**Case study: How wellness technology company plays it smart?**

# Executive Summary

# Introduction

Welcome to the Bellabeat data analysis case study! In this case study, you will perform many real-world tasks of a junior data analyst. You will imagine you are working for Bellabeat, a high-tech manufacturer of health-focused products for women, and meet different characters and team members. To answer the key business questions, you will follow the steps of the data analysis process: **ask**, **prepare**, **process**, **analyze**, **share**, and **act**. Along the way, the **Case Study Roadmap** tables — including guiding questions and key tasks — will help you stay on the right path.

By the end of this lesson, you will have a portfolio-ready case study. Download the packet and reference the details of this case study anytime. Then, when you begin your job hunt, your case study will be a tangible way to demonstrate your knowledge and skills to potential employers.

# Scenario

You are a junior data analyst working on the marketing analyst team at Bellabeat, a high-tech manufacturer of health-focused products for women. Bellabeat is a successful small company, but they have the potential to become a larger player in the market. Urška Sršen, co-founder and Chief Creative Officer of Bellabeat, believes that analyzing smart device fitness data could help unlock new growth opportunities for the company. You have been asked to focus on one of Bellabeat’s products and analyze smart device data to gain insight into how consumers are using their smart devices. The insights you discover will then help guide the marketing strategy for the company. You will present your analysis to the Bellabeat executive team along with your high-level recommendations for Bellabeat’s marketing strategy.

# Character & products

**Characters**

* + - **Urška Sršen:** Bellabeat’s co-founder and Chief Creative Officer
    - **Sando Mur:** Mathematician and Bellabeat’s cofounder; a key member of the Bellabeat executive team
    - **Bellabeat marketing analytics team:** A team of data analysts responsible for collecting, analyzing, and reporting data that helps guide Bellabeat’s marketing strategy. You joined this team six months ago and have been busy learning about Bellabeat’s mission and business goals — as well as how you, as a junior data analyst, can help Bellabeat achieve them.

**Products**

* + - **Bellabeat app:** The Bellabeat app provides users with health data related to their activity, sleep, stress, menstrual cycle, and mindfulness habits. This data can help users better understand their current habits and make healthy decisions. The Bellabeat app connects to their line of smart wellness products.
    - **Leaf:** Bellabeat’s classic wellness tracker can be worn as a bracelet, necklace, or clip. The Leaf tracker connects to the Bellabeat app to track activity, sleep, and stress.
    - **Time:** This wellness watch combines the timeless look of a classic timepiece with smart technology to track user activity, sleep, and stress. The Time watch connects to the Bellabeat app to provide you with insights into your daily wellness.
    - **Spring:** This is a water bottle that tracks daily water intake using smart technology to ensure that you are appropriately hydrated throughout the day. The Spring bottle connects to the Bellabeat app to track your hydration levels.
    - **Bellabeat membership:** Bellabeat also offers a subscription-based membership program for users. Membership gives users 24/7 access to fully personalized guidance on nutrition, activity, sleep, health, beauty, and mindfulness based on their lifestyle and goals.

# About the company

Urška Sršen and Sando Mur founded Bellabeat, a high-tech company that manufactures health-focused smart products. Sršen used her background as an artist to develop beautifully designed technology that informs and inspires women around the world. Collecting data on activity, sleep, stress, and reproductive health has allowed Bellabeat to empower women with knowledge about their health and habits. Since it was founded in 2013, Bellabeat has grown rapidly and quickly positioned itself as a tech-driven wellness company for women.

By 2016, Bellabeat had opened offices around the world and launched multiple products. Bellabeat products became available through a growing number of online retailers in addition to their e-commerce channel on **their website**. The company has invested in traditional advertising media, such as radio, out-of-home billboards, print, and television, but focuses on digital marketing extensively. Bellabeat invests year-round in Google Search, maintains active Facebook and Instagram pages, and consistently engages consumers on Twitter. Additionally, Bellabeat runs video ads on Youtube and display ads on the Google Display Network to support campaigns around key marketing dates.

Sršen knows that an analysis of Bellabeat’s available consumer data would reveal more growth opportunities. She has asked the marketing analytics team to focus on a Bellabeat product and analyze smart device usage data to gain insight into how people are already using their smart devices. Then, using this information, she would like high-level recommendations for how these trends can inform Bellabeat marketing strategy.

# Ask

Stakeholders:

* Urška Sršen: Bellabeat’s co-founder and Chief Creative Officer.
* Sando Mur: Mathematician and Bellabeat’s cofounder; a key member of the Bellabeat executive team.
* Bellabeat marketing analytics team.

