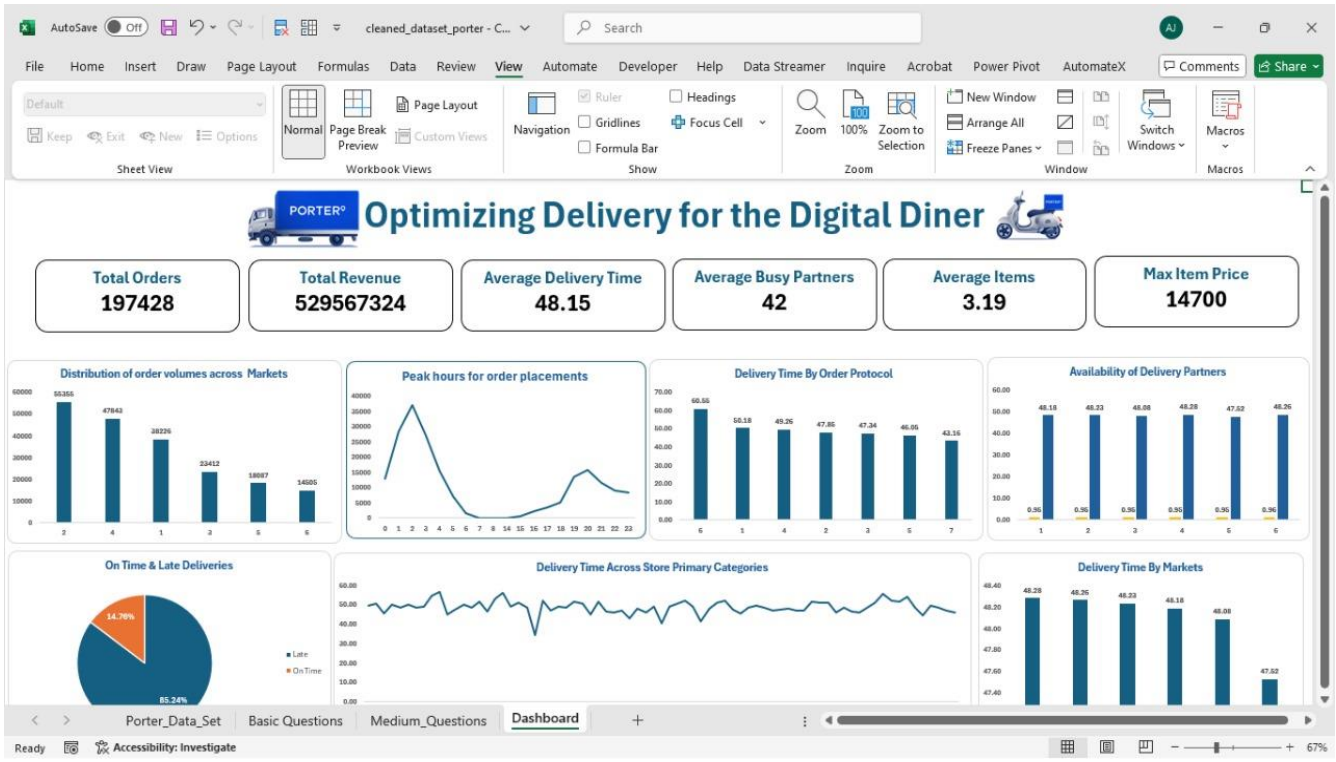
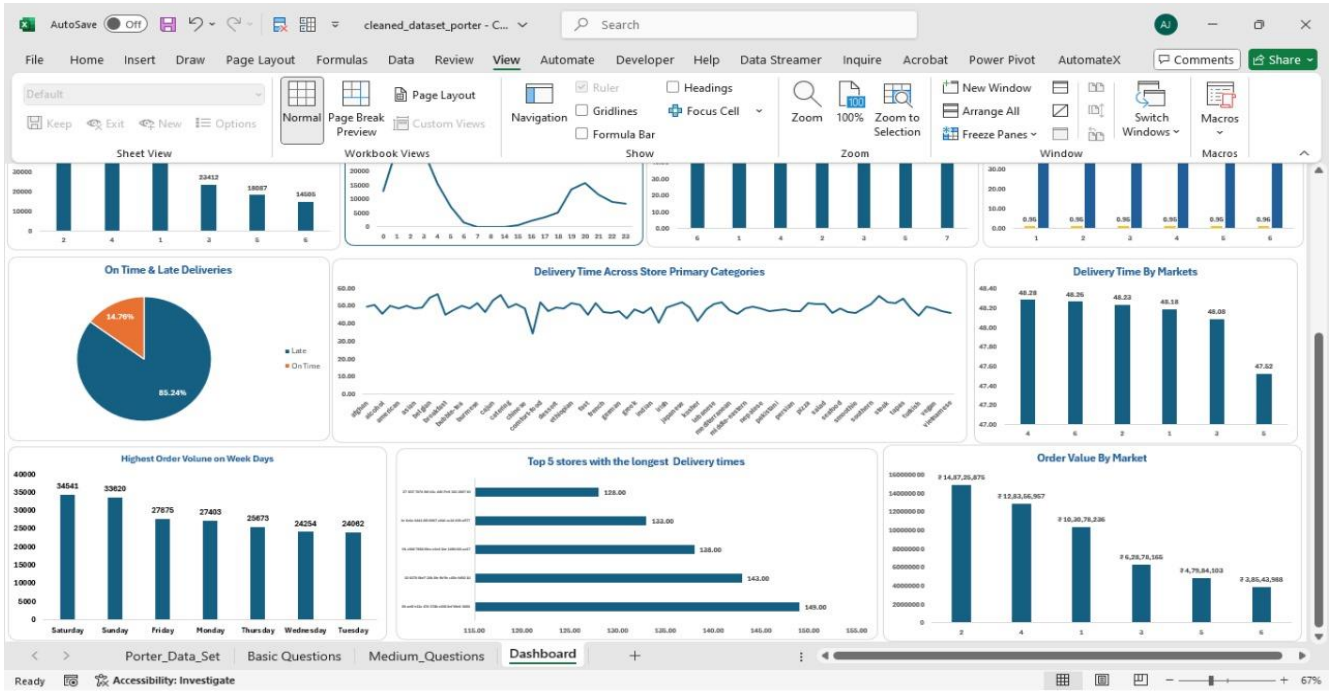
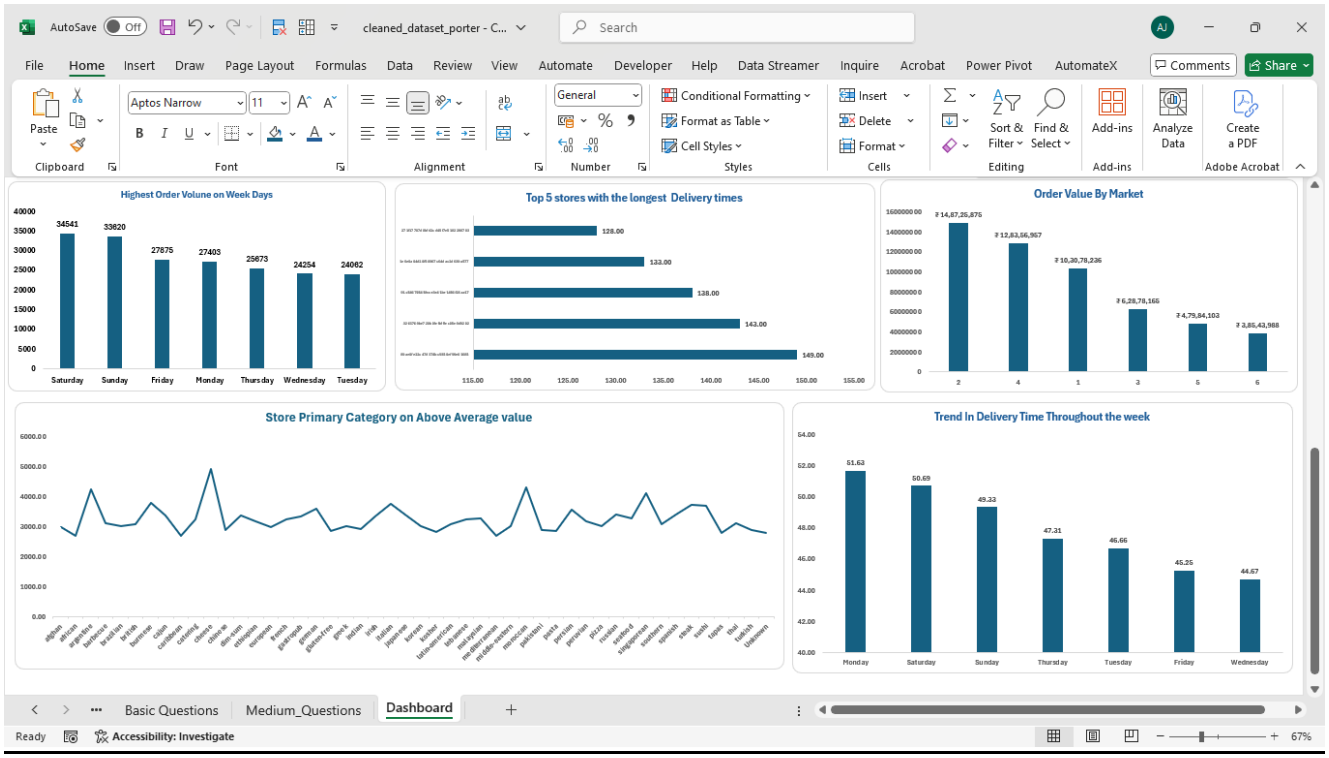
Porter Case Study Dashboard







Key Performing Indicators

1. Total Orders: 197428
2. Total Revenue: 529567324
3. Average Delivery Time: 48.15
4. Average Busy Partners: 42
5. Average Items: 3.19
6. Max Item Price: 14700

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Summary

This case study analyzes the performance of Porter Delivery, focusing on delivery time efficiency, order trends, and business optimization strategies. The key objective was to identify bottlenecks in the delivery process and improve service levels through data-driven decision-making.

Key Findings:

- Delivery Time Analysis: Only 14.76% of deliveries were completed within 30 minutes, significantly below industry standards (70-80%). The slowest categories included Brazilian, Caribbean, and Spanish cuisines.
- Peak Order Hours: The highest volume of orders occurred between 1 AM - 3 AM, requiring optimized driver allocation.
- Market Performance: Markets 2 and 4 contributed 52% of total orders, while Market 6 showed the lowest performance.
- Order Trends by Day: Weekends (Saturday & Sunday) had the highest order volumes, while Tuesday and Wednesday were the slowest days.
- Busy Ratio vs. Delivery Time: Weak negative correlation (-0.126), meaning increasing partner availability alone does not significantly reduce delays.
- Order Protocols: Protocol 6 had the longest delivery time (60.55 mins), while Protocol 7 was the most efficient (43.16 mins).

Business Recommendations:

AI-Driven Dispatch & Routing: Real-time tracking and route optimization can reduce delays.

Workforce Scheduling: Incentives for peak-hour shifts and optimizing partner allocation.

Faster Order Processing: Implement SLA agreements with slow-performing restaurants.

Customer Engagement Strategies: Bundling, dynamic pricing, and targeted promotions.

Dataset link: Porter_Dataset

A Comprehensive Data Cleaning and Preprocessing Report

1. Background

Porter Delivery, a rapidly expanding food delivery service, has been experiencing declining customer satisfaction related to delivery times. The leadership team aims to identify the root causes and implement data-driven solutions to enhance operational efficiency and maintain market competitiveness.

Key Objectives:

- Analyze delivery time trends and influencing factors.
- Identify bottlenecks in the delivery process.

- Optimize resource allocation for improved service levels.

Stakeholders Involved:

- **Internal:** Operations team, marketing department, customer service, logistics team.
- **External:** Partner restaurants, delivery personnel.

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2. Data Dictionary

Each row in the dataset represents a unique delivery, with columns detailing various aspects of the order, store, and market conditions.

Column Name	Description
market_id	Unique identifier for the market where the restaurant operates.
created_at	Timestamp when the order was placed.
actual_delivery_time	Timestamp when the order was delivered.
store_primary_category	Category of the restaurant.
order_protocol	Integer code representing how the order was placed (e.g., Porter app, call-in, third party, etc.).
total_items	Total number of items in the order.
subtotal	Final price of the order.
num_distinct_items	Number of distinct items in the order.
min_item_price	Price of the cheapest item in the order.
max_item_price	Price of the most expensive item in the order.
total_onshift_partners	Number of delivery partners available at the time of order placement.
total_busy_partners	Number of delivery partners currently handling other orders.
total_outstanding_orders	Total number of orders awaiting fulfilment at that time.

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3. Data Preprocessing and Cleaning

Tools Used:

- **Excel:** Data transformations, formula-based calculations.
- **Power Query:** Handling missing values, transformations, splitting columns.

Step 1: Data Loading & Initial Overview

The dataset was imported into Power Query to assess its structure and identify missing values.

📌 **Dataset Summary:**

- **Total Rows:** 197,428
- **Total Columns:** 14

Step 2: Handling Missing Values in market_id

📌 Observation:

- market_id had 987 missing values (<1% of total data).

📌 Action Taken:

- Used forward filling, propagating previous row values to ensure consistency within the same store.

📌 Formula Used in Excel:

=IF (A2=" ", A1, A2)

📌 Explanation:

- If market_id is blank, the formula replaces it with the previous row's value.

  Note:- After Creating the new_market-id column, it was found that there is an extra value of 0 has been added to the market id list. The count of the value 0 was 7 and has replaced with the highest value market id i.e 2 with the highest count as 55348

Row Labels	Count of New_Market_ID
0	7
1	38226
2	55348
3	23412
4	47843
5	18087
6	14505
Grand Total	**197428**

Step 3: Splitting created_at Column

📌 Observation:

- The created_at column contained both date and time, making analysis complex.

