# Answers

## Objective Questions:

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

   **Solution:**

   - The Zomato Analysis workbook contains 2 worksheets and the total number of tables is Two.
   - In the woekbook that I have made, has 5 worksheets.

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

   **Solution:**

   - The total number of attributes in the dataset after creating new columns is 26.
   - I have also created 10 Pivot tables for neat and clean summarization of the data.

3. **How many categorical columns are there in the data?**

   **Solution**

   - **Categorical Data:** This type of data represents characteristics or labels and can be divided into groups or categories.
   - **Continuous Data:** This data can take any numerical value within a given range. It's measurable.
   - **Categorical columns** contain discrete, finite values. In this dataset, there are 16 categorical columns that represent different groups or classifications: RestaurantID, RestaurantName, CountryCode, City, Address, Locality, Updated Cuisines, Currency, Has_Table_booking, Has_Online_delivery, Is_delivering_now, Date of Opening, Switch_to_order_menu, Price_range, and Countries.

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

   **Explanation:**

   **DateKey_Opening Correction:**

   - The "DateKey_Opening" column has data as strings. I had to correct that and convert it into Numerical or date, I opted for a formula-based approach: =TEXT(DATEVALUE(SUBSTITUTE(U2,"_","-")),"dd-mm-yyyy")

- I choose this method to avoid creating additional columns convert it directly into the correct format. i.e., Date format

Cuisines Column Cleaning:

- Applied a filter to the "Cuisines" column and found blank spaces, all within the same country.
- As all were from only America, I choose it to be filled with American.
- =IF(ISBLANK(J2),"American",J2) is the formula I used to fill the blank cells.

| Cuisines | Updated Cuisines |
|---|---|
| | American |
| | American |
| | American |
| | American |
| | American |
| | American |
| | American |
| | American |
| | American |

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

**Approach**:

- Create a new column, "Country" in the "Raw Data" worksheet ,Then by using Vlookup match the "CountryCode" with "country description" in the Given sheet.

**Explanation**:

- We have been given with the country names that matches with the country codes in the Raw data worksheet,
- =VLOOKUP(C2,Pivots!$A$1:$B$16,2)
- C2 is the Lookup value
- 'country description'!$A$1:$B$16 is the Lookup array
- 2 is the index

**Output**:

=VLOOKUP(C8656,Pivots!$A$1:$B$16,2)

| C | X | |
|---|---|---|
| CountryCode | Country | Averag |
| 216 | United States of A | |
| 216 | United States of A | |
| 1 | India | |
| 1 | India | |
| 1 | India | |
| 1 | India | |

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

**Approach**:

- Create a Pivot table to find number Restaurant in each country.

**Explanation**:

- Select all the cells in the "Raw Data" worksheet.
- Click on Insert Pivot Table and specify the location where you want to insert the pivot table.
- Select the Countries in the rows.
- Then in the Values selection Select RestaurantID.
- Then change the Value field section to Count to find the count of the restaurant with respect to the countries.

**Visualization**

| Number of restaurants opened in each country | |
|---|---|
| **Row Labels** | **Count of RestaurantID** |
| India | 8652 |
| United States of America | 434 |
| United Kingdom | 80 |
| Brazil | 60 |
| South Africa | 60 |
| United Arab Emirates | 60 |
| New Zealand | 40 |
| Turkey | 34 |
| Australia | 24 |
| Philippines | 22 |
| Indonesia | 21 |
| Sri Lanka | 20 |
| Singapore | 20 |
| Qatar | 20 |
| Canada | 4 |
| **Grand Total** | **9551** |

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

**Explanation:**

1. Create a New Column for the Year:
   I have used the formula =YEAR(V2)

2. Create a Pivot Table:
   - Click Insert Pivot Table, then range then specify the location where you want to place the pivot table.
   - In the pivot table, drag the "Year" field into the Rows section.
   - Drag the "RestaurantID" into the Values section.
     Change the value field to Count to display the number of restaurants.

**Visualization**:

| Number of restaurants opened each year | |
|---|---|
| **Row Labels** | **Count of RestaurantID** |
| 2010 | 1080 |
| 2011 | 1098 |
| 2012 | 1022 |
| 2013 | 1061 |
| 2014 | 1051 |
| 2015 | 1024 |
| 2016 | 1027 |
| 2017 | 1086 |
| 2018 | 1102 |
| **Grand Total** | **9551** |

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

**Approach**:

To determine the total number of restaurants in India with a price range of 4, we use the COUNTIFS function.

