AI versus Human Content Creation on Instagram: Engagement Outcomes and Consumer Perceptions

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Izvorni znanstveni rad / *Original scientific paper*
UDK / UDC: 004.8:[004.738.5:339.138]
Primljeno / Received: 21. kolovoza 2025. / August 24th, 2025.
Prihvaćeno za objavu / Accepted for publishing: 04. studeni 2025. / November 04th, 2025.
DOI: 10.15291/oec.4845

Abstract: The study examines the comparative performance of content produced by humans versus that generated by AI on Instagram, focusing on both engagement metrics and consumer preferences. The aim is to determine if AI can equal or surpass human content creation in terms of reach, interaction, and perceived quality. A within-subjects field experiment was carried out on an established Instagram account with 770 followers. A total of twenty-four single-image culinary posts (12 human-created, 12 AI-generated) were released in alternating sequence. Engagement data were gathered through Instagram Insights and analysed using the Mann-Whitney U test. Additionally, two Instagram Story surveys were conducted to ascertain which elements of the posts (image, caption, recipe) had the most significant impact on engagement. The results showed that AI-generated content has the capability to produce comparable results in terms of likes, comments, shares, saves, reach, impressions, engagement rate, or engagement score. Human-generated content elicited more comments and hashtag impressions, whereas AI-generated content resulted in a higher number of profile visits and greater reach among non-followers. The survey findings indicated that visuals were the primary factor driving engagement at 64%, followed by recipe/information at 26% and captions at 10%. Consumers showed a preference for human visuals and recipes, although AI-generated captions were found to be more attractive. These results suggest complementary strengths, which have implications for hybrid content strategies. It is important to note that the study was confined to a single Instagram account within the culinary niche, utilizing static image posts. Therefore, the results may not be applicable to other industries, platforms, or content formats. Additionally, potential platform effects, such as shadow banning, along with the limitations of the AI tool in generating specific dishes, may have also impacted the outcomes. Future research should aim to test across various industries, platforms, and content formats to explore the long-term effects of AI in content creation.

Keywords: social media marketing, Instagram engagement, artificial intelligence, content creation, consumer preferences
JEL Classification: M37, M31

1. Introduction

In recent years, social media has undergone continuous changes to meet the needs of consumers. This tool encompasses various apps and blogs that facilitate communication and connection among individuals. It provides the opportunity to create, share, and exchange knowledge and ideas within online communities and networks. According to Belle Wong (2023), around 4.9 billion individuals utilized social media in 2023, with projections indicating an increase to 5.85 billion by 2027, while the average user engages with six to seven platforms.

Numerous companies have embraced platforms like Facebook and Instagram, utilizing content creation and Electronic Word-of-Mouth (eWOM) strategies to reach and broaden their audience, enhance brand awareness, cultivate customer relationships, and reinforce loyalty to their brands and products. (Aji et al., 2020; Alves et al., 2016; Walsh, 2025).

Marketers have come to understand that the future of marketing emphasizes innovation, transparency, and co-creation, moving away from controlling customers and instead fostering a genuine commitment. (Constantinides, 2014). Social media has opened up avenues for customers to engage in product creation and development, especially for tailored offerings, while also providing a platform for them to voice their opinions. (Piller & Walcher, 2006). Stephen (2016) predicted that by 2017, around one-third of global advertising expenditures would be directed towards digital channels; by 2023, this percentage had increased to 72% of global marketing budgets.

