

THE RAPID RISE OF CGI ADVERTISING: BRINGING THE IMPOSSIBLE TO LIFE

BRZI RAST CGI OGLAŠAVANJA: OŽIVLJAVANJE NEMOGUĆEG



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Abstract

Purpose – The purpose of this study is to analyze consumer comments on Computer-Generated Imagery (CGI) advertisements for Maybelline and L’Oreal Paris brands using sentiment analysis. The aim is to identify the reactions of consumers to these innovative advertising formats and the general trends of the comments.

Design/Methodology/Approach – In the research study, online consumer comments on Maybelline and L’Oreal Paris CGI advertisements were collected and evaluated using the sentiment analysis method. The data was analyzed using natural language processing (NLP) tools, which allow comments to be categorized as positive, negative, or neutral, and Ekman’s sentiment analysis method.

Findings and Implications – The results of the analyses show that the majority of comments for both brands are positive, creating emotions of joy and surprise in consumers. This reveals that CGI advertisements have an overall positive impact on consumers. The findings emphasize that brands can use CGI technology as an effective tool to strengthen consumer perception. Managerial implications point to the importance of brands adopting innovative advertising strategies by investing in CGI ads.

Limitations – The present research is limited to CGI adverts of Maybelline and L’Oreal Paris brands only. More-

Sažetak

Svrha Svrha je rada analizirati komentare potrošača na oglase s računalno generiranim slikama (*Computer-Generated Imagery* - CGI) korištenjem analize sentimenta za marke Maybelline i L’Oreal Paris. Istraživanje nastoji otkriti reakcije potrošača na ove inovativne formate oglasa te opće trendove u komentarima.

Metodološki pristup U istraživanju su prikupljeni i metodom analize sentimenta procijenjeni *online* komentari potrošača o CGI oglasima marki Maybelline i L’Oreal Paris. Podatci su analizirani pomoću alata za obradu prirodnog jezika (NLP) koji omogućuju kategorizaciju komentara kao pozitivnih, negativnih ili neutralnih te korištenjem Ekmanove metode analize sentimenta.

Rezultati i implikacije Rezultati analize pokazuju da je većina komentara za obje marke pozitivna te stvara radost i iznenađenje kod potrošača. To upućuje na to da CGI oglasi općenito imaju pozitivan utjecaj na potrošače. Nalazi naglašavaju da marke mogu koristiti CGI tehnologiju kao učinkovit alat za jačanje percepcije potrošača. Menadžerske implikacije pokazuju važnost usvajanja inovativnih strategija oglašavanja maraka kroz ulaganje u CGI oglase.

Ograničenja Istraživanje je ograničeno samo na CGI oglase maraka Maybelline i L’Oreal Paris. Nadalje, analizirani komentari prikupljeni su isključivo s *online* platformi.

over, the comments analyzed were collected solely from online platforms.

Originality – This is one of the limited number of studies analyzing the emotional reactions to CGI advertisements based on consumer comments. It fills an important gap in the literature by examining consumer perception of CGI advertising in depth.

Keywords: CGI, advertising, digital marketing, artificial intelligence, sentiment analysis

Doprinos Istraživanje je jedno od rijetkih koje analizira emocionalne reakcije na CGI oglase temeljem komentara potrošača. Detaljnim ispitivanjem percepcija potrošača prema CGI oglašavanju popunjen je važan jaz u literaturi.

Ključne riječi: CGI, oglašavanje, digitalni marketing, umjetna inteligencija, analiza sentimenta

1. INTRODUCTION

With the rapid increase in digitalization today, the way brands interact with consumers is undergoing a radical transformation. Computer Generated Imagery (CGI) has become an important part of this transformation, enabling brands to go beyond traditional advertising tools. CGI technology not only provides consumers with visually compelling experiences but also enables detailed product exploration, personalized reviews, and emotional connection. Three-dimensional models, interactive elements, and motion graphics allow consumers to get to know the products offered by brands and personalize them according to their wishes.

CGI advertising also offers brands the opportunity to tell their own stories in a creative and impressive way. By setting up scenes that cannot be enacted in real life in a virtual environment, brands can build their brand identities more powerfully by establishing an emotional connection with consumers. In this context, CGI creative applications stand out as a powerful tool that transforms the way brands present and promote their products and adapt to the rapidly changing consumer behavior of the digital age.