**Explanation**:

- =COUNTIFS('Raw Data'!X:X,"India",'Raw Data'!Q:Q,"4")'
- 'Raw Data'!Q:Q is the range to search for "Price_range" and we want it to 4 , so the criteria is 4
- 'Raw Data'!W:W is the range to check for "India" so the criteria is "India".

**Output**:

- As a result we get 388, so the total restaurants with price range 4 in India are 388.

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

**Approach**:

- We use Pivot table to calculate the average number of voters for restaurants in each country.

**Explanation**:

- Insert Pivot table Select the range of the Raw Data.
- Then Select the cell where we want to Show the pivot table.
- Drag "Country" to the Rows section and "Votes" to the Values section.
- Change the value field setting for the "Votes" to Average.

**Visualization**:

average number of voters for restaurants in each country

| Row Labels | Average of Votes |
|---|---|
| Indonesia | 772 |
| United Arab Emirates | 494 |
| Turkey | 431 |
| United States of America | 428 |
| Philippines | 407 |
| South Africa | 315 |
| New Zealand | 243 |
| United Kingdom | 205 |
| Qatar | 164 |
| Sri Lanka | 146 |
| India | 137 |
| Australia | 111 |
| Canada | 103 |
| Singapore | 32 |
| Brazil | 20 |
| **Grand Total** | **157** |

10. **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**.

**Approach**

- To calculate the average rating for restaurants with a price range less than 4 and Gives online delivery
- Using IF function along with (*) as a logical operators where * acts as a And Function and Average functions.

**Explanation**

- The idea is to apply the conditions within an IF function using the (*) as a logical operator. If both conditions are met, the function will calculate the average rating.

- =AVERAGE(IF(('Raw Data'!Q:Q<4)*('Raw Data'!N:N="Yes"),'Raw Data'!T:T)) is the formula I used for finding the solution.
- Where Average will find the average of the data set which will be given by IF function.
- In the IF function as a Logic we will give first criteria we will give the 'Raw Data'!Q:Q <4 where it will check for the Price Range <4
- Then we use (*) As a And Function
- Then give the Second Criteria 'Raw Data'!N:N = "Yes" this will give the Restaurants which provide On Delivery .

**Result**

- Average rating of all the restaurants with criteria is 3.27381151.

11. **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.**

**Approach**

- To highlight the rows of restaurants located in the countries or cities suggested for new restaurant openings, use conditional formatting.

**Explanation**

- Select all the rows of data, including the **country and city columns**
- Go to the **Home tab.**
- **Conditional Formatting** →Select **New Rule.**
- **"Use a formula to determine which cells to format**
- Formula to Highlight Based on Country
- =OR($X1="Canada", $X1="Indonesia", $X1="Philippines", $X1="Turkey")

**Visualizaion:**

| Year | Country |
|---|---|
| 2012 | Philippines |
| 2018 | India |
| 2010 | India |
| 2016 | India |
| 2010 | Brazil |
| 2013 | Brazil |
| 2015 | Indonesia |
| 2017 | United Kingdom |
| 2016 | United Kingdom |
| 2016 | United Kingdom |
| 2012 | United Kingdom |
| 2010 | Qatar |
| 2015 | Sri Lanka |
| 2014 | Turkey |
| 2010 | Turkey |
| 2018 | Turkey |
| 2018 | Turkey |
| 2015 | Turkey |
| 2013 | Brazil |
| 2016 | Brazil |
| 2014 | United Arab Emir |
| 2013 | Indonesia |
| 2011 | Indonesia |
| 2018 | Indonesia |
| 2012 | United Kingdom |
| 2011 | United Kingdom |

**Result**

- This will highlight the "RestaurantName" column when the country is **Turkey, News Zealand, UAE, Indonesia, Philippines.**

12. **Create a new customized price column that consists of the abbreviation/symbol of the currency along with the Average_cost_for_two value.**

**Solution:**

- To create a new column that combines the currency abbreviation/symbol with the "Average_cost_for_two" value, use the following formula: =CONCATENATE(L2," ",S2)
- This formula extracts the currency symbol and abbrevation from the "Currency" column (L) and combines it with the "Average_cost_for_two" value from column S, creating a customized price format.

13. **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?**

**Solution**:

- To count the number of restaurants 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,
- Use the following array formula: **=SUMPRODUCT(('Raw Data'!N2:NG552="No")*('RawData'!Q2:QG552=1)*('Raw Data'!Y2:YG552<=250))**
- This formula multiplies the conditions to filter the data accordingly and then sums the results to get the total count.
- The Final count was 1694.

