CAPSTONE PROJECT

TITLE

Exploring Coffee Quality Data

PRESENTED BY

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INTRODUCTION

The Coffee Quality Institute (CQI) is a non-profit organization that works to improve the quality and value of coffee worldwide. It was founded in 1996 and has its headquarters in California, USA.

CQI's mission is to promote coffee quality through a range of activities that include research, training, and certification programs. The organization works with coffee growers, processors, roasters, and other stakeholders to improve coffee quality standards, promote sustainability, and support the development of the specialty coffee industry

OBJECTIVE: The primary objective is to identify key factors that influence coffee quality and understand how various attributes affect the overall quality scores.

This presentation provides an analysis of a comprehensive coffee quality dataset.

THE ANALYSIS AIMS TO ANSWER THE FOLLOWING KEY QUESTIONS:

- What are the major determinants of coffee quality?
- How do different processing methods impact quality scores?
- What regional patterns and trends exist in coffee quality?
- How do defect occurrences affect coffee quality?
- What interactions exist between variables influencing Total Cup Points?

DATA OVERVIEW

- **DATA:**
- The data includes a range of information on coffee production, processing, and sensory evaluation. It also contains data on coffee genetics, soil types, and other factors that can affect coffee quality.
- **SENSORY EVALUATION (COFFEE _QUALITY_SCORES):**
- Aroma: Refers to the scent or fragrance of the coffee.
- Flavor: The flavor of coffee is evaluated based on the taste, including any sweetness, bitterness, acidity, and other flavor notes.
- Aftertaste: Refers to the lingering taste that remains in the mouth after swallowing the coffee.
- Acidity: Acidity in coffee refers to the brightness or liveliness of the taste.
- Body: The body of coffee refers to the thickness or viscosity of the coffee in the mouth.
- Balance: Balance refers to how well the different flavor components of the coffee work together.
- Uniformity: Uniformity refers to the consistency of the coffee from cup to cup.
- Clean Cup: A clean cup refers to a coffee that is free of any off-flavors or defects, such as sourness, mustiness, or staleness.
- Sweetness: It can be described as caramel-like, fruity, or floral, and is a desirable quality.
- **DEFECT COLUMNS:**
- Category One defects: are primary defects that can be perceived through visual inspection of the coffee beans. These defects include Black beans, sour beans, insect-damaged beans, fungus-damaged beans, etc.
- Category Two defects: are secondary defects that are more subtle and can only be detected through tasting. These defects include Over-fermentation, staleness, rancidness, chemical taste, etc.
- **Total Cup Points: is literally the total of 10 features given above.**