Today, many advertising models include entertainment elements and encourage active participation of consumers. Gamified content such as advergames as well as the collection of personal data and customization of advertising content according to individual preferences are among the examples of this transformation (De Pauw et al., 2018). When the existing literature is examined, it is seen that digital advertising and artificial intelligence applications have attracted increasing academic interest, especially in the recent period (Hocutt, 2024; Dong et al., 2024; Baek, 2023; Ford et al., 2023; Gołęb-Andrzejak, 2023; Agrawal & Nadakuditi, 2023; Shameem et al., 2023; Li, 2023; Sabharwal et al., 2022; Thilagavathy & Kumar, 2021; Vakratsas & Wang, 2021; Li, 2019).

Although the use of CGI is rapidly becoming widespread in advertising, research studies

directly examining the effects of CGI ads on consumer emotions in academic literature are scarce. A significant number of existing studies focuses on CGI influencers (Cho, 2023; Hyun-Sook, 2009). However, the way in which CGI ads affect consumer emotions has not been explored sufficiently to date, particularly through sentiment analysis-based investigations. This study is aimed at filling this important gap in the existing literature and contributing to the knowledge in the field by analyzing the emotional states of consumers in the face of CGI advertisements.

The sentiment analysis method will make it possible to evaluate consumers not only through indirect measures, such as sales data or click-through rates, but also directly through their psychological and emotional reactions. This will provide a new area of investigation for both academic research and applied marketing studies. The analysis, to be carried out on a large data set, will reveal consumer likes, dislikes, and general trends regarding CGI ads, thus contributing to the development of brands' strategies for their target audiences.

2. LITERATURE REVIEW

2.1. Computer-Generated Imagery (CGI) advertising

Traditional marketing is growing increasingly insufficient in attracting consumer attention and changing their behavior. Social media marketing has become an important tool due to its capacity to reach large audiences at a lower cost (Bazrkar et al., 2021; Sheak & Abdulrazak, 2023). However, social media advertising has also required the next innovative step: Computer-Generated Imagery (CGI) adverts. In such advertisements visuality and technology come together to attract user interest and increase interaction (Cho, 2023; Ahn, et al., 2022). CGI adverts can have a profound impact on consumer perception and allow brands to strengthen their presence in the digital environment while

simultaneously bridging the gap between digital and physical brand experiences (Landgrebe, 2024; Tayfur, 2024). This emphasizes the importance of CGI as an indispensable component of both creative marketing strategies and technological innovation.

CGI technology, augmented reality (AR), imagination, and creativity combine to create surrealism in the video format. CGI is not limited to Hollywood cinema only. A number of global brands such as Subway, Axe, L'Oréal, and the Barbie in Burj Khalifa campaign effectively use CGI as a creative theme in their advertisements. This hybrid experience, where the real and the virtual are intertwined, takes the interaction with the consumer to new immersive storytelling dimensions (Bose, 2023; Abdou, 2024).

CGI has revolutionized advertising by enabling highly realistic or fantastical visuals impossible to capture through conventional filming methods. It allows brands to present products in imaginative ways, emotionally connecting with consumers via immersive storytelling (Hollebeek & Macky, 2019; Manu, 2024; Abdou, 2024). Importantly, CGI offers cost-effective, scalable solutions: once a 3D product model is created, variables such as lighting, texture, and camera angles can be modified infinitely, eliminating costly physical reshoots and ensuring consistency across channels (Abdou, 2024; Chichmanov, 2024; Demir, 2023). This scalability supports omnichannel strategies by facilitating consistent brand representations in diverse digital environments (Tayfur, 2024).

Beyond advertising, CGI technologies are increasingly employed across industries such as film, gaming, and television. Their integration into visual arts has expanded creative boundaries, allowing content creators to craft complex digital narratives previously unattainable using traditional animation (Demir, 2024; Martínez-Cano & Rojas, 2024). The collaborative nature of CGI production often requires specialized agencies and interdisciplinary teams combining technology, creativity, and marketing expertise.