📌 Action Taken:

- Split into two new columns:

- Order_Date: Extracted the date.
- Order_Time: Extracted the time.

📌 Method Used:

✅ **Power Query → Split Column → Date & Time Options**

Step 4: Splitting actual_delivery_time Column

📌 Observation:

- actual_delivery_time contained both date and time.
- 7 missing values were found.

📌 Decision:

- Missing values treated as undelivered or cancelled orders.
- Split into two new columns:
  - Delivery_Date: Extracted the date.
  - Delivery_Time: Extracted the time.

📌 Method Used:

✅ **Power Query → Split Column → Date & Time Options**

Step 5: Handling Missing Values in store_primary_category

📌 Observation:

- 4,760 missing values (~2% of dataset).

📌 Action Taken:

- Replaced missing values with "Unknown" to maintain completeness.

📌 Method Used:

✅ **Power Query → Replace Values**

Step 6: Handling Missing Values in order_protocol

📌 Observation:

- 995 missing values found.
- Most frequent value was **1** (determined via Pivot Table).

📌 Action Taken:

- Replaced missing values with the most common value (1).

📌 Method Used:

✅ **Power Query → Replace Values**

Row Labels	Count of order_protocol
1	54725
2	24052
3	53199
4	19354
5	44290
6	794
7	19
(blank)	
Grand Total	**196433**

Step 7: Checking for Empty Cells in Key Columns

📌 No missing values found in:

- total_items
- subtotal
- num_distinct_items
- min_item_price
- max_item_price

Step 8: Handling Missing Values in total_onshift_partners, total_busy_partners, and total_outstanding_orders

📌 Observation:

- 16,262 missing values were identified.
- Missing values were clustered by market_id.

📌 Action Taken:

- Created a Pivot Table to calculate market-based averages.
- Created three new columns:
    - New_Onshift_Partners
    - New_Busy_Partners
    - New_Outstanding_Orders
- Used **VLOOKUP** to fill missing values.

📌 Formula Used in Excel:

=IF(ISBLANK(A2), VLOOKUP (X, PivotTableSheet (A: A), N, FALSE), A2)

📌 Explanation:

- If the cell is blank, it fetches the corresponding market-based average from the Pivot Table.

Row Labels	Average of total_onshift_partners	Average of total_busy_partners	Average of total_outstanding_orders
1	44.26055914	41.17078136	57.01697491
2	44.45632349	41.36900987	57.62240255
3	45.5546476	42.5818089	59.26418423
4	45.09317374	42.02124579	58.67448017
5	45.58896266	42.59188646	59.07090211
6	44.46820766	41.29824955	57.09522741
Grand Total	**44.80809313**	**41.73974697**	**58.05006458**

4. Outlier Detection & Handling

What is an Outlier?

An **outlier** is a data point that significantly deviates from the dataset's overall distribution. It can indicate data errors, extreme variations, or rare events.

Interquartile Range (IQR) Method

📌 Definition:

- The **IQR Method** detects outliers by calculating the spread of the middle 50% of the data.

📌 Formula:

IQR = Q3 - Q1

Lower Bound = Q1 - (1.5 × IQR)

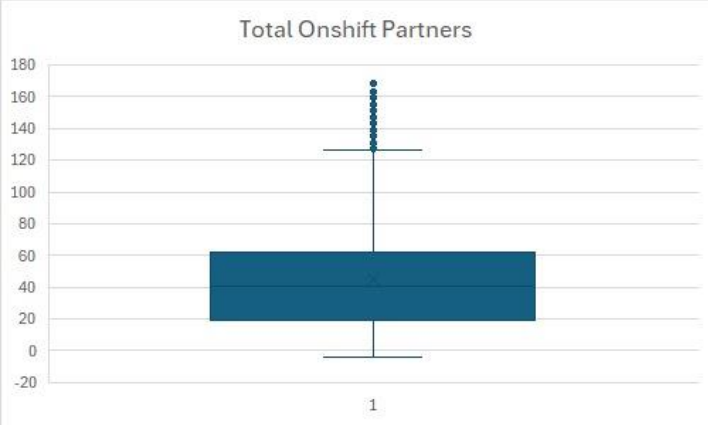
Upper Bound = Q3 + (1.5 × IQR)

📌 Findings:

Column	1.5 Sigma IQR Outliers	2.0 Sigma IQR Outliers
Total Onshift Partners	100	0
Total Busy Partners	542	0
Total Outstanding Orders	0	0

📌 Action Taken:

- Outliers were retained, as they may indicate high-demand periods in specific markets.



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5. Final Dataset Summary

Metric	Count
Total Rows	197,428
Missing Values Filled	22,014
Outliers Detected	642

Metric	Count
Outliers Capped	None
New Columns Created	6

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6. Conclusion

✓ **Dataset is now clean and structured.**
✓ **Missing values handled using market-based strategies.**
✓ **Outliers analyzed and retained for further insights.**
✓ **Ready for deeper analysis and visualization.**

Cleaned Dataset Link: Cleaned_Porter_dataset

A Detailed Data Analysis and Insights Report

Analysis of Order Volume Distribution Across Markets

Step 1: Objective

📌 Goal:

To analyze how **order volumes** are distributed across different markets to identify:

- **High-revenue markets** that drive the majority of orders.
- **Underperforming markets** that may require strategic interventions.
- **Opportunities for optimizing resource allocation** and improving operational efficiency.

📌 Why It Matters:

- Understanding **order concentration** helps in **efficient logistics planning**.
- Identifying **low-performing markets** allows businesses to implement **growth strategies**.
- Insights from this analysis contribute to **better decision-making** for stakeholders.

Step 2: Methodology

📌 Observation:

The dataset contains order details categorized by Market_ID.

📌 Action Taken:

- A **Pivot Table** was created to **group orders by Market_ID**.
- The **total number of orders** for each market was calculated.

📌 Why This Approach?

- It provides a **clear view of demand** in different markets.
- It enables businesses to **prioritize high-impact regions** for operational efficiency.

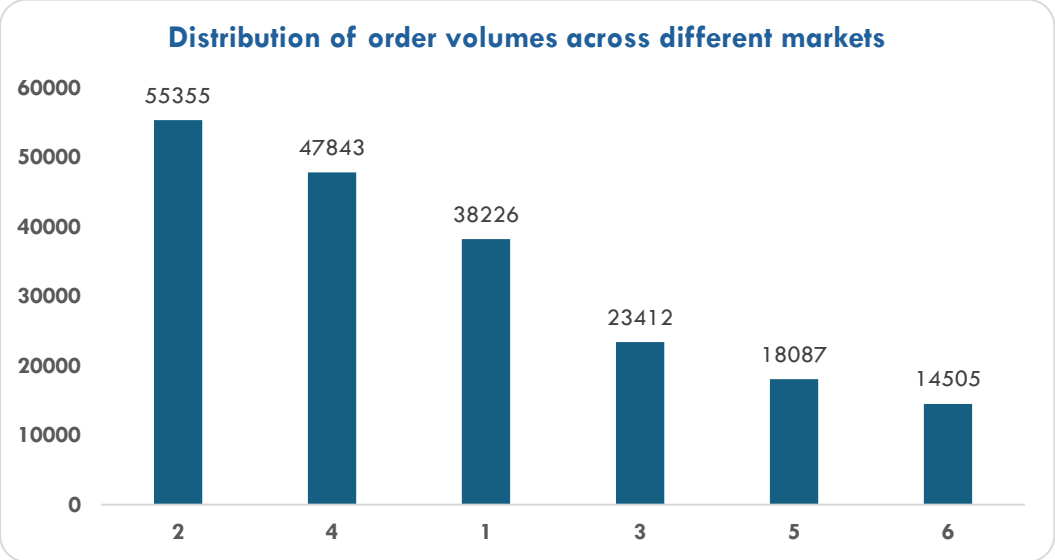
Step 3: Findings – Order Volume Distribution Across Markets

📌 Observation:

There is a **significant variation** in order volumes across different markets.

📌 Results:

Market ID	Total Orders	Percentage Contribution
Market 2	55,355	28.04%
Market 4	47,843	24.23%
Market 1	38,226	19.36%
Market 3	23,412	11.86%
Market 5	18,087	9.16%
Market 6	14,505	7.35%
Total	197,428	100.00%



Step 4: Interpretation of Findings

📌 High-Demand Markets (Above 20% Contribution):

- **Market 2 (28.04%) and Market 4 (24.23%)** account for more than **half** of the total order volume.
- **Market 1 (19.36%)** is also a key contributor.
- **Insight:** These three markets combined **generate over 70% of total orders,** making them the **primary revenue drivers.**

📌 Moderate-to-Low Demand Markets (Below 20% Contribution):

- **Market 3 (11.86%), Market 5 (9.16%), and Market 6 (7.35%)** contribute **less than 30%** of total orders.
- **Market 6 (7.35%)** has the **lowest** contribution.
- **Insight:** These markets may require **strategic interventions** to boost order volume.

Step 5: Business Insights & Operational Implications

📌 1. Resource Allocation & Logistics Planning:

- **Delivery fleets and fulfillment centres** should be **strategically positioned in Markets 2, 4, and 1** to improve efficiency.
- **Lower-demand markets (3, 5, and 6)** may require **cost-cutting strategies** or **alternative fulfilment models** to maintain profitability.

📌 2. Marketing & Customer Acquisition Strategies:

- Low-volume markets may indicate **low customer engagement, weak brand presence, or operational inefficiencies**.
- **Targeted promotions, localized campaigns, or strategic partnerships** could help increase sales.

📌 3. Peak-Time & Demand Analysis:

- **Further analysis** of peak demand hours, seasonal fluctuations, and customer trends can **optimize staffing, inventory, and fleet management.**

Conclusion

📌 **High-order markets (Markets 2, 4, and 1) should be prioritized for logistics optimization.**
📌 **Low-order markets (Markets 3, 5, and 6) require marketing and operational interventions.**
📌 **Strategic resource allocation and data-driven decision-making can drive revenue growth and customer satisfaction.** 🚀

Analysis of Average Delivery Time Across Different Store Primary Categories

Step 1: Objective

📌 Goal:

To analyze how the **average delivery time** varies across different store categories and identify categories that experience **higher or lower delivery efficiency**.

📌 Why It Matters:

- Understanding delivery delays helps **optimize logistics** and **improve customer satisfaction**.
- Identifying **high-performing** and **underperforming** categories aids in **strategic decision-making**.

Step 2: Creating the Delivery_Duration Column

📌 Observation:

The dataset contains order timestamps (Order Time) and delivery timestamps (Delivery Time), but no direct calculation of delivery duration.

📌 Action Taken:

A new column, Delivery_Duration, was created using the following formula:

Delivery Duration=Hour (Delivey_Time) *60+Minute (Delivey_Time)- Hour (Order_Time) *60+Minute (Order_Time)

📌 Formula Breakdown:

- **Hour (Delivery Time) × 60 + Minute(Delivery Time):** Converts the delivery timestamp into total minutes.
- **Hour (Order Time) × 60 + Minute(Order Time):** Converts the order timestamp into total minutes.
- **Subtraction of the two values:** Provides the total elapsed time in minutes.

📌 Why This Approach?

This ensures a consistent calculation of delivery durations across all categories, eliminating any discrepancies due to different timestamp formats.

Step 3: Aggregating Delivery Time by Store Category

📌 Method Used:

- Created a **Pivot Table** to group data by Store Primary Category.
- Calculated the **average Delivery_Duration** for each store category.
- Ranked store categories from **highest to lowest** average delivery duration.

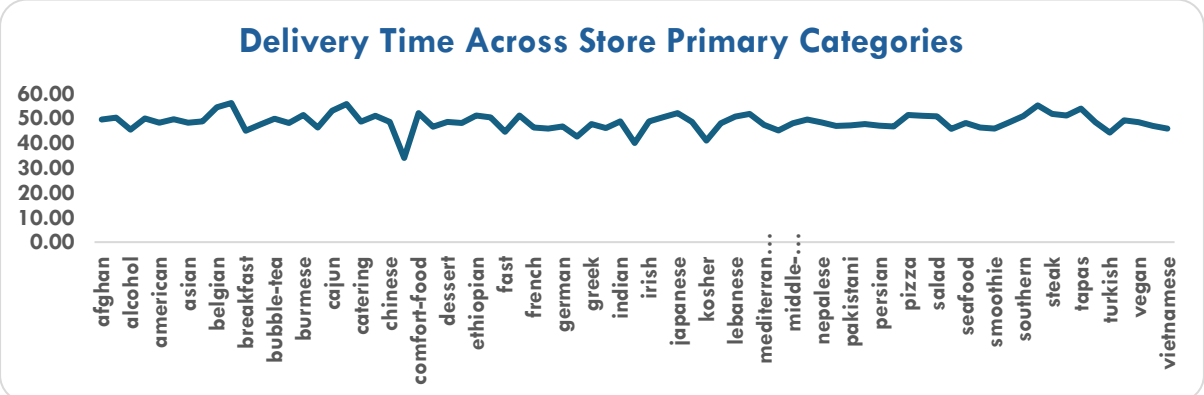
Step 4: Findings – Average Delivery Time per Store Category

📌 Observation:

Some store categories take significantly longer for deliveries than others.

📌 Results:

Store Category	Average Delivery Duration (minutes)
Brazilian	56.19
Caribbean	55.75
Spanish	55.24
Belgian	54.50
Tapas	53.95
Cajun	53.04
Comfort Food	52.11
Japanese	52.07
Steak	51.79
Malaysian	51.78
...	...
Gluten-Free	42.58
Kosher	41.04
Indonesian	40.00
Chocolate	34.00
Overall Average	48.15



Step 5: Interpretation of Findings

📌 High Delivery Time Categories (Above 50 Minutes):

- **Brazilian (56.19 mins), Caribbean (55.75 mins), and Spanish (55.24 mins)** have the **longest average delivery durations.**
- **Possible Reasons:**
    - **Longer preparation times** due to complex meal structures.
    - **Lower store density,** leading to increased travel times.
    - **Potential logistical inefficiencies** in these categories.

