**Objective Questions**:

1. What is the total no. of tables present in the data?

Originally, there were two tables: Raw Data and Country Description. However, after thorough analysis, the number of pivot tables has expanded to 14, along with the inclusion of 4 standard tables, 14 visual representations in the form of charts, and a comprehensive dashboard.

1. What is the total no. of attributes present in the data?

The number of attributes initially stood at 20 columns, which later expanded to 26.

1. How many categorical columns are there in the data? [Search about categorical and continuous data, and try to answer this question]

Initially, the 'Raw Data' Excel sheet contained 12 categorical and 8 continuous columns. However, after pre-processing, this layout was modified to accommodate 14 categorical and 12 continuous columns, respectively.

1. The data consists of some inconsistent and missing values so ensure that the data used for further analysis is cleaned.

At first, I pulled out the opening year from the 'datekey\_opening' column to make it easier to handle year-related queries. Then, I removed any blank entries in the 'cuisines' column to improve data cleanliness and reduce the chances of errors. For data cleaning purposes, functions such as LEFT, Remove Duplicates, Filter, and Remove were employed.

1. Using the LookUp functions, fill up the countries in the original data using the country code.

Using the VLOOKUP (=VLOOKUP(C2, 'country description'!$A$2:$B$16, 2, 0)) and filling all the cells with it in a new column named ‘**country’** in the Raw Data sheet the countries mentioned in the following screenshot were returned using country code as the reference:

A screenshot of a computer

Description automatically generated

Here is the returned column:

A table with a number of cities

Description automatically generated with medium confidence

1. Create a table to represent the number of restaurants opened in each country.

The following table shows the number of restaurants opened in each country. The total number of restaurants were 9542 out of which, as reported in the chart we can see that India had the maximum opened restaurants i.e. 8652 and least were in Canada i.e. 4. The table was created using Pivot Tables of countries and restaurant names as columns and values and pivot chart was respectively created using the above pivot table.

***A screenshot of a computer

Description automatically generated***

1. Also, the management wants to look at the number of restaurants opened each year, so provide them with something here.

The yearly number of restaurants opened were maximum in 1102 and minimum in 2012. The table below was created using opening years (which were fetched from the raw data using =LEFT function) and their values were referenced using Restaurant Names. And a chart was created per the pivot table.

***A screenshot of a spreadsheet

Description automatically generated***

1. What is the total number of restaurants in India in the price range of 4?

There are a total of 388 restaurants in India within the price range of 4.

The formula used for this on MS Excel is:

=COUNTIFS('Raw Data'!D:D,"India",'Raw Data'!Q:Q,"4")

1. What is the average number of voters for the restaurants in each country according to the data?

Per the table and the chart, most votes were in Indonesia and least were Brazil. This pivot table was created using Countries as the rows because average count of voters is to be calculated country-wise, and the values were considered of the number of votes from Raw Data sheet.

I chose the map chart for this as it seemed easier to display the country wise geographical data which was equally spread in the map format.

***A screenshot of a computer screen

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1. Calculate the average rating for all the restaurants that have price\_range < 4 and provide online delivery. Use only the “IF” function, Logical Operators, and Aggregation functions to solve this problem. **[Note: Don’t use Conditional aggregation in this question.]**

The average rating for restaurants with a price range less than 4 and offering online delivery is 3.27.

The formula used for this is:

=SUM(IF(('Raw Data'!$Q$2:$Q$9543<4)\*('Raw Data'!$N$2:$N$9543="Yes"), 'Raw Data'!$U$2:$U$9543, 0)) / SUM(IF(('Raw Data'!$Q$2:$Q$9543<4)\*('Raw Data'!$N$2:$N$9543="Yes"), 1, 0))

1. Using Conditional formatting highlight the rows of restaurants that are located in the countries or cities that you’ve suggested to the management for opening new restaurants.

Firstly using pivot table, I created the country-wise suggestion of the number of restaurant and voters, which shows that the cities where there are least restaurants per country was chosen as suggested cities and using conditional formatting of count of restaurants under 30 were chosen and the respective cities were then filtered out to showcase only the selected cities in the chart.

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1. Create a new customized price column that consists of the abbreviation/symbol of the currency along with the Average\_cost\_for\_two value. [Use string operations to do this task]

Firstly, I researched the currency exchange rates against Indian Rupees (INR) and included that in Country Description sheet.

A table with currency names

Description automatically generatedThereafter, as per these values in INR, I used the VLOOKUP function and multiplies the cost already mentioned in the Raw Data Sheet under Average\_Cost\_for\_two column and created a new column Average\_Cost\_for\_two in Rs and fetched the values in there.



Some examples are as follows:

A table with numbers and a few hundred and one hundred

Description automatically generated with medium confidenceA table with numbers and a number of numbers

Description automatically generated with medium confidence

1. How can you create an array formula in Excel or Google Sheets to count the number of restaurants listed that do not offer online delivery, are in the lowest price range, and have an average cost for two people less than or equal to 250 Indian Rupees?

Number = 1691

As per the following array formula, the number was calculated of the restaurants that do not offer online delivery and have a low price range as well as average cost for two.

A screen shot of a computer

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**Subjective Question:**

1. Suggest a few countries where the team can open newer restaurants with lesser competition. Which visualization/technique will you use here to justify the suggestions?

