

**Restaurant Analysis of swiggy**

**Problem Statement:**

The aim is to analyse and visualize restaurant data to extract meaningful insights that can help in making informed business decisions. Learners will use Power BI to create interactive dashboards showcasing various aspects of the restaurant's performance.

**1. Data Exploration**

**Objective:**

The purpose of **Data Exploration** was to get an initial understanding of the dataset. I explored the structure of the data to identify key features, potential issues like missing or inconsistent data, and overall distribution, which helped guide the cleaning and transformation steps.

**What I Did:**

**Loaded the Data**: I started by importing the dataset, which contained various columns such as **Restaurant Name**, **Avg Ratings**, **Price**, **Total Ratings**, **Delivery Time**, **Food Type**, and **City**. The first step was to load the data into the tool (e.g., Power BI or Excel).

**Initial Inspection**:

I inspected the first few rows of the data to understand its general structure. For example, I checked:

* **Avg Ratings** and **Price** columns to ensure they had numerical values.
* **Food Type** and **City** columns to verify they contained textual data without unexpected entries (e.g., typos or inconsistent naming).

**Checked for Missing Data**: I examined whether any of the critical columns (**Avg Ratings**, **Price**, **Total Ratings**, **Delivery Time**) had missing or **null values**. This was important to ensure that I wouldn't lose valuable insights during analysis due to missing data.

**Summary Statistics**:

I generated summary statistics for numeric columns to understand:

* The **range** and **average** values for **Price** and **Avg Ratings**.
* The distribution of **Total Ratings** across restaurants.

I also looked for any **outliers** (e.g., restaurants with prices much higher or lower than others), which could skew the analysis.

**Identified Data Types**:  
I verified the data types for each column, ensuring:

* **Price** and **Avg Ratings** were numeric.
* **Food Type** and **City** were categorical (text data).

**Outcome of Data Exploration:**

* I gained a clear understanding of the data structure and identified **missing values** and **outliers** in columns like **Avg Ratings** and **Delivery Time**.
* I identified **inconsistent categorical values** in the **Food Type** column (e.g., "South Indian" vs "south Indian").
* Discovered a few **incorrect data entries**, such as **negative values for Price** and **Delivery Time**, which needed to be cleaned.

**2. Data Cleaning**

**Objective:**

The objective of **Data Cleaning** was to prepare the dataset by handling missing values, removing duplicates, correcting errors, and ensuring the data is accurate, consistent, and ready for analysis.

**What I Did:**

**Handled Missing Data**:

* For columns like **Avg Ratings**, I found some missing values and chose to **remove** rows with missing ratings for accurate analysis.
* For **Price** and **Delivery Time**, I **imputed** missing values with the **mean** (average) of the respective columns to maintain dataset integrity.

**Removed Duplicates**:

* I checked for any **duplicate rows** where the same restaurant appeared more than once with identical data.
* Duplicate records were **removed** to prevent skewing the analysis, ensuring that each restaurant was represented only once.

**Corrected Data Errors**:

I identified and fixed errors in columns like **Price** (e.g., negative values) and **Delivery Time** (e.g., unreasonably high delivery times). These were corrected to realistic values:

* **Price** values that were negative were replaced with the average price for that city or food type.
* **Delivery Time** values over **120 minutes** were either capped or removed as they were deemed outliers.

**Standardized Categorical Data**:

* I standardized **Food Type** and **City** columns by fixing inconsistencies, such as different capitalizations (e.g., "South Indian" vs "south Indian").
* This helped ensure that all values were consistent and could be accurately grouped for analysis.

**Filtered Irrelevant Data**:

* I removed rows that were irrelevant to the analysis, such as restaurants that didn’t meet certain criteria (e.g., missing **Avg Ratings** or **Price**).
* Filtered out any data from cities or food types that were **not part of the analysis scope**.

**Outcome of Data Cleaning:**

* I ensured that there were **no missing values** or **inaccurate data** in key columns.
* Removed **duplicate rows**, leading to a clean and reliable dataset.
* Corrected **errors** in **Price** and **Delivery Time** and ensured **consistent formatting** in **Food Type** and **City** columns.

**3. Data Transformation**

**Objective:**

The goal of **Data Transformation** was to convert the dataset into a form that would be more suitable for analysis. This included creating new features, aggregating data, and transforming existing data to provide deeper insights.

**What I Did:**

**Created New Columns**:

**Rating Category**:  
I categorized **Avg Ratings** into four categories: **Low**, **Average**, **High**, and **Excellent** to make it easier to analyse the ratings distribution.

* + - **Low**: 1 - 2.5
    - **Average**: 2.5 - 3.5
    - **High**: 3.5 - 4.5
    - **Excellent**: 4.5 - 5.0

**Total Restaurants by City**: I calculated the total number of restaurants per **City** for a better understanding of restaurant distribution across cities.

**Handling Outliers**: I handled outliers by capping values in the **Delivery Time** column (e.g., removing any delivery times over 120 minutes) and ensuring realistic ranges for **Price** and **Avg Ratings**.

**Data Grouping**:

* I grouped the data by **Food Type** and **City** to gain insights into how restaurant types and locations influence ratings and pricing.
* This allowed for meaningful analysis of popular food types across different cities and how **Price Range** influences **Avg Ratings**.

**Outcome of Data Transformation:**

* I added three **new columns**: **Rating Category**, **Price Range**, and **Delivery Speed**, which helped categorize the data and made it easier to analyse.
* Aggregated key metrics like **Avg Price** and **Total Restaurants by City**, which provided more clarity on restaurant performance.
* Transformed the data into a structured format that is easier to analyse and visualize.

**Task 1: Top 10 Areas with Most Restaurants – Data Visualization and Deep Insights**

Objective:

The purpose of Task 1 was to identify and analyse the Top 10 Areas with the Most Restaurants. This task aims to provide valuable insights into the restaurant distribution across different areas, which can help in market analysis, resource allocation, business decision-making, and understanding consumer demand trends.

**Data Visualization:**

For Task 1, a Clustered Bar Chart was chosen as the most effective visual representation. This chart helps to clearly display:

Areas on the Y-axis.

Count of Restaurants on the X-axis.

The bars are color-coded for clarity, with the longest bar representing the area with the highest number of restaurants, and the shortest bar representing the least populated area within the top 10.

**Deeper Insights from Task 1:**

**Rohini Leads by a Wide Margin:**

Rohini stands out as the area with the most restaurants, totalling 257 restaurants, which makes up approximately 11.35% of the total restaurants in the top 10 areas. This dominance suggests that Rohini is likely a hub for food enthusiasts or a thriving business area and could also indicate a well-established customer base.

Recommendation: A deeper focus on targeted marketing and customer loyalty programs could increase market penetration in this area.

**High Restaurant Concentration in Chembur and Kothrud:**

Chembur and Kothrud hold the 2nd and 3rd positions with 208 and 149 restaurants respectively. These areas show that the restaurant market is still growing, but they are not yet as saturated as Rohini.

Recommendation: For restaurant owners or delivery services, these areas may represent opportunities for expansion, particularly in underserved niches like healthy food or delivery-only kitchens.

**Urban Centre Dominance:**

Areas like Andheri East (134), Navrangpura (132), and Indiranagar (130) all feature high restaurant counts, which are typical of urban centres. These areas likely have a higher consumer demand and foot traffic, making them prime locations for restaurant chains to enter.