Digital marketing stands as one of the industries poised to gain from the incorporation of AI tools into its operations and processes. AI empowers marketers to provide more personalized and captivating customer experiences, nurturing brand loyalty while also producing relevant content that enhances consumer satisfaction, boosts engagement, and ultimately draws in potential customers. (Haleem et al., 2022). Given that marketing depends on both cognitive and emotional intelligence, and with cognitive AI tools having rapidly evolved to handle numerous related tasks, it is expected that emotional AI will increasingly influence this field, a development that marketers regard with optimism. (Huang & Rust, 2021). The lingering question is whether AI will supplant human beings. Chintalapati and Pandey (2021) express their apprehensions regarding the potential for human creativity to be overshadowed by AI tools. Although these machines are developed and trained by humans, their capacity for continuous learning could pose a risk to the finite capabilities of the human mind. Saputra et al. (2023) assert that through collaboration with ChatGPT, the most widely available AI tool, businesses have succeeded in producing more focused content that effectively captures consumer attention. In support of this assertion, many contend that artificial intelligence is designed to enhance human abilities rather than replace them (Davenport et al., 2020). Kumar et al. (2019) suggest that individuals are open to new experiences and will welcome this form of content. However, issues such as privacy, security, and ethics persist, as these domains have not progressed as swiftly as artificial intelligence technologies. (Khatri, 2021; Kopalle et al., 2022).

Among the numerous apps and channels available for social media marketing, Instagram stands out as a significant choice. Gaber et al. (2019) indicated that customer reactions to advertisements are

influenced by various factors, such as the entertainment value, the usefulness and credibility of the content, and the extent to which the advertisement is perceived as bothersome. Kusumasondjaja (2018) discovered that consumers favoured interactive content that merges informative and entertaining aspects over purely informative, self-centred posts. Vinerean and Opreana (2019) explored the platform's focus on visual storytelling, which allows businesses to craft immersive virtual experiences for consumers, thereby positioning Instagram as a contemporary "window shopping" platform.

The objective of this paper is to examine the effects of AI tools on social media marketing by comparing consumer engagement with content generated by AI versus that created by humans on Instagram. In 2022, AI-generated content represented 15% of all feed posts, a figure expected to double by the conclusion of 2023 (Mancini, 2023).

This study centres on two main hypotheses regarding the influence of artificial intelligence on social media marketing. The first hypothesis (H1) posits that there is no significant difference in engagement (likes, comments, reach, saves) between content created by humans and that generated by AI on Instagram. This hypothesis arises from ongoing discussions about whether AI can replicate the creativity and connection that human creators offer. Considering AI's increasing involvement in content creation, it is essential to investigate whether human contributions still yield measurable advantages, thereby guiding marketers in optimal resource distribution. The second hypothesis (H2) posits that there is no notable distinction in consumer preference between content created by humans and that generated by AI. This topic is pertinent as visually oriented platforms like Instagram persist in influencing digital marketing strategies, and the prevalence of AI-generated images continues to rise. Should consumers exhibit a preference for visuals created by humans due to their authenticity or emotional impact, marketers will need to weigh the benefits of AI, such as speed and scalability, against possible reductions in engagement. Thus, exploring these hypotheses is significant for professionals seeking to adapt to technological advancements while maintaining meaningful connections with their audiences.

2. Literature review

2.1 Social media platform Instagram

2.1.1 Content creation process

When developing a brand's identity on Instagram, marketers take into account the emotional influence and ethical values they aim to convey, weaving these elements into their content to connect with consumers, especially when audiences feel a personal connection to the brand. Demonstrating emotional intelligence enhances brand equity and may provide a competitive edge (Ho et al., 2020; Harris, 2022). In formulating a social media marketing strategy, brands evaluate the content preferences of their target audience. Instagram offers a variety of tools, such as photos, reels, stories, captions, and hashtags; however, some researchers argue that hashtags might adversely impact performance (Cook, 2020). With the advent of reels and the popularity of short video formats, this type of content has typically resulted in greater engagement; nonetheless, scholars have expressed concerns regarding potential addictive behaviors and negative health implications, which could prompt platforms to reassess their use (Chen et al., 2022). Despite this, images remain a fundamental format across social media platforms.

