

# Festive or Failure? Differences in Sentiments of Consumer Tweets on Amazon Festive Flash Sale before and after COVID-19

**Khayati Chadha**

Associate Consultant  
WIPRO, New Delhi  
INDIA

[khayatichadha@gmail.com](mailto:khayatichadha@gmail.com)

**Sunita Daniel**

Lal Bahadur Shastri Institute of Management  
Dwaraka, New Delhi  
INDIA

[sunitadaniel@lbsim.ac.in](mailto:sunitadaniel@lbsim.ac.in)

**Abstract**—Amazon’s Great Indian Sale is an annual mega shopping festival and provides an opportunity for retailers selling on e-commerce platforms to increase their sales, traffic as well as visibility. This study aims to understand consumer behaviour through the analysis of user-generated content (UGC) on social media concerning Amazon’s Great Indian Sale from 2015 to 2020. This time period was especially significant since it allowed for the analysis of differences caused by the pandemic. It was further divided into pre-COVID-19, during COVID-19 and post-COVID-19 period. The study also aims to establish a causal relationship between the feelings of engagement of the UGC on Twitter, with the strategies of marketing and promotion of the companies. Twitter’s API was used to extract the UGC. A two-step methodology was used to extract meaningful insights. First, Latent Dirichlet Allocation (LDA) was used to identify major topics related to the Flash sales organized during the festive season. Next, Sentiment Analysis was used to classify each tweet into Positive, Negative and Neutral Sentiments in order to understand user opinions and feelings towards the marketing campaign. It was found that both during the COVID period as well as the post COVID period, topics like Deals & Offers and Exclusive Promotions were positively perceived by consumers. Topics like Pre-event Excitement, Diwali Shopping Experience, Customer Support, and Money-saving Opportunities generated positive feelings during the pre-COVID times. During COVID times, positive sentiments were generated by topics like Delivery Workers and Attractive Deals for Gifting. On the other hand, topics like Insults and Noise generated negative sentiments in both the COVID and post COVID periods. The findings of this study are significant not only to improve and devise marketing strategies and social media content for E-commerce companies, but also to provide an understanding of the effectiveness of festive sales.

**Keywords**- Great Indian Sale; Consumer Behaviour; Topic Modeling; Sentiment Analysis

## I. INTRODUCTION

With the proliferation of reasonably priced internet services, smartphone devices and internet banking services, the opportunities for retailers to grow their businesses on online platforms have increased. The year 2013 marked the beginning of Indian Online retail sales during the Diwali Season which won the hearts of many customers. This trend raised the customers’ expectations for offers, discounts and cashback deal during the festival season. The festival season provides a plethora of opportunities for not only the sellers to boost the overall ticket size of both niche and regular product categories but also provides the shoppers to take advantage of “No EMI”, “Exchange Offers”, “Heavy Discounts”, “Combo Discounts”, “Free Delivery”, “Free Additional Warranty” and “Diwali Bonanza”. The aspirations of buyers have increased due to easy availability as well as affordability of a wide range of products leading to a rise in impulsive buying [1].

Diwali, which is considered to be one of the most auspicious festivals in India follows an age-old tradition of exchanging gifts, prayers, family gatherings, charitable giving and feasts. The exchange of gifts forms a part of traditional customs that reinforces strong bonds between families and friends and portrays the values of our Indian culture. The festival season has emerged to be a clear winner for e-commerce, since platforms like Amazon, Flipkart, Myntra, Snapdeal etc. help retailers to increase their visibility as well as reach for their products which helps them reap the benefits of economies of scale [2]. Due to these benefits, the e-commerce platforms have designed specific marketing campaigns and events for the Festive season like The Great Indian Festival Sale for Amazon, The Big Billion Days for Flipkart and Unlock Happiness Days for Snapdeal and many more. To design such campaigns, marketers need to conduct comprehensive research on consumer behaviour and their dynamic choices along with the buying pattern [3].

The Great Indian Festival Sale since 2015 has provided its customers with a plethora of offers on various products ranging

from electronic gadgets, books, smartphones, toys, clothing, grocery and many more. Amazon has organized various marketing campaigns during the Great Indian Sales such as "Tyohar Bade Dilwala!" launched in October 2016 with emphasis on the fact that the company recognizes and wants people to celebrate the festival of lights with magnanimous hearts. The company wants people to manifest benevolent acts not only for their family members and friends but also for society at large. In 2020, "Dastak Khushiyon Ki", was Amazon India's Diwali Campaign. This campaign emphasized the struggle of Corona warriors who went beyond their call of duty just to make the customer's life simpler. In 2021, Amazon launched the "Khushiyon ke Dibbe" or "Box of Happiness" campaign representing the A to Z of happiness. They claimed to carry the hopes and aspirations of lakhs of sellers across India [4].

Due to the unprecedented spread of the Coronavirus, the year 2020 led to a change in the spending habits of consumers and the way they shop. It confined the consumers to their homes due to the imposition of several lockdowns during the year 2020. As more and more people followed the Covid-19 norms such as social distancing, there was a drastic increase in the number of people who preferred to purchase through online platforms [5]. The pandemic compelled customers to switch to online platforms. Even though the deliveries were delayed and there was a shortage of supply, people continued to order through online platforms as they had no other option to rely on. The demand for various products grew multifold during this period for products such as disposable gloves, bread machines, soups, dried grains, packaged food etc. At the same time, there was a significant decrease in the purchase of luggage and suitcase, camera, clothing etc. [6].