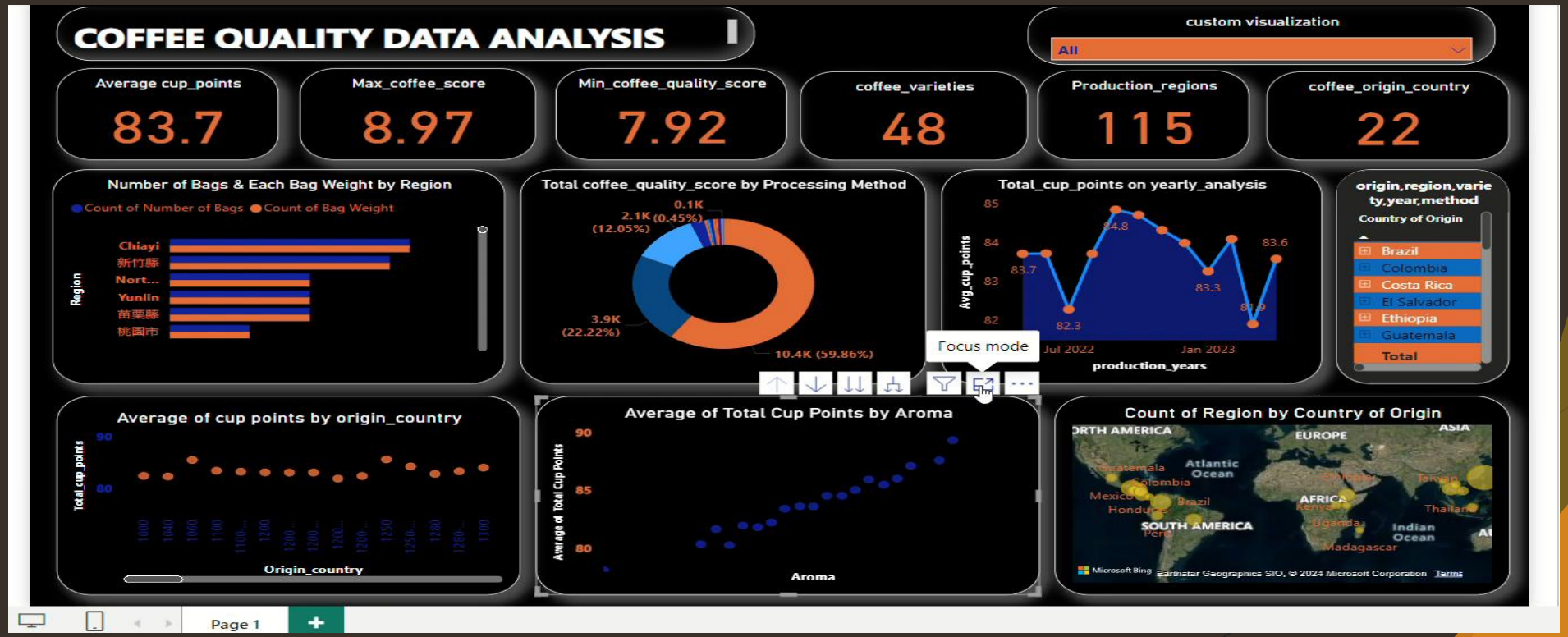
Key Determinants Of Coffee Quality:

>This section identifies the primary factors that significantly influence coffee quality scores. Through visualizations, we observed that factors such as aroma, flavor, acidity, body, balance, aftertaste plays crucial roles in determining coffee quality. The visualizations in this section highlight the relationships between these variables and coffee quality scores.

>These sensory evaluations such as the above mentioned have more influence on coffee quality

>Here is the below graph that shows the relation between these sensory evaluations that affecting the coffee quality .

>In this visualization I show the relation between the coffee quality and the sensory evaluations.



Correlation Between Processing Methods, Origin Regions, Defects, Altitude On Coffee Quality :

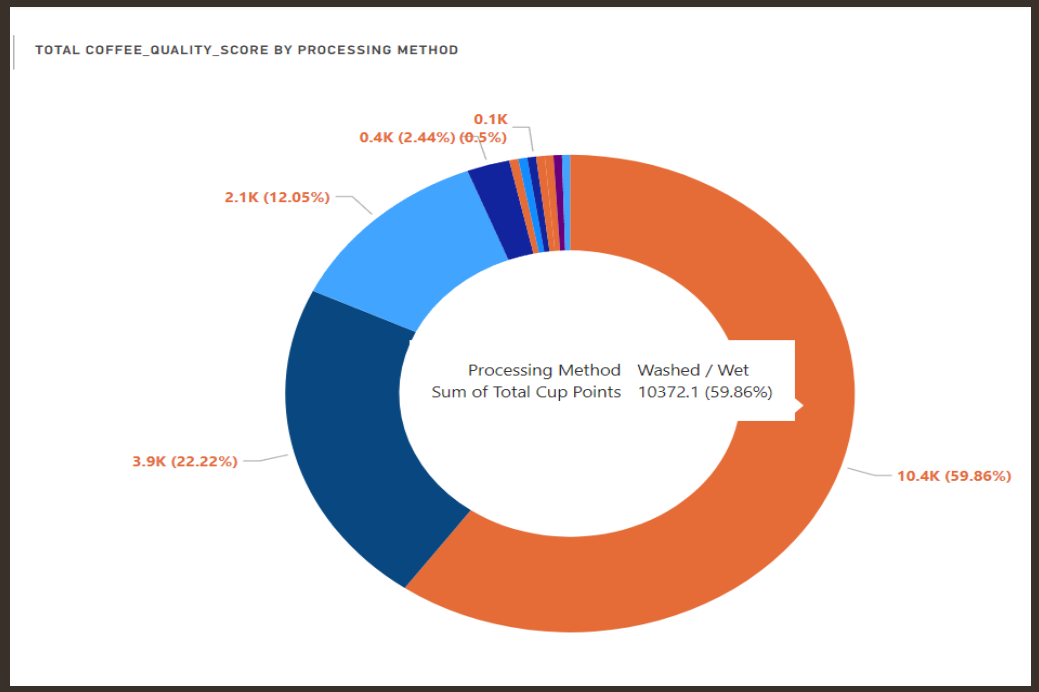
>Processing methods are a critical factor in coffee quality. This analysis explores the different processing techniques and their impact on quality scores. The correlation between various processing methods such as washed, natural, and honey processing and their respective quality scores is illustrated through visualizations. The results indicate that certain methods consistently yield higher quality scores.

