Coffee Quality Analysis Report

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🔎 Project Overview

Objective: To analyze global coffee quality using Power BI and identify the factors that drive *Total Cup Points*—the official metric used worldwide by Q-graders and coffee quality evaluators.

This project blends **technical Power BI capabilities** (Power Query cleaning, interactive bookmarks, key influencers, smart narrative, and decomposition tree) with **business-oriented quality insights** to understand what makes coffee "high quality."

The result: a **single-page interactive Power BI dashboard** covering sensory attributes, origin-wise scoring, processing methods, and statistical storytelling.

🎯 Business Problem & Objectives

The coffee industry demands high-quality beans to satisfy premium roasters and specialty markets.
This analysis aims to:

- Identify **top-performing countries** based on cup quality.
- Evaluate which **sensory attributes** (Aroma, Flavor, Aftertaste, Body, and Acidity) most strongly influence Total Cup Points.
- Compare **processing methods** and their effect on quality scores.
- Use Power BI's AI visuals (Key Influencer + Smart Narrative) to uncover **drivers of high cup scores**.
- Provide an interactive, bookmark-driven analytical experience to support sourcing decisions, quality evaluation, and Q-grader assessments.

🗁 Dataset

Source: Coffee Quality Institute dataset (CQI)
Records: ~211
Years Covered: Primarily 2023, with ~10 entries from 2024
Key Columns:

- **Country of Origin**
- **Total Cup Points**
- **Aroma, Flavor, Aftertaste, Acidity, Body**
- **Processing Method**
- **Species**
- **Altitude, Moisture, Defects**

🛠 Tools & Techniques

Power BI – DAX Formulas, Cleaning Dataset, Charts & Visualisation

- **Power BI Desktop** Data cleaning, formatting, type corrections
- **Bookmarks & Page Navigation** for interactive 1-page view
- **Key Influencer Visual** ML-driven insights
- **Decomposition Tree** decision tree for quality scoring
- **Smart Narrative** auto-generated insights
- **Top-N Filtering**
- **Interactive slicers & tooltips**

Data Cleaning & Preparation

Data pre-processing was performed inside Power Query.
Key steps include:

- Removal of duplicates and null rows
- Standardization of country and process names
- Converting sensory scores to decimal values
- Ensuring Total Cup Points → numeric (important for ranking & AI visuals)
- Fixing data types for year, species, and altitude
- Basic outlier check (no removals needed)

All transformations ensured accurate downstream visualizations and AI-driven insights.

Analysis Performed

1. Country-Level Quality Performance

- Compared **Maximum**, **Average**, and **Median** Cup Points.
- Highlighted Top 5 global origins based on Max Cup Score.
- Analyzed variability between Avg vs Max Cup Points.

2. Quality Parameters Breakdown

Aroma, Flavor, Aftertaste, Acidity, and Body were visualized to identify sensory strengths across origins.

3. Key Influencers (AI Visual)

Power BI identified main contributors to higher Total Cup Points:

- Aftertaste
- Aroma
- Flavor
- Acidity
- Body

These showed strong correlation and influence on scoring.

4. Decomposition Tree (Decision Tree)

Revealed optimal paths to high-quality coffee:

- Country → Processing Method → Sensory Attribute patterns
- Example: Washed process + High Flavor (>8.5) + Colombia/Ethiopia → Top scores

5. Smart Narrative

Auto-generated summary included insights such as:

- Colombia recorded the highest Max Cup Score (89.33), 2.68% above Guatemala.
- Max vs Avg cup score gap largest in Colombia (≈5.55).
- Ethiopia achieved highest median score (≈85.25).
- All major origins ranged from 87 to 89.33 in maximum quality.

6. Top 5 Origin Analysis

Used Top-N filters to highlight consistent high performers.

7. Bookmark-Driven Dashboard

One-page experience broken into:

- **Country Insights**
- **Quality Parameters**
- **Influencer Analysis**

📌 Key Insights

Quality Leaders

- Ethiopia, Colombia, Taiwan, Tanzania, and Guatemala consistently produced top-grade scores.
- Ethiopia leads in median consistency; Colombia leads in peak score.

Top Influencing Sensory Attributes

Based on Key Influencers:

- Aftertaste
- Aroma

- Flavor
- Body
- Acidity

These directly correlate with Total Cup Points.

Processing Method Impact

- **Washed** and **Honey Processed** coffees scored the highest.
- Natural process showed broader variance but lower consistency.