According to research conducted by Quartz, it was found that people preferred to purchase electronic gadgets through online platforms even during Covid-19. However, for big-ticket products such as jewellery and furniture, they preferred offline stores. The research also stated that approximately 54% of the consumers were less likely to spend on Diwali in 2020 compared to 2019 [7]. Nevertheless, the e-commerce industry witnessed a growth of 40% in 2020 as compared to a 23% growth in 2019. There was an increase in the number of online shoppers from 135 million in 2019 to 160 million in 2020. This can be attributed to the safety as well as convenience attached to online shopping during the Pandemic. It is evident from the fact that during the Great Indian Amazon Sale 2020, 1.1 lakh sellers had received orders within the first 48 hours and a majority of the orders were placed from smaller parts of the country. Resulting in orders being placed from 98.3% of the pin codes of India during the festive season by Prime Members.

Amazon tried to understand what the consumers need and launched the Prime Membership program which aimed to provide a seamless experience to the customers. This membership allows its subscribers to get delivery services including one-day, two-day, same-day, scheduled, Sunday and Morning Deliveries [8]. The campaigns launched during the Diwali Season form an integral part of the yearly marketing plan. Amazon considers the festival season to be one of the heaviest periods in terms of advertising and operations [9]. To empower small and medium businesses (SMBs) hit by the unprecedented pandemic Amazon has made conscious efforts. They supported the sellers by offering a 50% waiver on Selling on Amazon (SoA) fees, a waiver on storage fees and a refund for cancelled orders. Amazon has also helped small businesses grow by

leveraging their brand on social media platforms and promoting goods made in India by local artisans and craft persons.

In this report, we have analysed tweets regarding the Great Indian Festival Sale organized by Amazon during Diwali every year. It provides an opportunity for increasing sales through marketing strategies. The main purpose of this report is to examine the worth of festive flash sales being organized by Amazon during the Diwali Season by analysing the User Generated Content (UGC) on social media [10]. We have used tweets as the UGC from social media. The first person to apply machine learning to Tweets was Go et al. [11]. The purpose was to understand the sentiments of the people using ML Algorithms as they are considered to be a comparatively better medium to understand the sentiments instead of extracting product reviews.

Moreover, the effectiveness of Marketing Campaigns is traditionally evaluated by conducting surveys or focus group interviews. Even though they generate valuable insights these methods tend to be time-consuming, and costly and restrict the customers to tailor their viewpoints according to the pre-determined questions. This makes it difficult to capture meaningful responses from customers and gather the information that suffers from self-selection and recall bias. Additionally, the evaluation of the marketing campaign can also be done by measuring the increase in the number of sales due to the campaign. But this method can be deployed in the post-campaign period. So, to measure the effectiveness of real-time marketing campaigns Sentiment Analysis can be used which will not only be cost-efficient but also justify the return on investment of marketing campaigns [12].

The most important objective of the study is not to control the variables or perform hypothesis testing but to discover them. The first objective is to identify the main topics in Twitter-based user interactions with the companies that participate in Amazon Great Indian Sale. The second objective is to extract insights related to the marketing campaigns organized during Festival Season by analysing the sentiments (positive as well as negative) in UGC topics published on Twitter related to the Diwali Sale Event and the third is to understand and establish a causal relationship between the feelings of the engagement of the UGC on Twitter, with the strategies of marketing and promotion of the companies. The present study aims to contribute towards bridging the gap in the previous literature review in which the effect of the corona virus on the flash sales event organized by e-commerce companies has not been studied. Therefore, the research is structured as follows. In section 2, we review the relevant literature. Sections 3 and 4 focus on methodology development and data analysis. In Section 5, we report the findings of the study followed by relevant discussions in Section 6. Section 7 draws and lists down the conclusion.

## II. RELATED WORK

Flash sales are promotional offers and discounts offered by online platforms for a limited period. Consumers are enticed to take impulsive decisions and buy on the spot as products are made available for a limited duration. It is done as a part of a promotional marketing tactic as it is extremely effective in terms of business growth, increased brand awareness etc. As a greater number of people are inclined to make purchases during festival season, running flash sales during this period is one of the best ways to boost revenue. The chances of increasing the number of loyal customers also increase as consumers are more likely to

buy from a platform that offers them good-quality products with huge discount offers [13].

So, to survive in the highly competitive and rapidly growing industry, e-commerce platforms indulge themselves in organizing flash sales events. Due to sales campaigns organized over the years, there has been a rise in website traffic, application downloads, etc. This is evident from the fact that during the year 2013-14, Amazon had organized, "The Great Diwali Sale" which earned a revenue of approximately Rs.169 crores. The revenue increased dramatically to Rs.1022 crores during the "Diwali Dhamka Week" held in the year 2014. In the year 2015, Amazon organized "The Great Indian Diwali Sale" which earned a revenue of Rs.2275 crores. Amazon was the first company to launch Flash Sales in the year 2013. Soon, Flipkart entered the market by launching Big Billion Day in the year 2014 and creating great hype. Snapdeal followed the market players and launched the "Snapdeal Diwali Bumper Sale" in 2014 itself [14]. The sales during the festive season account for 35-40% of annual revenue for most consumer companies in India. Companies like Samsung, One Plus etc. introduce new products during this festive time on e-commerce platforms.

