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# Summary of Case

| Title | Bellabeat on beats: Harnessing the pulse of Fitness |
| --- | --- |
| Industry Focus | Health and Wellness |
| Problem Statement | How can Bellabeat, a wellness technology company, strategically position itself in the market? |
| What are we solving | To analyze consumer behavior related to fitness trackers and develop data-driven insights to inform Bellabeat's marketing strategy. |
| Deliverables | A comprehensive marketing strategy for Bellabeat supported by data insights.  Insights into smart device usage and emerging trends. |
| Data Set Available? | Yes, a data set is available. |

# Introduction

Bellabeat is a pioneering femtech (female technology) company dedicated to advancing women's health. Offering innovative tracking devices such as "Ivy," "Leaf Chakra," and "Leaf Urban," Bellabeat Inc. (2024) has established itself as a leader in the industry. Founded in 2014 by Urška Sršen, Chief Creative Officer, and Sando Mur, Co-founder, the company boasts a diverse portfolio of products and services aimed at empowering women to monitor and manage their health effectively through technology-driven solutions.

At Bellabeat, we prioritize data-driven decision-making to enable our users to make informed choices about their health and well-being. In this analysis, we will delve into the Fitbase dataset to uncover valuable insights, including:

* Trends in the usage of tracking devices.
* User behavior patterns concerning fitness tracking.
* Analysis of users' physical activity levels.
* Examination of users' sleep patterns.
* Trends in heart rate measurements.
* Daily intensity levels categorized by lifestyle.
* Relationship between calorie expenditure and daily intensities.
* By leveraging the Fitbase data, we aim to provide comprehensive insights that will inform strategic decisions and enhance our users' overall health and wellness journey.

# ASK Phase:

Business Task Identification:

The business task entails analyzing trends among smart device users to optimize Bellabeat's marketing strategy.

Key Stakeholders:

Urška Sršen: Co-founder and Chief Creative Officer of Bellabeat.

Sando Mur: Mathematician and Co-founder of Bellabeat.

Bellabeat Marketing Analytics Team.

# PREPARE Phase:

We will conduct an analysis using the Fitbit database available on Kaggle, provided as open-source data by Monica MD. This dataset comprises responses from a distributed survey conducted via Amazon Mechanical Turk between 03.12.2016 and 05.12.2016. Thirty eligible Fitbit users consented to submit their personal tracker data, including minute-level output for physical activity, heart rate, and sleep monitoring.

About the Data:

The dataset consists of 19 .csv files accessible on Kaggle. We will focus on specific files to gain insights into how users track their activities, sleep patterns, heart rate, calories, intensities, and METs (Metabolic Equivalents).

ROCC:

**Reliability:** The data is based on observations from only 30 respondents, which may impact the robustness of our findings.

**Original:** The data collection was facilitated by Amazon Mechanical Turk.

Comprehensive: We aim to provide a comprehensive analysis covering various aspects of user activity and health tracking.

**Current:** The dataset is not current, being 7 years old as of the project date (31.12.2023).

**Cited:** The source of the data is acknowledged.

# PROCESS PHASE:

Cleaning the data

-- daily activity table had no duplicate records

select id, Activitydate, totalsteps, count(\*)

from `fit-base1.fit.daily\_activity`

group by id, ActivityDate, TotalSteps

having count(\*) > 1

-- we identified 3 duplicate rows in the sleep\_day table so we created a new table and dropped the older one.

select Id,

SleepDate,

TotalSleepRecords,

count(\*)

from `fit-base1.fit.sleep\_day`

group by Id, SleepDate, TotalSleepRecords

having count(\*) > 1

create table fit-base1.fit.sleepday\_cleaned

as

select distinct \* from `fit-base1.fit.sleep\_day`

– To check if table has been created and then drop the older version of the table

select \* from `fit-base1.fit.sleepday\_cleaned`

drop table `fit-base1.fit.sleep\_day`

Every table in the analysis has been cleaned using a similar approach.

-- To find out Basic Statistics for Average Steps, distance, Sleep in the database

select da.Id,

round(avg(da.TotalSteps),1) avg\_steps,

round(avg(da.TotalDistance),1) avg\_distance,

round(avg(sd.TotalMinutesasleep),1) avg\_minute\_asleep

from `fit-base1.fit.daily\_activity` as da

join `fit-base1.fit.sleepday\_cleaned` as sd on

da.Id = sd.Id

group by da.Id

order by avg\_distance desc

-- To find out Basic Statistics Total Steps, distance, Sleep in the database for each id

select da.Id,

round(sum(da.TotalSteps),1) total\_steps,

round(sum(da.TotalDistance),1) total\_distance,

round(sum(sd.TotalMinutesasleep),1) total\_minute\_asleep

from `fit-base1.fit.daily\_activity` as da

join `fit-base1.fit.sleepday\_cleaned` as sd on

da.Id = sd.Id

group by da.Id

order by total\_distance desc

-- to get avg Activity minutes of each id with each day and Classify those minutes by activity level

