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Social media marketing effectiveness for value-added dairy brands in India: A sentiment analysis using NLP

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Abstract

There is no denying the significant changes in the marketing strategies of companies resulting from the rise of social media usage. This applies to the marketing strategies employed by value-added dairy brands using the likes of Instagram, Facebook, and X to reach their customers. The current research focuses on the assessment of the impact of social media marketing for a select few value-added dairy brands in India, such as Amul, Milky Mist, and Mother Dairy. Sentiment analysis will be used to assess consumer-generated opinions of selected value-added dairy brands. For that purpose, publicly available social media comments and reviews regarding the selected brands will be obtained and analyzed through the application of the Valence Aware Dictionary and Sentiment Reasoner (VADER), an emotion detection model specifically created for social media posts. Comments will be preprocessed through natural language processing (NLP) methods and categorized into five types of emotions: Highly Positive, Positive, Neutral, Negative, and Highly Negative.

The results found that all three brands got mostly positive reactions from consumers using social media. Mother Dairy had the largest percentage of extremely positive reactions (41.18%), followed by Milky Mist (39.00%) and Amul (33.04%). Amul had the largest percentage of neutral reactions (46.43%), mostly regarding inquiries about product availability. This shows high informational engagement between the company and its consumers. Milky Mist had somewhat high positive engagement from the consumers while having relatively high negative engagement from the consumers regarding their products. There were no extremely negative engagements from any of the brands which show a good digital image of the brands and positive consumer acceptance. In summary, this research concludes that using social media marketing can influence consumer perceptions towards value-added dairy products in India. Also, it can be concluded that sentiment analysis is an appropriate method for determining consumer perception, which might help in improving the strategy of the dairy companies' digital marketing.

Keywords: Social media marketing, sentiment analysis, VADER, value-added dairy products, consumer perception, Natural Language Processing (NLP), India

1. Introduction

In the past few years, there has been a significant change in how companies have interacted with their customers through social media channels like Instagram, Facebook, and X. These platforms have become essential tools for promoting goods, engaging with consumers, and influencing their perceptions. The widespread availability of the Internet and smartphones in India has resulted in more people being active on social media networks, providing additional chances for businesses to interact with their targeted consumers in real-time. The dairy industry, like other sectors, is not oblivious to digital marketing techniques.

In recent times, there has been an increase in the consumption of dairy goods that have undergone value addition, including flavored milk, yoghurt, cheese, probiotic beverages, ice-cream, paneer, and dairy-based sweets in the Indian market. This rise in consumption is primarily attributed to lifestyle changes, increased health

consciousness, urbanization, and increased income levels. With the growing number of dairy competitors, many organizations are now turning to social media marketing methods to distinguish themselves from their rivals. Dairy brands use innovative advertising, influencer collaboration, interactive campaigns, and user-generated content to build consumer trust.

Sentiment analysis, an NLP technique, is commonly used to analyze opinions expressed through textual data. Sentiment analysis allows researchers to find out whether a certain opinion or comment expresses positive, negative, or neutral sentiments. There are many methods used in sentiment analysis; however, the Valence Aware Dictionary and Sentiment Reasoner (VADER) stands out among all because of its high efficiency in classifying sentiments expressed in social media text. VADER is a rule-based sentiment analysis method specifically aimed at analyzing emotions that emerge from social media posts. This method can

effectively recognize emotive expressions, slangs, emojis, emphases through punctuations, and contextual polarities. The utility of using VADER for social media sentiment analysis was discussed by previous scholars working on Twitter sentiment analysis. (Elbagir & Yang, 2019) ^[1].

Previous researchers have primarily concentrated on sentiments related to politics, product reviews, election surveys, and consumer behavior. Researchers have stressed that social media sites are rich sources of consumer sentiments and vital consumer insights. (Elbagir & Yang, 2019) ^[1] However, very few researchers have explored the impact of the social media marketing strategies employed by value-added dairy brands in India through sentiment analysis techniques. Given the digital presence of dairy firms and consumer interactions on social media platforms like Instagram, Facebook, and X, it is crucial to analyze consumer responses to the brand messages posted on these sites. Consumers post a vast number of user-generated content on social media sites in the form of reviews, comments, likes, shares, and other social media interactions. This user-generated content reflects the emotions, preferences, and opinions of consumers toward dairy firms and their products. The increased level of competition in the value-added dairy segment has led dairy firms to focus more on digital marketing activities. (Youvan, 2024) ^[4].

