**BELLABEAT ANALYSIS**

**Bellabeat** Case Study - Data Analysis Documentation

**Project Overview**

**Project Title**: **Bellabeat** Smart Device Data Analysis

**Objective:** Analyze smart device usage data to help guide Bellabeat's marketing strategy, specifically targeting user behavior patterns and trends that can help optimize product offerings and marketing campaigns.

**Tools & Technologies**:

* Database: SQL Server Management Studio (SSMS)
* Analysis Tools: SQL for querying, Tableau for visualization
* Data Types: CSV/Excel files

**Phases Overview**

1. Ask

2. Prepare

3. Process

4. Analyze

5. Share

6. Act

**1. Ask**

Business Problem

Bellabeat, a high-tech company focusing on health-focused smart devices, wants to use its available user data to better understand the behaviors of its users. The insights from the data analysis will inform Bellabeat's marketing strategies and product development.

Key Questions

1. What are the user activity patterns (e.g., calories burned, heart rate) based on the data?

2. How does user activity vary over time (daily, weekly)?

3. Are there any key trends or anomalies that Bellabeat should address to better market their devices?

Deliverables

* Insights and trends on user activity and engagement with Bellabeat products.
* Visualization of user behavior patterns to guide marketing decisions.

**2. Prepare**

Data Collection

- Two folders of data were collected:

- Folder 1: 11 CSV files containing data from “March 12, 2016, to April 4, 2016”

- Folder 2: 18 CSV files containing data from “April 12, 2016, to May 12, 2016”, including 11 files of the same type as in Folder 1 and 7 additional files.

Data Assessment

- Files were reviewed to ensure compatibility.

- Duplicate data (the 11 common files between both folders) were identified for merging, creating a continuous dataset from “March 12, 2016, to May 12, 2016”.

- Seven additional files unique to Folder 2 were retained for analysis.

Database Setup

- Data from all 29 files were uploaded into SQL Server Management Studio (SSMS) as individual tables.

- The 11 common files were successfully merged based on their common structure.

- A total of 18 tables (11 merged and 7 unique) were created and stored in the database for further analysis.

**3. PROCESS**

Initial Data Cleaning Steps

- Ensured the correct data types for each column during upload (e.g., `decimal` for numeric data, `varchar` for text data).

- Addressed common formatting issues during the import phase, such as handling `true/false` values.

- Documented any data type changes made to ensure consistency.

-Blanks were identified only in the weightloginfo table. All blanks were replaced with 0 to maintain consistency in analysis.

-Duplicates

Duplicates were identified and removed from the following tables:

hourlySteps

sleepDay

weightLogInfo

minuteSleep

hourlyIntensities

hourlyCalories

heartrateSeconds

Data Consistency & Integrity:

-Ensured that key columns in these tables reflect accurate and non-redundant data to maintain the integrity of the database.

Limitations/Considerations

- No immediate limitations were identified, but potential issues related to the data format (e.g., handling of decimal precision) were addressed during the import process.

**4. Analyze**

Objective

The analysis phase focused on identifying user trends, correlations, and engagement patterns to inform Bellabeat’s marketing strategies and product development.

**Key Insights**

A. User Activity Patterns

* Daily Steps: Highly active users averaged 10,564 steps per day, while less active users averaged 4,592 steps per day.
* Weekday vs. Weekend Activity: Weekends showed significantly higher activity based on total steps, but average steps per user remained consistent across both.
* Peak Activity Hours: Users were most active between 12 PM–2 PM and 5 PM–7 PM, making these ideal times for engagement.

B. Sleep Patterns

* Sleep Duration: Users averaged 6.8 hours of sleep per night, with weekend sleep durations being 22.61 minutes longer on average.
* Sleep Consistency and Activity: Users with consistent sleep schedules contributed 19.56% of total steps and averaged 8,345 steps per day, compared to 6,861 steps for inconsistent sleepers.

C. Marketing Opportunities

* Activity Levels by Day: Tuesday and Saturday had the highest activity levels, presenting ideal opportunities for marketing campaigns.
* Highly Active vs. Less Active Users: Highly active users burned 23.7% more calories, spent more time in very active minutes, and logged 2.3x the steps compared to less active users.

**5. Share**

Deliverables

* A fully interactive Tableau dashboard with the following sections:

User Activity:

Line chart: Activity levels by hour of the day.

Doughnut chart: Weekend vs. Weekday Activity.

Treemap: Average daily steps across users.

Sleep Patterns:

Pie chart: Weekend vs. Weekday Sleep Patterns.

Bar chart: Average sleep durations.

Scatter plot: Sleep consistency and activity correlation.

Marketing Insights:

Stacked bar chart: Highly active vs. less active users.

Bar chart: Activity levels by day of the week.

Line chart: Most active hours for users.

* A slide deck summarizing key findings, insights, and actionable recommendations.

**6. Act**

Recommendations

Leverage Peak Activity Hours:

* Schedule notifications and promotions during 12 PM–2 PM and 5 PM–7 PM to maximize user engagement.

Target Weekday and Weekend Behavior:

* Promote weekday fitness challenges and encourage weekend recovery habits through personalized notifications.

Encourage Sleep Consistency:

* Introduce a sleep tracker and gamify sleep consistency to motivate users to maintain regular schedules.

Engage Highly Active Users:

* Use rewards and advanced analytics to sustain motivation among highly active users.

Motivate Less Active Users:

* Design beginner-friendly activity challenges and light-intensity suggestions to encourage participation.