Liang and Wolfe (2022) discovered that reels tend to be more engaging and proposed a formula for engagement specific to reels, which could also be modified for images:

$$Engagement\ score = \frac{\text{Number of likes} + (2 * \text{Number of comments})}{\text{Number of followers}} * 100\% \qquad (1)$$

To describe the quality of content, Instagram users frequently refer to the concept of "instagrammability," which is shaped by elements such as the subject matter, colours, props, brightness, angles, and editing techniques (Miguel et al., 2023). For brands, producing high-quality, "instagrammable" content presents a significant challenge (Kit, 2022). Features of posts that are linked to memorability and virality encompass succinct messaging, high-resolution visuals, a well-defined niche, accurate information, and accessibility for a wide audience (Cox, 2019).

2.1.2 Content creation with AI

The ongoing advancement of AI technologies necessitates that marketers adjust, especially in the realm of content creation, as AI is capable of producing tailored, targeted content and improving various aspects of social media posts (Kopalle et al., 2022).

Integrating AI into the content creation process provides numerous advantages, such as personalized outputs, a consistent brand presence, effective cross-cultural communication, automated community engagement, content pre-testing, and improved coordination across platforms and schedules (Sharma, 2025). The automation of repetitive tasks facilitates extensive data analysis, highly personalized consumer experiences, and the forecasting of trends and behaviors to aid in decision-making (Gupta & Khan, 2024).

Despite these benefits, current research points out various limitations. Brüns and Meißner (2024) discovered that consumers typically favoured content created by humans over outputs generated by generative AI (GenAI), as AI-generated content sometimes elicited negative reactions and undermined brand credibility. Murár et al. (2024) indicated that language produced by ChatGPT often lacks reliability and does not align with the brand's voice, necessitating human involvement.

In addition to concerns about quality, ethical and legal challenges have arisen. Artists have voiced their objections to AI training methods, accusing companies such as Google, Microsoft, OpenAI, and GitHub of art theft, which has led to numerous lawsuits aimed at safeguarding intellectual property rights (Vincent, 2023; Marr, 2023). A significant number of artists are also apprehensive about the long-term effects on their careers as companies increasingly choose AI-generated content (Roose, 2022; Jiang et al., 2023). Jiang et al. (2023) recommend implementing regulatory measures, including the requirement of explicit consent prior to utilizing existing artworks for training AI image generators.

2.2 Consumer response to Instagram posts

2.2.1 Impact of organic marketing content

Consumer engagement (CE) can be assessed through various methods, and a consensus among researchers indicates that consumers tend to interact with content and brands that provide satisfaction and nurture emotional connections (Pansari & Kumar, 2017). Engagement is frequently based on trust and commitment, which consumers reciprocate through a range of behaviors that go beyond mere attitudes (Pansari & Kumar, 2017). On Instagram, CE is promoted through features such as likes, comments, saves, shares to stories, quick reactions, and direct replies, allowing consumers numerous avenues to convey different levels of interaction with branded content.

Empirical studies show that consumers are more engaged with organic marketing strategies – including unpaid posts, search engine optimization (SEO), and user-generated content (UGC) – compared to technology-driven or paid options (Asante et al., 2023). Other findings suggest that product-focused images devoid of people can elicit greater engagement, as followers often visit brand pages to fulfil product-related needs (Rahman et al., 2022). Ballester et al. (2021) discovered that consumer engagement is positively affected not only by the enjoyment of posts but also by the originality of the content.
Ultimately, large-scale analyses underscore the significance of emotional appeal. Rietveld et al. (2022) examined 46.9K Instagram posts from 59 brands spanning 6 sectors and determined that consumer engagement is predominantly influenced by emotional content rather than informative content, especially images that elicit high-positive or low-negative arousal. However, informative appeal still holds relevance: textual mentions of brands are likely to generate likes, whereas comments are more significantly affected by the visual prominence of the brand. (Rietveld et al., 2022).