# 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?**

**Approach**:

By analyzing various insights from the data, I can suggest countries where the team can open new restaurants with lesser competition.

**Explanation**:

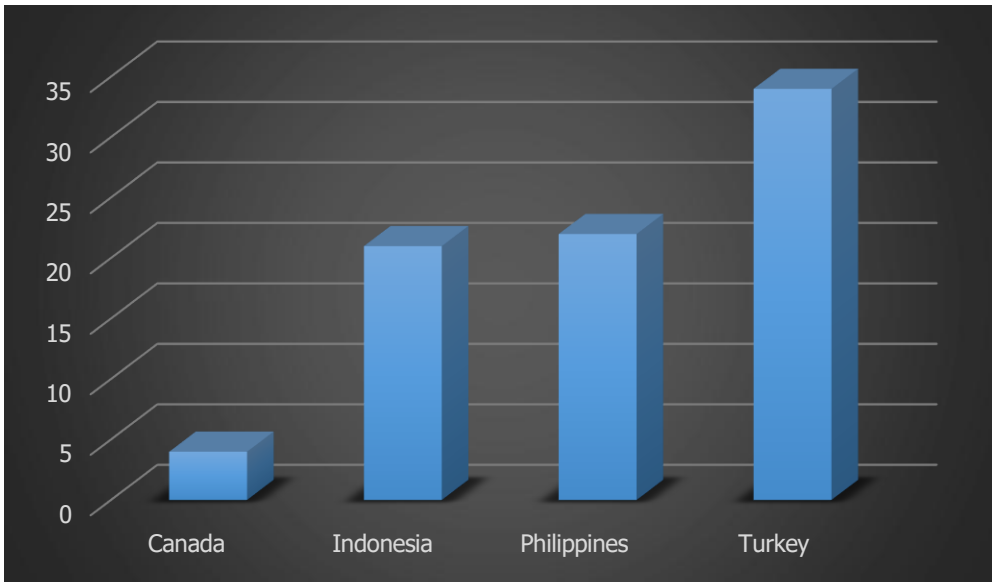
The most suitable countries for opening new restaurants are those where:
**The total number of restaurants is less than 50** (Less competition).
**The average ratings are 4.0 or higher** (customer satisfaction).
**The number of votes is good** (strong customer engagement).
**The Price range is reasonable** (affordability).

**Insights**:

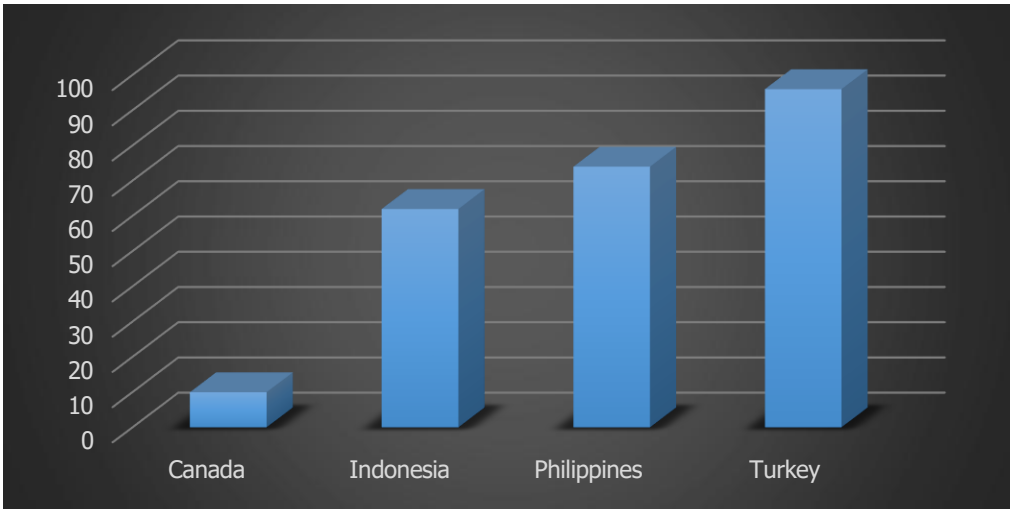
Based on these criteria, the suggested countries are **Philippines, Turkey Indonesia** and **Canada.**

The reason I choose Canada is that it has the minimal count of restaurants and the Price range is comparatively low but the rating is slightly low that refers to that it has to be improved and vote count is very much high with the few restaurants it has.