Recommendation: Focus should be placed on enhancing restaurant variety and quality in these areas, with a focus on quick delivery and food variety to meet high consumer demand.

**Suburban and Emerging Markets:**

Areas like Koramangala (124), Bidhannagar (123), and Ashok Nagar (118) show potential for future growth. While they have fewer restaurants, these areas are still among the top 10, indicating that they are emerging markets.

Recommendation: Expansion strategies in these regions could be focused on building brand awareness and tapping into the growing middle-class demographic that is likely to increase demand for dining options.

**Comparative Restaurant Density:**

The difference in restaurant counts between the 1st and 10th areas (Rohini at 257 and Ashok Nagar at 118) is significant. This indicates that while there are areas with extremely high restaurant counts (such as Rohini), others in the Top 10 have much lower densities.

Recommendation: A proportional allocation of marketing budgets can be considered, where areas with high restaurant counts like Rohini get more focused promotions while areas like Ashok Nagar can be targeted for growth strategies to increase restaurant presence.

**Business Implications:**

High restaurant density in these areas means more competition but also higher consumer traffic, which is an opportunity for restaurant businesses to leverage their marketing strategies. Understanding where the highest concentrations of restaurants are located can also guide location-based promotions (e.g., discounts, partnerships, or exclusive offers for customers in high-density areas).

**Geographic Expansion Strategy:**

Analysing the geographic concentration of restaurants in these areas can guide new business owners or delivery services on where to expand. The areas like Koramangala, Bidhannagar, and Ashok Nagar can be ideal expansion zones, with significant potential for growth.

**Analytical Summary:**

Top 3 Areas: Rohini, Chembur, and Kothrud lead with the most restaurants, indicating these areas have a larger market share.

Growth Potential: Areas like Ashok Nagar and Koramangala have relatively fewer restaurants, signalling untapped potential for future growth.

Concentration vs. Market Size: While Rohini is the leader, it is important to recognize that other areas like Andheri East and Navrangpura may have similarly high demand, indicating diverse opportunities across urban hubs.

**Recommendations for Action:**

Strategic Marketing:

Focus on high-traffic areas such as Rohini and Chembur for targeted promotions and exclusive events.

Business Expansion:

Explore new restaurant openings in Ashok Nagar, Koramangala, and Bidhannagar to capitalize on emerging demand.

Delivery and Service Focus:

In highly saturated areas, improving delivery speed and offering personalized services (e.g., custom meal options, loyalty programs) could differentiate a restaurant from its competitors.

Partnerships and Collaborations:

Establish partnerships with delivery services or use aggregators like Swiggy or Zomato for increased visibility in both dense and emerging areas.

This Task 1 data visualization provides a clear and insightful overview of restaurant density across different areas. Understanding these insights can help businesses, marketers, and restaurant owners make informed decisions regarding where to focus their efforts for growth and customer engagement.

**Task 2: Most Popular Food Types Served by Swiggy Restaurants in Each City – Data Visualization and Insights**

**Objective:**

The objective of **Task 2** is to determine the **most popular food types served in each city** by restaurants. This analysis helps to identify food preferences in different locations and provides valuable insights for targeted marketing, business strategy, and food distribution.

**Data Visualization:**

For **Task 2**, a **Clustered Column Chart** was created to visualize the **count of restaurants** by **food type** in a specific **city (Delhi in this case)**.

Here’s the breakdown of the chart:

* **Y-axis**: Represents the **count of restaurants**.
* **X-axis**: Represents the **food types** served in Delhi.
* **Bar Colour**: Blue to differentiate food types.
* **Filtered by City**: The chart is filtered to show only **Delhi**.

**Visualization from Power BI:**

**Insights from Task 2:**

**North Indian Food Dominates**:

* **North Indian** food type leads with **40+ restaurants**, which indicates a high demand for North Indian cuisine in Delhi. This suggests a **strong regional preference**, making it a staple offering for most restaurants in the area.
* **Recommendation**: Restaurant owners and food delivery services should continue to focus on **North Indian cuisine** in **Delhi**, perhaps introducing regional specialties or promotions to cater to local tastes.

**Indian Cuisine is a Close Follower**:

* The **Indian** food type also performs well, with **30+ restaurants** offering it. Since Indian cuisine can encompass a wide range of dishes, its popularity may be linked to **consumer familiarity** and preference for traditional Flavors.
* **Recommendation**: Restaurant businesses can differentiate themselves in the **Indian food** market by introducing **innovative Indian fusion dishes** or **regional specialties**.

**Chinese Food and Fast Food**:

* **Chinese** food (15 restaurants) and **Fast Food** (10 restaurants) are also popular, but they trail behind **North Indian** and **Indian** food types.
* **Recommendation**: Restaurants focusing on **Chinese** or **Fast Food** could introduce **exclusive meal deals** or **expansion into delivery-only formats** to cater to a fast-paced city like Delhi.

**Food Type Market Trend**:

* The **dominance of North Indian and Indian cuisines** highlights that consumers in Delhi prefer traditional and familiar food options. Meanwhile, the lower representation of Chinese and fast food may suggest these options are more niche or less in demand for dining out in comparison.
* **Recommendation**: Business owners could explore the **fast-casual dining** trend for Chinese and fast food to offer more **grab-and-go options**.

**Urban Preferences and Restaurant Opportunities**:

* The preference for traditional food types like **Indian** and **North Indian** reflects **urban food culture** in Delhi, where local tastes dominate. The data also shows areas of opportunity for **restaurant growth** in less popular cuisines like **Chinese** and **Fast Food**, which could be marketed toward a **youth demographic** or **working professionals**.

**Summary and Recommendations:**

**Top Cuisines**:

* **North Indian** and **Indian** cuisines dominate the restaurant market in Delhi. These cuisines appeal to a **broad customer base**, ensuring consistent demand.
* **Chinese** and **Fast-Food** cuisines are less dominant but still have their place, especially in **urban centres** and for **young consumers**.

**Business Strategy**:

* For **restaurant owners** in Delhi, focusing on **regional cuisines** such as **North Indian** and **Indian** is likely to yield the best results.
* Introducing **innovative dishes** within these popular food types can help businesses stand out in the competitive food service market.
* **Chinese** and **Fast-Food** restaurants could differentiate themselves by focusing on **delivery-based models** or introducing **trendy fast-casual formats**.

**Targeted Marketing**:

* **Restaurants focusing on North Indian** or Indian dishes can leverage **location-based marketing** to tap into Delhi's established consumer base.
* **Chinese and Fast-Food** outlets might benefit from **promotions targeting younger customers** or **professionals looking for quick meals**.

**Conclusion:**

The **Clustered Column Chart** provides a clear view of the **most popular food types** in **Delhi**, highlighting the dominance of traditional cuisines like **North Indian** and **Indian**. Insights derived from this visualization can inform **restaurant owners, food delivery services**, and **marketers** about **consumer preferences**, **market opportunities**, and strategies for **business growth** in Delhi.

**Task 3: Top Rated Swiggy Restaurants:**

The objective is to find out the **percentage of top-rated restaurants** (e.g., those with an average rating above 4.5). Below is a summary of the **steps**, **insights**, and **recommendations** based on the visualization you've shared.

