

Ben & Jerry's Ice Cream Analysis Report

Introduction

Overview

As a leading data analyst, I am pleased to present this comprehensive analysis of Ben & Jerry's ice cream flavors, incorporating detailed insights from customer reviews, product descriptions, and ingredient lists. This report is based on a robust dataset collected directly from the Ben & Jerry's website, encompassing 57 distinct ice cream flavors with over 7,943 customer reviews.

Purpose

The purpose of this analysis is to provide a deep understanding of the factors driving customer satisfaction and preferences. By examining star ratings, review sentiments, and product attributes, this report aims to uncover key trends and actionable insights that will inform strategic decisions and enhance our product offerings. **Data Sources**

Key Questions Addressed

This analysis seeks to answer critical questions such as:

The dataset comprises three primary components: 1. **Products Data**: Contains descriptive information about each ice cream flavor, including the flavor name, description, average rating, and ingredients list. 2. Reviews Data: Features customer reviews for each flavor, encompassing review authors, dates, star ratings, review texts, and helpfulness metrics. 3. **Images**: Includes visual representations of each product, aiding in the analysis of visual appeal and marketing effectiveness.

3. Text Analysis: Leveraging natural language processing to assess review sentiments and identify common themes in customer feedback.

4. Visualization: Using advanced visualizations to illustrate findings and support data-driven decision-making.

Methodology The analysis involves several key steps: 1. Data Cleaning: Ensuring data accuracy and consistency by handling missing values and standardizing formats. 2. **Descriptive Statistics**: Summarizing key metrics such as average ratings, rating distributions, and ingredient frequencies.

• Which ice cream flavors receive the highest customer ratings and why? What are the most common ingredients across top-rated flavors? How do customer sentiments vary across different flavors? What factors contribute to positive and negative reviews? **Expected Outcomes** By the end of this report, we aim to achieve the following outcomes:

 A clear understanding of customer preferences and satisfaction drivers. Insights into the most successful flavor profiles and their key ingredients. import pandas as pd

• Identification of areas for improvement based on customer feedback. Strategic recommendations to enhance product development and marketing efforts. In [14]: #First let's import the necessary libraries import matplotlib.pyplot as plt

import seaborn as sns from wordcloud import WordCloud from collections import Counter from textblob import TextBlob # Set the visualisation style

sns.set(style='whitegrid') # Load the datasets products = pd.read_csv('C:/Users/User/Downloads/archive (3)/bj/products.csv') reviews = pd.read_csv('C:/Users/User/Downloads/archive (3)/bj/reviews.csv') # Function to get the sentiment of a review def get_sentiment(review): analysis = TextBlob(review) return analysis.sentiment.polarity

Apply the function to the review texts reviews['sentiment'] = reviews['text'].apply(get_sentiment) # Plot sentiment distribution plt.figure(figsize=(8, 6)) sns.histplot(reviews['sentiment'], bins=20, kde=True, color='purple') plt.title('Distribution of Review Sentiments') plt.xlabel('Sentiment Score') plt.ylabel('Count') plt.show() Distribution of Review Sentiments 1200

1000 800 600 400

-0.25

sns.barplot(x='rating', y='name', data=top_flavors, palette='viridis')

0.00

Sentiment Score

0.25

0.50

1.00

Top 10 Flavors by Average Rating

4

3

Average Rating

Bottom 10 Flavors by Average Rating

1.5

1.0

2.0

Average Rating

2.5

3.0

3.5

5

0.75

-1.00-0.75-0.50Observations: The distribution is right-skewed, indicating that most sentiment scores are positive, falling between 0 and 0.5. There is a peak around 0.25, suggesting that many reviews have a moderately positive sentiment. This visual representation helps understand overall sentiment trends in the review data, highlighting that most customers have positive experiences with the ice cream flavors. This visualization is essential for grasping customer sentiment trends, providing valuable insights for improving product offerings and addressing customer concerns. # Display top 10 flavors by average rating

plt.figure(figsize=(10, 6))

plt.xlabel('Average Rating') plt.ylabel('Flavor Name')

top_flavors = avg_rating_per_flavor.head(10)

plt.title('Top 10 Flavors by Average Rating')

Chocolate Peanut Butter Split

Ice Cream Sammie

Peanut Butter World®

Vanilla Caramel Fudge

Chocolate Therapy®

Phish Food®

0

sns.barplot(x='rating', y='name', data=bottom_flavors, palette='viridis')

This visualization effectively highlights the most popular and highly rated flavors, providing valuable insights into customer preferences.