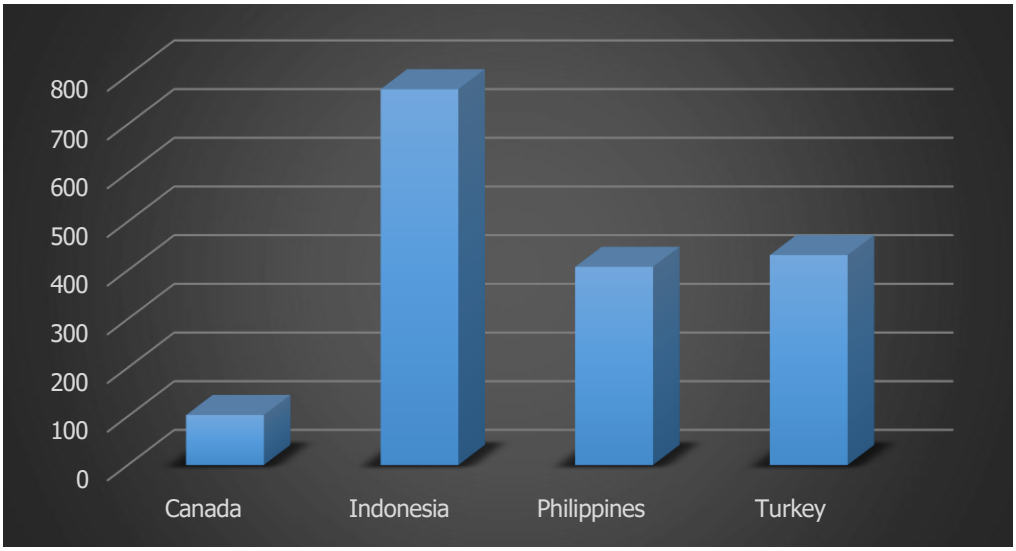
**Visualization:**



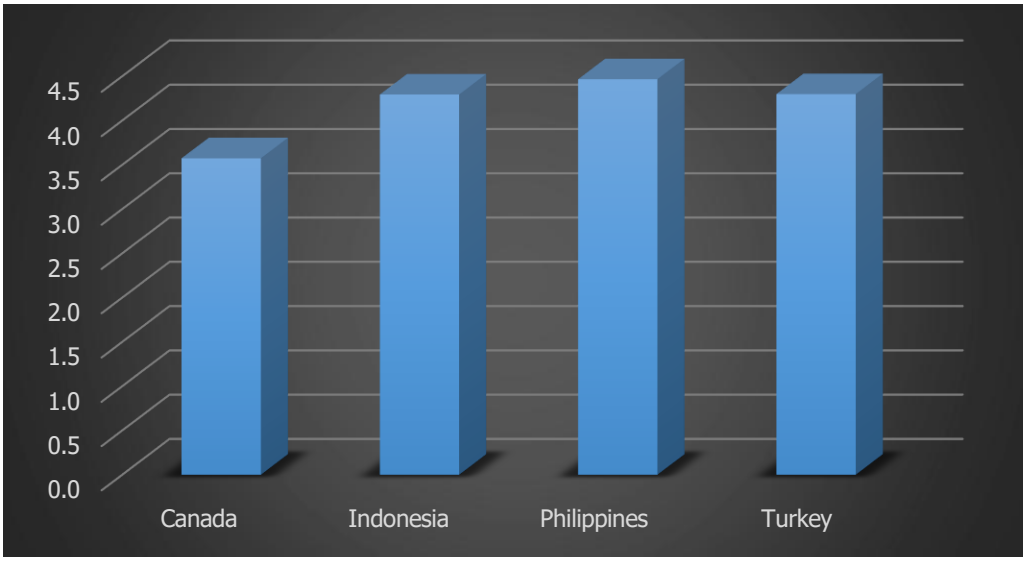

Total Count of Restaurants




Average Price range for countries




Average Votes for countries




Average Rating for countries

**Result**:

These visualizations will provide a clear, data-driven basis for recommending the most Recommended countries for new restaurant openings.