**Data Insights and Recommendations:**

**Steps to Create the Visualization:**

**Data Preparation**:

* The data provided includes restaurant names, their **average ratings**, **total ratings**, and **city**.
* **Key Columns**: Avg ratings, City, Restaurant.

**Formula for Top Rated Restaurants**:

* We defined a restaurant as **top-rated** if its **average rating is above 4.5**. A formula calculates the **percentage of top-rated restaurants** across all available cities.

**Visual Representation**:

* We created a **table** visual to display **top-rated restaurants** with the city and their respective **average ratings**.
* The **TopRatedRestaurantsPercentage** measure was placed in a **card visual** to highlight the overall percentage of top-rated restaurants.

**Data Filtering**:

* The **city filter** was applied, allowing analysis of top-rated restaurants per city.
* The **average rating** column is used to filter out restaurants with ratings below 4.5, highlighting only top-rated restaurants.

**Insights:**

**Overall Percentage**:

* The **TopRatedRestaurantsPercentage** is **3.74%**, which means only **3.74%** of the restaurants are top-rated (with an average rating above 4.5).

**City-wise Analysis**:

* The table lists **restaurants** with their ratings and city details. It’s useful to analyse which cities have a higher proportion of **top-rated restaurants**.

**Rating Distribution**:

* Most restaurants in each city have **average ratings** between **4.0 to 4.5**. A **small percentage** of restaurants achieve ratings above 4.5.
* **Recommendations**: Focus on improving customer satisfaction in restaurants with ratings below 4.5 to increase the overall percentage of top-rated restaurants.

**Top Cities for Top-Rated Restaurants**:

* Cities such as **Chennai**, **Mumbai**, and **Bangalore** have the highest number of restaurants with ratings above 4.5.
* **Recommendations**: Marketing efforts or business strategies in these cities could focus on promoting top-rated restaurants.

**Recommendations:**

**Increase Percentage of Top-Rated Restaurants**:

* Restaurants with ratings below 4.5 can improve their service, food quality, or customer experience to increase their rating and join the top-rated category.
* Consider customer feedback to identify pain points and areas for improvement.

**Marketing & Promotions for Top-Rated Restaurants**:

* Restaurants with higher ratings can use their status for **brand promotion**, **advertising**, or special **loyalty programs** to attract more customers.

**Customer Engagement**:

* Use **customer ratings** as feedback to understand preferences and further improve restaurant offerings.
* Offering **discounts or special promotions** for top-rated restaurants can drive business growth and attract new customers.

**Task 4: Correlation of Factors Affecting Average Rating**

**Objective:**

To investigate correlations between variables such as **Price**, **Total Ratings**, **Delivery Time**, and **Avg Ratings** to determine which factors influence the average rating of restaurants.

**Key Measures Created:**

* **Correlation\_AvgRatings\_Price**: Correlation between **Price** and **Avg Ratings**.
* **Correlation\_AvgRatings\_TotalRatings**: Correlation between **Total Ratings** and **Avg Ratings**.
* **Correlation\_AvgRatings\_DeliveryTime**: Correlation between **Delivery Time** and **Avg Ratings**.

**Visualizations:**

**Scatter Plot 1: Price vs Avg Ratings**

* **Correlation**: 0.11 (Weak Positive Correlation)
* **Interpretation**: A slight increase in **Avg Ratings** is observed as **Price** increases. However, the correlation is weak, suggesting that **Price** alone does not significantly influence **Avg Ratings**.

**Scatter Plot 2: Total Ratings vs Avg Ratings**

* **Correlation**: 0.16 (Moderate Positive Correlation)
* **Interpretation**: There is a moderate positive correlation, meaning restaurants with higher **Total Ratings** tend to have higher **Avg Ratings**.

**Scatter Plot 3: Delivery Time vs Avg Ratings**

* **Correlation**: -0.15 (Negative Correlation)
* **Interpretation**: A negative correlation indicates that as **Delivery Time** increases, **Avg Ratings** tend to decrease. Faster deliveries are preferred by customers.

**Insights:**

**Weak Positive Correlation between Price and Avg Ratings**:

* **Insight**: **Price** has a weak impact on **Avg Ratings**. Raising prices does not necessarily result in higher ratings.
* **Recommendation**: Focus on offering value rather than increasing prices.

**Moderate Positive Correlation between Total Ratings and Avg Ratings**:

* **Insight**: Restaurants with higher **Total Ratings** tend to have higher **Avg Ratings**.
* **Recommendation**: Encourage customers to leave feedback for better **Avg Ratings**.

**Negative Correlation between Delivery Time and Avg Ratings**:

* + **Insight**: **Delivery Time** has a slight negative impact on **Avg Ratings**, suggesting customers prefer quicker deliveries.
  + **Recommendation**: Optimize delivery operations to reduce delivery time and improve customer satisfaction.

**Actionable Recommendations:**

* **Enhance Delivery Speed**: Invest in optimizing logistics and delivery systems to ensure faster deliveries, which could lead to improved ratings.
* **Encourage More Reviews**: Provide incentives or reminders to customers to leave ratings, as higher numbers of **Total Ratings** correlate with better **Avg Ratings**.
* **Focus on Quality and Value**: Ensure that restaurants focus on providing high-quality food and service, as **Price** does not strongly correlate with **Avg Ratings**.

**Conclusion:**

By analysing the correlation between **Price**, **Total Ratings**, **Delivery Time**, and **Avg Ratings**, it's evident that while **Total Ratings** have a moderate positive impact, **Price** has minimal influence, and **Delivery Time** negatively affects the ratings. Therefore, the focus should be on improving delivery speed and encouraging customer reviews to improve the overall **Avg Rating** of restaurants.

**Task 5: Price Analysis**

**Objective:**

Analyse the distribution of restaurant prices and their correlation with the average ratings to understand pricing strategies and their impact on customer perception.

**Visualization:**

**Scatter Plot: Price vs Avg Ratings**

* **Data Points**: Each point on the scatter plot represents a restaurant.
* **X-Axis**: Price (ranging from 0 to ~2500).
* **Y-Axis**: Average Ratings (ranging from 2 to 5).
* **Trend Line**: A red trend line is added to show the general relationship between **Price** and **Avg Ratings**.

**Analysis:**

**Correlation Between Price and Avg Ratings**:

* **Correlation Value**: 0.11 (Weak Positive Correlation)
* **Interpretation**: There is a slight upward trend in **Avg Ratings** as **Price** increases, suggesting that restaurants with higher prices tend to have slightly higher ratings.
* However, the relationship is weak, indicating that **Price** is not a significant factor affecting **Avg Ratings**.

**Distribution of Data**:

* The scatter plot shows a **wide distribution** of restaurants across varying price points.
* Restaurants with lower prices (less than ₹500) generally have lower ratings, but there is no clear and consistent trend for restaurants priced higher.

**Insights:**

**Weak Positive Correlation**:

* **Insight**: While there is a slight positive correlation between **Price** and **Avg Ratings**, the relationship is not strong enough to suggest that increasing the price will consistently lead to higher ratings.
* **Recommendation**: Pricing should be competitive, but **value** and **quality** remain the most crucial factors for improving ratings. A balance between pricing and customer experience (food quality, service, etc.) is key.

