CONSUMER BEHAVIOR ANALYSIS USING DESCRIPTIVE AND INFERENTIAL STATISTICS IN EXCEL

1. Background and Problem Statement:

An FMCG company launched a new product line of organic personal care items and ran a survey campaign across three metro cities in India. Despite initial buzz, conversion rates post-awareness were underwhelming. The company needed to understand **consumer satisfaction levels**, **factors influencing purchase frequency**, and whether satisfaction significantly differed across demographic groups (especially gender). Excel was chosen as the platform for statistical analysis and reporting due to its accessibility across internal teams.

2. Objectives:

- Analyze satisfaction and purchase data using descriptive statistics

- Compare satisfaction scores across genders using t-tests and confidence intervals

- Visualize key metrics in Excel using clear and interactive charts

- Create a summary report that could be presented to the marketing and product teams

3. Methodology:

3.1 Data Overview

- **Sample Size:** 500 survey responses

- **Collected Data Points:**

    o Age group

    o Gender

    o Monthly purchase frequency

    o Product awareness (yes/no)

    o Satisfaction rating (scale 1–10)

    o Recommendation likelihood (scale 1–10)

3.2 Data Cleaning

- Cleaned for duplicates and incomplete responses using filters and conditional formatting

- Removed 12 entries with missing satisfaction values

- Encoded Yes/No responses numerically (1 = Yes, 0 = No)

3.3 Analysis Techniques

- Descriptive statistics: Mean, Median, Mode, Range, Standard Deviation

- Inferential analysis:

  - **Independent Samples t-test** between male and female satisfaction scores

  - **95% Confidence Interval** for average satisfaction

- Visualization:

  - Clustered bar charts for satisfaction by gender

  - Histograms for frequency distribution of purchase behavior

  - Boxplot-style visuals created using min/max/median functions

4. Results and Interpretation:

4.1 Descriptive Statistics

Metric	Value
Overall Avg Satisfaction	7.18
Median Satisfaction	7.00
Standard Deviation	1.92
Mode of Purchase Frequency	2/month

- Most consumers purchased the product **once or twice per month**

- A cluster of high satisfaction (score ≥ 8) existed primarily in the **25–34 age group**

4.2 Gender-Based Comparison

Group	Mean Satisfaction	Sample Size
Male	6.93	256
Female	7.43	232

- **t-Test Results:**

- o   t-statistic = –2.63

- o   p-value = 0.009

- o   Result: Statistically significant difference at 95% confidence level

- **95% Confidence Interval for Overall Mean Satisfaction:**

  - o   [6.99, 7.37]

Interpretation:

- Female consumers reported **significantly higher satisfaction** than male consumers

- The confidence interval suggests that the true average satisfaction lies between 6.99 and 7.37

5. Dashboard and Report Design in Excel:

- Created separate **PivotTable-based summaries** for gender, city, and age group

- Designed a **dynamic chart panel** using slicers (by gender, age group)

- All statistical calculations were shown in clearly labeled, formula-driven tables

- A two-page executive report sheet included key findings, graphs, and final interpretations

6. Recommendations:

- Focus on female segments (25–34 age group) in next phase of marketing

- Run A/B testing on value communication with male audience (highlighting price-benefit)

- Introduce loyalty program targeting 2x/month buyers with combo-pack offers

- Redesign survey to include questions on product quality perception and pricing clarity

7. Stakeholder Relevance:

Academic:

- A foundational case for teaching Excel-based statistical testing and consumer analysis

- Demonstrates integration of descriptive stats, inferential testing, and dynamic visualization

Corporate:

- Empowers marketers and product managers with low-cost, Excel-based analytics

- Builds analytical thinking around customer satisfaction and demographic segmentation

- Supports practical, data-driven adjustments to marketing and communication strategy