Identify trends in consumers’ usage of smart devices to apply insights to influence Bellabeat’s marketing strategies. Some questions to answer are:

* What are some trends in the smart device usage market?
  + What are the metrics used to define the usage of smart devices?
  + What are the individual patterns in daily calories burnt, total steps taken or distance traveled, and the total sleep time?
  + How do these metrics correlate to each other?
* How could these trends apply to Bellabeat customers? And to one of Bellabeat’s products?
  + What are the user segments available in the market?
  + How do user segments differ in terms of daily calories burnt, total steps taken or distance traveled, and the total sleep time?
  + What are the correlations of these metrics within each segment, and how do they differ for each segment?
* How could these trends help influence Bellabeat’s marketing strategy?
  + What key selling points/propositions can Bellabeat use to address each customer’s need/behavior?
  + What are the overall marketing and growth strategies for Bellabeat based on those key selling points/propositions?

# Prepare

* 1. Dataset used:

The data source used in this case study is [FitBit Fitness Tracker Data](https://www.kaggle.com/datasets/arashnic/fitbit?resource=download) which is stored in a public dataset from [Mobius](https://www.kaggle.com/arashnic) on Kaggle.

* 1. Accessibility and privacy of data:

We can confirm the data is open-sourced. You can copy, modify, distribute and perform the work, even for commercial purposes, all without asking permission.

* 1. Information about the data

This dataset was generated by respondents to a distributed survey via Amazon Mechanical Turk between 03.12.2016-05.12.2016. Thirty eligible Fitbit users consented to the submission of personal tracker data, including minute-level output for physical activity, heart rate, and sleep monitoring. Individual reports can be parsed by export session ID (column A) or timestamp (column B). Variation between output represents the use of different types of Fitbit trackers and individual tracking behaviors/preferences.

* 1. Data organization and verification

The dataset includes 18 CSV files, each illustrating different quantitative data tracked by FitBit – a smart device. Most of the data is considered long as each observation is unique by user id and a specific timestamp. One user can have many observations in terms of timestamps recording data.

| **Table Name** | **Type** | **Description** |
| --- | --- | --- |
| dailyActivity\_merged | Microsoft Excel CSV | Daily Activity over 31 days of 33 users. Tracking daily: Steps, Distance, Intensities, Calories |
| dailyCalories\_merged | Microsoft Excel CSV | Daily Calories over 31 days of 33 users |
| dailyIntensities\_merged | Microsoft Excel CSV | Daily Intensity over 31 days of 33 users. Measured in Minutes and Distance, dividing groups into 4 categories: Sedentary, Lightly Active, Fairly Active, Very Active |
| dailySteps\_merged | Microsoft Excel CSV | Daily Steps over 31 days of 33 users |
| heartrate\_seconds\_merged | Microsoft Excel CSV | The exact day and time heart rate logs for just 7 users |
| hourlyCalories\_merged | Microsoft Excel CSV | Hourly Calories burned over 31 days by 33 users |
| hourlyIntensities\_merged | Microsoft Excel CSV | Hourly total and average intensity over 31 days of 33 users |
| hourlySteps\_merged | Microsoft Excel CSV | Hourly Steps over 31 days of 33 users |
| minuteCaloriesNarrow\_merged | Microsoft Excel CSV | Calories burned every minute over 31 days of 33 users (Every minute in a single row) |
| minuteCaloriesWide\_merged | Microsoft Excel CSV | Calories burned every minute over 31 days of 33 users (Every minute in a single column) |
| minuteIntensitiesNarrow\_merged | Microsoft Excel CSV | Intensity counted by minute over 31 days of 33 users (Every minute in a single row) |
| minuteIntensitiesWide\_merged | Microsoft Excel CSV | Intensity counted by minute over 31 days of 33 users (Every minute in a single column) |
| minuteMETsNarrow\_merged | Microsoft Excel CSV | The ratio of the energy you are using in physical activity compared to the energy you would use at rest. Counted in minutes |
| minuteSleep\_merged | Microsoft Excel CSV | Log Sleep by Minute for 24 users over 31 days. Value column not specified |
| minuteStepsNarrow\_merged | Microsoft Excel CSV | Steps tracked every minute over 31 days of 33 users (Every minute in a single row) |
| minuteStepsWide\_merged | Microsoft Excel CSV | Steps tracked every minute over 31 days of 33 users (Every minute in a single column) |
| sleepDay\_merged | Microsoft Excel CSV | Daily sleep logs, tracked by: Number of times going to sleep a day, Total minutes, Total Time in Bed |
| weightLogInfo\_merged | Microsoft Excel CSV | Weight track by day in Kg and Pounds over 30 days. Calculation of BMI.5 users report weight manually 3 users do not. In total, there are 8 users |

* 1. Data creditability and integrity

Due to the limitation of only 30 users and not having enough information regarding demographic information, we could encounter sampling bias. With such a limitation in size, we cannot be sure about 30 users representing the whole population. Plus, the dataset is not current and only contains data for a 2-month duration.

* 1. Detailed data used:

Based on the questions to be discovered and listed above, the focus will be on the following files:

* Daily: activities, calories, steps, sleep.
* Hourly: calories, steps

# Process

For this case study, the data wrangling process will be conducted in **SQL**.