**Wide Distribution in Pricing**:

* **Insight**: The price range spans from ₹0 to ₹2500, with many restaurants falling into lower price categories. However, there is no significant indication that high-priced restaurants have a guaranteed higher rating.
* **Recommendation**: Restaurants should analyse their **cost structure**, but focus on maintaining consistent food quality, service, and customer satisfaction to drive ratings, rather than focusing solely on increasing prices.

**Customer Perception**:

* **Insight**: Customers might not always correlate price with quality or value. In fact, the range of prices does not show a clear link to **higher ratings**.
* **Recommendation**: Pricing strategies should consider **market segmentation** to offer different price points based on customer expectations and demand, rather than a one-size-fits-all model.

**Actionable Recommendations:**

* **Optimize Pricing for Value**: Conduct market research to determine what customers perceive as "good value" at various price points and optimize pricing to match those expectations.
* **Increase Customer Engagement**: Enhance overall customer experience through better service, quicker delivery, and consistent quality to improve ratings, regardless of pricing.
* **Regular Feedback Analysis**: Continuously analyse customer feedback to understand how **price perception** correlates with actual restaurant quality in terms of ratings.

**Conclusion:**

While there is a weak correlation between **Price** and **Avg Ratings**, it is evident that customers do not base their ratings solely on the price of the restaurant. The overall customer experience, including food quality and service, has a more substantial impact on ratings. Therefore, **pricing optimization** should be one part of a broader strategy focused on **quality improvement** and **customer satisfaction**.

**Task 6: Area-wise Restaurant Analysis**

**Objective:**

To analyse the distribution of restaurants across different areas within the city and understand which areas have the highest concentration of restaurants.

**Visualization:**

**Treemap**: Count of Restaurants by Area and City

* **Data Points**: Each block represents an area within a specific city.
* **Colour Coding**: The colour intensity varies depending on the number of restaurants in the area.
* **Area Size**: The size of the blocks represents the count of restaurants, with larger blocks indicating more restaurants in that area.
* **Cities**: The treemap is segmented by city, making it easier to compare the restaurant concentration across different locations.

**Analysis:**

**Distribution of Restaurants by Area**:

* The largest block in the treemap corresponds to **Mumbai** (1.36K restaurants), followed by **Chennai** (1.27K restaurants), showing that these two cities have the highest number of restaurants.
* Areas like **Rohini**, **Chembur**, and **Kothrud** have a relatively higher count of restaurants compared to other areas, indicating more densely populated restaurant zones.

**City-wise Distribution**:

* **Chennai** and **Mumbai** dominate the chart in terms of restaurant density, while **Surat** and **Delhi** have fewer restaurants in comparison.
* This indicates a **regional concentration** of restaurants, with some cities having a higher demand for dining options, which could be linked to population density and urbanization.

**Insights:**

**High Concentration in Major Cities**:

* **Insight**: The data shows a heavy concentration of restaurants in metropolitan cities like **Mumbai**, **Chennai**, and **Pune**. These cities appear to have more options for food delivery due to larger populations and higher demand for restaurants.
* **Recommendation**: For restaurant chains looking to expand, focusing on these high-density cities may be beneficial. However, new market entrants should also explore less saturated cities like **Surat** and **Ahmedabad**, which may have untapped potential.

**Popular Areas within Cities**:

* **Insight**: Some areas within these cities have significantly more restaurants compared to others, suggesting that certain areas are more popular for food delivery or dining.
* **Recommendation**: Restaurants should consider the location of their outlets in relation to high-traffic areas to increase visibility and attract customers. Focusing on densely populated or high-traffic areas might improve customer acquisition rates.

**Comparative Analysis Between Cities**:

* **Insight**: Cities like **Bangalore** and **Delhi** have fewer restaurants, which may indicate a more balanced market compared to **Mumbai** and **Chennai**, where restaurant density is higher.
* **Recommendation**: Competitive analysis in cities with fewer restaurants can help identify the best places to establish new restaurant chains. These cities may present **lower competition** and offer **opportunities** for growth.

**Actionable Recommendations:**

* **Expansion Strategy**: Focus on metropolitan cities with high population density (Mumbai, Chennai) for expansion, but don't ignore smaller cities such as **Surat** and **Ahmedabad** that might offer growth potential due to lower competition.
* **Market Analysis**: Regularly monitor the distribution of restaurants within various areas to identify gaps and new opportunities. Use this analysis to plan for the **opening of new outlets** or **strategic placement** of existing outlets.
* **Location Optimization**: Restaurants should evaluate whether they are situated in areas with high competition or underserved markets to better cater to customer needs and enhance visibility.

**Conclusion:**

The area-wise restaurant distribution analysis reveals that major metropolitan cities have a higher concentration of restaurants, while other cities show promising areas for expansion. Optimizing restaurant locations, focusing on high-demand areas, and analysing underrepresented cities can help drive business growth.

**Task 7: Price Analysis**

**Objective:**

To analyse the distribution of restaurants based on their price ranges and understand the percentage of top-rated restaurants in each price range.

**Visualization:**

**Donut Chart**: Count of Restaurants and Top-Rated Restaurants Percentage by Price Bins

* **Data Points**: Each segment in the donut chart represents a price bin (0-500, 501-1000, etc.).
* **Price Bins**: The price bins have been categorized based on the price range of the restaurants.
* **Colour Coding**: The chart uses different colours to represent the various price bins.
* **Top Rated Percentage**: The donut chart also shows the percentage of top-rated restaurants (those with an average rating above 4.5) in each price bin.

**Analysis:**

**Distribution of Restaurants by Price Range**:

* **0-500** price range contains most of the restaurants (88.31%), followed by the **501-1000** range, indicating that most restaurants fall under the more affordable price brackets.
* The **1001-1500** and **1501-2000** bins have fewer restaurants, showing a decline in the number of restaurants as the price range increases.
* The **2000+** bin has the least number of restaurants, suggesting that high-end or premium-priced restaurants are a minority.

**Percentage of Top-Rated Restaurants**:

* **Top-rated restaurants** (with ratings above 4.5) make up a small percentage of the overall restaurant population in the **0-500** price bin (3.59%), indicating that most high-rated restaurants are in the lower price brackets.
* There is a **slight increase** in the percentage of top-rated restaurants in the **501-1000** price range (4.53%).
* **Premium-priced restaurants** (in the **1001-1500** and **1501-2000** ranges) also show a reasonable percentage of top-rated establishments (7.83% in the 1001-1500 bin), suggesting that higher prices may correlate with better ratings.

**Insights:**

**Price Range and Restaurant Distribution**:

* **Insight**: The bulk of restaurants (83.31%) are priced between 0-500, with the number of restaurants decreasing as the price increases. This indicates that there is a **high demand** for more affordable dining options.
* **Recommendation**: Restaurant chains should consider pricing strategies for expansion, ensuring they have a variety of offerings across price ranges. Expanding into the **500-1000** price range could be beneficial as it contains a higher proportion of top-rated restaurants.

**Correlation Between Price and Top Ratings**:

* **Insight**: There is a higher concentration of top-rated restaurants in higher price ranges (1001-1500 and 1501-2000), but the overall count of such restaurants is still lower. This suggests that while premium restaurants tend to have better ratings, they are fewer in number.
* **Recommendation**: To stand out in competitive markets, restaurants in the **500-1000** price range should aim for higher ratings, while **high-end restaurants** should maintain quality and customer service to ensure they retain top ratings. Restaurants in the **0-500** range should focus on improving customer satisfaction to achieve higher ratings and stand out in their category.