In the current research, the focus will be on assessing the effectiveness of social media marketing for the promotion of value-added dairy products in India via analyzing the sentiments posted by consumers. VADER (Valence Aware Dictionary and Sentiment Reasoner) is one of the most effective models of sentiment analysis that will be utilized in the current research since it was developed explicitly for social media texts. VADER allows determining the sentiments through slang, emojis, punctuation, and language structures used in online texts. As recent studies reveal, the utilization of lexicons and heuristics makes VADER a more accurate model of sentiment analysis than some of its competitors. The purpose of the research will be to explore the sentiments related to value-added dairy products expressed on Instagram, Facebook, and X, which may assist companies in developing more efficient marketing strategies. (Youvan, 2024) ^[4].

2. Literature Review

Social Media Marketing and Consumer Interaction

With the increase in social media platforms, the way businesses interact with their customers has been greatly changed. For example, businesses now interact with consumers using social media platforms such as Instagram, Facebook, YouTube, and X. The researchers have established that social media marketing has evolved in communication practices for companies since it has transitioned from a one-way marketing campaign to two-way interactions among consumers, brands, and other stakeholders. According to Makwana and Prajapati (2025) ^[6], food and dairy brands use social media platforms to connect with consumers to build relations and awareness through digital campaigns and influencer marketing.

A number of research works have explored the impact of social media on the decisions made by consumers. Information posted on social media about health, products, recipe videos, and short-form videos influences consumer

perceptions and purchase decisions. For example, Makwana and Prajapati (2025) ^[6] found out that consumers strongly preferred to view more recipe videos and receive information related to their nutrition requirements from food and dairy brands' pages. In another research work, the findings were similar, and customers have been found to value transparency, authenticity, and customer reviews compared to the promotional content of products. (Makwana & Prajapati, 2025) ^[6].

The Use of Sentiment Analysis in Social Media Research

As more users start creating their content on social networking platforms, there have been growing concerns about the use of sentiment analysis to understand the public attitude and emotions of customers. Sentiment analysis is defined as the process through which opinions or emotions that are communicated through textual data are classified as positive, negative, and neutral. According to Elbagir & Yang (2019) ^[1], social media sites generate rich sources of opinion data that can be analyzed to gain insight into public opinion towards certain issues, perception of products, and customer satisfaction levels. The research pointed out that Twitter and other social networking sites are rich sources of short texts, which makes them ideal platforms for conducting sentiment classification research.

Sentiment analysis uses natural language processing (NLP) approaches because they aid in processing the unstructured texts generated by users on social media platforms. In a recent study, Başal (2025) ^[2] noted that NLP enables firms to get useful insights regarding consumer conversations, digital communication, and online discussion forums. Additionally, the study stated that the process of sentiment analysis helps companies analyze consumers' emotions in order to improve marketing and decision-making approaches.

Technique for VADER Sentiment Analysis

Among the different techniques for sentiment analysis, VADER (Valence Aware Dictionary and Sentiment Reasoner) has acquired significant prominence due to its effectiveness in the analysis of social media text. VADER is a lexicon and rules-based approach to sentiment analysis specifically tailored for analyzing short informal and emotionally charged texts. As stated by Chadha & Chaudhary (2023) ^[5], VADER works using the sentiment lexicon with positive and negative words and provides sentiment scores according to the context of usage. It identifies such features in text as slang words, emojis, acronyms, punctuation marks, capital letters and emotional valences.

Earlier research revealed the high efficiency of VADER in social media sentiment analysis compared to a variety of other machine learning algorithms. For example, Elbagir & Yang (2019) ^[1] noted that VADER performed excellently in Twitter sentiment analysis due to the effective management of informality in languages of online conversations. Likewise, Dixit et al. (2025) ^[3] observed that the algorithm was excellent in performing analysis of multilingual informal social media comments due to its capacity for analyzing slang, acronyms, emojis, and emoticons and context-specific words.

Research Gap

Even though many studies have been conducted on various topics including social media marketing strategy, consumer engagement, and sentiment analysis methods, very few studies have attempted to investigate the value-added dairy brands in an Indian perspective using VADER sentiment analysis method. Most of the studies have concentrated on general food industries, political communication, and product review studies rather than value-added dairy products on platforms like Instagram, Facebook, and X. In addition, very little literature has been available on social media marketing and sentiment analysis for the Indian dairy industry. Thus, this paper seeks to fill this research gap by evaluating the social media sentiments towards value-added dairy brands in India using VADER sentiment analysis method.

