Bellabeat case study analysis report

1. Business Task Summary

Bellabeat aims to leverage user data from the FitBit Fitness Tracker to gain insights into user behaviors and wellness habits. The goal of this analysis is to understand key patterns in physical activity, heart rate, sleep, and calorie expenditure. By identifying correlations and trends, Bellabeat can develop targeted strategies to improve user engagement, provide personalized recommendations, and enhance the user experience within their wellness app.

2. Data Sources

The dataset used for this analysis is the **FitBit Fitness Tracker Data**, sourced from Kaggle. It contains anonymized tracking information from multiple users, covering various aspects of health and activity, such as daily steps, heart rate data, sleep patterns, calorie expenditure, and weight tracking. This diverse data offers a comprehensive view of user engagement with their fitness devices and provides valuable insights into their wellness routines.

3. Data Cleaning and Manipulation

To prepare the data for analysis, the following steps were taken:

Manipulation:

- **Merging Columns**: Combined *hourly calories*, *hourly intensities*, and *hourly steps* data into a single table named **hourly activity**.

- **Database Import**: Imported relevant files into **Microsoft SQL Server Management Studio** for efficient data handling. This included files like *daily activity*, *heartrate_seconds*, *hourly activity*, *minute METs*, *minute sleep*, *sleep day*, and *weight log*.

- **File Combination**: Combined data from the same types of files with different date ranges into consolidated files for sequential analysis.

Cleaning:

- **Wide vs. Narrow Files**: Excluded wide-format files (e.g., minuteCaloriesWide) since narrow-format files offered equivalent data in a more analysis-friendly structure.

- **Duplicates**: Removed duplicate records generated during file combination.

- **Missing Values**: Ignored minor missing values as they had negligible impact on the overall analysis.

- **Data Type Corrections**: Corrected any mismatched data types to ensure accurate calculations and interpretations.

- **Column Removal**: Dropped redundant columns, such as weight in pounds, since weight in kilograms was available and preferable for consistency

4. Summary of Analysis

This analysis involved calculating key metrics and identifying patterns in user behavior:

- **Activity Tracking**: Measured the number of users actively tracking their activity.

- **Daily Metrics**: Calculated average steps, distance, and calorie burn to evaluate typical daily activity levels.

- **Heart Rate**: Analyzed heart rate data to find the average, maximum, and minimum heart rate among users.

- **Sleep Tracking**: Evaluated sleep tracking data, calculating the number of users tracking sleep, average sleep duration, and the range of total minutes asleep.

- **Weight Tracking**: Determined the number of users tracking weight and calculated average, maximum, and minimum recorded weights.

- **Activity Intensity**: Analyzed users' average *Very Active*, *Fairly Active*, and *Lightly Active* minutes.

- **Peak Active Hours**: Identified peak hours of activity to understand user routines.

- **Correlations**: Explored correlations between calories burned and:

    o Different activity intensities (lightly, fairly, and very active minutes)

    o Distance traveled

    o Total intensity levels

- **Sleep Stages**: Identified the sleep stage (light, deep, or REM) where users spent the most time, providing insights into sleep quality.

5. High-Level Content Recommendations

Based on the analysis, the following recommendations could enhance Bellabeat's product offerings and user experience:

- **Timed Notifications**: Since users are most active during specific hours, Bellabeat could send motivational notifications or reminders during these peak times to boost engagement.

- **Feature Promotion**: Promote popular features like activity tracking, heart rate monitoring, and sleep tracking to attract users interested in holistic health monitoring.

- **Personalized Feedback**: Provide users with tailored feedback on how different activities impact calorie burn and overall wellness, enabling more informed health choices.

- **Sleep Improvement Tips**: Given the interest in sleep tracking, offer content focused on sleep quality, such as tips for achieving deeper sleep or creating sleep-friendly routines.

- **Rewards and Challenges**: To encourage regular usage, introduce rewards or streak-based challenges, motivating users to consistently track their health data.

- **Targeted Marketing**: Schedule marketing campaigns or notifications to align with peak activity times, maximizing user engagement.

- **Positioning Bellabeat as a Personalized Wellness Tool**: Emphasize how Bellabeat's app adapts to individual lifestyles in marketing, highlighting its role in supporting personalized wellness journeys.

- **Sleep-Focused Campaigns**: Create campaigns centered on improving sleep quality, and use messaging around habit formation to appeal to users focused on long-term wellness.