CGI campaigns frequently feature hyper-realistic moving visuals, strategically deployed on social media. These campaigns often leverage iconic locations to amplify brand narratives and foster consumer engagement. Successful CGI executions strengthen brand recall, emotional loyalty, and modern brand positioning (Hollebeek & Macky, 2019; Erdoğan, 2023). The long-term use of reusable 3D models also significantly reduces production costs and labor requirements, enhancing overall marketing efficiency (Abdou, 2024; Tayfur, 2024).

One of the striking examples of CGI technology is Nike's "Dream Crazy" campaign in 2019. The campaign managed to establish a strong bond with its target audience by exhibiting an aesthetic and impressive structure with CGI content prepared with Colin Kaepernick and many athletes (Anshul, 2023). Similarly, L'Oréal Paris promoted its Infallible Matte Resistance liquid lipstick product with a CGI animation on Instagram in 2023, creating a scene where a giant lipstick carried on a Citroën 2CV left its color along the way (Famous Campaigns, 2023).

The Maybelline Sky High Mascara ad is possibly one of the most popular examples. The campaign went viral when trains on the London Underground were shown with CGI effects as if they were wearing false eyelashes, and giant brushes integrated into billboards combed these eyelashes (Redding, 2023). The campaign received more than 76 million views and over 22,000 comments on Instagram, generating wide interaction (Instagram, n.d.).

Despite the popularity of CGI advertising, it has also attracted various ethical criticism. Spurgin (2003) argues that the use of real individuals in advertisements is more impressive and finds the use of CGI deceptive and unrealistic. Describing the virtual world as "the most deceptive invention", Spurgin states that CGI advertisements may create an expectation in the viewer to look like a model and may lead to ethical problems.

A study by Hyun-Sook (2009), comparing the effect of CGI and real images, found that groups

with only real images had a better grasp on the story and background, while groups with CGI-heavy images remembered details better. Graphic images can complicate story integrity, while real images provide a clearer understanding.

FIGURE 1: L’Oreal Paris CGI ad



FIGURE 2: Maybelline CGI ad



In addition, production sources of the CGI content are often not disclosed to the viewer, leading to the impression that the content has been created in a physical environment. In the long run, this can lead to negative perceptions of brand credibility (Formroom, n.d.). Moreover, recent studies have emphasized the broader societal implications of CGI technologies.

Abdou (2024) warns about the growing risk of consumer manipulation through hyper-personalized and fabricated digital content, especially when combined with AI-based algorithms that profile and target consumers with emotionally charged visuals. Tayfur (2024) further discusses how unchecked CGI use may contribute to digital misinformation, complicating consumer discernment between factual and artificial representations in digital spaces. These evolving ethical challenges highlight the necessity for regulatory frameworks and industry guidelines that balance creative freedom with responsible CGI application in advertising.

3. METHODOLOGY

3.1. Data collection and preparation

In this study, the comments on the CGI advertisements of two famous cosmetic brands were subjected to “sentiment analysis.” These selected advertisements were shared as reels on Instagram through the official accounts of the brands. The ads, which are among the first examples of CGI ads in the cosmetics industry, have had a major impact. The L’Oreal Paris lipstick ad received 493,884 likes, while the Maybelline mascara advertisement was liked by 2,993,419 people. A total of 2,142 comments on the L’Oreal Paris advertisement and 4,028 comments on the Maybelline advertisement were collected through Web Scraper. Given that all data was collected from publicly available Instagram posts, no private user information was accessed, requiring no ethical approval.

The methodological process followed five key stages: ad selection, data collection, data cleaning, exploratory analysis, and sentiment analysis. At the stage of selecting the ads, the most watched CGI advertisements of the two brands were chosen for scrutiny. During the data collection process, the comments made on these ads were transferred to Excel using Web Scraper. In the data organization/cleaning phase,

non-English comments were translated into English. Publicly available data was used, ensuring that no privacy violations occurred. In the next stage, the collected data was analyzed using the Orange Data Mining program.

3.2. Text mining technique

Text mining is the process of extracting meaningful and useful information from large amounts of text data using various methods of analysis (Hotho et al., 2005). It uses various combinations of techniques such as natural language processing (NLP), machine learning, and statistics. Basically, text mining is the transformation of unstructured content such as articles, social media posts, etc. into structured information (Gaikwad et al., 2014). Text mining has been widely applied in consumer behavior research, particularly for analyzing large-scale social media data to capture consumer emotions and perceptions in real-time.