select distinct da.Id as Id,

da.ActivityDay as day,

round(avg(da.TotalSteps),2) as total\_steps,

round(avg(da.SedentaryMinutes),2) as sedentary\_minutes,

round(avg(da.LightlyActiveMinutes),2) as lightly\_actvive\_minutes,

round(avg(da.FairlyActiveMinutes),2) as fairly\_active\_minutes,

round(avg(da.VeryActiveMinutes),2) as very\_active\_minutes

from `fit-base1.fit.daily\_activity` as da

group by da.Id, da.ActivityDay

order by da.Id, da.ActivityDay

--To check if total steps and calories burned are related and their trends are related and classify them into Activity level

with Steps\_move

as

(

select ActivityDay,

Id,

ActivityDate,

Calories,

TotalSteps,

case

when TotalSteps < 5000 then "1.sedentary\_movement"

when TotalSteps between 5001 and 7499 then "2.low\_active\_movement"

when TotalSteps between 7500 and 9999 then "3.active\_movement"

else "4.very\_active\_movement"

end as daily\_movement

from `fit-base1.fit.daily\_activity`

) select \* from steps\_move

order by steps\_move.TotalSteps desc

The steps classification aligns with reputable sources such as the World Health Organization. (2023, June 7). Physical activity. American Heart Association. (2021, November 16).

U.S. Department of Health and Human Services. (2023, January 10), ensuring accuracy and reliability in promoting physical activity guidelines.

-- To check if there is relation between daily\_intensity and calories burned

with intt

as

(select TotalIntensity, Id,

ActivityHour,

string\_field\_2,

case

when TotalIntensity between 0 and 30 then 'sedentary\_lifestyle'

when TotalIntensity between 31 and 150 then 'fairly\_active\_lifestyle'

when TotalIntensity between 151 and 180 then 'active\_lifestyle'

else 'very\_active\_lifestyle'

end as activity\_level

from `fit-base1.fit.hourly\_intensities`)

select

hi.TotalIntensity,

hi.Id,

hi.ActivityHour,

hi.string\_field\_2 as day,

hi.activity\_level,

max(da.Calories) as calories

from intt as hi

join `fit-base1.fit.daily\_activity` as da

on da.Id = hi.Id

group by hi.TotalIntensity,

hi.ActivityHour,

hi.Id,

hi.string\_field\_2,

hi.activity\_level

order by activity\_level, day

The categorization of Sedentary, Fairly Active, and Active lifestyles is based on established guidelines provided by reputable health organizations. Specifically, the classifications are derived from authoritative sources such as the World Health Organization. (2022, May 31). American Heart Association. (2022, January 27). Centers for Disease Control and Prevention. (2023, January 6).. The Classification methodology ensures alignment with widely accepted standards and enables meaningful interpretations.

-- to find out when is the user most restless, awake or asleep

with parsed\_table

as

(select id,

safe.parse\_datetime('%m/%d/%Y %I:%M:%S %p', date) as converted\_datetime,

safe\_cast(Value as int64) as parsed\_value,

safe\_cast(logId as int64) as parsed\_logId

from `fit-base1.fit.minute\_sleep`)

select distinct Id,

parsed\_table.converted\_datetime,

extract(time from parsed\_table.converted\_datetime) as parsed\_time,

parsed\_table.parsed\_value,

parsed\_table.parsed\_logId,

case

when parsed\_table.parsed\_value = 1 then "asleep"

when parsed\_table.parsed\_value = 2 then "restless"

else "awake"

end as sleep\_value

from parsed\_table

order by sleep\_value asc

As per Fitbase Data dictionary Value in sleep table is

If Value = 1 then “Asleep”

Value = 2 then “Restless”

Value = 3 then “Awake”

--METs classification based on Activity Levels

select distinct id, METs/10 as METs,

format\_date('%A', EXTRACT(date from ActivityMinute)) as day,

case

when m.METs /10 between 0 and 1.5 then "sedentary\_mets"

when m.mets /10 between 1.6 and 2.9 then "light\_mets"

when m.mets /10 between 3.0 and 5.9 then "moderate\_mets"

when m.mets /10 between 6.0 and 8.9 then "vigrous\_mets"

else "high\_mets"

end as mets\_classification

from `fit-base1.fit.mets` as m

order by mets\_classification

The categorization of MET (Metabolic Equivalent) is established based on the studies by Tremblay, M. S., Aubert, S., Barnes, J. D., Saunders, T. J., Carson, V., Tremblay, B., ... & Canadian Paediatric Obesity Group. (2015). Sedentary behaviour and cardiovascular disease: a review of prospective studies. International Journal of Behavioral Nutrition and Physical Activity, 12(1), 16

-- To get customer free time before getting asleep

select distinct Id,

round(avg(TotalMinutesAsleep),1) as Avg\_sleep,

round(avg(Totaltimeinbed),1) as avg\_bedtime,

round(avg(Totaltimeinbed) - avg(TotalMinutesAsleep)) as avg\_free\_time

from `fit-base1.fit.sleepday\_cleaned`

group by Id

# Analysis and Sharing Phase:

During this phase, we have derived valuable insights from our analysis of user data. These insights encompass various dimensions of user behavior and engagement, providing a comprehensive view of their interaction with the Fitbase platform.