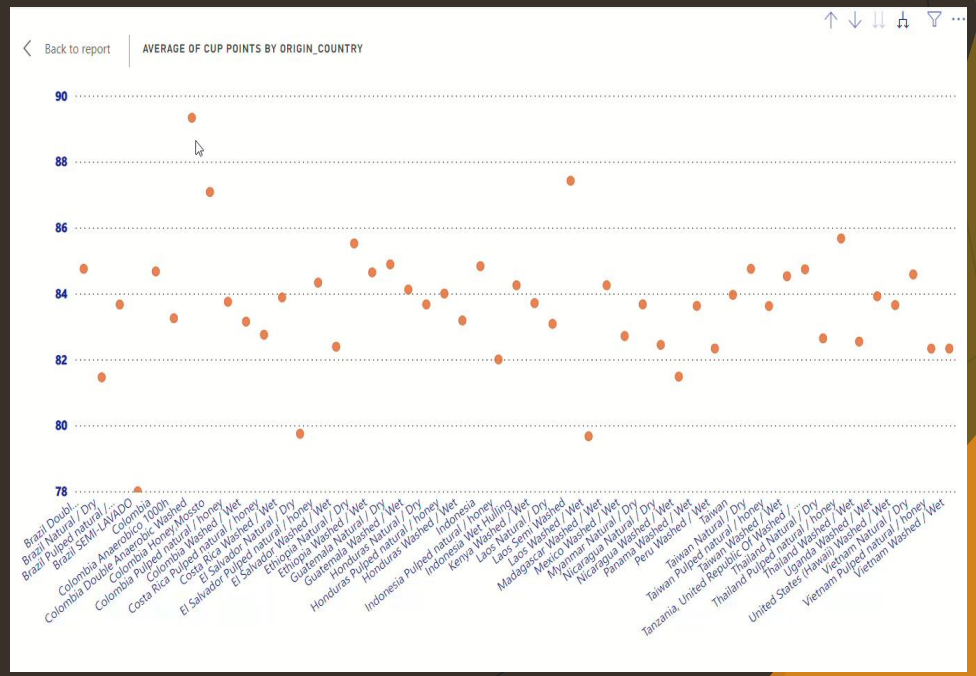
> This donut chart shows clearly about the wet/washed processing method having highest impact on coffee quality. almost(56.86%)

>In the below video I shows the relations between different columns like origin country, processing method, defect, region affecting the coffee quality

> Among these factors Defects have a negative impact on quality scores.

> we observed that factors such as country origin, processing methods plays crucial roles in determining coffee quality. The visualizations in this section highlight the relationships between these variables and coffee quality scores.





Impact of Time to Grade on Coffee Quality (Total Cup Points)

> Here the time to grade is nothing but number of days between the start of the harvest year and the grading date.

>A noticeable trend shows that as the Time to Grade increases, the Total Cup Points tend to decrease slightly.

>This indicates that coffee graded sooner after harvest tends to score higher in quality.

High-Quality Scores with Shorter Grading Times:

>The highest quality score (89.3 points) was observed at a grading time of 628 days.