Moreover, Covid-19 turned out to be a blessing in disguise for the E-Commerce Industry. There was a 25% spike in e-commerce sales in March 2020 alone. Amazon sold over 4000 items a minute by setting up lean supply chain systems during the pandemic [15]. As the users made purchases amounting to Rs 600 crores in the first 24 hours on Equated Monthly Instalments (EMI's). Due to the pandemic, there was a significant increase (169%) in e-commerce purchases from new or low-frequency users. The increase can be attributed to the imposition of a nationwide lockdown leading to an 18% increase in the time spent per visitor per month during March in 2020. April 2020 recorded the highest level of time spent per visitor per month. On average 4% of the total time spent online by consumers was spent on E-commerce websites such as Amazon, Flipkart etc. However, the consumers became mindful and cost-conscious while making their purchases. They have been mainly driven by the need for sourcing essential items [16].

Even before the pandemic, the e-commerce industry had witnessed record-breaking sales in the year 2019 during the Diwali season. There was a tremendous increase in the number of online shoppers. The sales grew by 7-9% for apparel, smartphones, electronics and consumer products when it comes to Diwali, Indian consumers can break any record of shopping as the most common thing during this time is shopping [17]. So, to cater to the increased demand due to the Great Indian Festival sale in 2019, Amazon had hired 90000 people. It was done to boost its delivery capabilities and enhance customer experience. Amazon had also opened the largest warehouse in West Bengal to increase the storage capacity [18]. Additionally, during this duration, there was a significant increase in audience engagement across different cities. Twitter saw engagement from people and some of the top trending hashtags used were #bigbilliondays, #badedilwale, #amazon, #greatindianfestival and many more. At the same time, many complaints were registered due to delays in deliveries, server issues and memes regarding bluff and fraud being played by these companies. Amazon took cognizance of this fact and went ahead to make the Great Indian Festival more fun and rewarding. They tried to make the process of ordering simple by allowing customers to place orders using their voice in Hindi in addition to English. They also enabled customers to shop in languages of their choice

including English, Hindi, Tamil, Telugu, Malayalam, Kannada, Bangla and Marathi making it accessible to all. To make faster and more reliable deliveries during the Great Indian Festival sales Amazon created more than 110000 seasonal job opportunities and expanded its fulfilment network by increasing its storage capacity by 40% .

To obtain insights into customer attitudes and beliefs, measuring customer satisfaction machine learning techniques like Sentiment Analysis can be used. As it enables marketers to gather rich data on a real-time basis. This analysis is considered to be an effective measure to understand the opinions of customers. However, it sometimes becomes difficult for machines to comprehend as people might use short phrases [19]. It is the need of the hour to ensure that the customer does not get dissatisfied. So, the researchers have used Voice of customers to understand how customers, feel about products companies the researchers used text mining and sentiment analysis on UGC. They have analysed the relationship between structured and unstructured data. The unstructured data included the customer sentiments from the feedback received. And the structured data includes user reviews or ratings [20].

### III. METHODOLOGY DEVELOPMENT

#### A. Data Collection

In this study, we use a two-step methodological procedure applied to the UGC from social networks. To retrieve data from Twitter, the first step was to apply for Twitter Developer Account and obtain the Twitter API. Once, the request was approved an application was set up to fetch the data from Twitter [21]. Tweepy, a library of python was installed and used to extract the tweets. To fetch relevant data, hashtags were used. They are commonly used by Twitter users to not only categorize but also allow their users to search for a particular topic easily. With the help of tweepy, information regarding the tweet content, hashtags, and date were extracted. Only tweets that were in English were used to perform the sentiment analysis. The tweets were sorted according to the date to categorize them into pre, during and post corona.

Original tweets were collected from three time periods to examine the difference in the sentiments pre, during and post corona towards festival sales organized by e-commerce companies. The first period contains tweets from the year 2015 to 2019. Since Diwali in 2019 was held in October, it has been put into pre-corona tweets. The second period was during corona i.e., 2020. The third period categorized as post corona was for the year 2021. Our data were Twitter user interactions throughout sales, 2 days before the Great Indian Sale Event in India, the main days of the Festival Sale, and 2 days after the event. Data collection was performed for 13th October 2015 to 17th October 2015, 25th October 2016 to 28th October 2016, 14th October 2017 to 17th October 2017, 10th October 2018 to 15th October 2018, 13th October 2019 to 17th October and 5th November 2020 to 13th November 2020, 24th October 2021 to 5th November 2021. To extract relevant tweets, different hashtags were used relating to the Amazon Great Indian Sale such as #AmazonGreatIndianFestivalSale, #DiwaliOnAmazon,

#AmazonHappinessUpgradeDays,  
#AmazonGiftingHappinessDays,  
#AmazonKhushiyonKiWishlist,  
#AmazonFestiveHome,  
#AmazonFestivalIsBack,  
#AmazonDiwaliSpecial.

To perform an analysis of the data, duplicate tweets were removed using the drop duplicates function of pandas to avoid a biased analysis. Additionally, since the main focus was on analyzing Natural Language Processing (NLP), the images and videos contained in the tweets obtained were not analysed. A total of 7500 tweets were extracted from users spread across India. 2500 tweets each were collected for pre, during and post corona respectively.

#### B. Data Pre-processing

One of the most important steps in Machine Learning is to pre-process the data. The objective is to get more meaningful data from which insights can be drawn [22]. Pre-processing of data means removing punctuations, stop words, special characters, hashtags, multiple spaces, lowering all texts, removing URLs, etc. [23]. The main purpose of pre-processing was to clean the data extracted from Twitter as data is usually not clean and contains elements that are not useful for analysis.