Below are the key findings:

* Average Steps, Distance, and Sleep Based on Days:

Our analysis reveals the average daily activity metrics, including steps taken, distance covered, and sleep duration. These insights shed light on users' activity patterns over different days.

* Classification of Users by Activity Level:

Users have been categorized into distinct activity levels, such as sedentary, lightly active, moderately active, and vigorously active. This segmentation enables us to target specific user groups with relevant marketing strategies.

* Correlation Between Total Steps and Calories:

We have explored the correlation between total steps taken and calories burned, uncovering insights into the effectiveness of physical activity in achieving fitness goals. Understanding this relationship informs our approach to promoting an active lifestyle.

* Correlation Between Daily Intensity and Calories:

Our analysis has investigated the correlation between daily intensity levels and calorie expenditure. This analysis provides valuable insights into the impact of different types of activities on energy consumption.

* Analysis of User Sleep Activity:

We have examined users' sleep activity, including periods of restful sleep, restlessness, and wakefulness. These insights offer valuable information for promoting better sleep habits and overall well-being among users.

* Classification of METs on Activity Levels:

Users' physical activity intensity has been classified based on METs (Metabolic Equivalents) and activity levels. This classification helps us understand users' adherence to recommended exercise guidelines and tailor interventions accordingly.

* Analysis of User Screen Time Before Getting Asleep:

Our analysis has investigated users' screen time behavior before bedtime, providing insights into their digital habits and potential influences on sleep quality. Understanding these patterns can inform strategies for promoting healthier bedtime routines.

By sharing these insights with Bellabeat's stakeholders, we aim to inform strategic decision-making, refine marketing initiatives, and enhance user engagement with the Fitbase platform. These findings serve as a foundation for data-driven interventions and personalized user experiences.

Click this link to view Tableau Dashboard. [Tableau](https://public.tableau.com/views/TotalStepsvsCalories_17074502623020/Dashboard1?:language=en-US&:sid=&:display_count=n&:origin=viz_share_link)

# Act Phase:

1. The data reveals that most users (88.9%) lead sedentary lifestyles, while a small portion (0.30%) are Very Active. Bellabeat should focus on gradual activity boosts through interactive plans to foster healthier habits.

The data highlights that the vast majority of users (88.9%) exhibit a sedentary lifestyle, with only a minute fraction (0.30%) demonstrating an active lifestyle. This underscores the need for Bellabeat to devise strategies that encourage gradual increases in activity levels. By developing interactive and user-friendly plans, Bellabeat can effectively engage users and promote a healthier lifestyle.

1. [Tableau](https://public.tableau.com/views/TotalStepsvsCalories_17074502623020/Dashboard1?:language=en-US&:sid=&:display_count=n&:origin=viz_share_link) analysis reveals 59.09% of users have 13 to 30 minutes of free time before bed, ideal for targeted interventions.

As per research conducted by Kwon, H. R., Kim, S. Y., & Shin, C. (2019), a staggering 92.4% of individuals habitually use their cellphones before retiring for the night. This presents a golden opportunity for Bellabeat to captivate users with targeted notifications and tailored content aimed at enhancing sleep quality and physical well-being. By harnessing this insight, Bellabeat can deploy push notifications delivering personalized activity summaries and invaluable sleep tips, fostering deeper user engagement and cultivating healthier lifestyles. Furthermore, our [Tableau](https://public.tableau.com/views/TotalStepsvsCalories_17074502623020/Dashboard1?:language=en-US&:sid=&:display_count=n&:origin=viz_share_link) analysis reveals that a significant 59.09% of our user base enjoys an average of 13 to 30 minutes of free time between 9:00 PM and 11:00 PM before getting asleep—a pivotal moment for meaningful interaction and strategic intervention.

# Recommendation:

* Bellabeat should consider redesigning its mobile application to emulate the interface of popular social media platforms. Research by Kwon, H. R., Kim, S. Y., & Shin, C. (2019) indicates that 80.5% of users engage with social media apps before bedtime, presenting an opportunity for Bellabeat to capitalize on this behavior. By integrating features that provide updated information on diets, workouts, and fitness tips tailored specifically for unique users, Bellabeat can enhance user engagement and promote healthy lifestyles. Additionally, aligning these features with Bellabeat's Chakra smart device will offer users a seamless experience and reinforce brand loyalty.
* Bellabeat should introduce live online workout, diet, and training classes customized to users' fitness goals. This initiative will not only enhance user engagement but also foster customer loyalty by providing personalized and interactive experiences. By leveraging the data collected from users' smart devices, Bellabeat can make data-driven decisions to tailor these offerings further, ensuring they meet the evolving needs and preferences of their user base. This proactive approach will position Bellabeat as a leader in the wellness technology industry and drive sustained growth and customer satisfaction.

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