**Actionable Recommendations:**

1. **Expansion in Affordable Price Range**: Given the dominance of the **0-500** price bin, focusing on expanding affordable restaurant options will likely meet the needs of a larger customer base.
2. **Improve Rating Strategies**: As the price increases, so does the potential for better ratings. Establishments in the **1001-1500** range and above should implement strategies for improving food quality, customer service, and consistency to stand out and maintain high ratings.
3. **Targeting Mid-Range**: There is a sweet spot for restaurants priced between **501-1000**, which are slightly less common but are gaining higher ratings. This may be a good opportunity for new restaurants to enter the market.

**Conclusion:**

The price analysis reveals that affordable restaurants dominate the market in terms of quantity, but the premium restaurants tend to have better ratings. This highlights the importance of pricing strategy for restaurant expansion and the potential for achieving high ratings through quality service and consistency.

**Task 8: Delivery Time Analysis**

**Objective:**

To analyse the average delivery time of restaurants and its correlation with average ratings.

**Visualization:**

**Line and Clustered Column Chart**: The chart compares **AvgDeliveryTime** and **AvgRatings** for each restaurant.

* **Column Values**: Represents the **Average Delivery Time** for each restaurant.
* **Line Values**: Represents the **Average Ratings** for each restaurant.
* **X-axis**: Lists the names of each restaurant.
* **Y-axis (Left)**: Shows the **Average Delivery Time**.
* **Y-axis (Right)**: Shows the **Average Ratings**.

**Analysis:**

**Delivery Time Trend**:

* There is a **wide variation in delivery times** across restaurants. Some restaurants have **relatively low delivery times**, while others have **spikes**, indicating that some restaurants may have more efficient delivery operations than others.
* The average delivery time fluctuates widely, and this could be an indicator of **operational inconsistencies** or differences in the areas served by these restaurants.

**Correlation Between Delivery Time and Ratings**:

* **Average Ratings** tend to decrease as the **Delivery Time** increases in some cases, especially for certain restaurants that exhibit **long delivery times**. This suggests that **slower delivery times** may negatively impact **customer satisfaction**.
* Some restaurants with **higher delivery times** still maintain **high average ratings**, which could indicate that customers are more tolerant of delivery delays if the quality of food and service is perceived as high.
* The **line for average ratings** shows a **slight decrease** with the increase in **delivery time**, which supports the hypothesis that faster delivery times contribute to higher customer satisfaction (i.e., higher ratings).

**Insights:**

**Inconsistencies in Delivery Time**:

* **Insight**: Restaurants have significant variations in their delivery times, with some having very high delivery times while others deliver much faster. This variation may be caused by factors such as the size of the restaurant, its location, or delivery personnel efficiency.
* **Recommendation**: Restaurants should aim to **optimize their delivery processes** to ensure consistent and timely deliveries. Improving **logistics** and **delivery route optimization** could help reduce delays and improve customer satisfaction.

**Impact of Delivery Time on Ratings**:

* **Insight**: The data suggests a potential correlation between **longer delivery times** and **lower ratings**. It is critical to **minimize delivery times** for maintaining high customer satisfaction.
* **Recommendation**: For restaurants with long delivery times and lower ratings, it would be helpful to **evaluate and optimize their delivery processes**, perhaps by improving their delivery routes or offering incentives for faster service to **enhance customer experience**.

**Customer Expectations and Tolerances**:

* **Insight**: Despite some restaurants having higher delivery times, they manage to maintain high ratings, possibly due to their **food quality** or **service**. This shows that **customers are more willing to tolerate delivery delays** if they are compensated with high-quality food and good service.
* **Recommendation**: Restaurants with longer delivery times should continue to focus on **quality assurance** to meet customer expectations. Clear communication regarding delivery times (e.g., notifications) could also help manage customer expectations.

**Recommendations:**

1. **Focus on Delivery Optimization**: The analysis indicates that faster delivery times correlate with higher ratings. Restaurants should consider **investing in delivery management systems**, optimizing delivery routes, or using **faster delivery personnel** to meet customer expectations and improve customer satisfaction.
2. **Maintain Quality During Delays**: For restaurants that experience higher delivery times, maintaining high food quality and customer service is essential. Consider offering promotions or incentives to **compensate for delays** (e.g., discounts or free items for long delivery times).
3. **Monitor and Improve Delivery Performance**: Regularly **track and analyse delivery time data** to identify restaurants with consistent delays. Restaurants should use this data to identify operational bottlenecks or inefficiencies and work toward improving delivery systems.

**Conclusion:**

The analysis of **average delivery time** and **ratings** reveals a trend where **faster delivery times tend to result in higher ratings**, though some restaurants manage to maintain high ratings despite longer delivery times. Restaurants can improve customer satisfaction by optimizing delivery times and maintaining food quality, especially for those with longer delivery times.

**Task 9: Cuisine Analysis**

**Objective:**

To analyse the variety of cuisines offered by restaurants across different cities.

**Visualization:**

**Table Visual**: The table shows the **count of restaurants** by **food type** and **city**.

* **Rows**: Represents the **food types** (e.g., Indian, Chinese, North Indian, South Indian, etc.).
* **Columns**: Represents the **cities** (e.g., Ahmedabad, Bangalore, Chennai, Delhi, etc.).
* **Values**: Displays the **count of restaurants** offering each food type in each city.

**Analysis:**

**Food Types Distribution Across Cities**:

* **Indian cuisine** is the most popular food type across most cities, with the highest number of restaurants in cities like **Kolkata** (66 restaurants) and **Chennai** (53 restaurants). This indicates that Indian cuisine has a widespread appeal, making it a dominant food type in various regions.
* **Chinese cuisine** also has significant representation across cities, with notable numbers in **Mumbai** (55 restaurants) and **Kolkata** (66 restaurants). This suggests that Chinese food has a strong customer base in urban areas.
* **Fast Food** and **North Indian** cuisines show moderate presence in cities such as **Chennai** and **Hyderabad**, with a decent number of restaurants offering these types of cuisines.

**Regional Specialties**:

* Cities like **Chennai**, **Kolkata**, and **Mumbai** offer a **wide range of cuisines**, but **Indian food** and **Chinese food** continue to dominate as top choices. These cities also host a variety of fusion food types like **Indian Chinese** and **Chinese North Indian** cuisines.
* **Ahmedabad** and **Surat** show less variety compared to larger cities, with a concentration on specific types like **Indian** and **Chinese** food.

**Food Preferences Across Cities**:

* Cities like **Pune** and **Bangalore** show a healthy mix of different types of cuisines, with each city offering a variety of food options that cater to diverse customer tastes.
* **Delhi** seems to have a balanced mix, with a decent number of restaurants offering **North Indian**, **Chinese**, and **Fast Food**, while cities like **Surat** and **Hyderabad** have fewer variations.

**Insights:**

**Cultural and Regional Influence on Cuisine Availability**:

* **Insight**: The variety of food types in each city reflects the cultural and regional preferences of the population. **Indian food** tends to dominate across all cities, but regional variations like **South Indian** and **North Indian** cuisines play a role in cities like **Chennai** and **Delhi**.
* **Recommendation**: Restaurants looking to expand into new cities should consider **local food preferences** and adapt their menu offerings to cater to **regional tastes**. This can help drive customer engagement and increase sales.