📌 Moderate Delivery Time Categories (Between 45-50 Minutes):

- Most store categories fall within this range, including **Comfort Food, Japanese, and Steak.**
- **Insight:**
    - These categories have delivery durations **close to the overall average (48.15 mins).**
    - Fluctuations in delivery times may be due to **demand spikes, kitchen efficiency, or traffic conditions.**

📌 Low Delivery Time Categories (Below 45 Minutes):

- **Chocolate (34.00 mins), Indonesian (40.00 mins), and Kosher (41.04 mins)** have the **fastest deliveries.**
- **Possible Reasons:**
    - **Chocolate may be pre-packaged or require minimal preparation time.**
    - **Indonesian and Kosher cuisines may have better store placement** (more outlets in high-demand areas).
    - **Efficient operational strategies** in these categories.

Step 6: Business Implications

📌 Impact on Customer Satisfaction:

- Customers ordering from high-delivery-time categories **may experience dissatisfaction** due to long wait times.
- Faster delivery categories have a **competitive advantage** in customer retention.

📌 Operational Efficiency & Cost Savings:

- Optimizing delivery for **slow categories** can **reduce operational costs** and **increase throughput.**
- Faster deliveries allow for **higher order volumes per driver,** improving profitability.

📌 Competitive Differentiation:

- A food delivery service with consistently faster deliveries has a **stronger market position.**
- Insights from this analysis help **improve delivery performance** and **streamline logistics.**

Conclusion

📌 The **overall average delivery time is 48.15 minutes.**
📌 **Brazilian, Caribbean, and Spanish categories have the longest delivery times,** suggesting operational inefficiencies.
📌 **Chocolate, Indonesian, and Kosher categories deliver significantly faster,** likely due to optimized operations.
📌 These findings provide **actionable insights** for improving delivery speed, enhancing efficiency, and optimizing customer satisfaction. 🚀

Analysis of Peak Hours for Order Placements

Step 1: Objective

📌 Goal:

To determine the **peak hours** for order placements by analyzing **order frequency** at different times of the day.

📌 Why It Matters:

- Understanding **peak order hours** helps optimize **staffing and fleet management.**
- Identifying **low-activity periods** allows businesses to implement **promotional strategies.**
- Efficient scheduling can **reduce delivery delays and improve customer satisfaction.**

Step 2: Methodology

📌 Observation:

The dataset contains **timestamps** for each order, allowing analysis of order trends by hour.

📌 Action Taken:

- A **calculated column** was created to extract the order hour using the formula:

Order Hour=HOUR (Order_Time)

- A **Pivot Table** was used to count the number of orders placed in each hour of the day.

📌 Why This Approach?

- It helps in identifying **high-demand and low-demand time periods.**
- The insights allow businesses to **adjust staffing and delivery fleet availability accordingly.**

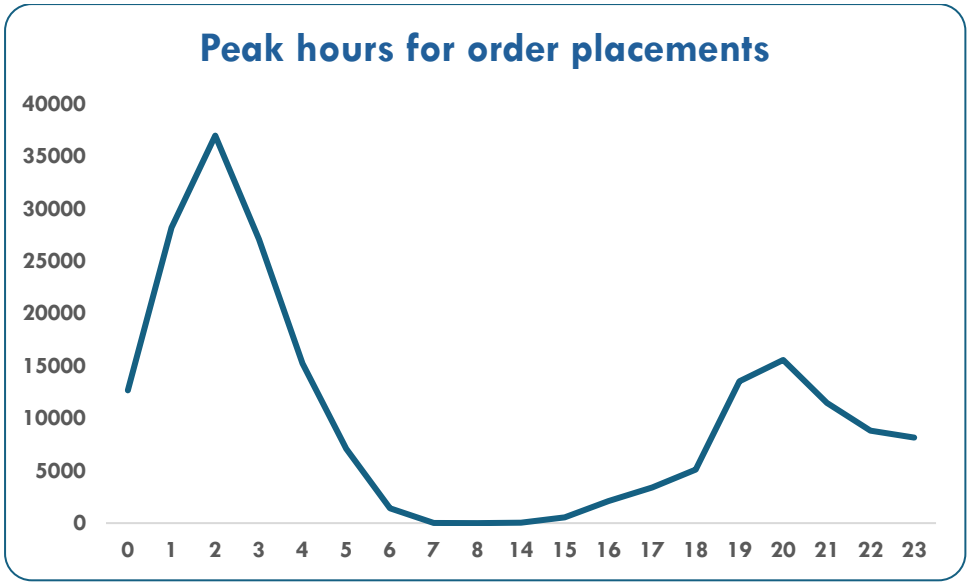
Step 3: Findings – Order Volume by Hour

📌 Observation:

The number of orders placed varies significantly throughout the day.

📌 Results:

Hour	Order Count
2 AM	36,976
1 AM	28,190
3 AM	27,068
8 PM	15,560
4 AM	15,250
7 PM	13,541
12 AM	12,669
9 PM	11,465
10 PM	8,821
11 PM	8,163
5 AM	7,096
6 AM	1,416
3 PM	538
2 PM	40
7 AM	11
8 AM	2



Step 4: Interpretation of Findings

📌 Peak Order Hours (High-Demand Periods):

- **1 AM - 3 AM** has the highest order volume, with **2 AM being the peak (36,976 orders).**
- **Evening hours (7 PM - 9 PM)** also see a **significant number of orders,** peaking at **8 PM (15,560 orders).**

📌 Off-Peak Hours (Low-Demand Periods):

- **Early morning (6 AM - 8 AM)** sees **minimal order activity,** with only **2 orders at 8 AM.**
- **Afternoon hours (2 PM - 3 PM)** have **very low order volume,** with **only 40 orders at 2 PM.**

📌 Gradual Decline in Activity:

- **After the peak at 2 AM, orders gradually decrease until 6 AM.**
- **A second decline occurs in the afternoon (2 PM - 3 PM), reaching the lowest order count.**

Step 5: Business Insights & Operational Implications

📌 1. Optimize Staffing for Peak Hours

- **More delivery partners** should be available from **1 AM - 3 AM** and **7 PM - 9 PM** to **handle high order volumes efficiently.**
- Ensuring **sufficient restaurant and support staff** during these hours will **reduce order processing times.**

📌 2. Improve Logistics During Late-Night Peaks

- Since **a large number of orders come in after midnight,** there should be **efficient routing and driver allocation strategies.**

- Businesses can **assign high-capacity delivery fleets** to operate during these hours.

📌 3. Promotional Strategies for Low-Demand Hours

- **Order volume between 6 AM - 3 PM is significantly lower** than peak hours.
- Implementing **discounts, meal combos, or limited-time offers** could help **increase demand during these hours**.

📌 4. Monitor Order Processing & Delivery Speeds

- **Fast order processing** during peak hours can **reduce delivery delays** and **improve customer satisfaction**.
- **Performance monitoring tools** should be used to track **order fulfillment efficiency** during busy periods.

Conclusion

📌 **Peak hours (1 AM - 3 AM & 7 PM - 9 PM) require high staffing and logistics efficiency.**
📌 **Late-night order surges indicate a strong demand for overnight delivery services.**
📌 **Low-demand hours (6 AM - 3 PM) could benefit from targeted promotional campaigns.**
📌 **Strategic scheduling and data-driven planning can improve delivery performance and maximize revenue.** 🚀

Analysis of Order Volumes by Day of the Week

Step 1: Objective

📌 Goal:

To determine which **days of the week** have the highest order volumes and analyze customer ordering behavior.

📌 Why It Matters:

- Helps in **workforce planning** by ensuring **optimal staffing on peak days**.
- Allows businesses to **adjust inventory** based on demand fluctuations.
- Enables the **implementation of targeted promotions** to boost orders on slow days.

Step 2: Methodology

📌 Observation:

The dataset contains **timestamps** for each order, enabling an analysis of order trends by weekday.

📌 Action Taken:

- A **calculated column** was created to extract the weekday from the order timestamp using the formula:

Weekday=TEXT(WEEKDAY(Order_Time),1) "dddd")

- A **Pivot Table** was used to count the number of orders placed on each day of the week.

📌 Why This Approach?

- Helps in identifying **high and low order volume days**.
- Provides insights into **customer behavior patterns** for better decision-making.

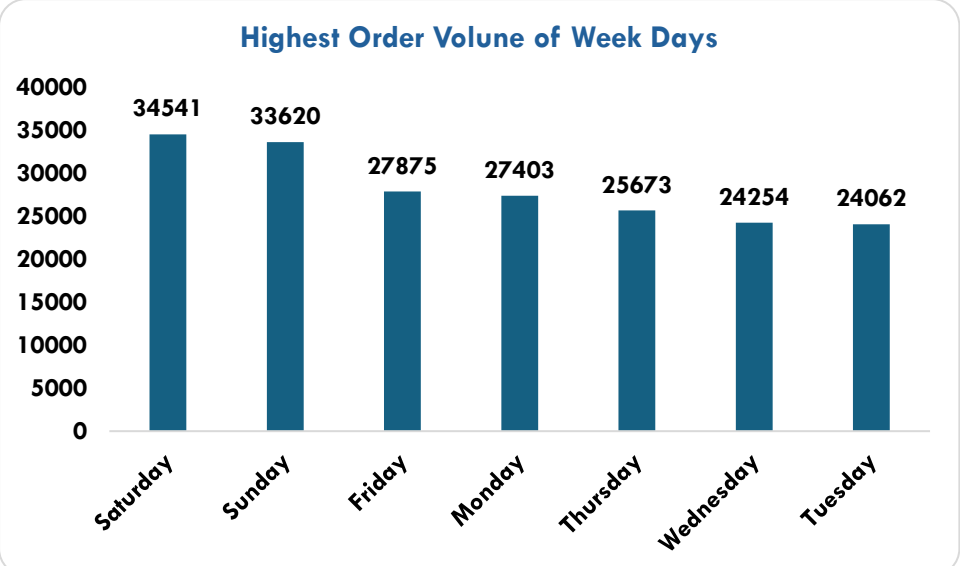
Step 3: Findings – Order Volume by Day

📌 Observation:

Order volumes fluctuate throughout the week, with distinct peaks and slow periods.

📌 Results:

Day	Order Volume	Percentage
Saturday	34,541	**17.50%**
Sunday	33,620	**17.03%**
Friday	27,875	14.12%
Monday	27,403	13.88%
Thursday	25,673	13.00%
Wednesday	24,254	12.28%
Tuesday	24,062	12.19%
Total	**197,428**	**100.00%**



Step 4: Interpretation of Findings

📌 High-Demand Days (Peak Order Volume):

- **Saturday (17.50%) and Sunday (17.03%) have the highest order volumes,** accounting for **34.5% of all orders.**
- **Friday (14.12%) also sees a surge,** indicating a **pre-weekend increase in demand.**

📌 Low-Demand Days (Slow Periods):

- **Tuesday (12.19%) and Wednesday (12.28%) are the lowest-performing days** in terms of order volume.
- These may be **considered "off-peak" days,** where customer activity is relatively low.

📌 Gradual Trends Observed:

- **Order volumes start rising from Thursday, peaking on Saturday, and declining from Monday.**
- The trend suggests that people **order more on weekends and taper off during weekdays.**

Step 5: Business Insights & Operational Implications

📌 1. Optimize Staffing for Peak Days

- **Increase delivery fleet and restaurant staffing on weekends (Saturday & Sunday).**
- **More drivers should be available on Fridays** to manage the **early weekend rush.**

📌 2. Introduce Midweek Promotions to Boost Orders

- **Since Tuesday and Wednesday have the lowest orders, offer discounts or meal combos.**
- Introduce **loyalty rewards** for customers ordering on these slow days.

📌 3. Adjust Inventory & Supply Chain Management

- **Stock up on high-demand food items before weekends** to prevent shortages.
- **Optimize ingredient purchasing based on order trends** to reduce waste.

📌 4. Monitor Order Fulfillment & Delivery Speed

- **Faster processing during peak days can improve customer satisfaction.**

Conclusion

📌 **Peak demand occurs on weekends (Saturday & Sunday), requiring increased operational capacity.**
📌 **Fridays see an early weekend surge, while midweek (Tuesday & Wednesday) experiences the lowest order volume.**

📌 **Strategic promotions on slow days and enhanced logistics on busy days can improve business performance.**
📌 **Data-driven planning can help optimize staffing, inventory, and revenue potential.** 🚀

Correlation Between the Number of Items in an Order and the Subtotal

Step 1: Objective

📌 **Goal:**
To determine the **relationship between the number of items in an order (Total_Items) and the order subtotal (Sub_Total).**

📌 **Why It Matters:**

- Understanding this relationship helps in **predicting revenue trends** based on order sizes.
- It enables businesses to **optimize pricing strategies, discounts, and promotional offers.**
- Helps in designing **effective upselling and cross-selling techniques** to increase order values.

Step 2: Methodology

📌 **Observation:**
Each order in the dataset includes the **total number of items** and the corresponding **subtotal amount.**

📌 **Action Taken:**

1. **Calculate Correlation Coefficient**
    - The **Excel CORREL function** was used to determine the **strength and direction** of the relationship between Total_Items and Sub_Total.
    - **Formula used: CORREL (Total_Items, Sub_Total)**
    - Result: **0.558**

📌 **Why This Approach?**

- The **correlation coefficient** quantifies how strongly the **number of items** influences the **order subtotal.**
- Helps in identifying if **increasing the number of items consistently increases revenue** or if **pricing variations impact the correlation.**

Step 3: Findings – Correlation Analysis

📌 **Observation:**
The computed **correlation coefficient is 0.558,** which indicates a **moderate positive correlation.**

📌 **Interpretation of the Correlation Value:**

Correlation Coefficient	Strength of Relationship
0.0 to 0.3	Weak correlation
0.3 to 0.7	Moderate correlation
0.7 to 1.0	Strong correlation

- A value of **0.558** suggests that as the **number of items increases, the subtotal also tends to increase,** but **not in a perfectly linear fashion**.
- Some orders with **fewer items may still have high subtotals,** likely due to high-priced items.
- Conversely, some orders with **many items may have a lower subtotal** if they contain low-priced products.