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

**Approach:**

I identified suitable cities in the suggested countries by analyzing factors such as average rating, the count of restaurants, and average price range. This helped in selecting locations with favorable conditions and lower competition.

| Row Labels | Average of Rating | Average of Price_range | Count of RestaurantID |
|---|---|---|---|
| **Canada** | **4** | **3** | **4** |
| Chatham-Kent | 3.7 | 2 | 1 |
| Consort | 3 | 2 | 1 |
| Vineland Station | 4.3 | 4 | 1 |
| Yorkton | 3.3 | 2 | 1 |
| **Indonesia** | **4** | **3** | **21** |
| Bandung | 4.2 | 3 | 1 |
| Bogor | 3.85 | 2.5 | 2 |
| Jakarta | 4.35625 | 3 | 16 |
| Tangerang | 4.3 | 3 | 2 |
| **Philippines** | **4** | **3** | **22** |
| Makati City | 4.65 | 3 | 2 |
| Mandaluyong City | 4.625 | 3.75 | 4 |
| Pasay City | 4.366666667 | 4 | 3 |
| Pasig City | 4.633333333 | 3 | 3 |
| Quezon City | 4.8 | 3 | 1 |
| San Juan City | 4.25 | 3 | 2 |
| Santa Rosa | 3.8 | 3 | 2 |
| Tagaytay City | 4.5 | 3 | 1 |
| Taguig City | 4.525 | 3.5 | 4 |
| **Turkey** | **4** | **3** | **34** |
| Ankara | 4.305 | 2.8 | 20 |
| Istanbul | 4.292857143 | 2.857142857 | 14 |

**Result**:

The most suitable locations are

- **Canada - Vineland Station, Chatham-Kent**
- **Indonesia - Bandung, Tangerang**
- **Philippines - Quezon City, Tagaytay City, Pasig City**
- **Turkey - Istanbul, Ankara**

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

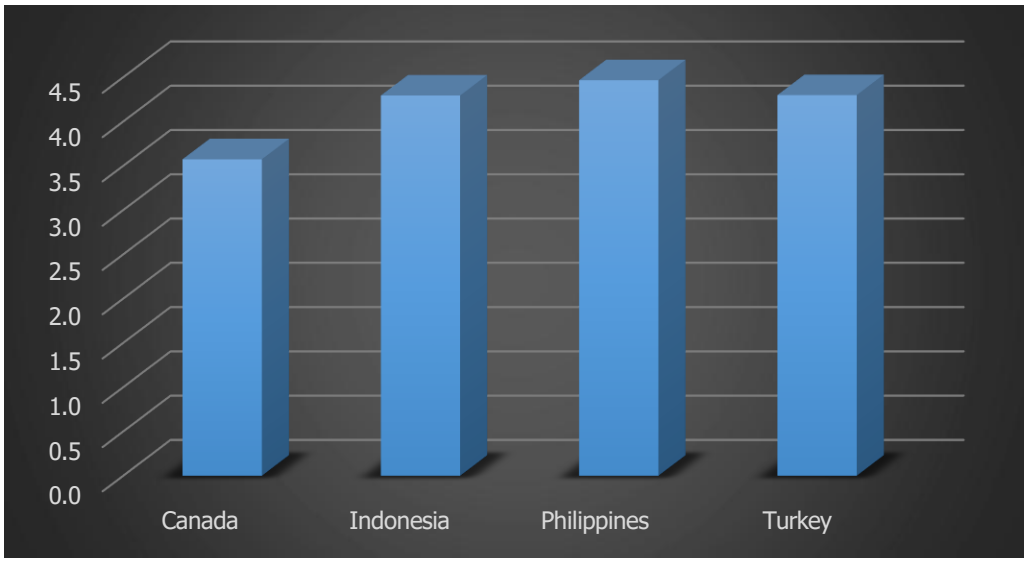
**Approach**:

Create a pivot table connected with a chart and a slicer to visualize the data effectively.

**Explanation:**

- Select data in the "Raw Data" worksheet.
- Go to Insert Pivot Table and choose the desired location.
- In the pivot table:
  Select the "Country" field into the Rows section.
  Drag the "Rating" field into the Values section and change the Field value to Average.
- Add a slicer to filter the data by country

**Visualization**:




**Insights**:

- We can able to the analysis that the selected country are having better rating above 4
- **Canada - 3.6**
- **Indonesia - 4.3**
- **Philippines - 4.5**
- **Turkey - 4.3**

**Suggestion**:

In all these countries the rating is very much good rating and we can enhance the customer satisfaction by taking the feedback from every customer and implement other options also like table booking and online delivery, so that the satisfaction of customers can be boosted.

