

Bellabeat Case Study: Smart Wellness Strategy

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1. Executive Summary

This case study analyzes behavioral data from 30 Fitbit users to help Bellabeat improve its product offerings and user engagement strategy. Using SQL and SQLite, I cleaned, transformed, and explored daily activity and sleep patterns. Key findings show that most users fall into low-activity categories, while sleep data suggests consistency but lacks diversity. Attempts to correlate physical activity and sleep behavior were inconclusive due to insufficient high-activity data. These insights informed targeted recommendations for Bellabeat's product and marketing strategies, particularly focusing on increasing activity, leveraging sleep data, and enhancing user engagement.

All SQL scripts and data preparation steps are available on my GitHub repository:
<https://github.com/thebryce15/bellabeat-case-study-sql>

2. Introduction

This case study explores how Bellabeat, a wellness-focused tech company, can use historical data from Fitbit users to guide marketing and product strategy. The analysis aims to uncover trends in physical activity, sleep behavior, and user engagement to enhance Bellabeat's value proposition.

3. Business Task

Bellabeat seeks to better understand user habits and identify how their smart devices can help users lead healthier lifestyles. The main objectives are:

- Determine patterns in daily activity and sleep.
- Identify areas for product improvement.
- Inform data-driven marketing strategies.

4. About Bellabeat

Bellabeat is a high-tech company that manufactures health-focused smart devices for women. Their product line includes:

- **Leaf:** a smart health tracker.
- **Time:** a wellness-focused smart watch.
- **Spring:** a smart water bottle.
- **Bellabeat App:** syncs with their devices to monitor activity, sleep, stress, and reproductive health.

5. Stakeholders

- **Urska Srsen:** Co-founder and CCO
- **Marketing Team:** For campaign insights.
- **Product Development Team:** To enhance features based on behavior data.
- **Executive Team:** For strategic decision-making.

6. Data Source

The dataset is publicly available on Kaggle, originally provided by [Mobius](#). It includes daily activity, sleep, and hourly data from 30 Fitbit users over a one-month period (April-May 2016).

7. Tools Used

- **SQLite3:** Data storage and transformation
- **DB Browser for SQLite:** Schema management
- **Python & Pandas** (optional): CSV parsing
- **Excel/Text Editor:** Output handling

8. Data Cleaning

Step 1: Import CSV files

- 11 CSVs were loaded into SQLite

Step 2: Clean Daily Activity Table

- Dates normalized
- Step categories:
 - < 5,000 steps = “Low”
 - 5,000-9,999 = “Moderate”
 - 10,000+ = “High”

Step 3: Clean Sleep Data Table

- Reconstructed `sleep_date` using formatted string parsing
- Daily aggregation of total minutes asleep
- `TotalTimeInBed` assumed equivalent to time asleep for simplification

9. Data Exploration

Step Engagement SummarySleep Summary

step_engagement_level	days_logged
High	1
Low	275
Moderate	145

avg_hours_asleep	avg_sleep_efficiency
7.05	100.0

Attempted Correlation: Steps vs. Sleep

I joined `user_daily_summary` and `user_sleep_summary` using `Id` and `date` (sleep date + 1 day). However, only one High Activity record existed, limiting statistical analysis.

10. Key Insights

1. **Most users are low-active:** Over 65% fell below the 5,000 steps threshold.
2. **Sleep is consistent:** Users averaged 7.05 hours/night with perfect logging (100% efficiency due to how data was structured).
3. **Lack of high-activity data:** I couldn't correlate activity to better sleep outcomes.

11. Recommendations

1. Emphasize Activity Nudges & Personalized Coaching

- Use behavior segmentation to send motivational reminders.
- Create habit tracking features to encourage more steps.

2. Leverage Sleep Insights

- Promote Bellabeat's sleep coaching tools.
- Introduce relaxation prompts before bedtime.

3. Promote High-Intensity Activity

- Encourage short bursts of intense activity.
- Offer wellness challenges or badges for milestones.

4. Increase Engagement Through Gamification

- Add points, rewards, and social challenges.
- Simplify manual activity logging with voice or automation.

5. Address Sedentary Behavior

- Identify prolonged sedentary periods and suggest gentle movement or stretch breaks.
- Market Bellabeat as a wellness guide, not just a tracker.

12. Limitations

- **Sample Size:** Only 30 users participated in the study.
- **Time Window:** One month of data may not represent long-term trends.
- **Activity Imbalance:** A heavy skew toward low-activity users limits generalization.
- **Synthetic Sleep Data:** Sleep efficiency appeared artificially perfect due to dataset construction.

13. Business Impact

These insights provide Bellabeat with a clearer picture of its user base and highlight major opportunities:

- **User Retention:** Early low activity could signal disengagement. Nudging users early may increase app/device stickiness.
- **Product Differentiation:** Emphasizing sleep and habit features positions Bellabeat as more holistic than competitors.
- **Marketing Messaging:** Campaigns should target sedentary behavior while showcasing Bellabeat's proactive wellness support.

14. Appendix: SQL Queries

Note: For full access to all SQL queries and related files, visit the project repository on GitHub:

<https://github.com/thebryce15/bellabeat-case-study-sql>

Author's Note: This project was completed using SQL and SQLite to meet the requirements of a data analyst position, including data wrangling, SQL scripting, and behavioral trend analysis for product strategy.