The countries I suggested are Australia, Canada, Indonesia, Singapore and Sri Lanka because these have lower-rated existing restaurants which are few and with lower quality which equals to lesser competition.

To represent these, I have used a combo-chart of Clustered Columns and Line.

1. Come up with the names of States and cities in the suggested countries suitable for opening restaurants.

The following cities and countries were suggested, as mentioned above, because not only do these have lower-rated restaurants (as shown with the Current Rating Quality table and chart) but also because there are lesser restaurants in each of these (as shown in Cities in suggested countries table and chart).

A screenshot of a graph

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1. According to the countries you suggested, what is the current quality regarding ratings for restaurants that are open there?

In the selected countries, most restaurants generally have lower ratings, with exceptions, while Indonesia boasts the highest average ratings at 4.30, whereas Canada and Singapore have the lowest with 3.58 each.

A screenshot of a graph

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1. Also, what is the current expenditure on food in the suggested countries, so we can keep our financial expenditure in control?

Using the pivot table and creating pivot chart (pie chart – because it reveals composition) from it, I found out that Singapore tops the list with the highest maximum expenses among the chosen countries, while Canada and Sri Lanka feature the lowest expenses. By implementing cost-effective menu planning and optimizing resource usage, expenditure can be controlled.

A screenshot of a graph

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1. Come up with the names of restaurants from the recommended states that are our biggest competitors and also those that are rated in the lower brackets, i.e. 1-2 or 2-3.

I used the data about restaurant ratings to create pivot tables showing highest and lowest rating restaurants and this was denoted using column and bar charts as it displays distinction in the same categories.

I found out that Ministry of Crab, Sushi Masa, and Talaga Sampireun emerge as top competitors with an impressive rating of 4.9, while Elite Indian Restaurant in Sri Lanka and Poets Cafe in Australia are among the least rated establishments.

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Description automatically generated

1. Which cuisines should we focus on in the newer restaurants to get better feedback? Does the choice of cuisines affect the restaurant ratings?

Pivot table of cuisines’ data and their average ratings helped in distinguishing, out of over 9500 restaurants and their cuisines, which ones were top rated by the customers.

The cuisines that consistently received high ratings across all five countries include Asian, Indonesian, Western, Cafe, Italian, Coffee and Tea, Desserts, Bakery, Seafood, Sunda, and Sushi. Among these, Italian cuisine stands out with the highest average rating of 4.90, indicating its widespread popularity across the five countries. Certainly, the selection of cuisines significantly impacts ratings, with higher ratings attracting more visitors, leading to increased sales and profits, while highly rated restaurants benefit from enhanced reputation, competitive advantage, and pricing flexibility.

A pie chart with a pie chart in the center

Description automatically generated

1. According to our current data, should we go for online delivery and table booking? Does that affect the customer’s ratings?

Pivot table and charts about the fact that whether a restaurant provided table bookings and online delivery or not helped in judging the following.

Given the current data, focusing on facilitating table bookings and enhancing online delivery services could be beneficial for the team, especially considering the prevailing trend of ordering food at home. However, it's important to note that only a small fraction, approximately 7-8% of the mentioned restaurants, currently provide online delivery services. Whether this provision influences customer ratings remains uncertain, as ratings typically hinge on various factors such as food quality, pricing, ambiance, and service, rather than solely on delivery options.

A screenshot of a computer

Description automatically generated

1. Should the team keep the rate of cuisines higher? Will that affect the feedback? According to our data are the rates of cuisines and ratings, correlated?

Our data shows that keeping higher prices for food is important because it's linked to better ratings for restaurants. It was found out that when restaurant prices go up, their ratings tend to go up too. This strong connection, shown by a correlation of about 0.81, means that higher prices often lead to better ratings.

The scatter chart below shows how when the prices rose, so did the ratings.

A graph with red dots

Description automatically generated

1. What is the distribution of the number of restaurants of different price ranges in all the countries?

Out of the price range of 1 to 4, among the 89 total restaurants mentioned in the data, Australia stands out because all four of its restaurants have prices lower than 500 INR. On the other hand, Indonesia is unique because it doesn't have any restaurants in the highest price range category of 4.

A screenshot of a computer

Description automatically generated

1. Explain your approach in brief for suggesting countries/cities in order to open new restaurants, if the objective and subjective questions would have not been given to assist you. **[you have to give bullet pointers in order to answer this question]**

Countries were chosen based on strategic factors:

- Less competition: These nations have fewer restaurants, which means lesser competition, which can be beneficial for new businesses.

- Lower ratings: With fewer highly-rated restaurants, there's a chance to shine and attract customers more easily.

- Fewer existing restaurants: The limited number of eateries suggests higher demand than supply, increasing the chances of success for new ventures.

Had the questions not been given, thorough research would have been essential:

Successful businesses rely on comprehensive research and understanding of the target markets. Factors like local preferences, demographics, and economic conditions would be carefully studied. Evaluating costs, ratings, and other relevant factors would also be crucial for determining the likelihood and potential success of a new venture.

**The dashboard must consist of Year-wise and country slicers.**

**A screenshot of a computer screen

Description automatically generated**

The dashboard reveals all the pertinent charts that help in deducing the cities that are suitable for making restaurants, the country-wise ratings and their expenditures. This dashboard accumulates all the analysed data and information from before and puts it into one place and makes it easier for everyone to understand the trends, changes and compositions of each data.