**Result:**

This is analysis of restaurant ratings across different countries

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

**Approach**:

To Know the expenditure we find average of two based on countries

**Explanation:**

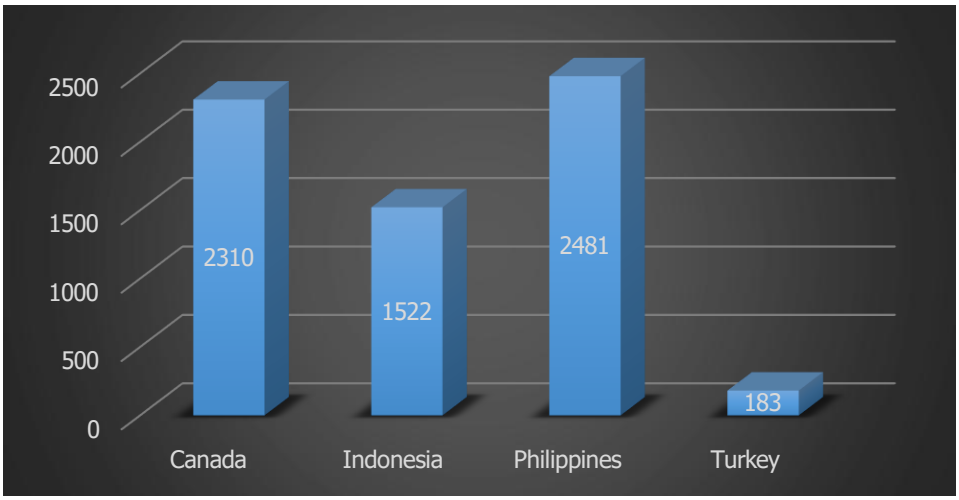
- Select data in the "Raw Data" worksheet.
- Go to Insert  Pivot Table and choose the desired location for the pivot table.
- In the pivot table:
- Select the "Country" field into the Rows section.
- Drag the "Average in rupees" field into the Value section.

**Insights**:

- Among the countries that I have selected for opening the new restaurants Philippines and Canada tops the list.
- Indonesia has a very moderate average of price for customers which enhances for affordability.
- Turkey on the other hand has relatively lower price range than the other countries which makes it straight away into the list of new restaurants to be opened.

**Visualization**:

| Row Labels | Average of Average in Rupees |
|---|---|
| Canada | 2310 |
| Indonesia | 1522 |
| Philippines | 2481 |
| Turkey | 183 |
| **Grand Total** | **1259.108955** |




Average cost for two in rupees

**Result:**

In this method we can easily find the average cost per country and manage expenditure and plan a strategic Approach.

5. **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.**

**Approach:**

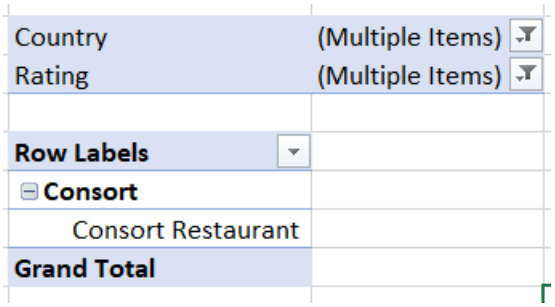
- To identify the biggest competitors and those rated in the lower brackets (1-2 or 2-3) from the recommended states, we'll follow this approach:
- Filter restaurants for suggested country as a competitors.
- Filter those rated in lower bracket (1-2 or 2-3).
- You will get the final list of your competitors.

**Explanation:**

- We already have a list of competitors based on whether they meet the specific criteria related to price range and average amount spent.
- For each restaurant identified as a competitor, we need to check their average rating to ensure they fall into the lower rating brackets.
- We get the Final Names of all the restaurants

**Visualization:**

- Here is the restaurant from the recommended states that is our biggest competitors and also rated in the lower brackets (1-2 or 2-3)



| Country | (Multiple Items) |
|---|---|
| Rating | (Multiple Items) |
| | |
| **Row Labels** | |
| **Consort** | |
| Consort Restaurant | |
| **Grand Total** | |

**Results:**

This restaurant is considered as a significant competitor in the region and has been rated in the lower brackets.

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

**Approach**:

By Viewing various insights from the data, I can determine which cuisines to focus on in new restaurants to potentially improve customer feedback and ratings.

**Explanation:**

To identify suitable cuisines for new restaurants:

- Create a pivot table
- Select the RAW DATA and create in desired place
- Drag Cuisines in Row and Rating in the values
- Select the value Field setting to Average
- And apply the Countries filter in the table.
- Now to we can get most rated Cuisines in each Country.