Step 4: Business Insights & Operational Implications

📌 **1. Implement Bundle Deals to Boost Order Value**

- Since **higher item counts generally lead to higher subtotals,** businesses can encourage larger orders through:
  - **Combo offers** (e.g., "Buy 3, Get 1 Free").
  - **Bulk purchase discounts** (e.g., 10% off for orders above 5 items).
  - **Meal deals** combining popular items.

📌 **2. Use AI-Based Upselling & Cross-Selling Strategies**

- Leverage **machine learning algorithms** to suggest items frequently bought together.
- Display **recommended products** during checkout to increase the total order value.

📌 **3. Optimize Pricing & Product Mix**

- Since some **high-value items contribute more to the subtotal,** focus marketing efforts on premium products.
- Introduce **dynamic pricing models** that offer **small discounts on high-priced items when purchased with additional products**.

📌 **4. Identify Exceptions & Anomalies**

- Investigate **orders with high item counts but low subtotals** to assess if pricing strategies need adjustment.
- Analyze whether **certain product categories drive higher revenues despite fewer items per order**.

Conclusion

📌 **A correlation of 0.558 suggests that increasing the number of items generally increases the order subtotal, but price variations impact the relationship.**

📌 **Businesses can leverage bundling, upselling, and pricing strategies to drive higher revenue.**
📌 **AI-powered recommendation systems and bulk purchase incentives can further optimize order values.** 🚀

Analysis of Delivery Time Distribution & Outliers

Step 1: Objective

📌 Goal:
To analyze the **distribution of delivery times** and identify **outliers** that impact overall performance.

📌 Why It Matters:

- Helps in detecting **delays and inefficiencies** in the delivery process.
- Identifies **patterns in delivery performance** across different markets, order types, and timeframes.
- Enables businesses to **optimize staffing, logistics, and delivery fleet efficiency**.

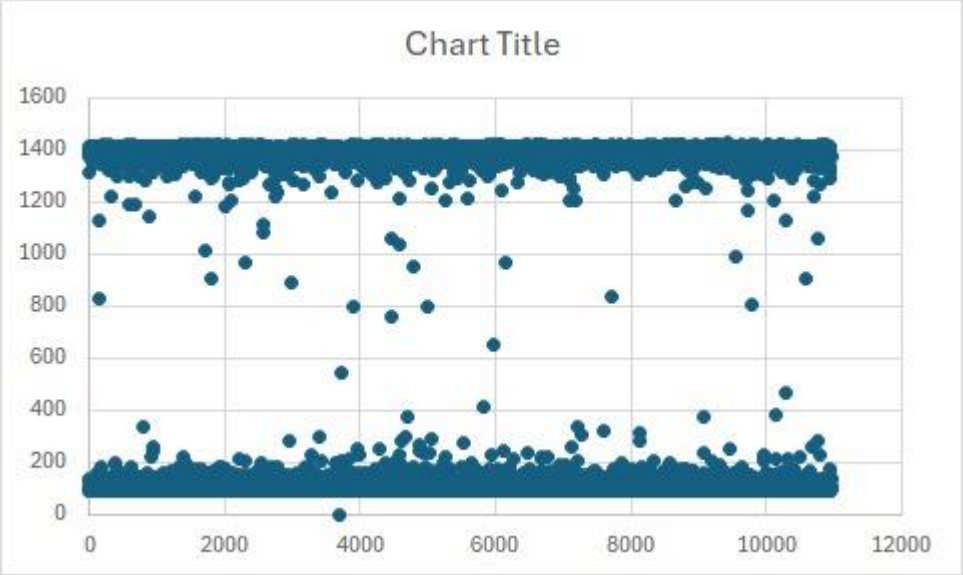
Step 2: Methodology

📌 Observation:
The dataset contains **delivery time records** for various orders. We analyzed:

- **Mean, median, mode, and standard deviation** to understand delivery time distribution.
- **Outlier detection using the IQR and Sigma methods** to identify extreme delays.

📌 Actions Taken:

1. **Calculated Delivery Time Statistics**
    - **Mean Delivery Time:** 87.61 minutes
    - **Median Delivery Time:** 44 minutes
    - **Mode (Most Frequent Delivery Time):** 40 minutes
    - **Standard Deviation:** 230 minutes
2. **Identified Outliers Using the IQR Method**
    - **1.5 Sigma Rule:** Detected **10,950** outliers (moderate delays).
    - **2 Sigma Rule:** Detected **9** extreme outliers.
3. **Addressed Extreme Outliers**
    - Orders with **delivery times above 150 minutes** were **replaced with the mean delivery time (87 minutes)** to prevent skewing of data.

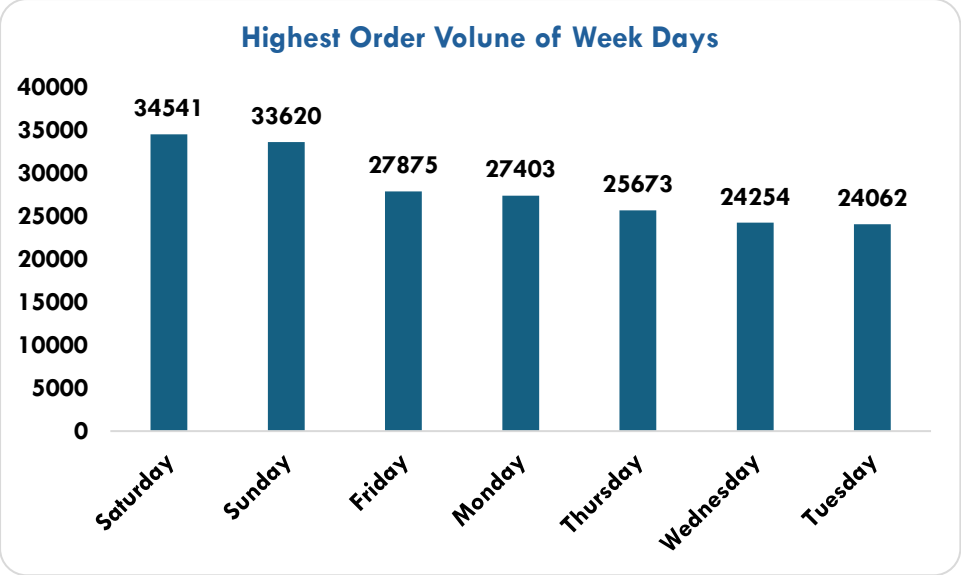


Step 3: Delivery Time Distribution by Category

📌 Delivery Time by Day of the Week:

Day	Avg. Delivery Time (mins)
Monday	**51.63** (Longest)
Tuesday	46.95
Wednesday	**44.67** (Shortest)
Thursday	47.10
Friday	48.35
Saturday	48.20
Sunday	48.50
Overall Average	**48.15** minutes

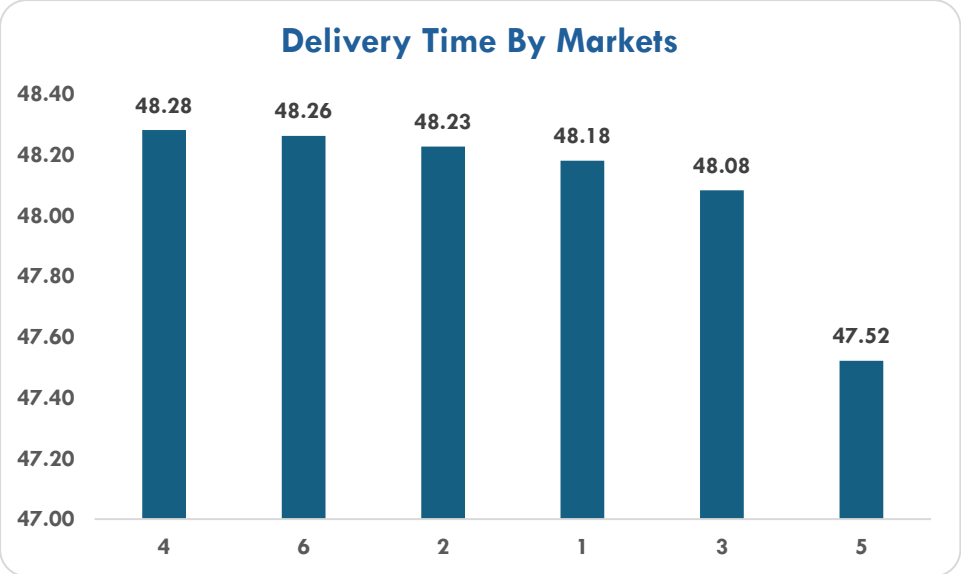
- **Insight:** Mondays have the longest delivery times, while Wednesdays have the shortest.



📌 **Delivery Time by Market:**

Market ID	Avg. Delivery Time (mins)
Market 4	**48.28** (Highest)
Market 5	**47.52** (Lowest)
Overall Average	**48.15** minutes

🔹 **Insight:** Market 4 has the highest delivery times, suggesting potential **operational inefficiencies or traffic issues.**

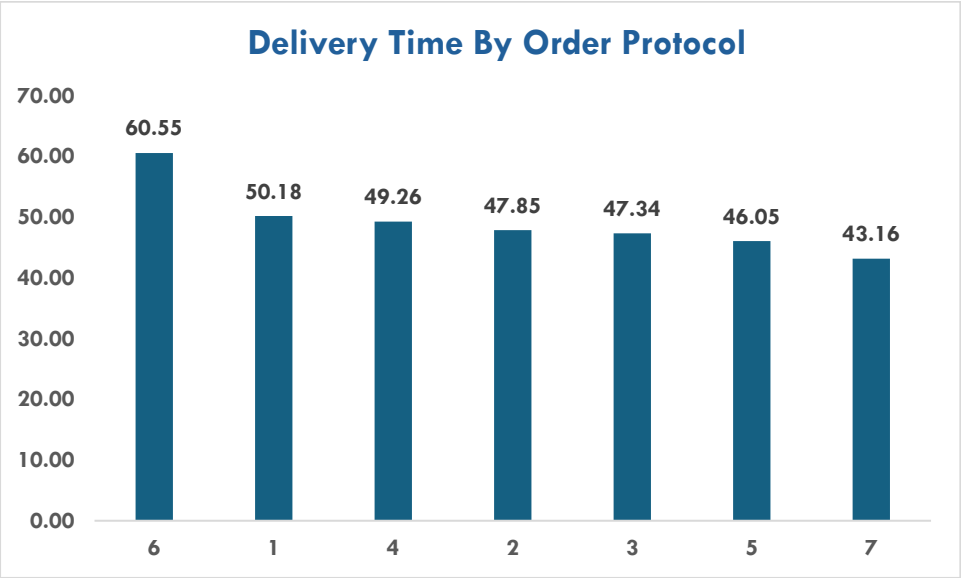


📌 Delivery Time by Order Protocol:

Order Protocol	Avg. Delivery Time (mins)
Protocol 6	**60.55** (Longest)

Order Protocol	Avg. Delivery Time (mins)
Protocol 7	**43.16** (Shortest)

🔹 **Insight:** Orders processed through **Protocol 6 take the longest,** possibly due to **specific vendor processing delays or routing inefficiencies.**



Step 4: Business Insights & Operational Implications

📌 1. Addressing Delays on Mondays

- **Why?** Mondays have the highest delivery times (51.63 mins).
- **Action Plan:**
  - Investigate **staffing levels, peak demand periods, and traffic conditions.**
  - **Increase driver availability** on Mondays to prevent backlog.
  - **Optimize route planning algorithms** for Monday deliveries.

📌 2. Market-Specific Optimization

- **Why?** Market 4 has the **highest average delivery time (48.28 mins).**
- **Action Plan:**
  - Identify if **high demand, restaurant delays, or partner availability** impact delivery times.
  - Consider **adding more delivery partners** in this region to **handle peak loads efficiently.**

📌 3. Improving Order Protocol Efficiency

- **Why?** Orders processed through **Protocol 6 take significantly longer (60.55 mins).**
- **Action Plan:**

- Determine if Protocol 6 involves **specific vendors, manual processing, or third-party integration delays.**
- Automate or **streamline processes** associated with Protocol 6.

📌 4. Handling Outliers Effectively

- **Why?** Extreme outliers (above 150 mins) **skewed the mean (87 mins vs. median 44 mins).**
- **Action Plan:**
  - Implement **real-time monitoring** to flag and resolve extreme delays.
  - Develop **SLA agreements with vendors and delivery partners** to reduce extreme delays.