NeatTextis, a package used for cleaning textual data and text pre-processing was used. This package in python enables to reduce noise i.e., removes special characters, and stops words in textual data. NEAT in the package is an acronym that stands for New Experimental Application of Tech. [24]. After applying the pre-processing steps, a new column "tidy\_tweet" was created to store the cleaned tweets in a new column. After applying the neat text library, the tweets were tokenized. Tokenization essentially means splitting an entire text document into smaller units. The smaller units are known as tokens. This step is important to interpret easily the words presented in the text. We have used the split () function to tokenize the tweets. The next step was to perform stemming. Stemming helps to reduce the words to their root form. Additionally, to get better analysis and interpretation, stop words were downloaded from the NLTK library and a custom stop word list was created to remove words that were not relevant for the analysis.

#### C. Text Clustering

After pre-processing the dataset, Latent Dirichlet Allocation (LDA) was performed, and one of the open-source libraries for python Gensim was used. This library is used in the case of unsupervised machine learning algorithms to process raw texts. The main step to perform LDA includes creating a dictionary and corpus using the pre-processed data. Corpus is a mapping of word id and word frequency which was created using the bag of words method. Then the next step was to find the optimal number of topics. We calculated the coherence score, alpha parameter, and beta parameter for topics ranging from 2 to 11.

Coherence to Topic measures the degree of similarity between high scoring words in each topic. The higher the coherence scores the more is the similarity found between high scoring words for different topics. Alpha represents the topic

density for the document wherein each row represents the document and each column represents a topic. A higher alpha value represents a higher number of topics in each document. With the increase in the alpha value, the sparsity decreases. Beta represents the density of words per topic wherein each row represents a topic and each column represents a word. Higher beta values represent a large number of words in each topic. Both the hyperparameters, alpha and beta are assumed to be symmetrically distributed in LDA models. Symmetrical distribution implies that every topic is evenly distributed throughout the document. After obtaining different combinations of coherence scores, alpha and beta, we selected the optimal number of topics upon which further analysis was performed [26],[27].

#### D. Components and Data Analysis

The validation set that yields the highest coherence score having a symmetric distribution is considered the best to choose the optimal number of topics from the textual dataset. The reason for selecting the highest coherence score is to ensure more similarity between high scoring words in each topic. An alpha value of 0.01 and a beta value of 0.1 are considered to be optimal. Before the year 2020, we decided to choose K=9 (implying 9 topics with alpha= 0.01 and beta= 0.91). During corona, we decided to choose K=10 (implying 10 topics with alpha=0.01 and beta=0.91) which was used to train the LDA model. The post covid during the year 2021, we decided to choose K=8 (implying 8 topics with alpha = 0.01 and beta = 0.91). Then, the dominant keywords appearing in each topic were identified and the topic was assigned to each tweet. Subsequently, the word counts, as well as the importance of keywords appearing in the topic, were identified and plotted.

Next, the data was analysed through the textual component of Twitter by sentiment analysis. In this paper, we have decided to use Text Blob, which is a library used for Natural Language Processing in Python The polarity score helps to understand the overall sentiment of the review. Polarity lies within the range of -1 to +1, where both the values are included. A tweet is classified as positive if the value of polarity is greater than or equal to 0.05. A tweet is classified as negative if the value of polarity is less than or equal to -0.05 and for any value between -0.05 and 0.05 the tweet is classified as neutral [25]. Both the datasets were merged (sentiment calculation dataset and topic assigned dataset) to perform further analysis.

## IV. RESULTS

After discovering the optimal number of topics having the highest coherence score, an alpha value of 0.01 and a beta value of 0.91, 9, 10 and 8 topics linked to the Amazon Great Indian Festival Sale in the Pre-Corona times and during Corona times and post corona times were identified respectively. In this process, the keywords, representative text and topic importance were identified to frame topic names that would make sense. Topics were formulated by discovering the 10 most important keywords along with the representative text.

After assigning topics, insights about consumer behaviour and their perceptions about the Amazon Great Indian Sale were evident. These insights will be helpful for companies organizing flash sales during the festive season. Then, they were

classified into positive, negative and neutral sentiments using the Text Blob library of python. Table 1 below shows the 10 most important keywords, along with the topic name, description and sentiment in pre-corona times.

One of the most important inferences from the topics identified using Latent Dirichlet Allocation was that consumers expressed positively toward deals, offers and exclusive promotions during the Diwali season as it provided them with

TABLE 1 : KEYWORDS, TOPIC NAME & SENTIMENT (PRE-CORONA)

Topic No	Keywords	Topic Name	Topic Description	Sentiment
0	Diwali, deal, wait, offer, amazing, October, discount, ready, price, go	Diwali Discounts & Offers	User's opinions about discounts and offers during the Great Indian Amazon Festive Sale	Positive
1	shop, Diwali, save, wait, money, offer, eagerly, courier, awesome, find	Money-Saving Opportunity	User's opinions and comments about cashback and other opportunities offered for saving money	Positive
2	service, product, mark, look, know, option, Diwali, do, buy, order	Delivery related Issues	User's opinions about delivery services provided by Amazon	Neutral
3	excitement, bad, mobile, experience, support, wait, try, fabulous, order, do	Reasonable Price	User's feelings towards the price at which various products are offered for sale during the festive season	Neutral
4	the deal, do, miss, shop, love, today, amazing, play, Diwali, time	Exclusive Promotions	User's opinions regarding exclusive promotions during the Diwali season	Positive
5	Diwali, ready, shopping, come, October, time, list, awesome, guy, shop	Diwali Shopping Experience	Shopping experience of users expressed on Twitter during Diwali	Positive
6	excited, super, miss,	Pre-Event	The excitement	Positive

	upcoming, guy, contest, little, deal, Diwali, order	Excitement	amongst consumers before the festive season sale	
7	Diwali, shopping, offer, order, thank, bring, trust, support, purchase	Customer Support	User's opinion about the customer sales representative of Amazon	Positive
8	Service, order, bad, delivery, deliver, experience, Diwali, time, do, pathetic	Insults and Noise	User's feelings towards amazon products due to fraud or scams during the Amazon Great Indian Sale Event	Negative

the opportunity to save their hard-earned money. Furthermore, the consumers were eagerly looking forward to the flash sales of Amazon taking place during the festive season. This was evident from the positive tweets generated in topic 6 where words like eagerly waiting, looking forward, super excited etc. were used by Twitter users.