**Emerging Trend of Fusion Cuisines**:

* **Insight**: **Indian Chinese** cuisine is emerging as a popular food type in urban centres, especially in cities like **Kolkata** and **Chennai**. This trend reflects an increasing appetite for fusion dishes.
* **Recommendation**: Restaurants should explore offering **fusion cuisines** to attract a diverse customer base, especially in cities with an appetite for unique and experimental dishes.

**Opportunities for Expansion in Less-Varied Markets**:

* **Insight**: Cities like **Surat** and **Ahmedabad** show a more limited range of food types. This suggests that there might be an opportunity to introduce new food types and cuisines to these markets.
* **Recommendation**: Expanding food options and diversifying the menu in cities with fewer varieties, such as **Surat** and **Ahmedabad**, could be a strategic way to differentiate restaurants and gain a competitive advantage in those areas.

**Recommendations:**

* **Adapt Menus to Regional Tastes**: Restaurants should tailor their **food offerings** to align with the cultural and regional preferences in each city. For instance, **South Indian cuisine** could be emphasized in **Chennai**, while **North Indian** cuisine might appeal more in cities like **Delhi**.
* **Explore Fusion Cuisine**: The growing trend of **Indian Chinese fusion** suggests that restaurants can experiment with **innovative food combinations** to cater to adventurous foodies.
* **Diversify Offerings in Low-Variety Cities**: There is potential for introducing a greater variety of cuisines in cities like **Surat** and **Ahmedabad**, where restaurant offerings appear more limited. Introducing new options, such as **Biryani** or **Desserts**, could attract new customer segments.

**Conclusion:**

The **variety of cuisines** offered by restaurants across different cities highlights cultural preferences and growing trends for fusion dishes. Understanding these trends will allow restaurants to better cater to customer tastes, expand into new markets, and stand out in a competitive environment.

**Task 10: Area-wise Restaurant Analysis**

**Objective:**

To analyse the number of restaurants in each area within the city.

**Visualization:**

**Table Visual**: The table shows the **count of restaurants** in each **area**.

* **Columns**: Represents **Area** and the corresponding **Count of Restaurant**.
* **Filters**: The filter applied on the **Count of Restaurant** is greater than or equal to a specified number. This helps in focusing on areas with a certain number of restaurants.

**Analysis:**

**Top Areas by Restaurant Count**: The **top areas** with the highest number of restaurants are **Rohini** (257), **Chembur** (208), and **Kothrud** (149). These areas are likely to have high demand for restaurants, indicating either a higher population density or a more developed urban infrastructure supporting a greater number of dining options.

**Areas with Moderate Restaurant Counts**: **Andheri East** (134), **Navrangpura** (132), and **Indiranagar** (130) follow as moderate-ranking areas in terms of the number of restaurants. These areas might still be considered viable for restaurant growth, with room for new establishments to cater to a growing demand.

**Less Saturated Areas**: Areas such as **Shivaji Nagar** (75), **Perambur** (89), and **Powai** (91) have lower restaurant counts. This might indicate less competition but also potential for growth in these areas.

**Total Restaurants Across Areas**: The total number of restaurants across all areas in the dataset is **2265**.

**Insights:**

**High-Demand Areas**:

* **Insight**: Areas like **Rohini** and **Chembur** with higher counts suggest a higher demand for dining options, either due to population density or economic factors.
* **Recommendation**: For new restaurant ventures, these areas could offer higher competition but also a larger customer base, making them ideal for targeting larger or more premium restaurant concepts.

**Growth Opportunity in Less Saturated Areas**:

* **Insight**: The lower counts in areas like **Shivaji Nagar** and **Powai** present opportunities for opening new restaurants, with less competition.
* **Recommendation**: Consider these areas for **expansion opportunities**. Lower competition can provide a first-mover advantage in serving niche food categories.

**Market Penetration Strategy**:

* **Insight**: Urban areas with significant restaurant counts are likely to be saturated, making it harder for new businesses to thrive without differentiation. However, these areas represent well-established markets.
* **Recommendation**: Restaurants looking to penetrate established markets like **Chembur** and **Andheri East** must focus on unique selling points (USP), such as **specialized cuisine**, **service innovation**, or **sustainability practices**.

**Recommendations:**

**Target Underrepresented Areas**: There is an opportunity for restaurants to cater to less saturated areas like **Shivaji Nagar** and **Powai**, where competition is lower. New ventures can focus on offering unique cuisine or value for money.

**Leverage High-Demand Areas for Popular Concepts**: Focus on high-demand areas like **Rohini** and **Chembur** for well-established restaurant concepts. These areas offer a steady customer base but might require differentiation strategies to stand out.

**Urban Expansion**: As the restaurant industry continues to grow, explore **expansion into newer and evolving urban areas** that are developing their restaurant scene, which would benefit from the introduction of diverse food types.

**Conclusion:**

By analysing the **area-wise restaurant distribution**, it becomes clear that some areas have high saturation, while others present an opportunity for growth. The analysis offers valuable insights into market dynamics and helps identify strategic locations for **restaurant expansion**. This can guide business owners and investors in making more informed decisions.

**Task 11: Correlation Analysis**

**Objective:**

To investigate any correlations between key variables such as price, ratings, and delivery time.

**Visualization:**

**Scatter Plots**: Three scatter plots are used to represent the correlation between the following variables:

* **Price vs. Average Ratings**
* **Price vs. Delivery Time**
* **Average Ratings vs. Delivery Time**
* **Trend Lines**: Each scatter plot includes a trend line (red line) that helps to visually identify the relationship between the variables.
* **Correlation Values**: The correlation values are displayed below each scatter plot to quantify the relationship between the variables.

**Analysis:**

**Price vs. Average Ratings**: The correlation value between **Price** and **Average Ratings** is **0.11**, which suggests a **very weak positive correlation**. This indicates that there is a slight tendency for higher-priced restaurants to have slightly higher average ratings. However, this relationship is weak, meaning other factors likely influence ratings more than price alone.

**Price vs. Delivery Time**: The correlation between **Price** and **Delivery Time** is **0.08**, which indicates a very weak positive correlation. The very low value suggests that there is little to no significant relationship between the price of a restaurant and its delivery time. This could imply that price is not a good indicator of how long it takes for food to be delivered.

**Average Ratings vs. Delivery Time**: The correlation between **Average Ratings** and **Delivery Time** is **-0.15**, which is a weak negative correlation. This suggests that as delivery time increases, the average ratings slightly decrease, indicating that longer delivery times could negatively impact customer satisfaction.

**Insights:**

**Price and Average Ratings**:

* **Insight**: A weak positive correlation between **price** and **average ratings** suggests that consumers might be willing to pay slightly more for higher-rated restaurants. However, the relationship is too weak to be conclusive, meaning that customers do not primarily base their ratings on price alone.
* **Recommendation**: Restaurants should focus on improving food quality and customer experience to boost ratings rather than just increasing their prices.

**Price and Delivery Time**:

* **Insight**: The lack of a significant correlation between **price** and **delivery time** suggests that price does not influence the delivery speed, and other factors like operational efficiency and delivery infrastructure are more important.
* **Recommendation**: Improve operational efficiency, streamline processes, or optimize delivery routes to reduce delivery time, rather than adjusting prices to control delivery times.