Sensory Correlation

Higher Aroma almost always → Higher Flavor, Body, Aftertaste.
Strong multi-attribute relationships indicate cohesive sensory excellence.

Score Distribution

- Max Cup Points ranged from **87 to 89.33**.
- Average Cup Points ranged **83.39 to 84.42**.
- Median highest in **Ethiopia (85.25)**.

Bookmark-Enabled UX

Interactive navigation makes the report intuitive and professional.

Recommendations

1. **For Coffee Buyers & Roasters**
   - Prioritize sourcing from **Ethiopia**, **Colombia**, and **Taiwan** for premium quality.
   - Use sensory attribute correlations to guide roasting and blending.
2. **For Quality Evaluators**
   - Focus sensory evaluation on Aroma, Flavor, Aftertaste, and Body as they strongly influence scores.
3. **For Producers**
   - Consider improving washed processing practices to push cup scores upward.
   - Invest in sensory enhancement techniques (post-harvest processing improvements).
4. **For Market Decisions**
   - Promote high-performing origins with consistent scoring to premium markets.

Executive Summary

This Power BI project delivers a comprehensive, interactive analysis of global coffee quality, highlighting the key sensory and geographical factors influencing total cup scores. Through Key Influencers, Decomposition Tree, Smart Narrative, and Top-N insights, the dashboard reveals what drives high-quality coffee and which countries consistently produce the best beans.

The project demonstrates advanced Power BI capabilities including:

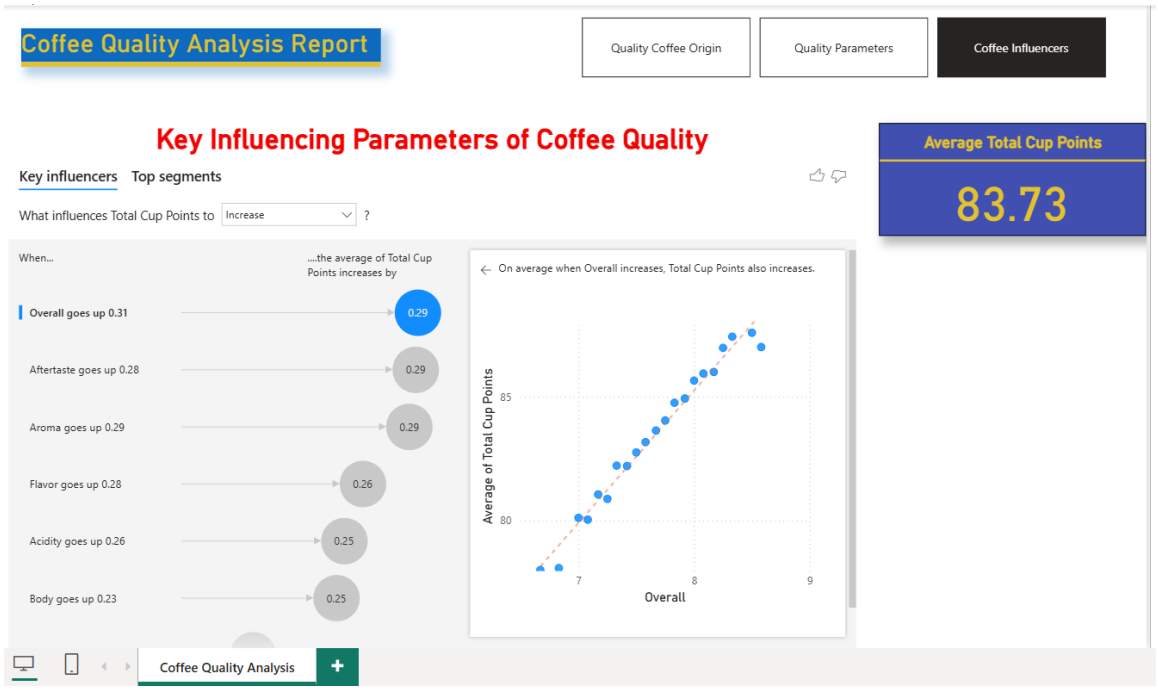
- **AI visuals**
- **Interactive UX via bookmarks**
- **Quality parameter modeling**
- **Country-level performance analysis**

Dashboard & Visuals

Screenshot of the Dashboard:

- **Coffee Quality Dashboard Preview:**

- **Key Influencers View:**



- **Quality Parameter Visualization:**