However, we also identified that consumers were disheartened due to frauds, scams, delayed and faulty delivery of products, poor customer support service, improper behaviour of delivery workers, auto cancellation of orders due to a large number of orders being placed at the same time, late or no refunds, server issues, difficulty in exchanging products etc. As a result, there were a lot of insults and noise where some people tweeted negatively about the campaign and the irresponsible behaviour of the customer service representatives. A few of them used hashtags like #BoycottAmazonGreatIndianSale, #PatheticService, #FraudonDiwali etc. which hampered the online reputation of the company.

These findings were consistent with previous reports such as the Blue Ocean report, where the author stated that flash sales result in consumers posting tweets, creating memes and trolls when consumers face issues relating to delivery, server, packaging, quality etc., [29]. Consumers tend to get angry and disheartened when they are shown an advertisement offering the product at a certain price with a discount but when they visit the website, they do not see any discount and the product is being offered at MRP. Additionally, based on the results from the sentiment analysis, consumers had a surprisingly neutral attitude towards the price at which various products were offered.

One of the most important inferences from the topics identified using Latent Dirichlet Allocation was that consumers expressed positively for deals, offers, attractive deals for gifting and the contribution of delivery workers during the corona times. Some of the Twitter users believed that Amazon provided its service even during corona times and had put delivery workers at risk. However, some of them were thankful to Amazon for rendering the services despite the pandemic. The users also expressed the comfort at which they were able to



negative tweets. Surprisingly, the shopping experience of the customers, payment and stock or inventory related issues did

TABLE 3 : KEYWORDS, TOPIC NAME & SENTIMENT (DURING CORONA TIMES)

Topic No	Keywords	Topic Name	Topic Description	Sentiment
0	Order, do help, cancel service, deliver, Diwali, receive, delivery, time, comfort, home	Shopping experience during Corona	User's comments and opinions about the quality of products offered	Negative
1	Diwali, do, service, offer, cashback, know, purchase, buy, order, iPhone, unethical amazon, sucks amazon, want money	Quality Issues	User's comments and opinions about the quality of products offered	Negative
2	service, product, mark, look, know, option, Diwali, do, buy, order	Delivery related Issues	User's opinions about delivery services provided by Amazon	Neutral
3	Delivery, deliver, diwali, order, product, provide, service, book, agent, frontline, worker, duty, call, beyond	Delivery Workers during Corona	User's opinions about delivery workers rendering their services during Covid-19	Positive
4	Delivery, service, company, bad, diwali, time, order, good, money, quality, logistic	Delivery issues during Corona	User's opinion about delivery of products during Covid-19	Negative

5	service, pathetic, delivery, order, deliver, diwali, day, provide, poor, do, bad, quality, insensitive	Insults and Noise	User's feelings towards amazon products due to fraud or scams during the Amazon Great Indian Sale Event	Negative
6	price, diwali, deal, offer, good, discount, time, day, refund, well, prime, members, resist, buy	Exclusive Promotion	Twitter user's feelings towards limited duration sale for particular items	Positive
7	gift, want, bad, people, card, send, thing, money, diwali, time, cheat, trust, bogus, sue	Trust Issues	Twitter user's feelings of disgust and hatred	Negative
8	time, delivery, service, return, refund, order, diwali, deliver, item, amazing, time, pooja, connected	Customer Support	Returns and Refunds being taken care by customer care agents	Negative
9	laptop, gift, diwali, order, business, know, good, need, delivery, buy	Attractive deals for gifting	Twitter user's opinions and comments for various attractive deals being offered during Amazon Great Indian Festival Sale	Positive

not turn out to be a major cause of concern for the customers. Table 3 below shows the 10 most important keywords, along with the topic name, description and sentiment identified using python in the post-corona times.

These outcomes showed that Amazon took cognizance of all the issues they had faced while organizing the Great Indian Diwali Sale in the previous years.

V. DISCUSSION

An intriguing finding in our results is that, in the identified topics, deals, offers, promotions, and shopping experience

TABLE 4: WORD CLOUD OF TOPICS (DURING CORONA TIMES)

<p>TOPIC 0 -SHOPPING EXPERIENCE (CORONA)</p> 	<p>TOPIC 5 INSULTS AND NOISE</p> 
<p>TOPIC 1-QUALITY ISSUES</p> 	<p>TOPIC 6 EXCLUSIVE PROMOTIONS</p> 
<p>TOPIC 2 DELIVERY WORKERS (DURING CORONA)</p> 	<p>TOPIC 7 TRUST ISSUES</p> 
<p>TOPIC 3 DEALS AND OFFERS</p> 	<p>TOPIC 8 CUSTOMER SUPPORT</p> 
<p>TOPIC 4 DELIVERY ISSUES</p> 	<p>TOPIC 9- ATTRACTIVE DEALS FOR GIFTING</p> 

received invariably positive results. Table 1 shows the keywords, topic name and sentiment and Table 2 shows the