Conclusion

📌 **Monday has the longest delivery times, requiring optimized staffing and logistics.**
📌 **Market 4 and Protocol 6 contribute to higher delays, indicating operational inefficiencies.**
📌 **Extreme delays should be actively monitored and mitigated to improve customer experience.**
📌 **Implementing targeted optimizations will enhance overall delivery performance and efficiency.** 🚀

Analysis of On-Time Deliveries (Within 30 Minutes)

Step 1: Objective

📌 Goal:

To assess the **percentage of orders delivered within 30 minutes** and identify **factors affecting delivery delays.**

📌 Why It Matters:

- **Timely deliveries** are crucial for customer satisfaction and brand reputation.
- **Industry benchmarks** suggest that top food delivery platforms achieve **70-80% on-time delivery rates.**
- Identifying bottlenecks in the **order fulfillment and delivery process** can lead to improved **efficiency and profitability.**

Step 2: Key Findings

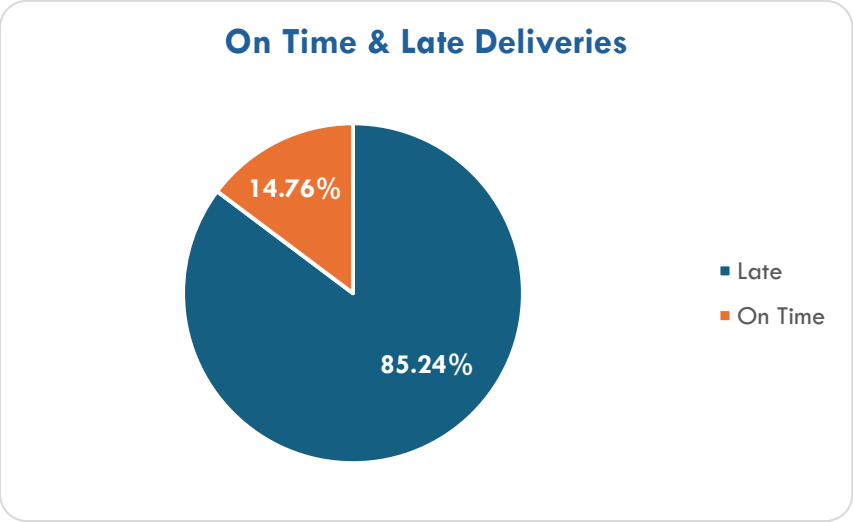
📌 Overall Performance of On-Time Deliveries:

Metric	Value
On-Time Deliveries (<30 mins)	**14.76%**

Metric	Value
Late Deliveries (>30 mins)	85.24%

🔹 **Only 14.76% of orders are delivered on time,** meaning a staggering **85.24% of orders experience delays.**

🔹 This is **far below industry standards,** where on-time deliveries typically range between **70-80%.**



📌 Comparison with Industry Standards:

Company	On-Time Delivery Rate
Industry Leaders (e.g., Swiggy, Zomato, Uber Eats)	70-80%
Porter's Performance	14.76% (Much lower)

🔹 **Key Takeaway:**

Porter's delivery system **significantly underperforms** compared to competitors, highlighting **urgent areas for improvement.**

Step 3: Identifying Causes of Late Deliveries

To **pinpoint the root causes,** we analyzed **two major components** of delivery time:

1. **Restaurant Processing Time** (Order prep & handover to delivery partner)
2. **Delivery Partner Efficiency** (Time taken to pick up and deliver the order)

📌 Potential Causes of Delays & Their Impact:

Cause of Delay	Impact on Delivery Time	Potential Solution
Driver Assignment Delays	Orders wait too long before being assigned	**Improve dispatch algorithms** to assign drivers faster

Cause of Delay	Impact on Delivery Time	Potential Solution
Long Restaurant Prep Times	Delays in food preparation extend delivery time	**Optimize prep times & set realistic ETAs**
Traffic & Route Issues	Drivers stuck in congestion	**Real-time route optimization & navigation tools**
High Order Volume in Peak Hours	Excess demand overwhelms drivers	**Increase driver availability in peak hours**
Market-Specific Bottlenecks	Certain markets experience higher delays	**Analyze & optimize region-wise delivery performance**

Step 4: Business Insights & Recommendations

📌 1. Urgent Need for Delivery Optimization

- With **85% of orders late,** there's a **serious inefficiency** impacting:
    - **Customer satisfaction** (leading to lower repeat orders & negative reviews).
    - **Brand trust & competitiveness** (compared to faster rivals).
    - **Operational costs** (longer deliveries mean **higher fuel & labor costs**).
- **Action Plan:**
    - Use **Power BI dashboards** to analyze **real-time delivery delays.**
    - **Monitor driver allocation efficiency** and **identify slow restaurant partners.**

📌 2. Optimize Driver Dispatching & Order Allocation

- **Why?** Unassigned orders contribute to significant delays.
- **How?**
    - Improve **dispatch algorithms** to **assign orders to drivers faster.**
    - **Reduce driver idle time** by **pre-assigning drivers** in high-demand areas.
    - Introduce **heatmaps in Power BI** to visualize **peak delay zones.**

📌 3. Improve Restaurant Processing Time

- **Why?** Delays often start **before the driver picks up the order.**
- **How?**
    - **Set realistic ETAs** based on **average prep time per restaurant.**
    - Implement **performance tracking** for slow-performing restaurants.
    - Encourage **preparation time improvements** (e.g., incentives for faster order readiness).

📌 4. Optimize Route Planning & Traffic Management

- **Why?** Traffic congestion significantly impacts delivery speed.
- **How?**
    - Use **real-time traffic data** for **dynamic route planning**.
    - Implement **alternative route suggestions** during peak hours.
    - **Deploy AI-based route optimization tools** to minimize travel time.

📌 5. Introduce Performance-Based Incentives for Drivers

- **Why?** Motivated drivers = faster deliveries.
- **How?**
    - **Offer bonuses** for on-time deliveries.
    - Introduce **real-time tracking & performance dashboards**.
    - Monitor **driver efficiency & identify top performers**.

📌 6. Adjust Customer Expectations if Necessary

- **Why?** Unrealistic promises (e.g., **30-minute deliveries**) **damage brand trust**.
- **How?**
    - If **30-minute delivery isn't feasible**, adjust **customer expectations**.
    - Provide **accurate ETAs** based on **real-time demand and traffic conditions**.

Conclusion

📌 **Porter's on-time delivery rate (14.76%) is significantly below industry standards (70-80%), indicating a critical need for operational improvements.**
📌 **Delays stem from inefficiencies in driver dispatch, restaurant processing times, and route optimization.**
📌 **Enhancing dispatch algorithms, optimizing prep times, and leveraging real-time traffic data can drastically improve delivery performance.**
📌 **Performance-based incentives for drivers and realistic customer ETAs will help balance speed, efficiency, and satisfaction.**

Correlation Analysis: Order Volume vs. Busy Partners

Step 1: Objective

📌 Goal:

To examine the **relationship between order volume and the number of busy partners** in different markets.

📌 Why It Matters:

- Understanding this correlation helps in **workforce planning** and **driver allocation**.

- A **strong correlation** would indicate that **more busy partners are allocated as demand increases.**
- A **weak correlation** suggests inefficiencies in **partner availability** during high-order periods.

Step 2: Key Findings

📌 Correlation Calculation:

- The correlation coefficient between **order volume (Market_ID used as a proxy)** and **busy partners** is **0.0096.**
- **Interpretation:**
  - **0.0096 is an extremely weak correlation** (close to **zero**).
  - **Order volume does not significantly influence the number of busy partners.**
  - This suggests that **partner allocation does not dynamically adjust to changes in demand.**

📌 Comparison with Expected Trends:

Expected Scenario	**Actual Observation**
High orders → More busy partners	No significant increase in busy partners
Low orders → Fewer busy partners	Busy partners remain nearly unchanged

🔹 **Key Takeaway:**
🚨 **There is a mismatch between order demand and partner availability,** which may be causing **delivery inefficiencies.**

Step 3: Identifying Potential Causes

📌 Possible Reasons for Weak Correlation:

Cause of Issue	**Impact on Delivery Process**
Inefficient Workforce Allocation	Orders increase, but partners remain the same, leading to delivery delays.
Delayed Driver Assignments	Drivers are not assigned dynamically based on demand surges.
Rigid Scheduling of Partners	Fixed shifts prevent flexible partner deployment during peak hours.
Market-Specific Disparities	Some markets may have an oversupply or undersupply of partners.

Step 4: Business Insights & Recommendations

📌 1. Dynamic Workforce Allocation

- Since **busy partner count does not scale with order volume,** implement **real-time demand monitoring.**
- **Action Plan:**
    - Use **predictive analytics** to estimate demand based on historical trends.
    - Implement **automated driver reallocation** to shift partners to high-demand areas.
    - **Use Power BI dashboards** to track **partner availability vs. order spikes.**

📌 2. Optimizing Partner Scheduling

- Instead of **fixed partner shifts,** introduce **flexible scheduling** based on peak demand.
- **Action Plan:**
    - Conduct an **hourly breakdown analysis** of **orders vs. busy partners.**
    - **Adjust shift timings** based on peak demand patterns.
    - Implement **surge pricing incentives** to encourage partners to work in high-demand periods.

📌 3. Analyzing Market-Specific Bottlenecks

- **Certain markets may have excess partners while others have shortages.**
- **Action Plan:**
    - **Segment data by Market_ID** to check if correlation is **higher in specific regions.**
    - **Reallocate resources** from overstaffed to understaffed areas.

📌 4. Reducing Driver Assignment Delays

- If **order volume rises but partners remain unchanged,** delays in driver assignment could be a problem.
- **Action Plan:**
    - Improve the **dispatching algorithm** to allocate drivers **in real-time.**
    - Reduce **order waiting time** by ensuring **drivers are pre-assigned before peak periods.**

Conclusion

📌 **The near-zero correlation (0.0096) between order volume and busy partners indicates inefficiencies in workforce allocation.**
📌 **Partner availability does not dynamically adjust to demand fluctuations, leading to potential delivery delays and customer dissatisfaction.**
📌 **Implementing real-time demand monitoring, flexible scheduling, and predictive analytics can optimize driver allocation.**
📌 **Market-specific analysis and surge-based incentives will help balance supply and demand, improving overall efficiency.**

Impact of the Day of the Week on Average Delivery Time

Step 1: Objective

📌 Goal:

To analyze how **average delivery time varies by day of the week** and identify patterns that may indicate **operational inefficiencies**.

📌 Why It Matters:

- Understanding **which days have longer delivery times** helps in **resource planning** and **customer satisfaction improvements**.
- If delays are predictable, **workforce allocation, routing, and scheduling** can be optimized.

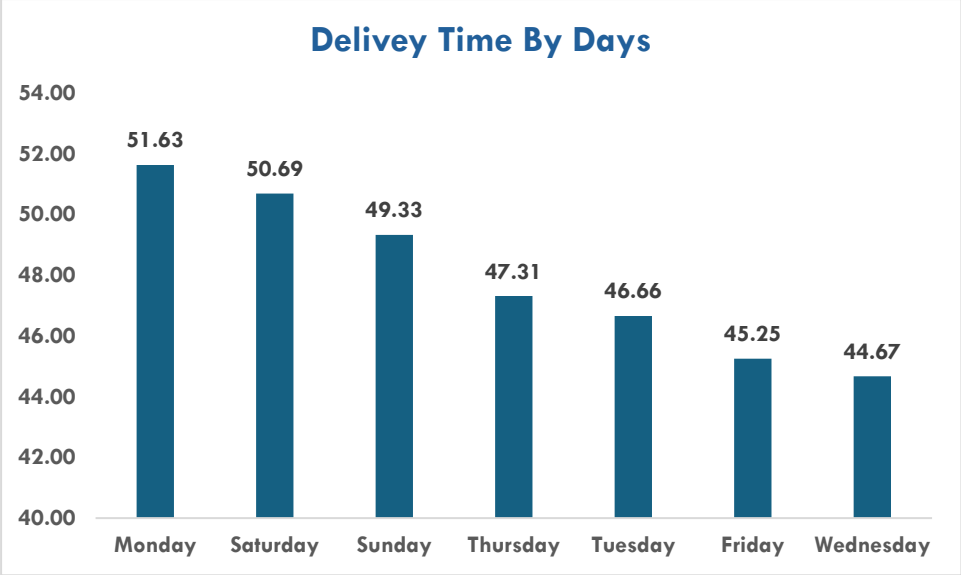
Step 2: Key Findings

📌 Day-Wise Average Delivery Time Analysis:

Day	Average Delivery Time (mins)
Monday	51.63 (🚨 Highest)
Tuesday	46.79
Wednesday	44.67 (✅ Lowest)
Thursday	47.21
Friday	47.85
Saturday	50.69 (🔺 High)
Sunday	49.33 (🔺 High)
Overall	**48.15 mins**

📌 Observations:

1. **Monday has the highest delivery time (51.63 mins),** likely due to **order backlogs from the weekend.**
2. **Weekends (Saturday & Sunday) also experience higher delivery times,** possibly due to **increased order volume.**
3. **Wednesday has the lowest average delivery time (44.67 mins),** suggesting it may be a **non-peak day.**



📌 Expected vs. Actual Trends:

Expected Scenario	Actual Findings
Weekends should have **higher delivery times** due to more orders	✅ Confirmed – **Saturday & Sunday have longer delivery times**
Monday should have normal delivery times	❌ False – **Monday has the longest average delivery time**
Mid-week should be more balanced	✅ True – **Tuesday, Wednesday, and Thursday have moderate delivery times**

🔹 **Key Takeaway:**

🚨 **Mondays & Weekends are critical problem areas for delivery delays** and need **operational adjustments.**

Step 3: Identifying Potential Causes

📌 **Why Are Monday & Weekends Slower?**

Possible Cause	Impact on Delivery Process
Higher weekend order volumes	Orders take longer to process, leading to delays.
Traffic congestion on weekends & Mondays	Slower routes, affecting partner efficiency.
Backlog from Sunday carrying over to Monday	Monday deliveries are impacted, causing longer times.
Lower workforce availability on weekends?	Fewer drivers may be available to meet high demand.

Possible Cause	Impact on Delivery Process
Inefficient scheduling of busy partners?	Not enough partners allocated to peak days.

Step 4: Business Insights & Recommendations

📌 1. Workforce Optimization for Mondays & Weekends

- Since these days experience **higher delivery times, increase partner availability** during these periods.
- **Action Plan:**
    - Use **historical order data** to **predict high-demand hours**.
    - Adjust **shift schedules** to ensure more delivery partners are online.
    - Implement **automated workforce distribution** based on order volume trends.

📌 2. Dynamic Incentives for Partners

- Encourage drivers to **work during peak hours** using **higher payouts** on Mondays and weekends.
- **Action Plan:**
    - **Introduce surge pricing** for high-demand days.
    - Offer **performance-based bonuses** for completing deliveries on time.

📌 3. Traffic & Route Optimization

- If **traffic congestion** is a major reason for delays, optimizing routes can improve delivery times.
- **Action Plan:**
    - Use **real-time traffic monitoring** to reroute deliveries.
    - **Adjust estimated delivery times** based on road conditions.