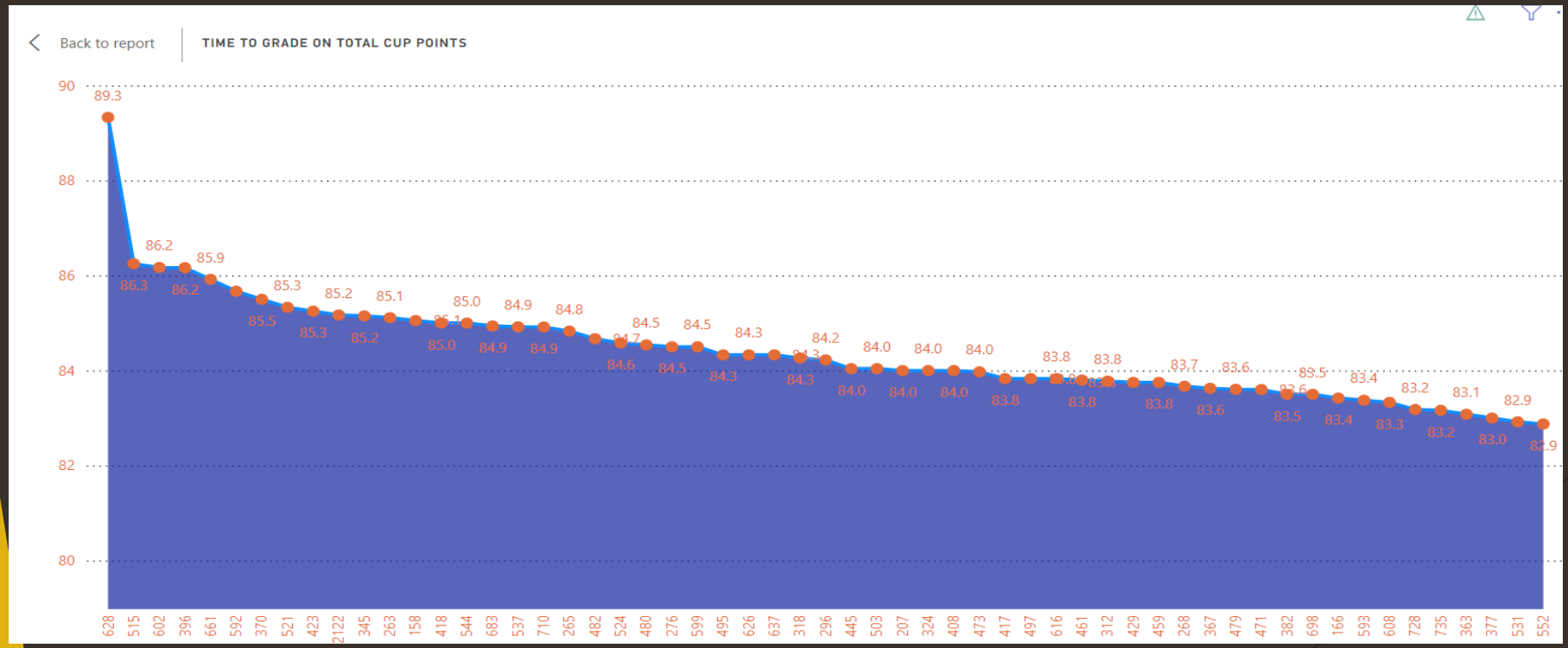
>Coffees graded within 600 days generally exhibit higher quality scores.

Decreasing Quality with Extended Grading Times:

>Beyond 600 days, the average Total Cup Points tend to decrease, stabilizing around 84-85 points.