Plot top 10 flavors by average rating

200

0

Coffee Coffee BuzzBuzzBuzz!® Peanut Butter Half Baked® Flavor Name New York Super Fudge Chunk® Sweet Like Sugar Cookie Dough Core

plt.show()

Observations: All the flavors in the top 10 list have high average ratings, close to the maximum score of 5. Ice Cream Sammie has the highest average rating among all flavors. The bar lengths visually represent the average ratings, making it easy to compare the popularity and customer satisfaction for each flavor.

In [20]: # Display bottom 10 flavors by average rating

plt.figure(figsize=(10, 6))

plt.xlabel('Average Rating') plt.ylabel('Flavor Name')

bottom_flavors = avg_rating_per_flavor.tail(10)

plt.title('Bottom 10 Flavors by Average Rating')

Everything But The ... ®

Salted Caramel Core

Brownie Batter Core

Chillin' the Roast™

Red, White & Blueberry

Chocolate Fudge Brownie

Coffee Toffee Bar Crunch

Wake & " No Bake " Cookie Dough Core

Cannoli

0.0

0.5

Count of Flavors by Rating Range

Plot bottom 10 flavors by average rating

Flavor Name

plt.show()

Chocolate Chip Cookie Dough Core Observations: These flavors have lower average ratings compared to others, indicating they are less popular among customers. Chocolate Chip Cookie Dough Core has the lowest average rating among all flavors. This chart is useful for identifying flavors that may need improvement or could be considered for discontinuation based on customer feedback. This visualization highlights the flavors that receive the lowest customer satisfaction, providing insights into areas that may need attention for improving product offerings. In [21]: # Define rating ranges bins = [0, 2, 3, 4, 5]

labels = ['0-2', '2-3', '3-4', '4-5'] products['rating_range'] = pd.cut(products['rating'], bins=bins, labels=labels, include_lowest=True) # Count of flavors in each rating range rating_range_count = products['rating_range'].value_counts().sort_index() # Plot count of flavors in each rating range plt.figure(figsize=(10, 6)) sns.barplot(x=rating_range_count.index, y=rating_range_count.values, palette='viridis') plt.title('Count of Flavors by Rating Range') plt.xlabel('Rating Range') plt.ylabel('Count of Flavors') plt.show() 40

30 Count of Flavors 20

10

0

Observations:

0-2

Function to count occurrences of each ingredient

all_ingredients = ' '.join(ingredients_list).split(',')

ingredients_count = count_ingredients(products['ingredients'])

SKIM MILK

WATER)

WATER

SUGAR

SALT

EGG YOLKS

GUAR GUM

SOY LECITHIN

COCONUT OIL

WHEAT FLOUR

BAKING SODA

CARRAGEENAN

BUTTER (CREAM

SOYBEAN OIL

CORN SYRUP

NATURAL FLAVOR

SALT)

SKIM MILK is the most frequently used ingredient, appearing in around 50 products.

2

all_reviews = ' '.join(review for review in reviews['text'])

I chocolate

enjoy

made

The frequent mentions of positive descriptors indicate high customer satisfaction.

put swirl

want

favorite

Observations:

mentioned words in the reviews.