Text mining is used to extract keywords from a large number of words and create meaningful patterns with them. Thus, it attempts to reveal the implicit relationships in the text data. In the text, a knowledge discovery is made. For this, data should be collected first. Afterwards, the text is cleaned by tokenizing and lemmatizing the data while also removing unimportant pause words. Features are extracted with techniques such as word groups. After that, the text is analyzed using algorithms such as machine learning. Various techniques can be used at this stage. Finally, the findings are evaluated and visualized (Patel & Soni, 2012). Text mining and sentiment analysis are often applied together because sentiment analysis is an application area of text mining. In this study, text mining served as the foundation for sentiment analysis, revealing implicit emotional patterns embedded within consumer comments.

3.3. Sentiment analysis and Ekman's model

Human emotions are multifaceted and complex; therefore, it is difficult to categorize them.

Sentiment analysis, also known as opinion mining, is a technique aimed at identifying and extracting subjective information from a text to determine the emotion behind it. These emotions are determined according to whether the attitudes in the whole text are positive, negative, or neutral. The text can be at the level of a document, sentence, or just a word. Sentiment analysis is a highly current technique that can be supported by many algorithms, ranging from very simple methods to analyses with neural networks (Medhat et al., 2014; Saberi & Saad, 2017). Sentiment analysis is becoming increasingly important for businesses in its usage areas such as understanding customers' feelings about products or services, analyzing market trends and consumer behaviors, examining comments and posts made on social media platforms, and making general sentiment analysis from there.

A number of models have been developed for the detection and analysis of emotions. In this study, Ekman's theory was used for the analysis part. Ekman (1999) categorizes basic emotions into six distinct emotions: happiness, sadness, fear, anger, surprise, disgust. According to Ekman, these expressions of emotion are not learnt but completely natural. Many researchers have used Ekman's model in sentiment analysis studies; for instance, Becker et al. (2011), Kumar et al. (2018), Sailunaz and Alhadjj (2019), and Batbaatar et al. (2019) adopted Ekman's model and sentiment analysis in their studies. Ekman argues that these emotional expressions are innate and culturally universal, making his model suitable for analyzing diverse international audiences on social media platforms. Sentiment analysis offers brands deep psychological insights into consumer reactions, supporting the development of emotionally resonant marketing strategies.

3.4. Data analysis

Sentiment analysis of the collected data was conducted using the Orange Data Mining program. Orange is a visual programming tool for

developing data mining and machine learning applications. It allows users to perform complex data analyses and modelling through a graphical interface using drag-and-drop. The program is popular among data analysts, scientists, and educators alike. Orange is developed in Python programming language and uses Python libraries such as NumPy, SciPy, scikit-learn for data processing and machine learning tasks. The user interface is built using the PyQt framework (<https://orangedatamining.com>). Orange was selected thanks to its accessibility, visualization capacity, and suitability for non-programmers

in performing sentiment analysis on large-scale social media datasets.

4. FINDINGS

In the initial phase of the analysis, the collected comments were uploaded to Orange as a corpus and displayed. After making sure that there was no missing data, word clouds were created separately for both ads with tokenized and lemmatized data using the preprocess text tool. The word clouds and the top 10 most frequently repeated words are shown in Figure 3 and Figure 4.

FIGURE 3: L’Oreal Paris CGI ad comments word cloud



Source: Authors’ own research.

Figure 3 shows the word cloud in which the most frequently repeated words in the comments on the L’Oreal Paris advertisement stand out. Accordingly, the most frequently used words are: “amazing” (1297), “congrats” (687), “wow2 (458), “lipstick” (148), and “love2 (112). These words represent generally positive comments, indicating that viewers found the advertisement impressive. Other notable words such as “marketing” (75), “town” (65), and “pain” (39) indicate comments on the content of the advertisement and

the marketing strategy applied. In general, the comments are quite positive.

Figure 4 shows the word cloud of the comments on the Maybelline advertisement. The most frequently used words are: “amazing” (1081), “love” (763), “congrats” (636), “wow” (384), and “marketing” (231). These words show that the viewers liked the advertisement and found it impressive. The frequent use of positive words such as “amazing” and “love” suggests that the advertisement had an overall positive impact.