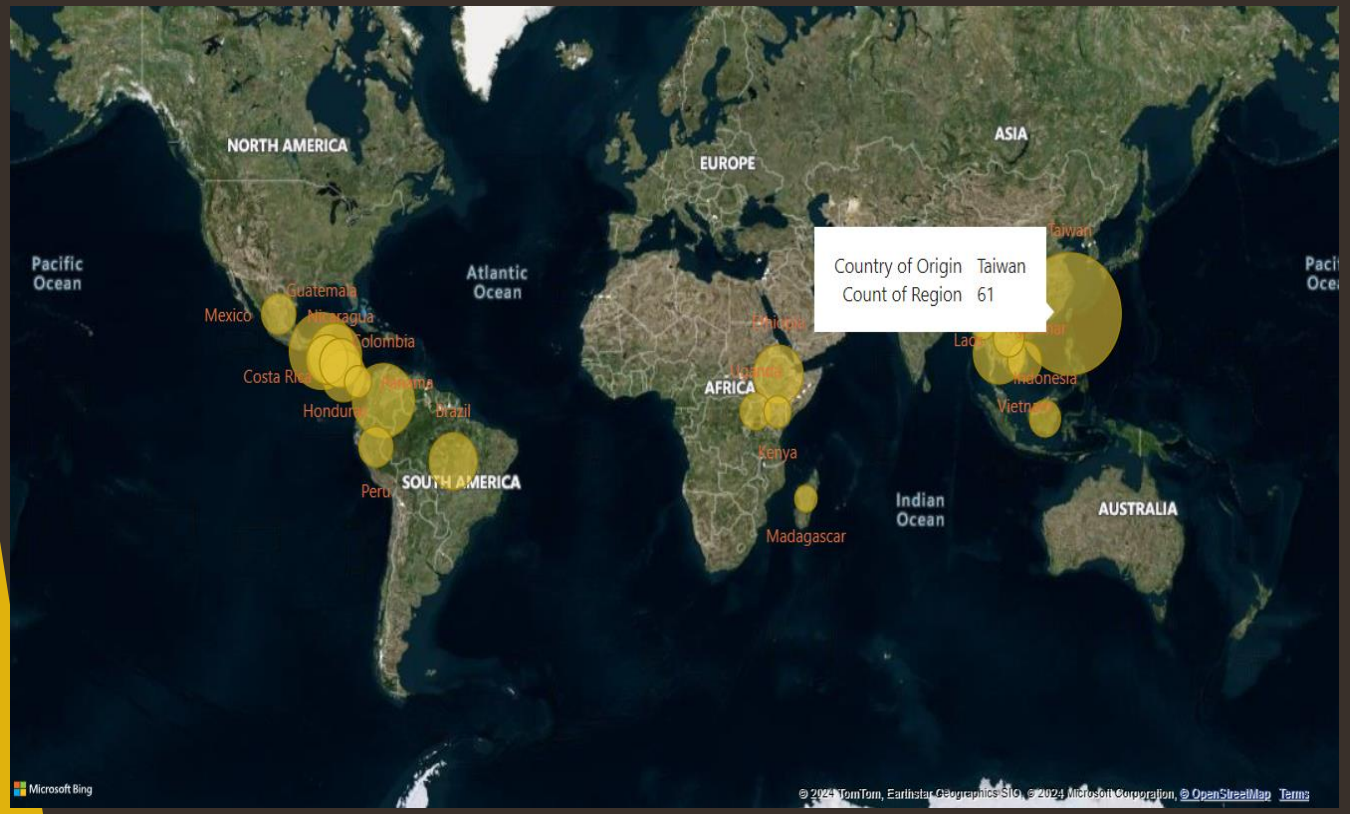
>This suggests that delays in grading may negatively affect coffee quality.

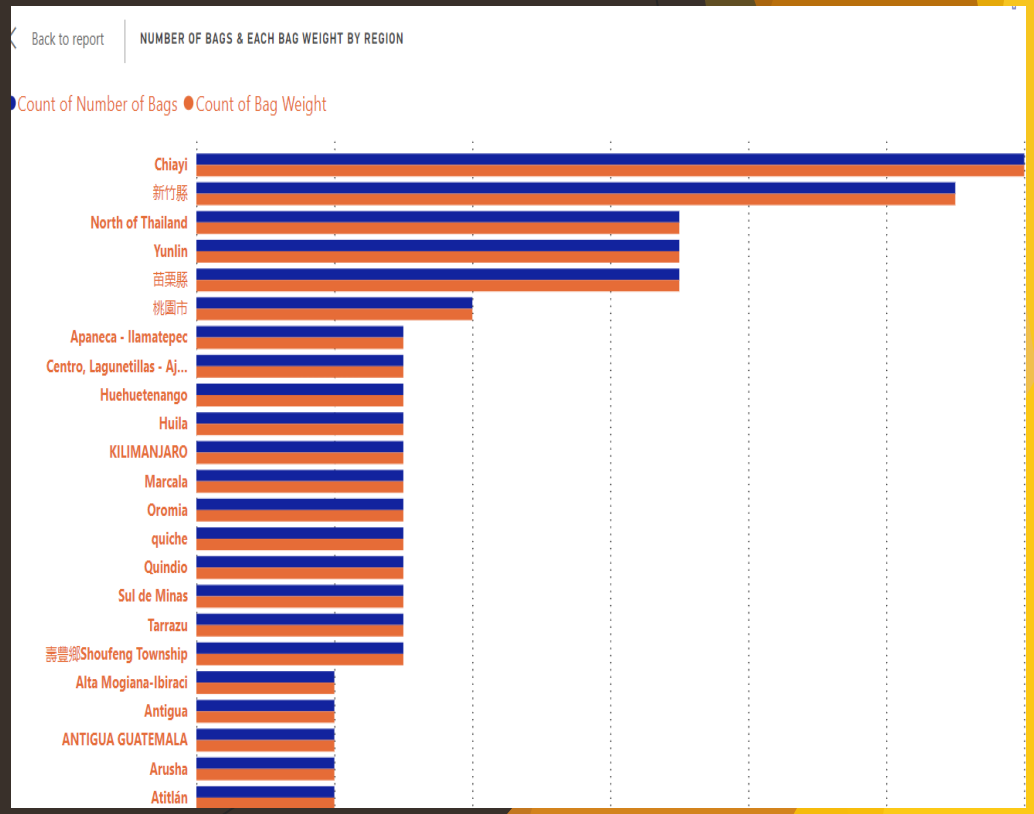
>This suggests that coffee quality may diminish if the grading process is delayed.