3. Statement of the Problem

The increase in social media use including applications such as Instagram, Facebook, and X has led to changes in how value-added dairy brands in India have promoted their products and interacted with consumers. Value-added dairy brands have continued investing in digital marketing strategies in order to enhance brand visibility, customer experience, and consumer satisfaction within a highly competitive market environment. On the other hand, consumers have also taken advantage of social media marketing by engaging in the sharing of their feelings and experiences on social media sites regarding various dairy products. In spite of the increased use of social media in marketing, little attention has been paid to evaluating the effectiveness of marketing practices using sentiment analysis approaches among value-added dairy brands in India. While studies have concentrated on general consumer behaviors or even industries, fewer studies have addressed the issue of consumer sentiments in relation to dairy products on social media. The need therefore arises to conduct an analysis of sentiments of consumers expressed on social media sites such as Instagram, Facebook, and X using VADER sentiment analysis model in order to determine whether social media marketing generates positive, negative or neutral consumer responses.

4. Need for the Study

The current research is required to evaluate the effectiveness of social media marketing campaigns carried out by dairy brands that offer added value in India. In addition, there is a need to explore the sentiments of consumers conveyed through various social media networks like Instagram, Facebook, and X. As consumers increasingly rely on digital media in influencing their behavior and purchase decisions, it is essential for dairy brands to be aware of how their customers view their brand and marketing efforts. The use of sentiment analysis with the aid of the VADER model will allow identifying positive, negative, and neutral consumer sentiments conveyed in the form of social media posts.

5. Objectives of the Study

To collect and analyze comments and reviews related to value-added dairy brands from Instagram, Facebook, and X. To examine consumer sentiments toward value-added dairy brands using the VADER sentiment analysis model.

To evaluate the effectiveness of social media marketing content based on consumer sentiments and online engagement.

6. Hypotheses of the Study

H0 (Null Hypothesis)

There is no significant relationship between social media marketing activities and consumer engagement toward value-added dairy brands in India.

H1 (Alternative Hypothesis)

There is a significant relationship between social media marketing activities and consumer engagement toward value-added dairy brands in India.

7. Research Methodology

7.1 Proposed Method

In the current research, there are three main stages involved in the analysis. The first stage is about the gathering of social media comments and reviews regarding value-added dairy brands in India. Such information could be retrieved from platforms like Instagram, Facebook, and X. Publicly available information such as comments, captions, replies, and discussion forums regarding social media marketing of the dairy brands were selected through the help of social media search tools and filters. This data included consumer reactions towards social media marketing, campaigns, product content, and customer engagement of the brands in question.

The second stage of data analysis is related to data preprocessing and cleaning. Comments from the social media channels may include hashtags, emojis, hyperlinks, usernames, acronyms, repeating words, punctuations, and other features that would require preprocessing in order to increase the level of accuracy in the analysis. During this process, all duplicates, irrelevancies, URLs, usernames, symbols, and excessive punctuation were eliminated. Then, the text was turned into lower case, and such stop words as "is," "the," "and," "of" were removed through NLP processes. Additionally, tokenization took place as well in order to split comments into terms.

Phase three involves sentiment classification through the use of VADER (Valence Aware Dictionary and Sentiment Reasoner) sentiment analyzer. VADER is a rule-based sentiment analysis method that focuses on the sentiments in the social media text. It effectively detects the sentiments portrayed in the language through emojis, slang, abbreviations, punctuation emphasis, and context-specific language patterns. VADER Analyzer was used to classify the sentiments in social media comment into five different sentiments including Highly Positive, Positive, Neutral, Negative, and Highly Negative sentiments.

In the current research paper, the overall score produced by VADER was used to identify whether the comments are positive, neutral or negative sentiments. The criteria were as below:

Further breakdown of the sentiments was done by classifying the comments into five different groups depending on the intensity of the sentiments reflected in the comments. The approach adopted in the current study was:

- **Positive response:** compound score > 0.001
- **Neutral response:** compound score between -0.001

and 0.001

- **Negative response:** compound score < -0.001

Comments with highly positive sentiments were considered as Highly Positive, comments with negative sentiments were considered as Highly Negative. Comments with moderate sentiments were considered either Positive or Negative whereas the other comments without strong sentiments were considered as Neutral.

- Highly Positive = +2
- Positive = +1
- Neutral = 0
- Negative = -1
- Highly Negative = -2

7.2 Tools Used

Natural Language Toolkit (NLTK)

Natural Language Toolkit (NLTK) is an open-source Python library designed for text processing and sentiment analysis. NLTK offers different functions like tokenization, removing stopwords, stemming, and text preprocessing which make social media data ready for sentiment analysis. NLTK was applied in the current research to clean up and preprocess social media data before classification.