2.2.2 Impact of AI generated content

Consumer perception of AI is shaped by multidimensional criteria, assessed through both functional and emotional perspectives (Chen et al., 2022). In the realm of marketing, this results in mixed reactions: while some consumers appreciate customized advertising and personalized experiences, others perceive these methods as intrusive (Chen et al., 2022). The success of AI-driven marketing is contingent upon the quality of the interaction between consumers and technology. Effective communication fosters engagement and positively impacts behavioural intentions, underscoring the necessity of deploying dependable AI systems that enhance customer experiences (Sung et al., 2021). Studies suggest that AI marketing influences consumer behaviour beyond immediate engagement. Ho and Chow (2024) discovered that AI-driven initiatives positively affect brand preference and the intention to repurchase. Likewise, Nazir et al. (2023) demonstrated that AI can increase social media engagement and conversion rates, thus improving customer experiences and reinforcing repurchase intentions.

3. Methodology

3.1 Research design

This paper seeks to ascertain if consumers are able to differentiate between two categories of posts and which one they favour. Each post includes an image, a recipe, a caption, and hashtags, which allows for insights regarding content creation and social media marketing.
The experiment utilized a within-subjects design, presenting the same followers with various posts to improve the precision of the results and to augment ecological validity. (Coolican & Coolican, 2013).

3.2 Platform and audience

The experiment was carried out on Instagram, selected for its robust visual storytelling capabilities that brands utilize to establish their online identity and presence. The researchers faced a decision between posting content on a new account or an existing one. Considering the time needed for a new account to attract a sufficient number of followers and produce relevant data, an existing account was deemed the more appropriate choice.

The genre of content was crucial for the validity of the study, as it needed to engage consumer interest while maintaining a degree of objectivity. According to ProfileTree (2025), 39% of Instagram users follow food-related content, and the hashtag #food is utilized 250 million times each month. In light of this, culinary content was chosen to reduce bias and enhance engagement. The Instagram account utilized had 770 followers who were already acquainted with culinary posts, having previously shared numerous recipes and related content.

3.3 Content development

3.3.1 Human generated content

The posts generated by humans were designed to represent genuine user-created content on Instagram. Each dish underwent thorough research, preparation, and plating based on chosen recipes and personal modifications. A researcher captured multiple photographs of the dish, selecting the best one through human aesthetic evaluation and adherence to the photographic rule of thirds. The final image received minor edits in Lightroom to improve visual quality while maintaining realism. These images acted as the authentic standard for evaluating engagement and consumer perception.
Subsequently, a brief and succinct caption was crafted to be both playful and informal, while vividly portraying the dish to evoke a sense of desire for the recipe among consumers. Various emoticons were incorporated, and three hashtags were appended at the end. The decision to use only three hashtags adhered to the 3×3 strategy, which suggests that each hashtag should address one of three elements (Hodder, 2023):

- The targeted audience - Who?
- The product or service offered - What?
- The problem it solves - Why?

The selected hashtags were determined not only by the recipe and the dish but also in accordance with Instagram's recommendations. Demeku (2025) observes that hashtags utilized in millions of posts can be ineffective, particularly for smaller creators and businesses, as their content may become obscured amidst the overwhelming number of posts shared daily. Instead, employing hashtags that have around 10K-200K posts is deemed the ideal range, offering marketers a greater opportunity to attain noticeable results.

3.3.2 AI-generated content

The content generated by AI was produced using DeepAI (https://deepai.org/), showcasing the process of algorithmic content creation. This tool is free and easily accessible, providing high-quality content across various styles.
Dish concepts were developed and enhanced through numerous prompts until a realistic and visually appealing result was achieved. In instances of low accuracy, prompts were modified to yield improved outcomes. The images facilitated the research in examining how consumers react to visuals generated by AI compared to those created by humans, particularly regarding authenticity and engagement.

After generating a satisfactory image, the recipe was formulated. In most instances, it accurately reflected the requested dish, delivering authentic and traditional recipes. For each dish, the initial recipe produced was utilized without any modifications to the units of measurement or other specifics.
The concluding step involved crafting an appropriate Instagram caption for the AI-generated recipe, which also featured three hashtags at the end. For instance:
Could you please create a fitting Instagram caption with three hashtags at the conclusion?