Other notable words are “mascara” (132), “cute” (120), “genius” (90), and “advertising” (78), indicating specific statements about the content of the advertisement and the product (mascara) presented. Comparing Figure 1 and Figure 2, it was noted that the first 4 most frequently repeated words were the same for both advertisements.

These words are “amazing,” “love,” “congrats,” and “wow”.

Furthermore, both advertisement comments were analyzed using the sentiment analysis tool to examine whether the attitudes were positive, negative, or neutral. Average positive, negative, and neutral weights for the data are shown in Table 1.

FIGURE 4: Maybelline CGI Ad comments word cloud



Source: Authors’ own research.

TABLE 1: Sentiment analysis average weights results

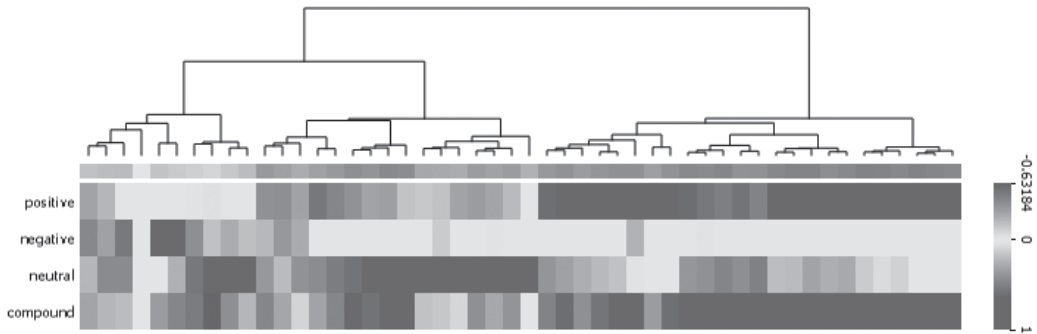
	Positive	Negative	Neutral	Compound
L’Oreal Paris	0.5837	0.0099	0.3816	0.5231
Maybelline	0.5974	0.0175	0.3672	0.3351

Source: Authors’ own research.

As shown in Table 1, most comments made on both advertisements consist of positive attitudes. For the CGI advertisement of L’Oreal Paris, 58% of the comments were positive and 38% were neutral. For the Maybelline CGI advertisement, 49% of the comments were positive and

46% were neutral. In general, most of the comments for both advertisements were positive. The results of sentiment analysis for L’Oreal Paris and Maybelline advertisements are shown as a heat map in Figure 5 and Figure 6, respectively.

FIGURE 5: Heat map of L’Oreal Paris CGI advertisement sentiment analysis results

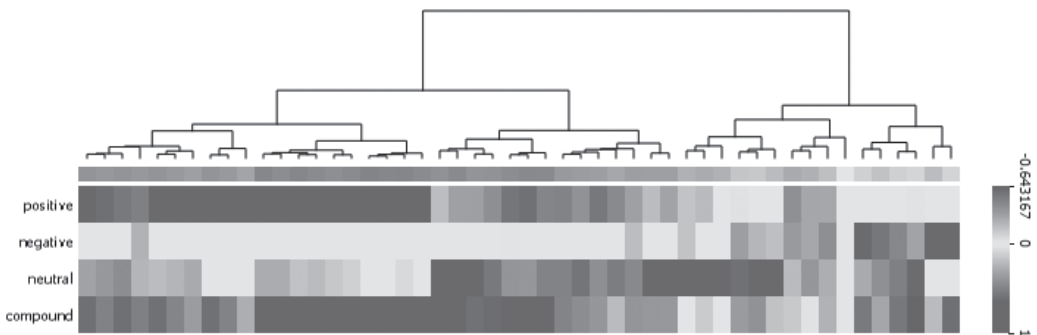


Source: Authors’ own research.

The heat map in Figure 5 shows the results of sentiment analysis of the comments on the L’Oreal CGI advertisement. The map visualizes the intensity of different sentiment categories (positive, negative, neutral, compound). The color scale indicates the intensity of each sentiment, ranging from -0.631 to 1. Red represents higher intensities while blue represents lower intensities. The intense red colors in the positive part of the map indicate that positive sentiments are high. It can be assumed that the majority of comments contain positive sentiments

and generally reflect a positive attitude. The heat map shows that neutral sentiments are also intense, with negative sentiments being quite low. In the compound category, blue and red colors are found together. Blue colors indicate that the compound sentiments are concentrated in the negative direction, while red colors indicate that the compound sentiments are concentrated in the positive direction. In general, it is understood that compound sentiments tend toward the positive side, but there are some negative intensities too.