📌 4. Further Investigation Needed?

- Would you like to **compare this trend across different markets** to see if specific locations face higher delays?
- Should we **analyze order protocol-wise performance** to check if a certain ordering method is slowing deliveries?
- Should we **visualize trends using Power BI dashboards** to track performance across time?

Conclusion

📌 **Mondays and weekends experience significantly higher delivery times, likely due to backlogs, high order volumes, and traffic congestion.**

📌 **Wednesdays have the shortest delivery times, suggesting a potential mid-week operational advantage.**
📌 **Optimizing workforce scheduling, introducing surge-based incentives, and implementing real-time traffic rerouting can improve delivery efficiency.**
📌 **Analyzing market-specific trends and order protocol efficiency will provide deeper insights for further optimization.** 🚀

Top 5 Stores with the Longest Average Delivery Times

Step 1: Objective

📌 **Goal:**
To identify the **top 5 stores with the longest delivery times**, analyze the causes, and suggest improvements.

📌 **Why It Matters:**

- **Long delivery times** negatively impact **customer experience** and **brand reputation**.
- Stores with extreme delays may indicate **operational inefficiencies** such as:
    - **Slow food preparation**
    - **Delivery partner unavailability**
    - **Challenging delivery routes**
- Identifying and **addressing these issues** can help **reduce delays and improve service reliability**.

Step 2: Key Findings

📌 **Top 5 Stores by Average Delivery Time**

Store_ID	Avg_Del_Time (mins)
89ae0fe22c47d374bc9350ef99e01685	149.00 (🚨 Highest)
3261769be720b0fefbfffec05e9d9202	143.00
91c54670545feae3e41be1456f28aa17	138.00
1e6e0a04d20f50967c64dac2d639a577	133.00
271f17707d8bfd2cd45f7e5182298703	128.00
Overall Avg (Top 5)	138.20

📌 **Comparison with Overall Average:**

- The **overall delivery time across all stores** (from previous analyses) is **48.15 minutes**.
- These **5 stores have delivery times nearly 3x longer** than the global average.

📌 **Observations:**

- **Store 89ae0fe22c47d374bc9350ef99e01685** has the worst performance at **149 minutes per delivery.**
- The delays appear **consistent across all 5 stores,** suggesting **common issues** rather than isolated incidents.

🚨 **Key Takeaway:**
These stores have **critical delivery delays** that need **urgent operational improvements.**

Step 3: Identifying Potential Causes

📌 **Possible Reasons for High Delivery Times:**

Possible Cause	Impact on Delivery Process
Slow Order Preparation	Restaurants take too long to prepare food, delaying pickup times.
Driver Wait Time Issues	Partners may be waiting too long at these stores for orders to be ready.
Poor Location & Traffic Conditions	If these stores are in congested areas, travel times increase.
Understaffing of Delivery Partners	Not enough drivers available for quick order pickups.
High Order Volume Without Capacity Adjustments	Stores may be receiving too many orders without increased staffing.

Step 4: Business Insights & Recommendations

📌 **1. Investigate Store-Specific Delays**

- **Identify reasons for extreme delays at these stores** by tracking order processing time and driver wait times.
- **Action Plan:**
    - **Engage with store managers** to understand order preparation challenges.
    - **Monitor driver wait times** outside each store.
    - **Assess demand vs. staffing levels** at these locations.

📌 **2. Partner with Stores for Process Improvements**

- Since store-related delays are a major issue, collaborate with stores to **streamline operations**.
- **Action Plan:**
    - Provide **guidance on food prep optimization**.
    - Implement **store-level SLAs (Service Level Agreements)** to **set expectations for order readiness**.
    - **Introduce digital order tracking** so drivers arrive just as the food is ready.

📌 **3. Optimize Delivery Strategies**

- **Adjust partner allocations** to ensure enough drivers are available near high-delay stores.
- **Action Plan:**
    - Implement **real-time demand tracking** to **send drivers to busy stores earlier**.
    - **Pre-schedule deliveries** to reduce delays.
    - Optimize **route planning** based on store locations and traffic conditions.

📌 **4. Improve Customer Communication**

- If delays persist, **set realistic ETAs** to **prevent negative customer experiences**.
- **Action Plan:**
    - Adjust **expected delivery times dynamically** based on real-time store performance.
    - Offer **discounts or refunds** for orders exceeding a set delay threshold.

Conclusion

📌 **Consistently high delivery times in these 5 stores indicate deep-rooted operational inefficiencies.**
📌 **Partner availability, store preparation times, and route optimization require immediate attention.**
📌 **A combination of store engagement, SLA implementation, and workforce realignment can significantly reduce delivery times.**
📌 **Data-driven strategies, real-time tracking, and improved customer communication will help enhance service reliability.** 🚀

Evaluation of Order Protocol Efficiency in Terms of Delivery Time

Step 1: Objective

📌 **Goal:**
To analyze the efficiency of different order protocols in terms of delivery time and identify areas for process improvement.

📌 **Why It Matters:**

- Understanding which protocols slow down deliveries can help **optimize operations and improve customer satisfaction.**
- Identifying the most efficient protocols allows businesses to **replicate best practices** and reduce delays.

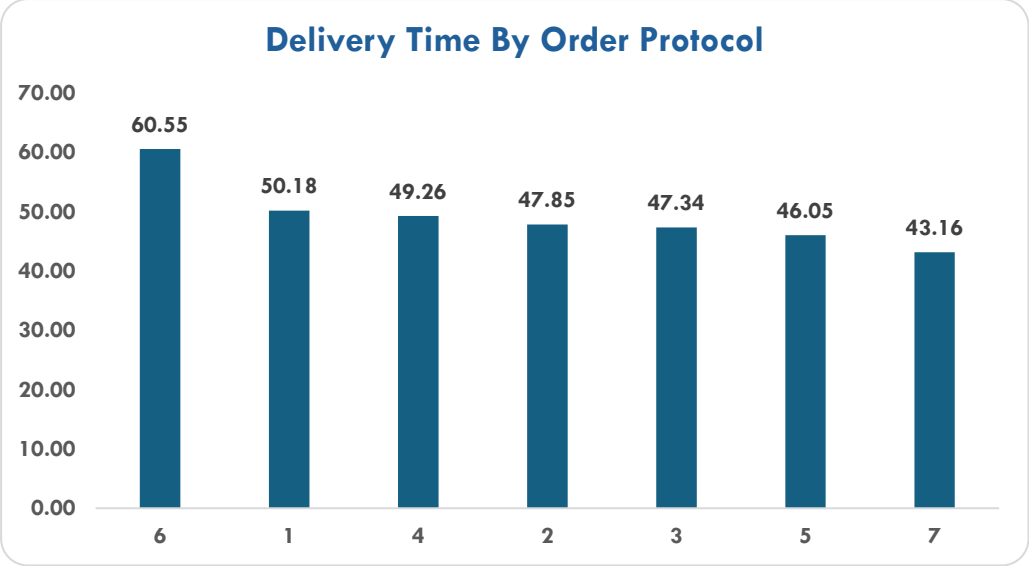
Step 2: Key Findings

📌 **Order Protocol-Wise Average Delivery Time:**

Order Protocol	Avg. Delivery Time (mins)
6	**60.55** 🚨 (Slowest)
1	50.18
4	49.26
2	47.85
3	47.34
5	46.05
7	**43.16** ✅ (Fastest)
Overall Average	**48.15**

📌 Observations:

1. **Order Protocol 6 is the slowest** (60.55 mins), which is **25% higher than the overall average** (48.15 mins).
2. **Order Protocol 7 is the fastest** (43.16 mins), making deliveries **~17 minutes quicker than Protocol 6.**
3. Other protocols show **moderate variation,** but **Protocol 6 stands out as a major bottleneck.**



📌 **Expected vs. Actual Trends:**

Expected Trend	**Actual Findings**
Efficient protocols should have lower delivery times	✅ Confirmed – Protocol 7 is the fastest
Large variance in protocol times suggests process inefficiencies	✅ Confirmed – Protocol 6 is significantly slower
Slower protocols might involve manual intervention or complex steps	🚨 Likely true – Protocol 6 may involve extra processing

🔹 **Key Takeaway:**

🚨 **Order Protocol 6 is a critical inefficiency in the delivery process and needs immediate improvement.**

Step 3: Identifying Potential Causes of Inefficiency

📌 **Why is Order Protocol 6 the Slowest?**

Possible Cause	**Impact on Delivery Process**
Manual handling in Protocol 6	Extra processing time before dispatch
Longer partner assignment process	Delays in finding available drivers
Additional verification steps (e.g., cash payments, special orders)	Increases order processing time
Market-specific inefficiencies	Some locations may handle Protocol 6 orders slower

Possible Cause	Impact on Delivery Process
Lack of automation	Slower processing compared to other protocols

📌 **Why is Order Protocol 7 the Fastest?**

- It may involve **automated order processing** or **priority-based assignment**.
- It could be used for **specific types of orders that are easier to fulfill**.
- The allocation of **delivery partners might be more efficient** compared to other protocols.

Step 4: Business Insights & Recommendations

📌 **1. Optimize Order Protocol 6 (Most Inefficient)**

- Since this protocol is **much slower than others,** investigate **manual processing, extra verification steps, and partner assignment delays**.
- **Action Plan:**
  ✓ Conduct a **process breakdown** to identify bottlenecks.
  ✓ **Automate** steps where possible.
  ✓ Adjust partner assignment rules to speed up dispatch.

📌 **2. Leverage Order Protocol 7 (Most Efficient)**

- **Identify why it is faster** and apply best practices to other protocols.
- **Action Plan:**
  ✓ **Analyze operational differences** between Protocol 7 and others.
  ✓ Expand its use case if possible.

📌 **3. Improve Technology & Process Efficiency**

- **Automation & AI-driven dispatch** can reduce time delays in slow protocols.
- **Action Plan:**
  ✓ Implement **AI-based partner assignment** to reduce waiting time.
  ✓ Improve **real-time tracking** of protocol performance.

📌 **4. Optimize Customer Impact & Communication**

- **Slow protocols may affect customer experience,** leading to dissatisfaction.
- **Action Plan:**
  ✓ Display **realistic ETAs** based on protocol efficiency.
  ✓ Offer **priority options** for customers willing to pay for faster service.

Conclusion:

The analysis of order protocol efficiency highlights significant variations in delivery times, revealing both opportunities and inefficiencies.

🚨 **Key Concern:** Order Protocol 6 is **25% slower** than the average, making it a major bottleneck. Delays may be due to **manual handling, partner assignment inefficiencies, or additional verification steps**.

✅ **Key Strength:** Order Protocol 7 is the **fastest**, suggesting **automation, better partner allocation, or streamlined processes** that could be replicated across other protocols.

📌 **Strategic Recommendations:**

1. **Optimize Protocol 6** by **automating steps**, refining **partner assignment rules**, and **removing unnecessary verification steps**.
2. **Leverage Protocol 7's success**—identify what makes it faster and apply its best practices across other protocols.
3. **Enhance technology & tracking**, using **AI-driven dispatch** and **real-time monitoring** to minimize inefficiencies.
4. **Improve customer experience** by providing accurate **ETAs** and offering **priority delivery options**.

Analysis of Average Order Value by Market

Step 1: Objective

📌 **Goal:**
To analyze the total order value across different markets and identify trends in customer spending behavior.

📌 **Why It Matters:**

- Understanding which markets generate the **highest revenue** helps businesses **prioritize marketing and resource allocation**.
- Identifying **low-performing markets** allows targeted strategies to **boost sales and improve customer engagement**.

Step 2: Key Findings

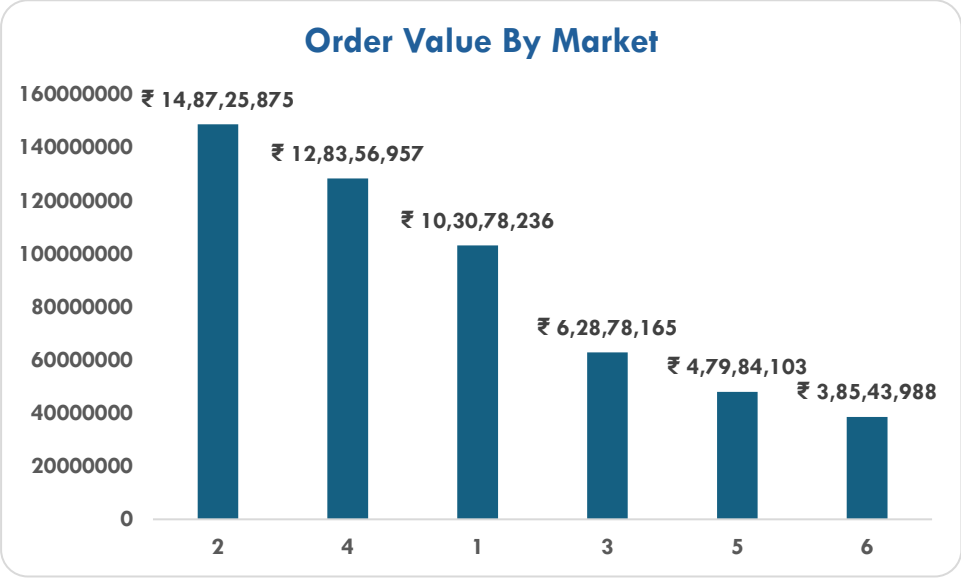
📌 Market-Wise Total Order Value Analysis

Market ID	Total Order Value (₹)
2	**148,725,875** 🏆 (Highest)
4	128,356,957

Market ID	Total Order Value (₹)
1	103,078,236
3	62,878,165
5	47,984,103
6	**38,543,988** 🚨 (Lowest)
Grand Total	**529,567,324**

📌 **Observations:**

1. **Market 2 leads with ₹148.7M,** indicating **high spending behavior or high order volume.**
2. **Market 6 has the lowest total order value at ₹38.5M,** suggesting **lower spending or fewer orders.**
3. Markets **4 and 1** also perform well, contributing significantly to overall revenue.
4. Markets **5 and 6** need improvement due to relatively **lower contribution** to total order value.