> "*Cozying up with a bowl of creamy potato leek soup on a chilly day* 🥣✨ *#souptime #comfortfood #homemade"*

In the absence of further instructions, the AI tool generated brief, amusing captions that incorporated emoticons appropriate for each individual recipe. However, after producing several posts, the captions began to exhibit repetitive tendencies, frequently reusing identical words and phrases.
Despite being directed to provide only three hashtags, the AI tool often suggested between three to six. To ensure uniformity, any hashtags exceeding the initial three were eliminated. This measure was deemed essential, as the inclusion of extra hashtags could have impacted the reach and effectiveness of the AI-generated content in comparison to the posts created by humans, thereby potentially jeopardizing the ecological validity of the study.

3.3.3 Visual and caption strategy

The visual content was crafted to highlight a range of both sweet and savoury recipes, guaranteeing that every follower would discover something enticing and subsequently interact with the posts (Figure 1).

Figure 1. Examples of human created images
Source: developed by the authors (2025)

Despite the recipes being familiar enough for DeepAI to produce the requested image, the process of generation remained complex (Figure 2).

Figure 2. Examples of AI generated images
Source: developed by the authors (2025)

The captions employed were both engaging and succinct, providing clear guidance without being overly detailed to avoid overwhelming consumers with complex, lengthy recipes (Table 1). Additionally, both content types included three appropriate hashtags at the conclusion, targeting non-follower consumers as well.

Table 1. Examples of human-created, and AI-generated content that was used

Human created content examples	AI generated content examples
Fronmara Day 2 of the most perfect dessert for spring, blueberry muffins. If you want to impress your friends and family with the most flavourful and fluffy muffins, this is the recipe you need: Method & Ingredients: - In a bowl mix: • 2 cups of flour • 1/2 tsp salt • 2 tsp baking powder - In a separate bowl mix: • 1/2 (120g) soft butter • 1 cup, sugar • 2 tsp vanilla sugar -Then add: • 2 eggs • 2 tsp vanilla extract • 1 tsp orange extract • 1 tsp lemon extract -Then add alternately 1/2 cup of milk and the dry ingredients one half at a time. -When the flour is still a bit visible add 2 cups of frozen blueberries coated in flour and mix with a spatula. -Add one scoop at a time of the mixture to the tray lined with parchment paper and into the	Fronmara Indulge in these fluffy blueberry muffins, bursting with juicy berries! Ingredients: •1 1/2 cups all-purpose flour •3/4 cup granulated sugar •1/2 teaspoon salt •2 teaspoons baking powder •1/3 cup vegetable oil •1 egg •1/3 cup milk • cup fresh or frozen blueberries •1/2 teaspoon vanilla extract Instructions: Preheat your oven to 400°F (200°C) and line a muffin tin with paper liners. In a large bowl, mix together the flour, sugar, salt, and baking powder. In a separate bowl, whisk together the vegetable oil, egg, and milk. Pour the wet ingredients into the dry ingredients and stir until just combined. Do not overmix. Gently fold in the blueberries and vanilla extract. Divide the batter evenly among the muffin cups. Bake for 18-20 minutes, or until a toothpick inserted into the center of a muffin comes out clean. Allow the muffins to cool in the pan for a few minutes before transferring them to a wire rack to cool completely. Enjoy your freshly baked blueberry