**Visualization:**

| Country | (Multiple Items) |
|---|---|
| | |
| **Row Labels** | **Average of Rating** |
| Sunda, Indonesian | 5 |
| World Cuisine | 5 |
| Sushi, Japanese | 5 |
| European, Asian, Indian | 5 |
| Bar Food | 5 |
| Filipino, Mexican | 5 |
| Japanese, Korean | 5 |
| French, Japanese, Desserts | 5 |
| Pizza | 5 |
| Desserts, Bí_rek | 5 |
| Seafood, American, Mediterranean, Japanese | 5 |
| Desserts | 5 |
| **Grand Total** | **5** |

Top rated cuisines from the selected countries

**Suggestion:**

Based on the analysis of cuisine ratings,Sunda, Indonesian, World Cuisine, Japanese, Asian, Indian, European, Mexican, Desserts, Seafood, American have received high ratings. Adding these cuisines to the menu will be Profitable for new restaurants.

**Result:**

By these tables we can see that these Cuisines will help in growth of new restaurants with great rating.

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

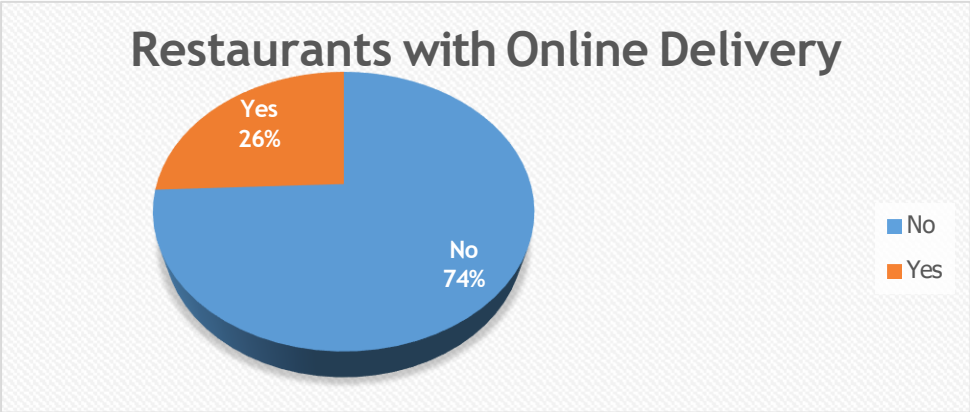
**Approach:**

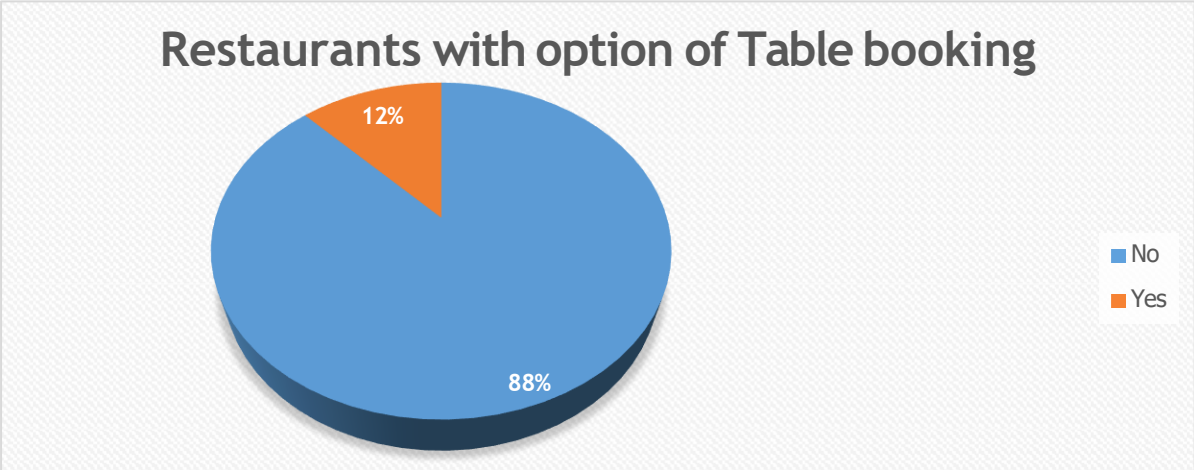
- Created a pivot table with "Online Delivery" and "Table Booking" in the Rows section and their Average rating in the values
- Added a slicer for country filtering and converted the data into a chart for visualization.