FIGURE 6: Heat map of Maybelline CGI Advertisement Sentiment Analysis Results



Source: Authors’ own research.

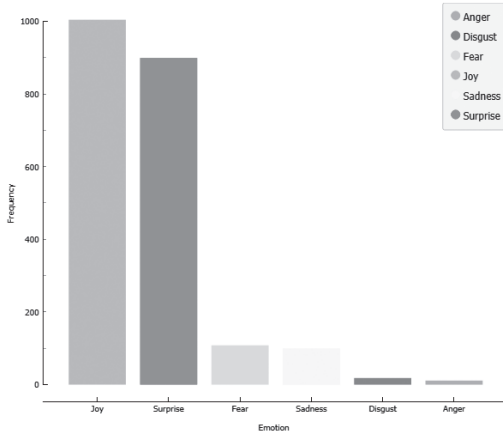
The heat map in Figure 6 shows the results of sentiment analysis of the comments on the Maybelline CGI advertisement. The color scale again indicates the intensity of each sentiment and ranges from -0.643 to 1. The intensity of

red colors in the positive part of the map shows that positive emotions predominate. This indicates that many comments contain positive feelings. There is also an intensity in the neutral part, which contains neither negative nor

positive sentiments. Similar to the results for L’Oreal Paris, the intensity of negative sentiments is also low. According to the results of sentiment analysis of the comments on the Maybelline CGI advertisement, the majority of the comments contain positive sentiments, while a certain number of comments contain negative and neutral sentiments. The analysis of compound sentiments shows an overall positive trend. This indicates that the ad had a positive effect in general.

Advertisement comments were analyzed in terms of sentiment distribution with (multiclass) Ekman’s model using the tweet profiler tool. This allowed comments to be categorized according to emotion classes. It allows us to understand what emotions the comments contain. The results for L’Oreal Paris and Maybelline are shown in Figure 7 and Figure 8, respectively.

FIGURE 7: Ekman’s model emotion classification for L’Oreal Paris CGI ad comments

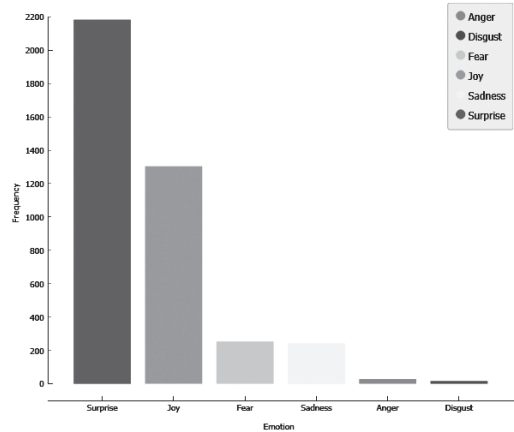


Source: Authors’ own research.

As reflected in Figure 7, the emotions identified in the comments on the CGI advertisement of L’Oreal Paris are mostly “joy” and “surprise”. This shows that the great majority of comments are positive and contain happiness and amazement. In the distribution of emotions, the emotion of joy is the highest, followed by surprise. This is followed by fear, which corresponds to about one tenth of joy in terms of distribution,

then sadness, and very low levels of disgust and anger.

FIGURE 8: Ekman’s model emotion classification for Maybelline CGI ad comments



Source: Authors’ own research.

According to Figure 8, “surprise” was stated approximately 2200 times and has the highest frequency of all emotions. This indicates that the great majority of the comments on the Maybelline CGI advertisement contain surprise. “Joy” was detected approximately 1300 times, indicating that many comments are positive and contain happiness. Fear and sadness are the next emotions, again corresponding to about one tenth of the emotion of surprise. Very low levels of anger and disgust were detected.