preheated oven at 190 degrees Celsius for 35 minutes. Enjoy and let me know how it goes! #blueberries #muffins #bakingtime	muffins! Feel free to customize this recipe by adding lemon zest, a crumb topping, or a touch of cinnamon. Enjoy! #blueberrymuffins #homemade #bakinglove
fronmara Day 2 | All roads lead to Rome & all the time spent in the kitchen leads me back to my one true love: pasta Carbonara Ingredients: • 200g guanciale • 100g grated pecorino roman • pepper to taste • 4 egg yolks • 250g spaghetti • 1 cup pasta water Method: • Mix the egg yolks, the pecorino romano and the pepper together • Cut the guanciale into small cubes and throw into a cold pan on medium low heat and cook slowly so that the fat has time to melt • Remove the guanciale from the heat and pour all the fat into the egg yolk mixture and mix • Cook the pasta according to the package instructions and take one cup of pasta water out before draining • Add the pasta to the pan over medium-low heat and pour the egg mixture over it then slowly incorporate the pasta water and mix vigorously until all the water is absorbed • Add half of the guanciale into the pasta and mix then remove from the heat • Plate the pasta and top it with the rest of the guanciale and some freshly grated parmesan cheese Enjoy and let me know how it goes! #pastacarbonara #italianfood #pastalovers	fronmara Indulge in the creamy goodness of homemade carbonara pasta. Just a few simple ingredients come together to create this classic Italian dish. Ingredients: - 200g spaghetti or other long pasta - 100g guanciale or pancetta, diced - 2 cloves garlic, minced - 2 large eggs - 1 cup grated Pecorino Romano cheese - 1/2 tsp black pepper - Salt, to taste - Fresh parsley, chopped (for garnish) Instructions: 1. Cook the pasta according to package instructions until al dente. Reserve 1/2 cup of pasta water before draining, 2. In a large skillet over medium heat, cook the guanciale or pancetta until crispy and browned. Add the minced garlic and cook for an additional 1-2 minutes. 3. In a separate bowl, whisk together the eggs, grated cheese, black pepper, and a pinch of salt. 4. Add the cooked pasta to the skillet with the guanciale and garlic, tossing to coat the pasta in the rendered fat. 5. Remove the skillet from heat and quickly stir in the egg mixture, tossing the pasta continuously to prevent the eggs from scrambling. 6. Add a splash of reserved pasta water as needed to create a creamy sauce. 7. Serve the carbonara pasta immediately, garnished with fresh parsley and additional grated cheese, if desired. Enjoy your delicious carbonara pasta! #Carbonara #PastaLover #ComfortFood

Source: developed by the authors (2025)

3.4 Posting strategy

The core of the experiment revolved around the content creation process: one post was entirely crafted by a human, while the other was completely generated by AI, with both being published two days apart to sustain consumer interest. To reduce bias and avoid data distortion, the following measures were taken:

- Followers were not informed about the experiment beforehand,
- Both posts were centred on the same dish,
- The dishes featured both savoury and sweet options,
- For each dish, the first post alternated between human-created and AI-generated content.

We counterbalanced the sequencing at the recipe level (12 pairs): 6 pairs had human-first posts and 6 pairs had AI-first posts, ensuring that the initial exposure was evenly distributed across conditions. Each post uploaded to the account consisted of three elements: an image, a recipe, and a caption. For each element, the highest quality version was selected to guarantee high-quality content capable of eliciting engaging actions such as likes, comments, shares, and saves. The experiment utilized single images instead of carousel posts or reels due to the current limitations of AI in generating multiple images of the same subject from various angles and in producing detailed, coherent videos of the entire cooking process.

The recipes were alternated randomly between sweet and savoury options, chosen for their suitability for home cooking and their global appeal. According to CBS News (2022), 82% of participants reported that they enjoy baking their own cookies. The final dish featured in each post was selected only after verifying that the AI-generated image accurately represented the chosen recipe. Posts were released at various times between 11 AM and 12 AM local time, spanning different weekdays. The effects of time of day and day of the week were not controlled in this field study. In terms of the "best time to post" on Instagram, recent studies indicate that Wednesday, Thursday, and Friday are typically the most effective days for content publication; however, the specific time frame is subjective and should be tailored by each brand based on the behaviour observed within its community (Singh et al., 2023).

3.5 Data collection and metrics

Once the posts were uploaded to the Instagram account, data regarding overview, reach, post insights, engagement, and post interactions were gathered from each post's Insights 48 hours post-upload to standardize observation periods, recognizing that patterns such as diurnal or weekday activity may still influence this timeframe. The data was consolidated into an Excel spreadsheet for further analysis.

A significant drawback of the Within-Subjects design is the order effect. To address this issue and maintain the integrity of the study, the initial post for each recipe was alternated between the human-created and AI-generated versions. Furthermore, a two-day gap was observed between posts to reduce practice effects prior to the subsequent upload.