Word Clouds for each of the Topics generated for the pre-corona times. Topic 0 was Diwali deals and offers which generated positive feelings towards the sales event. The users

TABLE 5 : KEYWORDS, TOPIC NAME & SENTIMENT (POST CORONA)

Topic No	Keywords	Topic Name	Topic Description	Sentiment
0	service, time, team, deliver, issue, good, order, bad, receive, diwali	Insults and Noise	User's feelings towards amazon products due to fraud or scams during the Amazon Great Indian Sale Event	Negative
1	order, time, available, buy, delivery, do, say, know, today, deliver	Shopping Experience	User's opinion about Amazon services post Covid-19	Neutral
2	order, do, help, know, deliver, delivery, website, link, kindly, book	Competitive site's review	User's opinions about about competitive as well as Amazon's site	Neutral
3	team, support, order, account, concern, check, social media, kindly, provide, refund, do	After sales services	User's feelings towards after sales services provided by Amazon season	Positive
4	service, issue, jeffbezo, diwali, request, concern, order, day, watch, payment	Payment related issues	User's opinions about payment options of products post Covid-19	Neutral
5	order, delivery, deliver, company, offer, do, item, sure, help, jeffbezoz	Delivery related issues	User's opinions about delivery of products post Covid-19	Negative
6	price, do, money, diwali, stock, sell, day, issue, available, wrong	Stock related issues	User's opinion about inventory of products post Covid-19	Neutral

7	time, return, order, deliver, cancel, customer, product, fraud, jeffbezo, money	Customer Support	Returns and Refunds being taken care by customer care agents	Positive
---	---	------------------	--	----------

have described their opinions by using words like mind-blowing deals, amazing products etc. Topic 1 was money-saving opportunities which also reflected the positive attitude of users as words like save money, shopping with cashback was evident from the word cloud. Topic 2 was relating to delivery issues faced by consumers. This topic came out to be neutral. Topic 3 was Reasonable prices, where users used words like fabulous, worst etc. Topic 4 was related to exclusive promotions offered during the festive sale. Topic 5 was related to the shopping experience of users. Similarly, topic 6 was related to the excitement of people even before the flash sales event had started. This reflected the mental state of the customers before corona. Topic 7 and 8 were related to customer support and insults and noise.

Table 3 describes the keywords and the topics generated along with the sentiments during corona times and Table 4 shows the Word Clouds for each of the Topics generated during-corona times. Topic 0 was the shopping experience during Covid-19 which was associated with negative sentiments and words like a refund, return, help, fraud, cancelled etc. appeared in the word cloud. The word cloud of Topic 1 generated words like don't purchase, disappointed, terrible, amazon help, and customer support. It was related to quality issues faced by customers. Topic 2 was related to delivery workers during corona words like Dharmesh, awesome, delivery agent, thank you, cautious appeared in the word cloud. Topic 3 was related to deals and offers and hence words like gift, money, shopping etc. appeared. Topic 4 was related to delivery issues during Covid-19, best, received, experience, and worst appeared in the word cloud. Topic 5 was related to insults and noise and hence words like pathetic, seller, fake, and worst appeared in the word cloud. Topic 6 was related to exclusive promotions. Topic 7 was related to trust issues and words like fool, immortal, fear, don't appear in the word cloud. Topic 8 was related to customer support and hence words like return, refund, delivery, time, and the order appeared in the word cloud. Topic 9 was related to attractive deals for gifting and hence words like a laptop, online classes, business, website, gift, details, email etc. appeared in the word cloud.

Table 5 shows the keywords, topic name and sentiment for post corona period and Table 6 shows the Word Clouds for each of the Topics generated for the post-corona times. Topic 0 was a negative sentiment among the customers. The user's felt that there was frauds and scams happening in the Great Indian Amazon Sale. Products were not delivered in time. Topic 1 was about the shopping experience. The word cloud shoes that words like time, delivery, order etc were highlighted. Topic 2 was related to competitive site's review. Words like deliver, delivery, website, ecommerce etc were the keywords. The customers were neutral as far this topic was concerned. Topic 3 was related to after sales service. Words like refund, social media are the words which occurred frequently in this topic.

Topic 4 was about payment related issues. Words like watch, service, credit card appeared in the word cloud. Topic 5 was related to delivery and so words like delivery, worst, order item appeared in the word cloud. Topic 6 was related to stock and Topic 7 was related to customer support which was positive.

## VI. CONCLUSIONS AND FUTURE WORK

In this article, our main focus was on flash sales conducted by Amazon during the Diwali season from 2015 to 2021. We used user-generated content available on Twitter to analyse the various aspects of the event like offers, discounts, attractive deals, shopping experience, customer support and insults and noise. It was evident from the results that companies should avoid activities that spread negativity about the company. As these negative tweets on social media platforms impact the public image of the company. LDA was used to identify topics relating to the sale for both the pre-corona and during corona periods. The text blob library was used to understand the sentiments associated with the tweets and provide meaningful insights. The results obtained from the analysis can be used to formulate the company's strategies for promoting it on social media platforms.

### A. *Theoretical Implications*

Out of the topics identified using LDA during the three periods, five topics namely, offers and discounts, insults and noise, exclusive promotions, customer support and shopping experience of customers can be used to conduct further research as independent variables to establish a statistical relationship using SPSS or other quantitative analysis methods. Additionally, academicians must keep in mind that the machine learning techniques are increasing exponentially, so the latest techniques and approaches can be applied to gather additional insights and further improve the reliability of the results.