5. DISCUSSION

As a result of the analyses conducted in this research study to understand the emotional effects of CGI ads on consumers, it was observed that to a large extent CGI ads of both L’Oreal Paris and Maybelline brands evoked positive emotions. While the most common emotions in the comments were “joy” and “surprise,” it is noteworthy that the rate of negative emotions remained at very low levels. These results suggest that CGI technology can be an effective tool in strengthening brand perception by creating positive emotional effects on consumers.

These findings are in line with the concept of emotional engagement, which has been emphasized in an increasing number of recent studies (Hollebeek & Macky, 2019; Abdou, 2024). Hollebeek and Macky (2019) found that emotional engagement in consumer experiences, especially in digital content, has a direct impact on brand loyalty and purchase intention. Hyper-realistic and creative visuals created through CGI technology stimulate the viewer's imagination and strengthen this emotional interaction.

The results of the study also support the impact of the immersive storytelling approach, which is frequently emphasized in the literature (Bose, 2023). The extraordinary scenes and surreal visuals that CGI ads offer to the consumer allow the ads to leave a lasting impression on the audience by breaking out of the ordinary. Especially in the example of Maybelline, giant eyelash animations attached to trains increase content interaction by arousing the consumer's feelings of surprise and admiration.

The predominance of "joy" and "surprise" emotions in the study shows the capacity of CGI to create positive emotional associations in marketing communication. Positive emotions are crucial in positive consumer attitude towards the brand and brand loyalty (Vakratsas & Wang, 2021; Ahn et al., 2022). Especially considering the high sensitivity of young generation consumers to visual content, innovative tools such as CGI have even more potential to be effective in this segment (Cho, 2023).

These findings clearly demonstrate the capacity of CGI ads to evoke positive emotions and create an emotional connection with consumers. The immersive storytelling and visual creativity emphasized in the literature appear to play a critical role in increasing consumer engagement and brand loyalty. However, in addition to the creative possibilities of CGI, its potential to affect the perception of reality and push ethical boundaries should also be considered. In this respect, the opportunities offered by CGI advertising, as well as the responsibilities it brings, are

being discussed increasingly in the marketing literature.

6. CONCLUSION

This study addresses an important gap in the literature by examining consumer reactions to CGI advertisements using sentiment analysis. Although CGI technology has become more common in advertising, studies exploring how consumers emotionally respond to such content remain quite limited.

The findings show that CGI advertisements have the ability to create highly engaging and visually appealing content that evokes positive emotions. The analysis of L'Oréal Paris and Maybelline CGI ads revealed that most consumer comments expressed positive feelings, especially joy and surprise, while negative emotions were very rare. This suggests that CGI may help improve consumer satisfaction and strengthen brand image.

In previous research, CGI has been discussed not only for its production and cost advantages but also for how it can build emotional bonds between brands and consumers (Abdou, 2024; Hollebeek & Macky, 2019; Chichmanov, 2024). When brands include elements that trigger emotions like joy and surprise, they may improve customer attachment and influence buying behavior (Vakratsas & Wang, 2021). Moreover, the flexibility of CGI allows brands to reuse 3D models across different campaigns and platforms, which helps maintain brand consistency while reducing costs (Tayfur, 2024; Manu, 2024).

Unlike traditional advertising, which often involves high costs for photo shoots or physical sets, CGI makes it possible to produce creative and innovative campaigns with fewer resources. As consumers often respond positively to CGI ads, brands may continue using such approaches to capture attention and differentiate themselves in competitive digital spaces. While negative comments were few, brands might still

benefit from reviewing feedback and adjusting strategies as needed.

However, there are ethical challenges that come with using CGI in advertising. Highly realistic CGI content may affect consumers' perception of reality and raise concerns about transparency (Spurgin, 2003; Hyun-Sook, 2009; Abdou, 2024; Tayfur, 2024). When combined with AI-driven personalization, there is also a risk that consumers could be manipulated in subtle ways. For this reason, applying CGI technology responsibly is essential for maintaining consumer trust over the long term.

This study has some limitations. It focused on just two cosmetic brands and analyzed comments from Instagram posts only. Therefore, the findings may not apply to other industries or platforms. In addition, the study was limited to sentiment analysis, with no other measures such as sales performance or brand awareness being included.

Future research could explore CGI advertisements across a wider range of industries and include different types of data. Longitudinal studies could also contribute to a better understanding of how CGI advertising influences sales, consumer loyalty, and brand value over time.

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