In [34]: # Calculate helpfulness score

Author: clouds513

Stars: 5

Stars: 5

Author: huntp

Stars: 1

Stars: 1

Stars: 5

Date: 2019-07-31 00:00:00

Helpfulness Score: 105

Author: ahumanbeing

Helpfulness Score: 64

Date: 2019-02-13 00:00:00

Date: 2018-04-22 00:00:00

Helpfulness Score: 50

Author: Icecreamlover1 Date: 2019-02-27 00:00:00

Helpfulness Score: 47

Date: 2018-10-29 00:00:00

Date: 2020-09-08 00:00:00

Date: 2019-02-28 00:00:00

Helpfulness Score: 45

Author: abclementine Date: 2019-03-21 00:00:00

Helpfulness Score: 44

ad so much potential

Author: Phish Food Fan Date: 2019-04-14 00:00:00

Helpfulness Score: 42

Author: ramsey92

Observations

Conclusions

products.

1. Overall Customer Satisfaction

2. Top and Bottom Flavors

3. Common Ingredients

4. Review Sentiments

5. Helpfulness of Reviews

Recommendations

identified in the reviews.

formulations.

customers.

observed in the ratings.

Date: 2019-04-03 00:00:00

Helpfulness Score: 42

Helpfulness Score: 46

Helpfulness Score: 47

Author: BJLUVER

Author: Mickey4

Author: APMNSNW

Stars: 1

Stars: 1

Stars: 1

Stars: 1

Stars: 2

Top 10 most helpful reviews

Display top 10 most helpful reviews

for index, review in top_helpful_reviews.iterrows():

out there, they can expect nothing less than a full on war.

plt.imshow(wordcloud, interpolation='bilinear')

plt.title('Word Cloud of Review Text')

sns.countplot(x='stars', data=reviews, palette='viridis')

VANILLA EXTRACT

COCOA (PROCESSED WITH ALKALI)

LIQUID SUGAR (SUGAR

common_ingredients = ingredients_count.most_common(20)

from collections import Counter

return ingredients_count

Count ingredients

plt.xlabel('Count') plt.ylabel('Ingredient')

plt.show()

Ingredient

Observations:

In [24]: # Plot distribution of ratings plt.figure(figsize=(8, 6))

> plt.xlabel('Stars') plt.ylabel('Count')

plt.show()

6000

5000

4000

3000

2000

1000

Observations:

In [25]: # Combine all review texts

plt.show()

Generate the word cloud

Display the word cloud plt.figure(figsize=(15, 8))

chocolate ice

freezer wish

buying

plt.title('Distribution of Ratings')

Plot common ingredients

plt.figure(figsize=(15, 8))

plt.title('Most Common Ingredients')

def count_ingredients(ingredients_list):

2-3

ingredients_count = Counter([ingredient.strip() for ingredient in all_ingredients])

ingredients_df = pd.DataFrame(common_ingredients, columns=['Ingredient', 'Count'])

sns.barplot(x='Count', y='Ingredient', data=ingredients_df, palette='viridis')

Rating Range

Majority in 4-5 Range: Most flavors fall within the 4-5 rating range, indicating that the majority of Ben & Jerry's ice cream flavors are highly rated by customers.

Few Flavors in Lower Ranges: The 3-4 rating range contains about 10 flavors, and there are very few flavors (less than 5) in the 2-3 and 0-2 rating ranges.

Overall High Ratings: This distribution highlights that Ben & Jerry's generally enjoys positive customer feedback, with most flavors receiving favorable ratings.

3-4

This chart provides a clear visual representation of how flavors are distributed across different rating ranges, emphasizing the brand's strength in maintaining high-quality and well-loved products.

20

5

10

Other common ingredients include LIQUID SUGAR (SUGAR, WATER), WATER, and SUGAR, all found in over 40 products.

Distribution of Ratings

3

Stars

wordcloud = WordCloud(width=800, height=400, background_color='white').generate(all_reviews)

chip

think almost handespecially

maybe

day

lot

texture

Insights: This word cloud provides a quick visual summary of common themes and sentiments in the reviews.

top_helpful_reviews = reviews.sort_values(by='helpfulness_score', ascending=False).head(10)

reviews['helpfulness_score'] = reviews['helpful_yes'] - reviews['helpful_no']

Heath Bar

4

Lower Ratings: The counts for 1, 2, 3, and 4 stars are significantly lower, all below 1000. This suggests that negative or neutral reviews are less common.

Insights: High Customer Satisfaction: The high number of 5-star ratings demonstrates that customers are generally very satisfied with the ice cream flavors.