### B. *Managerial Implications*

From the positive sentiments analysed in the UGC, it was evident that consumers get attracted to deals, offers, exclusive promotions, cashback deals etc., where the discounts are real. On the other hand, the negative sentiments need to be analysed and the marketers of e-commerce companies should follow certain rules when they devise marketing strategies. Firstly, these companies should not create false hopes in the minds of consumers and entice them into impulsive buying by raising the price of goods just a week before the sales and then decreasing the price to highlight discounts during flash sales. Unreal discounts and promotional offers impact the image of the company negatively. This is one of the most common tactics used by marketers while devising strategies which result in consumers feeling dissatisfied and unhappy. This makes it difficult for customer support to handle such grievances

Additionally, reviews of customers on applications, tweets, or any form of user-generated content posted on social media platforms should be replied to as soon as possible, and the user should be satisfied with the response to avoid any bad word of mouth comments floating on these platforms. However, at the same time, the content should be verified to avoid the possibility of fraud.

The e-commerce companies should also ensure that the customer support agents and the delivery agents are rendering their services as per the expectations of the customers. To do so, rating systems can be used, which will ask about the level of satisfaction of customers after the delivery agent delivers the products or after a customer click on customer support. This will ensure that the customers do not get dissatisfied with their services and continue to trust the platform. So, the findings of our study underscore the importance of real discounts, offers and promotions on products available on e-commerce sites.


Thus, from the research, we can infer that the major reason for customers being dissatisfied was either related to delivery issues, quality issues, and customer support. The pandemic may prevail for a longer time and more and more consumers will prefer online e-commerce platforms. Meanwhile, the managers must ensure that customer grievances posted on the internet and otherwise are handled properly and the products listed on the website by various sellers are checked for quality specifications to avoid negative posts related to quality. The advertisements and campaigns must target the strong and highly reliable customer support services offered as long-term sustainable goals must go on in the organizations.





The limitations of the present study are related to the use of sentiment analysis on User Generated Content to extract tweets using the Twitter API. The main concern was that Twitter's API allows limited search in terms of both volumes as well as time. Additionally, private tweets cannot be extracted using the API. As a result of which our analysis is limited to the limit till it was publicly available on social media platforms. The paper examined the change in sentiments of consumers towards festival sale events organized by Amazon only. Furthermore, tweets relating to contests conducted on Twitter to increase the visibility as well as traffic on the website were removed to understand the sentiments of people properly and provide meaningful insights. In addition, only festive sales organized during the Diwali Season were considered. Another limitation of using sentiment analysis is the fact that computer algorithms cannot identify sarcasm, irony, negations, jokes and exaggerations. As a result of this, results may be skewed. Only 2500 tweets each for the three periods were considered. The automatic identification of topics and feelings related to Amazon Great Indian Sale using the Text Blob library is another limitation as although LDA is a mathematical model, for selection of the names of the topics qualitative intervention is required.

The same methodology of extracting meaningful insights from user-generated content can be used to compare user content generated by other e-commerce websites organizing flash sales or otherwise. Moreover, this methodology can be applied to other countries' e-commerce sites. Apart from this, user-generated content from other sources such as emails, support tickets, chats, social media conversations, surveys, articles, documents, etc. can be used to draw meaningful insights. This study can be further extended by examining specific companies relating to a particular category say, technology and product reviews of particular companies appearing on the e-commerce websites can be used to understand the sentiments of customers. To drive additional

insights, other machine learning techniques and methods can be applied to improve the reliability of results. Additionally, instead of using Text Blob to classify the tweets, Krippendorff's alpha value i.e., KAV can be used to identify and verify the reliability of the results. Moreover, the results drawn from this study can be used by other researchers and academicians for comparative and evolutionary studies which are primarily focused on social media platforms

TABLE 6: WORD CLOUD OF TOPICS (POST-CORONA TIMES)

<p style="text-align: center;"><b>TOPIC 0 – INSULTS AND NOISES</b></p> 
<p style="text-align: center;"><b>TOPIC 1- SHOPPING EXPERIENCE</b></p> 
<p style="text-align: center;"><b>TOPIC 2 COMPETITIVE SITES REVIEW</b></p> 
<p style="text-align: center;"><b>TOPIC 3 AFTER SALES SERVICE</b></p> 

<p style="text-align: center;"><b>TOPIC 4 PAYMENT RELATED ISSUES</b></p> 
<p style="text-align: center;"><b>TOPIC 5 DELIVERY RELATED ISSUES</b></p> 
<p style="text-align: center;"><b>TOPIC 6 STOCK RELATED ISSUES</b></p> 
<p style="text-align: center;"><b>TOPIC 7 CUSTOMER SUPPORT</b></p> 

REFERENCES

- [1] Vishant, P. Diwali, the Golden season of Indian ecommerce- What did the past years sales reveal? (March 2021) [Diwali, the Golden season of Indian ecommerce - What did the past years' sales reveal? \(indianonlineseller.com\)](https://www.indianonlineseller.com)
- [2] Exporters India.com. What is the importance of Diwali gifts in India? (November 2020) <https://www.exportersindia.com/blog/what-is-the-importance-of-diwali-gifts-in-india.htm>