Regional & Country Analysis:

> The origin of coffee beans has a significant impact on quality.
> This map visualization shows clearly which country is producing the most quantity of the coffee beans.
>I showed the regions and the country which are producing the more coffee.in this bar graph
we can clearly see that the Chiayi region producing the more quantity of coffee beans.
> we illustrate how certain regions produce higher quality coffee, shedding light on geographical influences on coffee quality.





CONCLUSION

- The analysis of coffee quality data reveals several critical insights that can help stakeholders in the coffee industry improve their products and processes. Key findings from the analysis include.
- **Significant Determinants of Quality:**
- The origin region and processing methods are significant determinants of coffee quality. Certain regions consistently produce higher quality coffee, likely due to favorable growing conditions and practices.
- Processing methods such as washed, natural, and honey have varying impacts on coffee quality, with some methods consistently yielding higher scores.
- **Impact of Defects:**
- Defect occurrences in coffee beans have a noticeable negative impact on quality scores. This underscores the importance of minimizing defects to maintain high coffee quality.
- **Impact of time to grade (difference blw harvest & grading) on quality:**
- The time to grade has a significant impact on coffee quality with shorter grading times generally resulting in higher total cup points

RECOMMENDATIONS

- Focus on Improving Processing Methods:
- Invest in research and training programs to identify and implement best practices in coffee processing. Emphasizing methods that consistently yield higher quality scores can lead to significant improvements.
- Minimize Defects:
- Implement stringent quality control measures at various stages of coffee production to reduce defect occurrences. This includes better sorting, handling, and processing techniques.
- Leverage Regional Strengths:
- Promote and support coffee-growing regions that consistently produce high-quality coffee. Encourage the adoption of successful practices from these regions in other areas.
- Continuous Monitoring and Analysis:
- Regularly monitor coffee quality scores and conduct periodic analyses to identify emerging trends and areas for improvement. This will help in making data-driven decisions and adapting to changing conditions
- **Optimizing Grading Time:**
- **To maintain high coffee quality, it is recommended that the grading process be conducted as soon as possible after harvest. Shortening the time between harvest and grading can help preserve the coffee's quality, leading to higher Total Cup Points and better market value.**

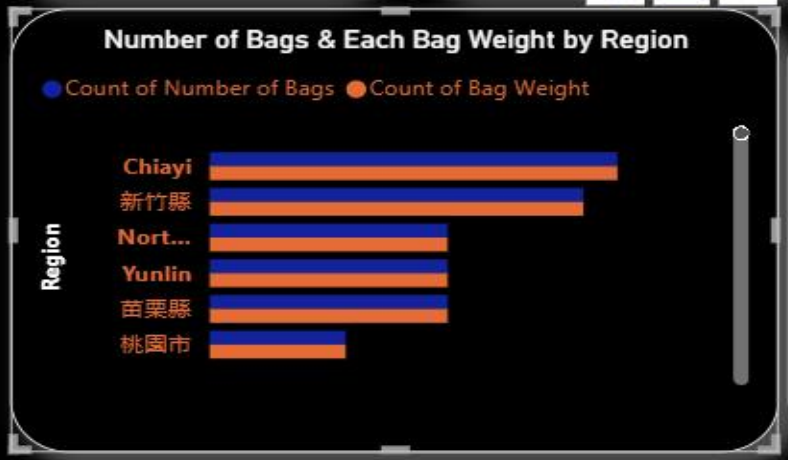
Exploring Coffee Quality Data With Power BI