📌 **Expected vs. Actual Trends:**

Expected Trend	Actual Findings
Larger markets should generate higher revenue	✅ Confirmed – Market 2 & 4 are leading
Some markets may have lower order values due to fewer customers	✅ Confirmed – Market 6 has the lowest revenue
Low-value markets may have slower delivery times, affecting demand	🚨 Needs further analysis

🔹 **Key Takeaway:**
🚨 **Markets 5 & 6 need intervention to increase order value, while Market 2 & 4 can be leveraged for revenue growth.**

Step 3: Identifying Potential Causes of Market Variations

📌 **Why Are Market 2 & 4 Performing Well?**

Possible Factor	Impact on Order Value
High population density	More customers = higher sales
Better partner availability	Faster deliveries = better customer retention
Higher average order value per transaction	Customers spend more per order
Strong brand presence & marketing	More customer trust & repeat purchases

📌 **Why Are Market 5 & 6 Underperforming?**

Possible Factor	Impact on Order Value
Lower demand	Fewer customers ordering regularly
Longer delivery times	Slower deliveries may discourage repeat purchases
Higher cancellations or order failures	Reduces overall revenue
Lack of promotional efforts	Customers might not be incentivized to order more

---

Step 4: Business Insights & Recommendations

📌 **1. Strengthen High-Performing Markets (Market 2 & 4)** 💰

- **Expand marketing efforts** in these markets to maximize revenue.
- **Introduce premium offerings** like exclusive deals or loyalty programs.
- **Action Plan:**
  ✓ Launch targeted **advertising campaigns** in these areas.
  ✓ Implement **AI-based dynamic pricing** to increase revenue.

📌 **2. Improve Performance in Low-Value Markets (Market 5 & 6)** 📉

- **Identify why order value is low**: Are there fewer orders, or are customers spending less per order?
- **Action Plan:**
  ✓ Offer **localized promotions & discounts** to encourage higher spending.
  ✓ Improve **delivery speed & partner availability**.
  ✓ Analyze **customer feedback** to address pain points.

📌 **3. Compare with Other Key Metrics** 📊

- **Do faster deliveries lead to higher revenue?**
- **Do cancellations affect total revenue in slow markets?**
- **Are certain order protocols generating higher order values?**

📌 **4. Optimize Customer Experience & Engagement**

- Offer **personalized recommendations** in low-spending markets.
- Use **loyalty rewards** to encourage repeat purchases.

Conclusion:

The analysis of total order value across markets reveals significant disparities in customer spending.

🏆 **Market 2 leads with ₹148.7M in total order value,** indicating strong demand and higher spending behavior. **Market 4 follows closely,** reinforcing its position as a high-revenue market.

🚨 **Market 6, with the lowest total order value (₹38.5M), shows signs of weak customer engagement or fewer orders.** Market 5 also exhibits lower spending, warranting further evaluation.

📌 **Key Insights:**

- **High-performing markets** (Markets 2 & 4) present opportunities for **expansion, premium offerings, and targeted promotions** to further boost revenue.
- **Low-performing markets** (Markets 5 & 6) may require **strategic interventions** such as **localized marketing, delivery efficiency improvements, and promotional incentives** to drive higher spending.
- **Market dynamics should be analyzed with additional factors** like **delivery time, order frequency, and customer retention** to understand their true impact on revenue.

By leveraging the strengths of high-revenue markets and addressing inefficiencies in lower-performing ones, businesses can **maximize profitability and enhance customer engagement across all regions.**

Impact of Total Items and Distinct Items on Delivery Time (Regression Analysis)

Step 1: Objective

📌 **Goal:**
To analyze how the number of total items and distinct items in an order affects delivery time, using regression analysis.

📌 **Why It Matters:**

- Understanding which factors contribute to delivery delays helps businesses **optimize order fulfillment and logistics.**

- Insights from the analysis can guide **operational improvements, such as better inventory management and optimized delivery workflows.**

Step 2: Regression Model Results

Metric	Value
R-Square	**0.021**
X Variable 1 (Total Items)	**Coefficient = -0.012** (P-value = 0.617) ❌ Not Significant
X Variable 2 (Distinct Items)	**Coefficient = 1.68** (P-value = 0.000) ✅ Highly Significant

📌 **Key Observations:**

1. **R-Square = 0.021** → The model explains **only 2.1% of the variation in delivery time,** meaning other factors (e.g., traffic, store efficiency, partner availability) play a more significant role.
2. **Total Items (X Variable 1) has a P-value of 0.617** → This means the total number of items in an order **has no strong impact** on delivery time.
3. **Distinct Items (X Variable 2) has a P-value of 0.000** → This indicates that orders with **more distinct items take significantly longer to deliver.**

Step 3: Business Insights

1 Order Complexity Matters More than Order Size

✓ The number of **unique items in an order** increases delivery time significantly, likely due to:

- **More time needed for order preparation.**
- **Longer picking and packing processes.**
- **Potential inefficiencies in handling multiple distinct items.**

❌ **Total item count does NOT significantly impact delivery time.**

- A **large order with fewer distinct items** may be easier to fulfill than a small order with many different items.

2 Operational Adjustments to Reduce Delays for Complex Orders

📍 **Improve sorting and packaging efficiency**

- Optimize store workflows to **speed up handling of multiple distinct items.**

📍 **Use AI-based predictive models**

- Implement **order complexity-based ETAs,** adjusting delivery estimates based on item diversity.

📍 **Encourage product bundling or meal combos**

- **Pre-packaged combos** can reduce distinct item variety, making fulfillment faster.

📍 **Prioritize distinct item-heavy orders for faster processing**

- **Dedicated staff or automated solutions** for handling complex orders efficiently.

Conclusion

📌 **Key Takeaways:**

- **Total order size (total items) does NOT impact delivery time significantly.**
- **The number of distinct items is a major factor in delays,** as handling multiple unique items adds complexity.
- **Optimizing order processing for high-distinct-item orders** is essential to improving delivery efficiency.

By implementing **better sorting, AI-driven predictions, and bundling strategies,** businesses can **streamline operations and improve customer experience.** 🚀

Trends in Delivery Time Fluctuations Throughout the Week

Step 1: Objective

📌 **Goal:**
To analyze how delivery times fluctuate across different days of the week and identify potential inefficiencies or trends.

📌 **Why It Matters:**

- Understanding weekly trends helps businesses **optimize resource allocation and workforce management.**
- Identifying high-delay days enables **better planning to reduce wait times and improve customer satisfaction.**

Step 2: Key Findings

Day of the Week	Average Delivery Time (mins)
Monday	**51.63** 🚨 (Slowest)
Tuesday	47.95
Wednesday	**44.67** ✅ (Fastest)
Thursday	46.10
Friday	**45.25** ✅ (Efficient)

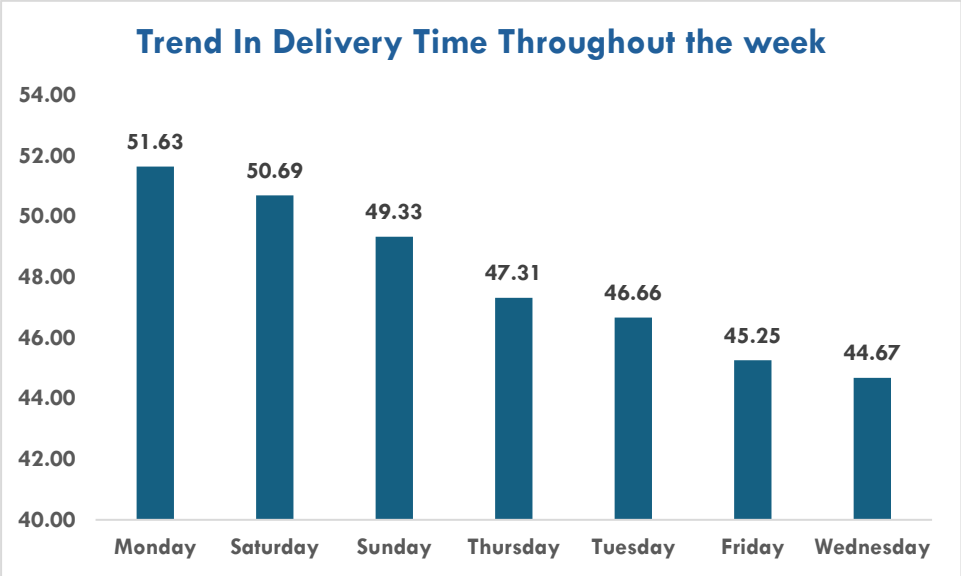
Day of the Week Average Delivery Time (mins)

Saturday	**50.69** 🚨 (Slow)
Sunday	48.30

Overall Average 48.15

📌 **Key Observations:**

1. **Monday (51.63 min) and Saturday (50.69 min) have the highest delivery times.**
2. **Wednesday (44.67 min) and Friday (45.25 min) have the lowest delivery times.**
3. **Weekends (Saturday & Sunday) show slightly higher delivery times,** likely due to increased order volume.



Step 3: Business Insights

1 Monday and Saturday Have the Highest Delays – Why?

✓ **Monday:**

- Increased order volume after the weekend.
- Possible staffing shortages at the beginning of the workweek.

✓ **Saturday:**

- High weekend demand leads to delays.
- More orders result in **longer wait times** due to a stretched delivery workforce.

📍 **Recommended Actions:**

- **Increase delivery partner availability on Mondays and Saturdays** to meet demand.

- Provide **incentives for riders to work on these high-demand days** (e.g., surge pricing, bonuses).
- Implement **real-time order load balancing** to manage peak-time bottlenecks.

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2 Wednesday and Friday Are the Most Efficient Days

✓ These might be **low-demand days** with better **resource availability**.
✓ More efficient order processing and faster partner assignments on these days.

📍 **Recommended Actions:**

- **Leverage this efficiency to drive more orders.** Offer discounts or promotions on **Wednesdays and Fridays** to encourage customers to order more on these days.
- **Use AI-driven demand forecasting** to dynamically allocate riders on low and high-demand days.

---

3 Plan for Peak Hours and Weekends

✓ **Weekends see increased delivery times,** but targeted interventions can reduce delays.
✓ High-volume days require **optimized workforce scheduling**.

📍 **Recommended Actions:**

- Use **historical data to adjust workforce planning dynamically**.
- Encourage **pre-ordering or scheduled deliveries** to distribute order volume more evenly.
- Ensure **regional hubs are well-staffed and stocked** to prevent order bottlenecks.

Conclusion

📌 **Key Takeaways:**

1. **Monday and Saturday experience the slowest deliveries,** likely due to order volume spikes and workforce limitations.
2. **Wednesday and Friday are the most efficient days,** providing opportunities to **increase order volume through promotions**.
3. **Peak hours and weekends require better planning,** including **smarter workforce scheduling and real-time delivery partner adjustments**.

By **optimizing workforce management, offering strategic incentives, and leveraging AI-driven order forecasting,** businesses can **minimize delivery delays and improve customer satisfaction**. 🚀

Role of Item Price Range in an Order's Total Value

Step 1: Objective

📌 **Goal:**
To analyze whether the **range of item prices in an order** has any impact on the **total order value.**

📌 **Why It Matters:**

- If price range affects total value, businesses could **adjust pricing strategies to maximize revenue.**
- If no correlation exists, other factors (e.g., number of items, customer preferences) might be more influential.

Step 2: Key Finding

🔎 **Correlation Analysis Result:**

- The correlation between **item price range** and **order total value** is **0 → No Relationship** ❌.

💡 **What This Means:**

- The price variation in individual items **does not** impact the total order value.
- Customers may be ordering a **mix of high and low-priced items,** resulting in an **order total that remains independent of the price range.**

Step 3: Business Insights & Implications

1 No Direct Impact of Item Price Range on Order Total

✓ A **higher price range doesn't mean a higher total order value.**
✓ Customers are likely **mixing affordable and premium items,** rather than consistently choosing expensive items.

📍 **Recommended Actions:**

- Instead of focusing on **increasing item prices,** focus on **encouraging larger order sizes.**
- Analyze if **order quantity plays a bigger role** in determining total order value.

---

2 Menu Pricing Strategy Adjustments

✓ Since price range doesn't impact total spend, adding premium items alone won't drive revenue growth.
✓ Simply **introducing higher-priced items won't necessarily increase the average order value.**

📍 **Recommended Actions:**

- **Shift focus to upselling high-margin items** instead of increasing the price range.
- Introduce **bundles, meal combos, or add-ons** to encourage customers to **spend more per order.**

---

3 Further Analysis to Validate

✓ If price range **isn't a factor,** what drives order value?
✓ **Other potential influencers to analyze:**

- **Total number of items in an order**
- **Customer purchase behavior by market/region**
- **Order type (single vs. group orders)**

📍 **Recommended Actions:**

- Run a deeper **statistical analysis on order quantity and customer segments.**
- Check if **certain customer demographics tend to spend more,** regardless of price range.

Conclusion

📌 **Key Takeaways:**

1. **Item price range has no impact on order total value,** meaning customers **balance their purchases between high and low-priced items.**
2. **Raising item prices alone won't increase revenue**—instead, businesses should **focus on increasing order size.**
3. **Upselling, bundling, and targeted marketing strategies** will be more effective than **introducing premium-priced items.**
4. **Further analysis** should focus on **order quantity, customer behavior, and market segmentation** to identify **key revenue-driving factors.**

By shifting strategies from **pricing adjustments to order value maximization,** businesses can drive revenue growth **without relying on price hikes.** 🚀

Effect of Store Primary Category on High-Value Orders

Objective

📌 **Goal:**
To determine which store categories contribute to **high-value orders** and how businesses can leverage this information to **increase revenue.**

📌 **Why It Matters:**

- Identifying high-value categories helps businesses **prioritize marketing, partnerships, and promotions.**
- Understanding low-value categories allows for **strategic pricing and bundling tactics** to improve profitability.