VADER Sentiment Analyzer

VADER is a lexicon and rule-based sentiment analysis tool that was created specially for sentiment analysis in the social media text. This tool can identify the intensity of emotions in online conversations by accounting for slang words, emoticons, punctuation and contextual elements. In the current research, the VADER sentiment analyzer was applied to classify social media opinions on value added dairy products into five emotion classes.

8. Results and Discussion

The discussion of the outcomes obtained during the sentiment analysis process carried out on the comments left by customers on social media and online reviews using the VADER sentiment analyzer is provided below. All comments retrieved from Instagram, Facebook, and X have been analyzed and classified into five emotion groups as follows: highly positive (+2), positive (+1), neutral (0), negative (-1), and highly negative (-2). The classification was done through the use of the VADER sentiment scoring approach that evaluates the responses made by consumers depending on their emotional intensity revealed on social media comments.

8.1 Sentiment Analysis for Amul

The sentiment analysis of Amul social media comments was done using the VADER sentiment analysis tool to gauge the sentiments of the customers towards the value-added dairy products and social media communications. In all, 112 comments and reviews were gathered from the social media channels. They were then classified into five categories based on their emotional level: Highly Positive (+2), Positive (+1), Neutral (0), Negative (-1), and Highly Negative (-2).

The findings show that the Neutral category had the highest

number of comments, accounting for 46.43% of the comments, followed by Highly Positive at 33.04%, Positive at 16.96%, and Negative at 3.57%. There were no comments classified under the Highly Negative category. It can be inferred that many comments were made with a neutral tone since they were informative and meant to ask questions regarding the product rather than express emotions.

Concurrently, it is evident that the existence of extremely positive and positive comments denotes a positive attitude of consumers towards Amul's value-added dairy products. Comments that praise the nutritional value of the products as well as communication efforts made by the brand point to a positive brand perception in the minds of social media users. Nevertheless, a small percentage of negative comments, especially relating to taste issues, denote product areas that require improvement.

It can be concluded that there is a favorable image of Amul among consumers using social media channels. Even though the majority of the comments are neutral, the sum of both highly positive and positive remarks is adequate to show that consumer engagement and acceptance of Amul social media advertisements are acceptable. The most likely cause for the greater number of neutral comments may be linked to product unavailability issues, since some consumers used social media to communicate about their queries regarding the product's availability and purchasing options, rather than voicing any emotional opinions on it.

Table 1: Sentiment Category Distribution of Amul Comments

Sentiment Category	Score	Count	Percentage (%)
Highly Positive	+2	37	33.04
Positive	+1	19	16.96
Neutral	0	52	46.43
Negative	-1	4	3.57
Highly Negative	-2	0	0.00

8.2 Sentiment Analysis of Milky Mist

Sentiment analysis of comments posted on social media concerning Milky Mist has been conducted in order to understand how the company's product line and use of social media platform as a communication tool is perceived by consumers. In total, there were 100 comments and reviews posted on social media platforms that have been analyzed using the VADER sentiment analyzer and sorted by five types of emotions.

In terms of emotions expressed in comments, it was found that the percentage of comments with highly positive sentiments (39%) was the highest followed by the neutral comments (28%), positive comments (25%), and negative comments (8%). There were no comments with highly negative sentiments. It can be said that there are positive emotions in relation to Milky Mist's use of social media and its product line among customers.

Some comments like "Looking amazing," "Taste is Good," "Very good," "Nice," and "Wow" show the presence of high consumer satisfaction with quality of product and promotional content provided by Milky Mist. Some comments, like "Too much sugar," and those related to product availability show that there is some dissatisfaction from customers about their products.

Table 2: Sentiment Category Distribution of Milky Mist Comments

Sentiment Category	Score	Count	Percentage (%)
Highly Positive	+2	39	39.0
Positive	+1	25	25.0
Neutral	0	28	28.0
Negative	-1	8	8.0
Highly Negative	-2	0	0.0

8.3 Sentiment Analysis of Mother Dairy

Sentiment analysis of social media comments about Mother Dairy helped determine consumer responses to its social media marketing efforts and product communication. In all, the comments and reviews of 85 consumers, obtained from social media sites, were analyzed using the VADER sentiment analyzer and classified into five types of sentiments: highly positive (+2), positive (+1), neutral (0), negative (-1), and highly negative (-2).

The results show that the largest percentage of comments were highly positive (41.18%), followed by neutral (36.47%), positive (20.00%), and negative (2.35%) comments. There were no highly negative comments made. Thus, the high percentage of highly positive comments shows that consumers had an excellent opinion about Mother Dairy's products and social media content. Several examples of highly positive comments included "Super," "Nice," and others.