COFFEE QUALITY DATA ANALYSIS

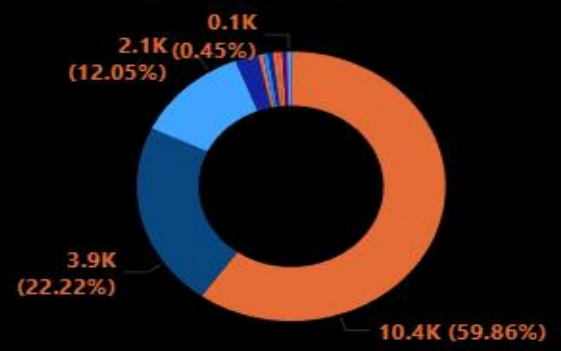
custom visualization: All

Average cup_points	Max_coffee_score	Min_coffee_quality_score	coffee_varieties	Production_regions	coffee_origin_country
83.7	8.97	7.92	48	115	22

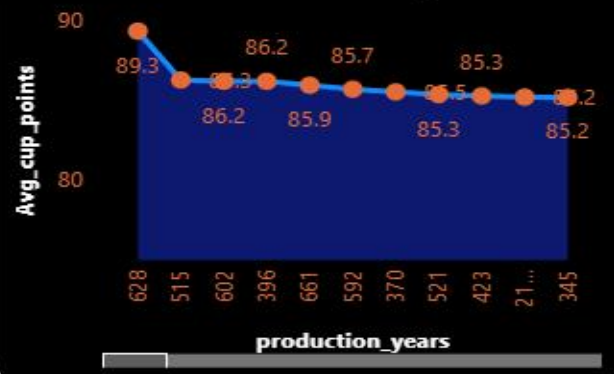
Number of Bags & Each Bag Weight by Region