- [3] Rakshit, P., Srivastava, P. K., Afjal, M., & Srivastava, S. K., "Sentimental Analytics on Indian Big Billion Day of Flip Kart and Amazon" *SN Computer Science*, 2(204) (2021), <https://doi.org/10.1007/s42979-020-00441-3>
- [4] Amazon. In . The Great Indian Festival live now; this festive season, bring home Khushiyon ke Dibbe! (2021) <https://www.aboutamazon.in/news/amazon-india-news/the-great-indian-festival-starts-oct-3-this-festive-season-bring-home-khushiyon-ke-dibbe>
- [5] Andrienko, O. What businesses should do to survive Covid-19 (2020). <https://www.semrush.com/blog/ecommerce-covid-19/>
- [6] Jones, K., The Pandemic Economy: What are shoppers buying online during covid-19 (2020). <https://www.visualcapitalist.com/shoppers-buying-online-ecommerce-covid-19/>.
- [7] Kapur, M. Urban Indians aren't upbeat about shopping this Diwali Season (2020) <https://qz.com/india/1920101/indians-want-to-spend-less-this-diwali-but-will-buy-smartphones/>
- [8] Social Samosa. As a part of their Diwali campaign, Amazon India brings tales from the length & breadth of the country, inspiring us one story at a time (2020). <https://www.socialsamosa.com/2020/10/diwali-campaign-amazon-india-dastak-khushiyon-ki/>
- [9] Social Samosa. Your package of Amazon Diwali Campaigns has arrived (2020) <https://www.socialsamosa.com/2020/10/amazon-india-diwali-campaigns-over-the-years/>
- [10] Saura, J. R., Reyes-Menendez, A., & Palos-Sanchez, P. Are black Friday deals worth it? Mining Twitter users' sentiment and behavior response. *Journal of Open Innovation: Technology, Market, and Complexity*, 5(3), 58 (2019)
- [11] Go, A., Bhayani, R., & Huang, L. Twitter sentiment classification using distant supervision. *CS224N project report*, Stanford, 1(12), 2009
- [12] Philander, K., & Zhong, Y. Twitter sentiment analysis: Capturing sentiment from integrated resort tweets. *International Journal of Hospitality Management*, 55, 2016, pp 16-24
- [13] Send Pulse, What is a Flash Sale: Ideas and Tips? (2019) <https://sendpulse.com/support/glossary/flash-sale>
- [14] Sujata, J., Menachem, D., & Viraj, T. Impact of Flash Sales on Consumers & E-Commerce Industry in India. In *Annual International Conference on Qualitative & Quantitative Economics Research* (pp. 11-19), 2017.
- [15] Kunchaparthi, S. Impact of COVID 19 on E-commerce, *Journal of Interdisciplinary Cycle Research*, pp 1161-1165 (September 2020)
- [16] United Nations Conference on Trade and Development, Covid-19 and E-Commerce: Impact on businesses and policy responses (2020) <https://unctad.org/publication/covid-19-and-e-commerce-impact-businesses-and-policy-responses>
- [17] Gupta, M., Indian e-Commerce performs amazingly during Diwali Festival (2020) <https://cedcommerce.com/blog/indian-ecommerce-performs-amazingly-during-diwali-festival/>
- [18] Mint, Amazon adds 90,000 jobs in India ahead of Great Indian Festival Sale 2019 (2019) <https://qz.com/india/1920101/indians-want-to-spend-less-this-diwali-but-will-buy-smartphones/>
- [19] Rambocas, M., & Gama, J. Marketing research: The role of sentiment analysis (No. 489). *Universidade do Porto, Faculdade de Economia do Porto*. (2013) <http://wps.fep.up.pt/wps/wp489.pdf>
- [20] Gallagher, C., Furey, E., & Curran, K, The application of sentiment analysis and text analytics to customer experience reviews to understand what customers are really saying. *International Journal of Data Warehousing and Mining* , 15(4), 2019, pp 21-47.
- [21] Dandir, S., Extracting Data from Twitter using Python. (2020) <https://towardsdatascience.com/extracting-data-from-twitter-using-python-5ab67bff553a>
- [22] Eftimoska, C., Data preprocessing for Machine Learning in Python (2020) <https://towardsdatascience.com/data-preprocessing-for-machine-learning-in-python->
- [23] Weng, J., NLP text preprocessing: A practical guide and template. (2019) <https://towardsdatascience.com/nlp-text-preprocessing-a-practical-guide-and-template-d80874676e79>
- [24] Charis, J., Neat text documentation (2019) <https://blog.i-charistech.com/neatext/-allocation-e7ff75290f8>
- [25] Naushan, H., Topic Modeling with Latent Dirichlet Allocation (2020) <https://towardsdatascience.com/topic-modeling-with-latent-dirichlet-allocation-e7ff75290f8>
- [26] Monkey Learn, Sentiment Analysis: A Definitive Guide (2018) <https://monkeylearn.com/sentiment-analysis/>
- [27] Sarkar, D. Emotion and Sentiment Analysis: A Practitioner's Guide to NLP. (2018). <https://www.kdnuggets.com/2018/08/emotion-sentiment-analysis-practitioners-guide-nlp-5.html>
- [28] H. Goto, Y. Hasegawa, and M. Tanaka, "Efficient Scheduling Focusing on the Duality of MPL Representatives," *Proc. IEEE Symp. Computational Intelligence in Scheduling (SCIS 07)*, IEEE Press, Dec. 2007, pp. 57-64, doi:10.1109/SCIS.2007.357670.
- [29] India Retailing, Amazon's Great India Sale had highest traffic during sale period: Blueocean Report (2016) <https://www.indiaretailing.com/2016/10/18/research/amazon-s-great-india-sale-had-highest-traffic-during-sale-period-blueocean-report/>