**Ratings and Delivery Time**:

* **Insight**: The weak negative correlation between **ratings** and **delivery time** indicates that customers are slightly more likely to give lower ratings to restaurants with longer delivery times. This underscores the importance of timely deliveries in maintaining customer satisfaction.
* **Recommendation**: Restaurants should aim to reduce delivery times, especially in urban areas, where customers may have high expectations for quick service.

**Conclusion:**

The correlations identified in this analysis provide valuable insights into the relationships between key business variables such as **price**, **ratings**, and **delivery time**. While the correlations are generally weak, they indicate areas where businesses can focus their improvement efforts, especially in optimizing delivery times to boost customer satisfaction. These insights can guide future operational decisions and marketing strategies for restaurants to enhance customer experience.

**Task 12: Customer Feedback Analysis**

**Objective:**

Analyse customer feedback based on ratings and total ratings, considering the rating categories (High, Average, Excellent, and Low).

**Visualization:**

**Pie Chart**: A pie chart shows the distribution of restaurants by **rating category** (High, Average, Excellent, and Low), providing insights into how restaurants are performing in terms of their ratings. The chart helps to identify which category has the most significant number of restaurants and how the overall distribution looks.

* **High Rating Category**: 36.1K restaurants (41.55% of the total).
* **Average Rating Category**: 4.7K restaurants (54.61% of the total).
* **Excellent Rating Category**: 0.01K restaurants (0.08% of the total).
* **Low Rating Category**: 0.32K restaurants (3.74% of the total).

**Scatter Plot**: The scatter plot represents **Total Ratings vs. Average Ratings**:

* The X-axis shows the **total ratings** across restaurants.
* The Y-axis shows the **average ratings** for the restaurants.
* **Trend Line**: A red trend line indicates the correlation between total ratings and average ratings, showing whether higher total ratings result in higher average ratings.

**Analysis:**

**Rating Categories**:

* **Observation**: Most restaurants (54.61%) fall into the **Average Rating** category, while only a small percentage are rated as **Excellent** (0.08%).
* **Insight**: The overwhelming number of restaurants with average ratings suggests that many restaurants have room for improvement in terms of quality or customer satisfaction. The small number of **Excellent** rated restaurants indicates that those who achieve high ratings may stand out in the market.
* **Recommendation**: Focus on improving customer service, food quality, or delivery time to elevate the restaurant's rating and move into the **Excellent** category.

**Total Ratings vs. Average Ratings**:

* **Observation**: The scatter plot shows a **positive correlation** between **Total Ratings** and **Average Ratings**. This indicates that restaurants with more total ratings tend to have higher average ratings.
* **Insight**: A large volume of ratings may suggest a more reliable reflection of customer satisfaction, as it is less likely to be influenced by outliers or isolated incidents. The positive correlation suggests that restaurants with a high number of ratings are likely to maintain a good reputation.
* **Recommendation**: Encourage more customer feedback to improve the overall rating reliability. A higher volume of ratings can help solidify the restaurant’s credibility and possibly increase its ranking.

**Summary:**

The analysis reveals that while most restaurants are in the **Average Rating** category, there's potential for improvement in customer satisfaction to reach the **Excellent** category.

The scatter plot between total ratings and average ratings confirms that a larger number of ratings correlates with higher average ratings, which reinforces the idea of leveraging customer feedback to improve restaurant performance.

**Task 13: Geographical Mapping**

**Objective:**

Create a geographical map of restaurant locations, focusing on the distribution of restaurants by city and area.

**Visualization:**

**Geographical Map**: The map displays restaurant locations in **Hyderabad** by area, with each area represented in a pie chart overlay.

* **Legend**: The chart is broken down by **Area** (e.g., Alwal, Malkajgiri, etc.).
* **Count of Restaurants**: The pie chart size varies according to the count of restaurants in each area.
* **Location**: The map focuses on Hyderabad, which highlights where the restaurants are located geographically.
* **Interactive Elements**: Clicking on each area or adjusting filters (e.g., changing the area or city) updates the visualization in real-time.

**Analysis:**

**Area-wise Distribution**:

* **Observation**: The distribution of restaurants in Hyderabad shows various areas with varying numbers of restaurants.
* **Insight**: Certain areas have a higher concentration of restaurants, such as the central or more densely populated regions of Hyderabad. This could be due to higher demand or better accessibility in those areas.
* **Recommendation**: Identify areas with fewer restaurants and explore potential opportunities for new restaurant openings. Additionally, areas with high concentrations could benefit from more targeted marketing or promotions to stand out in a competitive market.

**Geographic Accessibility**:

* **Observation**: The distribution indicates how restaurants are spread across Hyderabad’s different areas.
* **Insight**: The map helps identify clusters of restaurants in specific regions and can guide restaurant chains or delivery services in optimizing delivery routes.
* **Recommendation**: Delivery services can use this geographic mapping to streamline delivery areas, ensuring quicker and more efficient deliveries. Restaurant owners can consider opening new locations in areas with fewer competitors.

***Dashboard:***

A screenshot of a computer

Description automatically generated

Based on the data shown in the Swiggy Analysis Dashboard, here are some insights and recommendations

**Analysis and Insights from the Dashboard:**

The **Power BI Dashboard** provides valuable insights into Swiggy's restaurant performance, delivery time, customer ratings, food types, and pricing. These insights can be used to optimize Swiggy’s **delivery services**, **customer engagement**, **pricing strategies**, and **market positioning**.

**Insights:**

**Total Ratings and Average Ratings**:

* There are **1 million total ratings** with an **average rating of 3.66**.
* A large proportion of the ratings fall under **low to average ratings**, indicating that there may be significant room for improvement in customer satisfaction.

**Top-Rated Restaurants**:

* **3.74%** of the restaurants are top-rated (4+ stars), with an average rating of **3.66**.
* The focus should be on improving the number of top-rated restaurants by addressing customer pain points.

**Price Distribution**:

* Most restaurants (88.31%) fall under the **0-500 price range**, which might suggest that budget-friendly restaurants are dominating the platform.
* A smaller percentage (9.54%) falls under the **1500-2000+ price range**, indicating there may be an opportunity for increasing high-end restaurant availability.

**Count of Restaurants by Rating Category**:

* A significant portion of restaurants have **"Excellent"** ratings (54.61%), while the **"High"** category contributes 41.58%, leaving a minimal 3.74% in the **"Low"** category.
* The current trend indicates a high satisfaction rate, but a few restaurants might be underperforming, and efforts should be focused on addressing customer complaints in these.

**Delivery Time vs. Ratings**:

* The **average delivery time** across the restaurants is **53.97 minutes**, and there is a slight inverse relationship between delivery time and ratings (negative correlation). Restaurants that take longer to deliver tend to have lower ratings, highlighting a potential area for improvement in delivery efficiency.

**Top 10 Areas with the Most Restaurants**:

* **Rohini** (257 restaurants) and **Chembur** (208 restaurants) have the highest number of restaurants. These areas likely represent high-demand zones.
* Targeting underrepresented areas may help balance out the restaurant distribution across different regions.

**Restaurants by City**:

* **Kolkata** (1.346K restaurants) leads the city-wise count, followed by **Mumbai** and **Delhi**.
* There's potential for growth in cities like **Chennai** and **Surat**, where the number of restaurants is relatively lower.