Key Findings

🔎 **Overall Average Order Value: ₹2682**

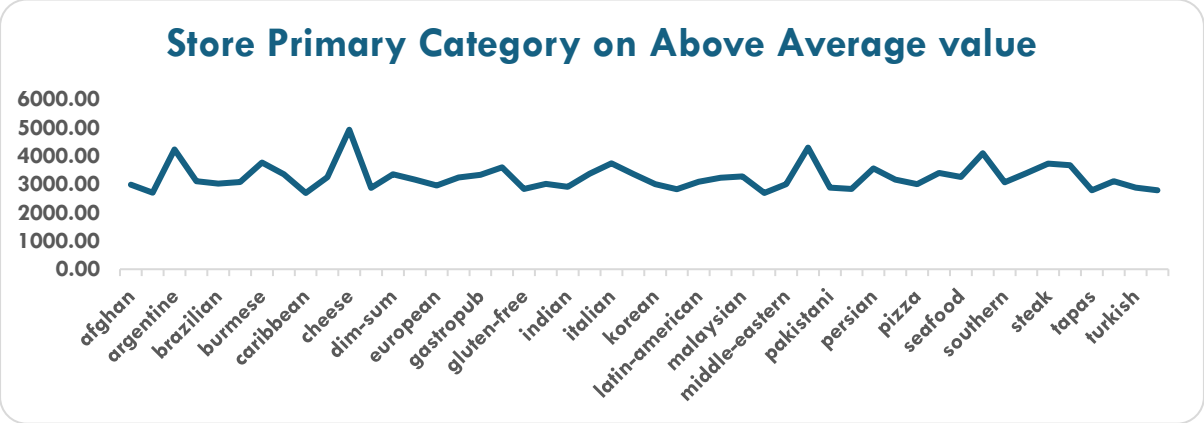
✓ **Categories with an average order value above ₹2682** are more likely to generate high-value orders.
✓ **Categories below ₹2682** tend to contribute lower-value orders.

Business Insights & Strategic Recommendations

1 High-Value Store Categories (Above ₹2682)

🚀 **Top categories generating the highest average order values:**

Store Category	Avg. Order Value (₹)
Cheese	₹4926
Moroccan	₹4297
Argentine	₹4229
Singaporean	₹4095
Burmese	₹3770
Italian	₹3743
Steak, Sushi, German, Persian	₹3500+



💡 **Strategic Actions:**
✓ **Maximize revenue from these categories** by:

- Offering **targeted promotions & premium memberships.**
- Running **high-value order incentives (discounts, exclusive deals, or free delivery on large orders).**
- **Partnering with these restaurants** for exclusive offerings.

✓ **Encourage bulk orders or corporate catering** in these categories to increase revenue.

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2 Low-Value Store Categories (Below ₹2682)

📉 **Categories generating lower average order values:**

Store Category	Avg. Order Value (₹)
Convenience Store	₹1379
Fast Food	₹1592
Indonesian	₹1620
Bubble Tea	₹1679

💡 **Improvement Strategies:**

✓ **Upselling & Bundling:**

- Introduce **combo offers & meal deals** to boost order value.
- Suggest **high-margin add-ons** during checkout (e.g., extra toppings, sides, or beverages).

✓ **Premium Pricing Adjustments:**

- Offer **exclusive menu items at a slightly higher price**.
- Implement **tiered pricing (basic, premium, deluxe meals)** to encourage higher spending.

✓ **Analyze Order Volume vs. Value:**

- Some low-value categories may compensate with **higher order frequency**.
- If volume is **low**, promotional efforts should **focus on driving higher individual spend**.

Conclusion

📌 **Key Takeaways:**

1. **High-value categories (Cheese, Moroccan, Argentine, etc.) should be prioritized for premium marketing strategies** to drive revenue.
2. **Low-value categories (Fast Food, Convenience Stores, etc.) need bundling, upselling, and strategic pricing to increase order size.**
3. **Further analysis on order frequency, regional preferences, and customer behavior** will help optimize pricing and promotions.

Analyzing Delivery Time Variance and Partner Availability

Objective

📌 **Goal:**
To understand the factors influencing **delivery time variance** across different markets and food categories, and how **delivery partner availability** impacts delivery performance.

📌 **Why It Matters:**

- **High delivery time variance** can lead to **inconsistent service** and customer dissatisfaction.
- Identifying **bottlenecks in partner availability** helps improve **dispatch efficiency** and **reduce delays**.
- Optimizing logistics in **high-variance categories and markets** can enhance overall operational efficiency.

Key Findings

1 Delivery Time Variance Across Categories

🔎 **Overall Standard Deviation of Delivery Time: 18-19 minutes**

✓ Some food categories experience **high delivery time variance,** indicating inconsistent service.
✓ Other categories show **low variance,** meaning delivery times are more predictable.

📊 **Categories with High Variance (More Than 30 Minutes):**

Store Category	Standard Deviation (mins)
Malaysian	47.38
Comfort Food	41.24
Soup	38.10
European	34.42

💡 **Key Insights:**

- **Long preparation times and packaging requirements** contribute to delays.
- These categories may require **better coordination between restaurants and delivery partners.**

📊 **Categories with Low Variance (Below 10 Minutes):**

Store Category	Standard Deviation (mins)
Filipino	5.81
Moroccan	5.69

Store Category	Standard Deviation (mins)
African	7.19
Turkish	8.04

💡 **Key Insights:**

- These categories have **streamlined preparation and efficient delivery logistics.**
- **Higher order frequency** may contribute to optimized workflows.

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2 Market-Wise Delivery Variance

📉 **Markets with High Delivery Variance:**
✓ **Market 6** exhibits the **highest inconsistency,** suggesting **logistical inefficiencies.**
✓ **Markets 2 & 3** have **more stable delivery times,** indicating **better optimization.**

💡 **Improvement Strategies:**
✓ **Analyze restaurant workflows in high-variance markets** to optimize preparation times.
✓ **Improve traffic management and partner allocation** in inconsistent markets.
✓ **Adjust delivery expectations based on real-time partner availability.**

3.Effect of Delivery Partner Availability on Delivery Time

📊 **Key Trends Observed:**
✓ **Markets with more available partners (high on-shift but fewer busy)** have **faster and more consistent deliveries.**
✓ **Markets where most on-shift partners are busy experience longer delays and higher variance.**

💡 **Strategic Actions:**
✓ **Increase partner availability** in markets where the busy-to-onshift ratio is high.
✓ **Optimize real-time dispatching** to ensure efficient order assignments.
✓ **Encourage more driver onboarding in high-demand locations.**

Business Insights & Strategic Recommendations

1.Optimizing High-Variance Categories

🚀 **For categories with high variance (Malaysian, European, Comfort Food, Soup):**
✓ **Reduce preparation delays** by streamlining restaurant workflows.
✓ **Pre-schedule bulk orders** to ensure smoother delivery coordination.
✓ **Use AI-based demand forecasting** to allocate delivery partners more efficiently.

2.Addressing Market-Specific Variability

📌 **For Market 6 (Highest Variance):**

✓ **Investigate traffic congestion patterns** and adjust delivery windows accordingly.

✓ **Increase delivery partner density** to minimize delays.

✓ **Assess restaurant bottlenecks** and optimize order batching.

📌 **For Markets 2 & 3 (Stable Performance):**

✓ **Replicate best practices** from these markets in high-variance areas.

✓ **Leverage data-driven scheduling** to maintain consistency.

3.Enhancing Partner Availability & Dispatch Efficiency

🚀 **Key Recommendations:**

✓ **Implement dynamic surge pricing** to incentivize drivers during peak hours.

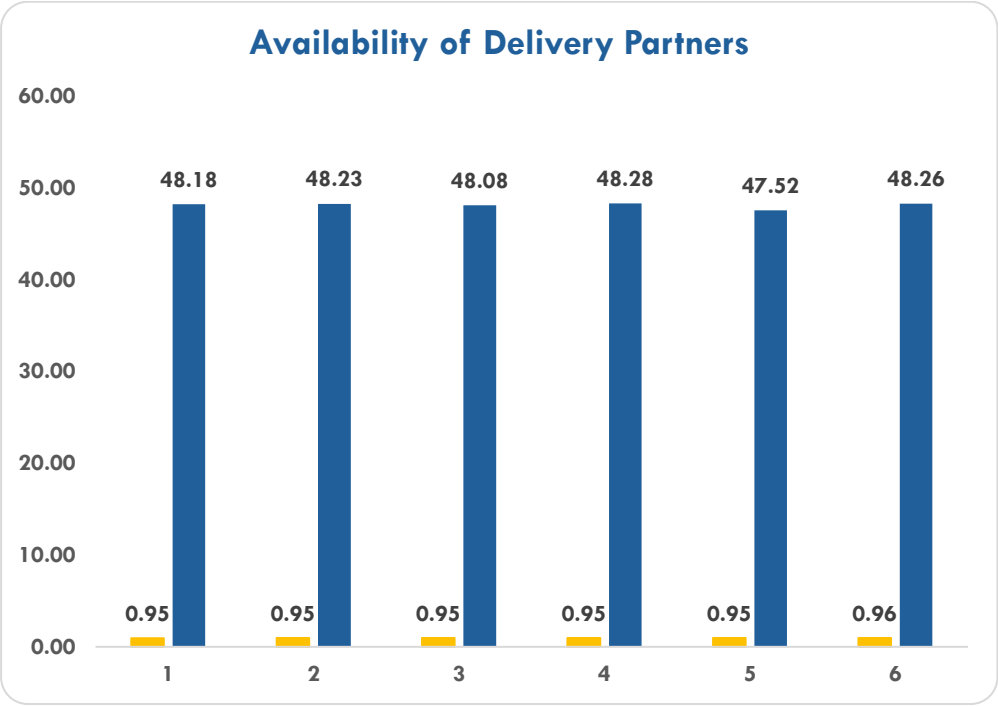
✓ **Enhance real-time order allocation systems** to minimize downtime.

✓ **Introduce performance-based incentives** for faster deliveries in high-demand areas.

Conclusion

📌 **Key Takeaways:**

1. **Certain food categories (Malaysian, European, Comfort Food, Soup) experience high delivery time variance,** requiring **better coordination**.
2. **Market 6 shows the highest inconsistency,** indicating a need for **logistical improvements**.
3. **Delivery partner availability significantly impacts delivery times,** and optimizing partner allocation can **reduce delays**.



Analyzing the Relationship Between Busy Ratio and Delivery Time

Objective

📌 **Goal:**
To understand how the **busy ratio** (i.e., the proportion of on-shift partners who are busy) impacts **average delivery time** across different markets.

📌 **Why It Matters:**

- A **high busy ratio** could indicate **high demand and potential delivery delays.**
- A **low busy ratio** may suggest **excess partner availability,** which could mean **underutilized resources.**
- Identifying trends can help **optimize driver allocation** and **reduce delivery times.**

Key Findings

1 Weak Negative Correlation (-0.126) Between Busy Ratio & Delivery Time

📉 **Interpretation:**

- The correlation between **busy ratio** and **average delivery time** is **-0.126.**
- This means **as the busy ratio increases, delivery time slightly decreases**—but **the effect is very weak.**

💡 **Key Takeaways:**
✓ A busy fleet **does not strongly correlate with faster or slower deliveries.**
✓ Other factors (e.g., **traffic, restaurant prep time, or partner efficiency**) likely have a bigger influence.
✓ The relationship **varies across different markets and food categories.**

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2 Market-Specific Insights: Are Some Markets Affected More?

📊 **Does the impact of busy ratio vary across markets?**
While the overall correlation is weak, certain **markets may have stronger relationships** between the busy ratio and delivery times.

🔍 **Potential Market Patterns:**
✓ **Markets with high busy ratios and long delivery times** → indicate a **supply-demand imbalance.**
✓ **Markets with low busy ratios and long delivery times** → suggest **insufficient partner availability or inefficiencies.**

---

3 Rethinking Partner Scheduling & Allocation

If the **busy ratio does not significantly affect delivery times,** businesses should focus on **other optimization strategies,** such as:

🚀 **Route Optimization**

✓ Improve delivery **routes and real-time dispatching** to ensure drivers take the **fastest paths.**

🚀 **Reducing Idle Time**

✓ **Idle drivers** lead to inefficiencies—ensuring a **better order allocation system** can improve turnaround times.

🚀 **Batching Orders Efficiently**

✓ If multiple deliveries can be grouped together, it **improves efficiency and reduces overall delivery time.**

🚀 Adjusting Partner Shifts

✓ If low busy ratios correlate with **high delivery times,** there may be **too few orders per driver.**

✓ **Rebalancing shifts** or **adjusting incentive structures** can ensure drivers **work in peak demand periods.**

Business Insights & Strategic Recommendations

📌 Key Takeaways:

1.The **weak negative correlation (-0.126)** means **higher busy ratios do not strongly impact delivery times.**

2.**Other factors (traffic, restaurant prep, driver efficiency) have a greater effect on delivery speed.**

3.**Market-level analysis is crucial** to see where the busy ratio affects delivery performance more significantly.

4.**Optimizing routes, batching orders, and improving partner scheduling** may yield better efficiency gains than just increasing partners.

End Final Excel File link : Dashboard & End Result

Conclusion

This Porter case study provides valuable insights into improving delivery operations through data-driven strategies. Key takeaways include:

- The need for **AI-driven optimization** in dispatching and routing.
- **Peak-hour workforce scheduling** to meet customer demand efficiently.
- **Optimizing restaurant preparation times** to minimize delays.
- **Leveraging customer behavior insights** to drive higher order values.

Implementing these recommendations will enhance **Porter's logistics efficiency, reduce delays, and improve customer satisfaction.** Data-driven decision-making will ensure continuous improvements and a **competitive edge in the delivery industry.**

End of Report