This visualization effectively shows the overall distribution of customer ratings and highlights the strong positive reception of Ben & Jerry's ice cream flavors.

Predominance of 5-Star Ratings: The majority of ratings are 5 stars, with a count of around 6000. This indicates a high level of customer satisfaction with many of the products.

Opportunities for Improvement: While the majority of ratings are positive, the presence of lower ratings indicates that there are areas where the products could be improved.

Word Cloud of Review Text

don

Prominent Words: The most prominent words in the word cloud, such as "ice cream," "flavor," "cookie dough," "chocolate," "love," and "delicious," appear larger and bolder. This indicates that they are the most frequently

print(f"Author: {review['author']}\nDate: {review['date']}\nStars: {review['stars']}\nHelpfulness_score: {review['helpfulness_score']}\nReview: {review['text']}\n\n{'-'*80}\n")

Review: I've been buying Milk & Cookies for i don't even know how long. I have to drive 30 minutes total just to go get it because none of my local stores have it. It's officially ruined all other cookies & cream flavored ice creams for me, nothing can top it. I mean, it't got TWO kinds of cookies in it. What??? Man that's a lot of cookie. And you know, ever y time I buy a pint, I always think "man, is this \$4-something-or-other worth it for just one pint?" and every time I get a different brand's cookies and cream flavor I always get my answer. It's absolutely worth it. This will be served at my wedding, and most certainly at my funeral. If anyone comes up to me and tries to convince me there's a better flavor

Review: 30 years. 3 continents. 7 countries. Countless types and flavors of ice cream. This is it. This is literally the best ice cream flavor I have ever tasted in my whole life,

Review: I love coffee ice cream and heath bars, but try to eat them infrequently due to needing to watch my sugar and weight. On a nearly 90 degree day here in NH, I decided to ind ulge. What a horrible disappointment. The ice cream is ok, but after a few bites of toffee, I was done and tossed the pint. I found myself avoiding the crunch. So disappointing. I appreciate your dedication to non GMO, but I prefer strong labeling. I am a big girl, and can make my own choices. I just won't bother with B&J's if they sacrifice taste. This is n

Review: Such a let down from Ben and Jerry's. The cookie dough core was hard, dry, and basically tasted like granulated sugar. I am so underwhelmed by all the cores but this one wa

Review: Wow. Just wow. I mean there's nothing better than this flavor. No topping it. Cherry ice cream combined with cherries and chunks of chocolate? Come on. This is the best fla vor of all time. I'm not saying there aren't other delicious flavors that fill me with intense, creamy, passionate emotion, but cherry garcia is home. Cherry garcia is the dog that you cuddle up with on the couch after a long day of dragging your feet through the world. Cherry garcia is the mother that rubs your sweet lil head after the local school bully cal led your shoes "dorky." Cherry garcia is life. Such a wonderful flavor. I'm a life-long fan and I will pass this flavor on to my kids, my kids, kids, and their kids' kids. I love i

Review: Bought this last night and was incredibly disappointed. Never write reviews but don't buy this. The cookie dough was literally like sweet sand. It was gritty and grainy. The

Review: I waited and waited for this to be available at my local store. Yuck. Hard, grainy cookie dough core? This is nothing like cookie dough. Don't be fooled, the cookie dough c

Review: Even after reading all the reviews that said it wasn't good I still went and bought it anyways because it looked & sounded so good, but sadly the reviews are right. most of the time with cookie dough ice cream I wish there was more cookie dough (i thought this would be the super cookie-doughy flavor i always dreamed of.. theres not even that much in i t), but with this pint i actually prefer the part around the core that doesn't have any. ben & jerry if u see this please re-make this flavor with better quality cookie dough, it h

Review: I preordered this as soon as they announced that it was available in the online store. I was so excited to dig in but while the ice cream is delicious, the cookie dough cor e is terrible. Rock hard, gritty, sandy, and very inconsistent in size from the top of the pint to the bottom. I hate having to write this review, especially because the other 2 ne

Review: i am so upset that this didnt meet any of my expectations. the cookie "dough" is just grainy sugar! not to mention i get more cookie dough out of a regular ben & jerry's co

High Customer Satisfaction: The majority of the ice cream flavors have high average ratings, with most flavors falling within the 4-5 rating range. This indicates a generally high level of customer satisfaction with Ben & Jerry's

Top Flavors: The flavors like Ice Cream Sammie, Chocolate Peanut Butter Split, and Coffee BuzzBuzzBuzzI® received the highest average ratings, indicating strong customer preference and satisfaction.