Total coffee_quality_score by Processing Method

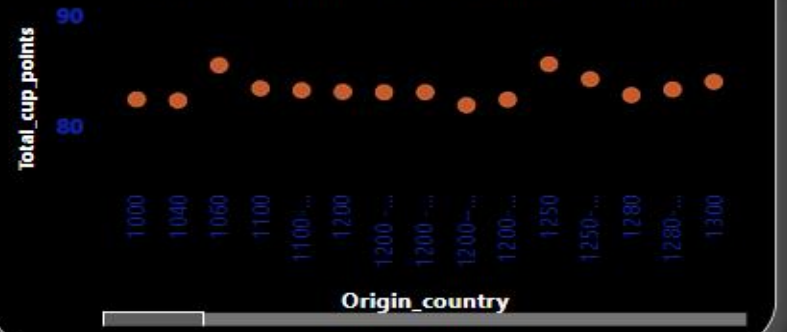


Time to Grade on Total cup Points

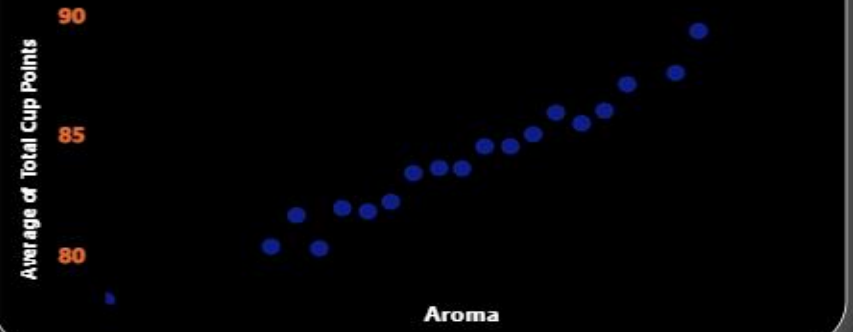


origin,region,variety,year,method

Average of cup points by origin_country

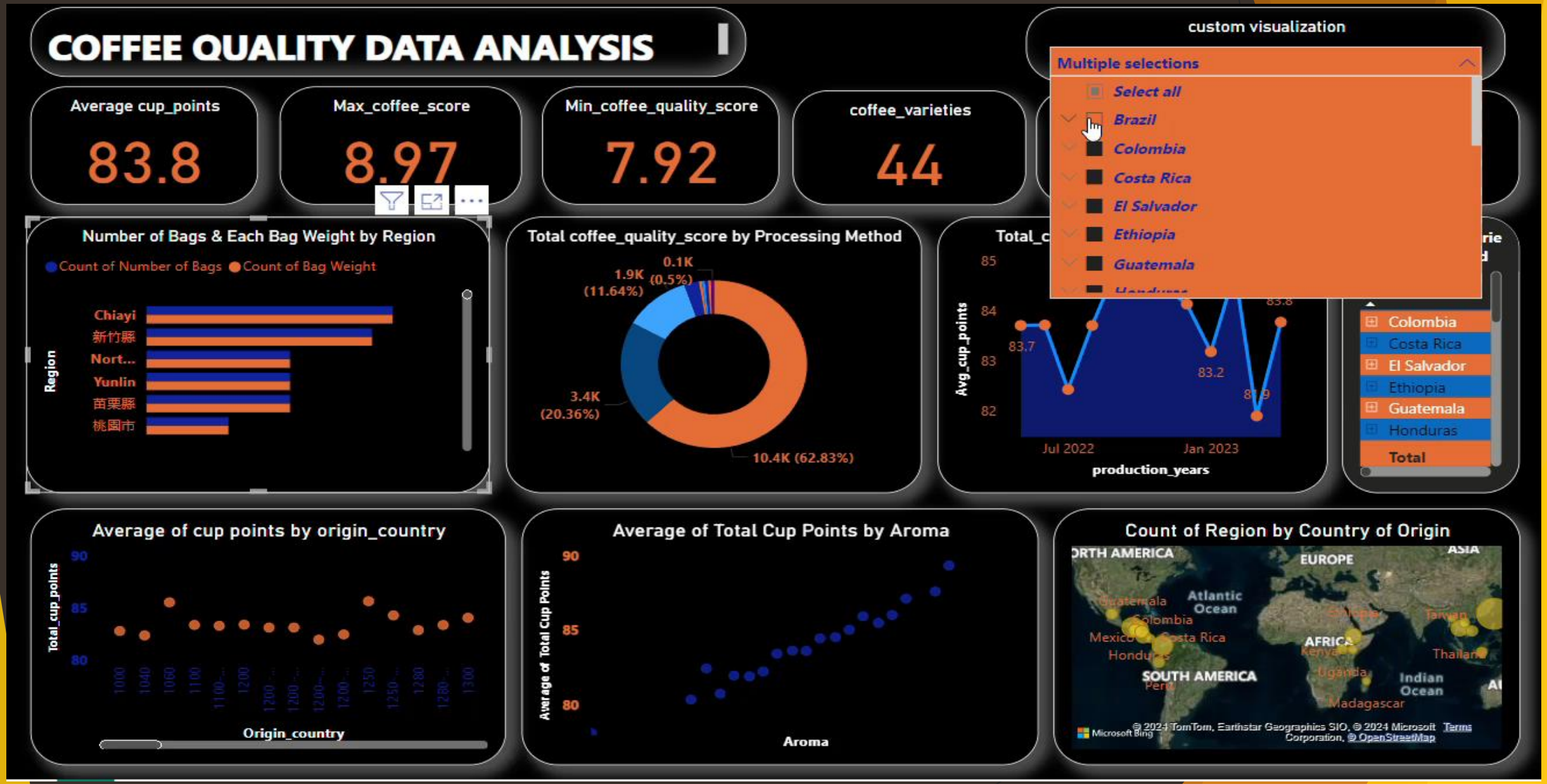


Average of Total Cup Points by Aroma



Count of Region by Country of Origin

Interaction With The Power Bi Report(custom-visualizations)



THANK YOU