Some consumers responded to Mother Dairy's product communications positively. On the contrary, neutral comments showed that most of the users did not have any special feelings when interacting with Mother Dairy's social media content. This can be explained by the fact that they simply used this site to get some information. At the same time, the low percentage of negative comments indicates a lack of dissatisfaction among consumers.

Table 3: Sentiment Category Distribution of Mother Dairy Comments

Sentiment Category	Score	Count	Percentage (%)
Highly Positive	+2	35	41.18
Positive	+1	17	20.00
Neutral	0	31	36.47
Negative	-1	2	2.35
Highly Negative	-2	0	0.00

This research shows that the feedback received by Mother Dairy through social media is mainly positive. This is demonstrated by the high percentage of both positive and highly positive comments, showing that consumers are engaged positively with the communications strategies of Mother Dairy. The fact that the percentage of negative comments is negligible means that consumers do not have many problems with this brand.

8.4 Sentiment Distribution Among Amul, Milky Mist and Mother Dairy: Comparative Analysis

Consumer responses towards the social media marketing activities of various value-added dairy products were compared for Amul, Milky Mist, and Mother Dairy brands. Social media comments and reviews about the three brands were analyzed for emotional content using the VADER sentiment analyzer tool to identify emotional trends in the

five groups: highly positive, positive, neutral, negative, and highly negative sentiments.

The analysis reveals some significant differences between the three brands. Mother Dairy had the highest share of Highly Positive comments (41.18%), whereas Milky Mist had 39.00% and Amul 33.04%. It appears that Mother Dairy was able to create more favorable emotions among consumers than other brands through its social media communications and product communication strategies.

In the category of Positive comments, Milky Mist had the highest share (25.00%), Mother Dairy 20.00%, and Amul 16.96%. Thus, Milky Mist was more appreciated by consumers for its product quality and attractiveness of promotion.

As far as the number of Neutral comments is concerned, Amul has a higher percentage share (46.43%), while Mother Dairy follows with 36.47%, and Milky Mist follows with 28.00%. It can be attributed to the higher percentage of neutral comments related to Amul products due to the issue of product unavailability, where consumers utilized the social media platform to ask questions about the availability of their products and purchase locations. It implies that even though Amul garners a high consumer presence on social media platforms, a significant percentage of its presence still holds informational value.

Table 4: Comparative Sentiment Distribution of Selected Dairy Brands

Sentiment Category	Amul (%)	Milky Mist (%)	Mother Dairy (%)
Highly Positive (+2)	33.04	39.00	41.18
Positive (+1)	16.96	25.00	20.00
Neutral (0)	46.43	28.00	36.47
Negative (-1)	3.57	8.00	2.35
Highly Negative (-2)	0.00	0.00	0.00

9. Conclusion

In the current study, the use of social media in marketing of the selected value-added dairy brands like Amul, Milky Mist, and Mother Dairy were assessed with the help of sentiment analysis of consumer feedback available on Instagram, Facebook, and X using the VADER sentiment analysis technique. Results showed that social media is a significant platform in influencing the perception and interaction of consumers about the dairy brands. Consumer generated content in the form of comments, reviews, and reactions offered useful information regarding consumer perceptions about dairy brands and marketing communication of brands to consumers.

Based on the sentiment analysis, all three brands attracted positive consumer sentiments with more highly positive, positive, and neutral reviews as opposed to negative ones. Of all the brands analyzed, Mother Dairy had the highest percentage of highly positive customer sentiments. This suggests that Mother Dairy attracted the most favorable consumer emotions for the content posted on their social media platforms. On the other hand, Milky Mist had a higher percentage of positive reviews but was also associated with more negative consumer sentiments owing to product issues. The highest percentage of neutral sentiments among the three brands was observed in Amul due to consumer interactions about the availability of the

products.

Based on the lack of presence of negative remarks from all the three brands, it can be concluded that they have a good digital brand image and that consumers are satisfied with value-added dairy products. Based on the research results, it is evident that social media marketing proves to be quite effective in creating consumer awareness, driving engagement and improving the brand perception in the competitive environment of the dairy industry. Nevertheless, there is a necessity to take into account several areas for improvement in order to raise consumer satisfaction and digital engagement levels among value-added dairy consumers.

Overall, it is safe to say that sentiment analysis based on the VADER model represents an efficient tool for analyzing consumer attitudes towards social media marketing actions of dairy brands. The results may prove useful for value-added dairy brands in improving their social media communication practices and building relationships with consumers.

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