Skim Milk and Sugar: These are among the most frequently used ingredients. Their high usage aligns with their presence in popular flavors, indicating they are key components in creating well-liked products.

Moderate Correlation: There is a moderate positive correlation between star ratings and review sentiments, indicating that as the sentiment of the review text improves, the star ratings tend to increase as well.

Positive Sentiment: The sentiment analysis and word cloud reveal that most customer reviews are positive, with frequent mentions of words like "love," "delicious," and "favorite." This reinforces the high satisfaction levels

Most Helpful Reviews: Reviews with high helpfulness scores often provide detailed, constructive feedback. These can be valuable for identifying specific strengths and areas for improvement from the customer's perspective.

Improve Low-Rated Flavors: Investigate the reasons behind the lower ratings of certain flavors. This might involve tweaking the recipes, improving the ingredient quality, or addressing any common customer complaints

Ingredient Optimization: Leverage the insights from ingredient ratings to enhance existing flavors and develop new products. Ingredients associated with higher-rated flavors should be considered prominently in future

Leverage Positive Reviews: Utilize the positive feedback in marketing campaigns to highlight what customers love about Ben & Jerry's products. Authentic customer testimonials can be a powerful tool for attracting new

okie dough or even half baked than what i got in this. this needs a reboot! please consider making the core out of your oringinal cookie dough recipe!

Based on the comprehensive analysis of Ben & Jerry's ice cream flavors, including product ratings, customer reviews, and ingredient data, here are the key findings and actionable insights:

Bottom Flavors: Flavors such as Chocolate Chip Cookie Dough Core and Coffee Toffee Bar Crunch received lower ratings, suggesting areas for potential improvement or reevaluation.

Variety of Ingredients: The diverse range of ingredients used suggests Ben & Jerry's caters to a wide array of tastes, which is reflected in the positive reviews.

Focus on Top Flavors: Continue to promote and perhaps develop variations of the top-rated flavors to maintain high customer engagement and satisfaction.

Monitor Trends Over Time: Continuously monitor customer ratings and review sentiments over time to quickly identify and respond to any emerging trends or issues.

By addressing these recommendations, Ben & Jerry's can further enhance customer satisfaction, innovate its product offerings, and strengthen its market position.

found

Positive Sentiments: Words like "love," "delicious," "amazing," "favorite," and "good" suggest that customers generally have positive sentiments about the ice cream flavors.

something

1Ce almond

toffee

used tasted

graham

Popular Ingredients: The presence of words like "cookie dough" and "chocolate" highlights the popularity of these ingredients in the reviews.

It also highlights the popularity of specific flavors and ingredients, which could be useful for product development and marketing strategies.

ot health food, there is no way this variant is any better for you than the Heath version, let's not kid ourselves.

w cookie cores were pretty good, but this one is REALLY dreadful! I'm really bummed because I wanted badly to love it.

s by far the most disappointing. Stick to the regular pints: my opinion best flavor is Gimme S'more.

rew us away after about 5 bites. I'll stick to the original Cookie Dough.

ore is SMALL! I'm a Ben and Jerry's fan, but you lost me here. So disappointed!

Most Helpful Reviews - Identify the most helpful reviews based on the upvotes they received.

This visual representation is effective in summarizing the overall customer feedback and pinpointing what customers love most about Ben & Jerry's ice cream.

Ingredients like CORN SYRUP and NATURAL FLAVOR are among the least common in the top list but are still used frequently.

4-5

Most Common Ingredients

30

Count

40

carame⊥

cream

Sprice

ecommend

enough

bite

little

eating

many

50