**Recommendations:**

**Improve Customer Satisfaction**:

* Focus on improving the quality of service and food to convert more average ratings into top-rated ones. This can be achieved by addressing delivery time delays and improving food quality.
* Provide incentives for restaurants with **"High"** ratings to push towards the **"Excellent"** category through promotional offers or training.

**Enhance Delivery Efficiency**:

* As delivery time directly impacts customer ratings, consider implementing faster delivery methods or optimizing routes for better efficiency.
* Explore the possibility of implementing a **"premium delivery service"** for faster delivery with a higher price tier.

**Target High-End Restaurant Growth**:

* Increase the variety of restaurants in the **1500-2000+ price range** to attract more premium customers and cater to diverse customer segments. Partnerships with fine-dining restaurants could be beneficial.

**Geographical Expansion**:

* Focus on cities such as **Chennai**, **Bangalore**, and **Surat**, where the restaurant count is relatively lower, to further increase the footprint in these markets.
* Consider opening restaurants in suburban areas or underrepresented regions to provide better coverage and avoid overcrowding in high-density cities.

**Optimize for High-Demand Areas**:

* The areas with the most restaurants should be carefully analysed to understand why these regions have high restaurant density. You can replicate successful strategies from these areas to other locations.

**Key Insights from the Overall Analysis:**

**Restaurant Distribution & Concentration:**

**Insight**: Certain areas like **Rohini** and **Chembur** have a high concentration of restaurants, indicating that these areas are highly competitive. Swiggy needs to ensure that it has the best delivery service in these high-demand regions.

**Recommendation**:

* **Optimize Delivery in High-Demand Areas**: In high-density restaurant areas (e.g., Rohini), Swiggy should focus on **faster delivery routes**, **increased delivery capacity**, and **optimal fleet management** to ensure that orders are delivered quickly despite the high number of restaurants.
* **Dynamic Delivery Pricing**: Implement **dynamic pricing strategies** to account for areas with high competition, where delivery might be slower due to traffic or restaurant proximity. This would allow Swiggy to remain competitive and maintain service quality.

**Food Type Preferences by City:**

**Insight**: Certain cities like **Delhi** and **Chennai** have a strong dominance of **North Indian** and **Indian** cuisines. Swiggy’s service can be better optimized for such demand patterns.

**Recommendation**:

* **Enhance Cuisine-Based Promotions**: Swiggy can create **city-specific campaigns** that focus on high-demand cuisines, such as **North Indian** in Delhi and **South Indian** in Chennai. Offering targeted discounts, meal combos, or cross-promotions with popular restaurants could enhance sales in these cities.
* **Highlight Trending Cuisines**: Swiggy can push certain **popular cuisines** more prominently on their platform for cities where they know these types of food are in demand.

**Customer Ratings and Restaurant Performance:**

**Insight**: The positive correlation between **total ratings** and **average ratings** suggests that restaurants with more reviews generally have higher ratings. Swiggy’s platform thrives on reviews, and the quality of reviews directly affects restaurant visibility.

**Recommendation**:

* **Incentivize Customer Reviews**: Swiggy should **incentivize users** to leave reviews, especially for restaurants with lower ratings. Encouraging reviews will not only help boost restaurant visibility but also provide a more accurate feedback loop to improve services.
* **Promote High-Rated Restaurants**: Highlight **top-rated restaurants** through promotional banners or special recommendations, encouraging customers to try highly rated establishments.

**Price and Delivery Time Correlation:**

**Insight**: There is a **weak positive correlation** between **price** and **average ratings**, and a **negative correlation** (-0.15) between **delivery time** and **average ratings**.

**Recommendation**:

* **Pricing Transparency and Strategy**: Swiggy could ensure that customers are always aware of the **delivery costs** upfront and offer fair pricing for faster deliveries. Customers who pay more for delivery should expect reduced delivery times, and this expectation must be clearly communicated.
* **Enhance Delivery Speed**: Swiggy should continue to **optimize delivery routes** and **use AI-based predictive algorithms** for more accurate delivery time estimations. Customers tend to rate faster deliveries higher, so minimizing delivery times will increase satisfaction.

**Price Bins & Customer Preferences:**

**Insight**: A significant portion of the restaurants is priced within the **0-500** range, and this is the most popular pricing category.

**Recommendation**:

* **Target Budget-Conscious Consumers**: Focus on providing **affordable meal options** and **discount offers** in the lower pricing range (0-500) to attract more customers.
* **Premium Offers for Higher Price Bins**: For restaurants in the **higher price range** (1000-2000), Swiggy can introduce **premium offerings** such as exclusive deals for frequent customers or bundle options that add value without significantly increasing prices.

**Performance of Top-Rated Restaurants:**

**Insight**: Top-rated restaurants consistently have higher ratings and total reviews, with **Excellent** rated restaurants showing better performance.

**Recommendation**:

* **Promote Top-Rated Restaurants**: Swiggy should **feature top-rated restaurants** in prominent sections of the app or website (e.g., on the homepage or as suggested options), giving them visibility and encouraging more customers to explore high-quality options.
* **Support Low-Rated Restaurants**: For restaurants with **lower ratings**, Swiggy should consider offering them **operational training**, **quality control measures**, or better promotional deals to help them improve their ratings.

**Impact of Delivery Time on Ratings:**

**Insight**: Delivery time negatively correlates with ratings, meaning that faster deliveries often lead to higher ratings.

**Recommendation**:

* **Streamline Delivery Operations**: To reduce delivery time, Swiggy should implement **advanced route optimization** algorithms and ensure that delivery staff is adequately equipped during peak hours.
* **Real-Time Delivery Tracking**: Providing customers with **real-time tracking** and accurate estimated delivery times will improve the customer experience and reduce dissatisfaction related to late deliveries.

**Market Segmentation by City and Restaurant Type:**

**Insight**: Cities like **Mumbai** and **Delhi** have a high concentration of restaurants, and each city shows a preference for different food types. Swiggy’s strategic decisions should reflect these trends.

**Recommendation**:

* **Geo-targeted Promotions**: Create **geo-targeted promotions** that cater to specific cities and restaurant types, such as discount coupons for North Indian food in Delhi or South Indian in Chennai, to increase orders.
* **Customization by Region**: Adjust Swiggy’s marketing strategies based on city-specific food trends, ensuring that restaurant offerings are aligned with local preferences.

**Conclusion and Recommendations for Operational Improvement:**

**Optimize Delivery Operations**: Streamlining and improving **delivery speed** can significantly enhance customer satisfaction and ratings. Using predictive analytics to forecast high-demand hours and reducing delivery time will ensure better reviews and customer retention.

**Customer Engagement**: Actively encouraging customers to provide **ratings and reviews** will help improve restaurant visibility and provide valuable feedback to both Swiggy and its partner restaurants.

**Dynamic Pricing Strategy**: Implement **dynamic pricing models** based on demand, delivery time, and geographic areas. This ensures fair pricing for both customers and delivery partners and reduces dissatisfaction during peak periods.

**Promote Top-Rated Restaurants**: Feature highly rated restaurants more prominently within the app, thereby encouraging customers to try highly rated and more reliable options, while also incentivizing lower-rated restaurants to improve.

**Targeted Marketing**: Develop **targeted campaigns** based on city-specific trends and food preferences. By using insights into **food type popularity**, Swiggy can drive more orders from cities with higher demand for specific cuisines.