In determining the most effective post for each dish, the authors prioritized the number of likes, followed by comments, shares, and saves.

3.6 Surveys and consumer feedback

The objective of this study was to examine whether consumers can discern differences between content created by humans and that generated by artificial intelligence. This necessitated an analysis of the factors that influence engagement with the most "successful" posts for each dish.
An online survey conducted through Instagram yielded deeper insights into the elements that stimulate consumer engagement with posts. The survey was carried out after every three recipes, totalling six posts, from which the most successful post of each pair was selected.
Followers were allotted 24 hours to respond to the question, "What did you love the most about this post?" for the most successful post from each recipe. They were required to choose one of the three attributes (image, caption, and recipe) that made them favour it over the other post (Figure 3). The post included in the survey was chosen based on its performance regarding likes, comments, shares, and saves.

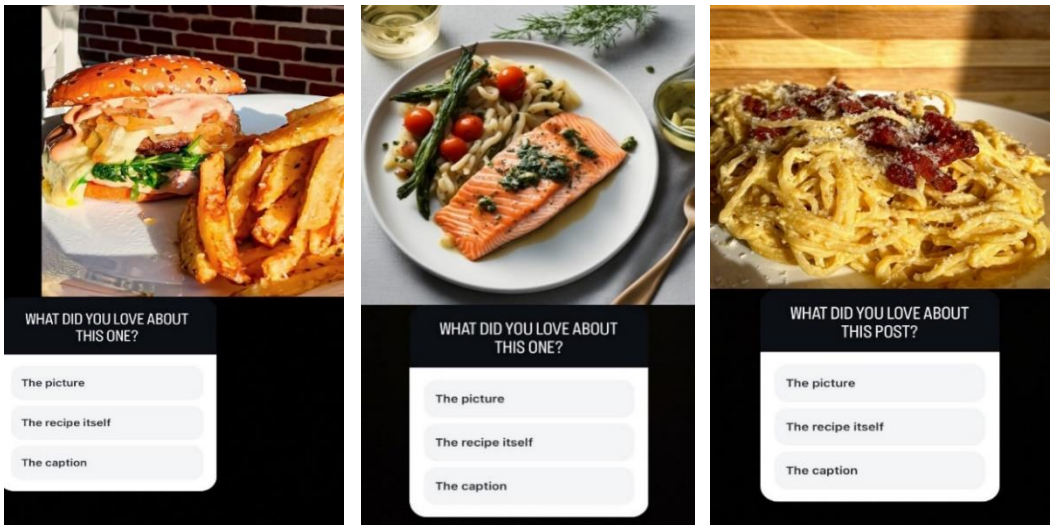

Figure 3. Sample questions used in the first survey
Source: developed by the authors (2025)

The collected responses were compiled into an Excel spreadsheet and analysed to address the following questions:

- What is the key factor that influences the success of a post?
- In which areas do humans excel?
- In which areas does AI excel?

Despite the survey attracting a limited number of participants, it provided significant insights into the elements that stimulate engaging behaviors and actions among consumers.
The subsequent survey posed one question for each successful post shared during the experiment: "What had a greater influence on your decision to engage with this post?" Respondents could select from three alternatives: 1. Image 2. Caption, and 3. Recipe (Figure 4).