**Explanation**:

- Create 2 Pivot table in desired locations select Online Delivery in one and Has table Booking in another Select Restaurant ID as unique identifier.
- After creating we can see the how many restaurant provide online delivery and table booking .
- By creating pivot table we can easily see that the According to the data Most of the restaurant that provide Online Delivery and Table Booking have Higher Average rating compare to those who doesn't.
- Then by adding slicer we can find the Average Rating For each country.

**Visualization:**




**Suggestion**:

Since very few reataurants in these countries provide table booking and online delivery, It would benefit the restaurants by implementing these two options.

**Result**:

- So providing Online Delivery and Table booking is Positively affect customer ratings and help them in preforming well.
- It will increase in customer Satisfaction.

8. **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?**

**Approach:**

- Calculated the correlation coefficient between Average of two in rupees of cuisine and ratings using the formula =CORREL('Raw Data'!T:T,'Raw Data'!Y:Y)

**Explanation**:

- The correlation coefficient between cuisine rates and ratings is approximately 0.31.
- A correlation of **0.31** suggests a **weak to moderate positive correlation** between two variables.
- From the calculations we can say that the impact is minimal.

**Suggestion**:

- Just by price adjustment its quite difficult to change the Rating of the restaurant especially when there a increase in price it sometime have negative impact.
- Focus on improving quality and service to enhance overall customer satisfaction.

**Result**:

Raising or lowering cuisine prices probably won't make a big difference in customer feedback. Instead, focusing on quality and service would have a much bigger impact on overall customer satisfaction.

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

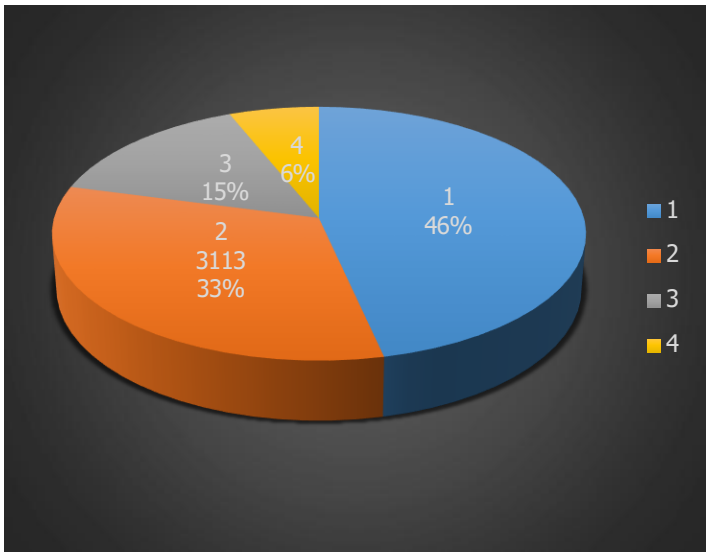
**Approach**:

- Created a pivot table with Price Range in rows and Count of RestaurantID in values.

**Explanation**:

- This Chart will give distribution of restaurants across different price ranges.
- After adding slicer we can view the date with respect to each country.

**Visualization:**




Percentage of restaurants with price range


Slicer

**Result:**

This gives a clear picture of how restaurants fall into different price ranges in each country. It also helps in analyzing pricing strategies and market trends, making it easier to plan for new restaurant openings.

10. **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.**

- Firstly, we need to shortlist the retaurants with less number of operating restaurants.
  We can use pivot table as the tool for looking into the number of restaurants.
  Shortlist the countries with fewer count of restaurants.
- Check for the cuisines that are performing well in the countries and cities that we selected.
  The cuisines with most rating can be used in the newer restaurants.
- We should also look for the customer ratings of the restaurants in the selected countries.
  If the customer ratings are higher than the customers are very much satisfied with the accomodoties and options in the restaurants.
  If the rating is on the lower side then there is a scope of betterment in the newer restaurants.
- Analyze Online Delivery C Table Booking Trends
  Check the percentage of restaurants offering online delivery C table booking in each country.
  A higher percentage means customers prefer online orders, making it a profitable market.
- Check for Market trend and affordability.
  Using the average cost in rupees for each country we can look for the better options.
- Shortlist the cities and their countries
  Put down the suggested cuisines that can be introduced in the newer restaurants.
  Also quote if table booking and online delivery is required and affordable in the selected cities.