* 1. Change file names

To keep file names consistent and easier for further usage in R, we start the cleaning process by redefining the naming convention and renaming these files

| **Table Name** | **New name** |
| --- | --- |
| dailyActivity\_merged | daily\_activity |
| dailyCalories\_merged | daily\_calories |
| dailyIntensities\_merged | daily\_intensities |
| dailySteps\_merged | daily\_steps |
| heartrate\_seconds\_merged | second\_heartrate |
| hourlyCalories\_merged | hourly\_calories |
| hourlyIntensities\_merged | hourly\_intensities |
| hourlySteps\_merged | hourly\_steps |
| minuteCaloriesNarrow\_merged | minute\_calories\_narrow |
| minuteCaloriesWide\_merged | minute\_calories\_wide |
| minuteIntensitiesNarrow\_merged | minute\_intensities\_narrow |
| minuteIntensitiesWide\_merged | minute\_intensities\_wide |
| minuteMETsNarrow\_merged | minute\_mets\_narrow |
| minuteSleep\_merged | minute\_sleep |
| minuteStepsNarrow\_merged | minute\_steps\_narrow |
| minuteStepsWide\_merged | minute\_steps\_wide |
| sleepDay\_merged | daily\_sleep |
| weightLogInfo\_merged | daily\_weight\_loginfo |

* 1. Next steps:

The next steps will be conducted in R which can be found here, including:

* Import and review datasets
* Clean and format
* Merge datasets

# Analyze

* What are some trends in the smart device usage market?
  + What are the metrics used to define the usage of smart devices?
  + What are the individual patterns in daily calories burnt, total steps taken or distance traveled, and the total sleep time?
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This case study’s analysis and sharing will be documented in the R notebook here.

# Share

Can be found in this presentation [here](GDACapstoneProject_Bellabeat_202209.pptx).

Chart, line chart

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Chart

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Chart, bar chart

Description automatically generatedChart, pie chart

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Key highlights:

* Metrics-wise:
  + Hourly/daily steps taken and hourly/daily calories burnt highly correlate, which can have huge impact on health benefits.
* Daily steps taken does not correlate much with the daily sleep time.
* People tend to have more step counts at 12 PM to 2 PM which is lunch time and refreshment for afternoon shift, and 5 PM - 7 PM which is after-work exercise sessions.
* Customer segments: high-use users accounted for 50% of the sample, following by low-use users with 38% and medium-use users with 12%.
  + All user groups have the tendency to wear the devices throughout the day (accounted for ~ 90-95% of the users).
  + Low-use users have a key pain point of having more calories burnt and significant low sleep time with average steps and high sedentary time on devices. On the bright side, they have low un-tracked time
  + High-use users tend to take more steps compared to the other groups, which is recommended for weight loss or better heart rate tendency or work efficiency.
  + All groups have a low sleep time if compared to standard sleep time of 8 hours.

Based on the findings, there are pillars for Bellabeat to focus on while developing marketing strategies:

* **Objective:**  (1) increase engagement time during the day of low/medium users and maintain that for high users, (2) encourage users more time to sleep, and (3) increase the daily usage of users.
* **Pillars:**

|  |  |
| --- | --- |
| Pillar | Focus |
| Proposition | A tech-driven wellness company for women with feminism and fashionably designed trackers. |
| Place | Focuses on partnership with health-related associations/websites or fashionable brands to increase the connection between having great health (both physical and mental) and keeping track of it. |
| Product | Focuses on products that are related to the analysis data, such as Leaf, Time, the membership package, and the Bellabeat app. |
| Price | Focuses on building a fee structure for key products. |
| Promotion | Focuses on campaigns that increase the usage frequency for low/medium users and retain that of high users. |

# Act

Based on the above insights, recommendations are:

|  |  |  |
| --- | --- | --- |
| **#** | **Recommendation** | **Description** |
| 1 | “Daily Challenge” campaign - which encourages users to exercise and engage with the devices more | **Objective:** engage and maintain exercise activities of users from which their health will benefit.  **Details:** P0 - Daily challenge can be occasional or P1 - designed as a function in the app that sets daily/monthly challenges for users to stay healthy. Possible incentives can be discounts for membership.  **Target group:** P0 - low/medium users, P1 - high users |
| 2 | Sleep notification | **Objective:** improve sleep time of users  **Details:** P0 - use notification systems to remind users of tracking their sleep habit and P1 – a function that warns users about their sleep time.  **Target group:** P0 - all users, P1 - focuses on low users |
| 3 | Partnership with media outlets/fashion brands to encourage a healthy and fashionable lifestyle using Bellabeat’s accessories | **Objective:** encourage the usage of tracker devices on a day-to-day basis  **Details:** partnership with media outlets/ fashion brands to highlight mix-and-match recommendations that enhance style and health.  **Target group:** P0 - low/medium users, P1 - all users |