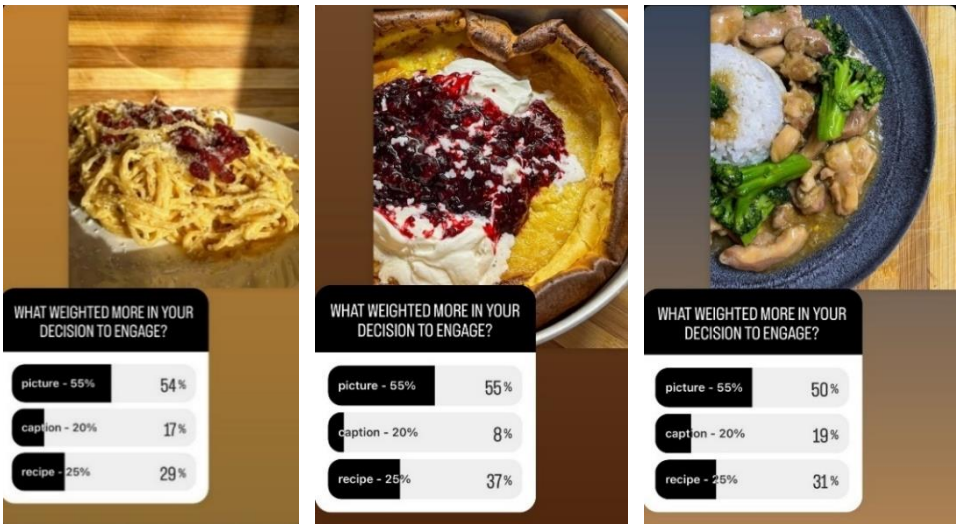

Figure 4. Sample questions used in the second survey
Source: developed by the authors (2025)

3.7 Data analysis

Both descriptive and inferential analyses were performed. The descriptive analysis utilized Microsoft Excel, whereas the inferential analysis was executed in Python v3. Consumer reactions to each post were assessed using Instagram Insights 48 hours post-publication. The gathered data were subsequently compiled in an Excel spreadsheet for additional analysis.
The Mann–Whitney U test was employed to evaluate both hypotheses, as no assumptions were made concerning the data distribution. All analyses were conducted with significance assessed at the 0.05 level.

4. Results and discussions

4.1 Descriptive performance of Instagram posts

Among the twelve posts chosen for the survey, seven were generated by AI while five were created by humans, suggesting a subconscious consumer inclination towards engaging with AI-generated content rather than human-created content (Annex 1).
The average metrics indicate that human-created posts marginally surpass AI-generated posts in most categories. Human-generated posts garnered a greater number of likes (M= 42.58 compared to 39.58), comments (M= 5.33 versus 2.33), and shares (M=0.25 against 0). Additionally, they reached a larger audience, attracted a higher percentage of non-followers (14.53% compared to 13.05%), generated more profile visits (M=7.5 versus 6.75), and achieved a superior overall engagement rate (ER) of 6.73% in contrast to 5.96% for AI-generated posts. Nevertheless, the differences observed were not statistically significant (Annex 1).
Liang and Wolfe's (2022) engagement score (ES), which was initially designed for reels, was utilized for the images in the experiment. The results were almost identical to the engagement rate (ER), preserving the same disparity between human-generated content (ES=6.92%) and AI-generated content

(ES=5.75%). The formula demonstrated sensitivity to posts with a high number of comments, as it assigns greater importance to comments while disregarding saves, shares, and follows. For instance, a human-generated post that received 14 comments had an ER of 17.14% and an ES of 15.19%, whereas another human-generated post with 16 comments recorded an ER of 8.18% and an ES of 9.74%.

The initial post of the experiment – a human-created chocolate chip cookie recipe, which is extremely popular online – garnered the highest engagement among all posts, partly due to its role in launching the experiment, when consumer interest was at its highest. To ensure ecological validity, the first cookie-related posts were omitted, and the data were re-evaluated (Annex 2).

Following the elimination of these outliers, the results exhibited a significant shift. The gap between human and AI performance decreased, with AI surpassing human content in almost half of the evaluated metrics. Posts generated by humans still garnered more comments (M = 4.55 compared to 2.45), attracted a greater number of followers (88.18% versus 86.35%), and produced more impressions from hashtags (M = 3.45 versus 0). Nevertheless, AI-generated posts achieved a superior engagement rate (ER) of 5.95% compared to 5.79% and resulted in a higher number of profile visits (M = 7.09 versus 4.91) (Annex 2).

These findings imply that AI-generated content is more adept at drawing in non-followers, while content created by humans continues to excel in engaging current followers. This may indicate that consumers are more accustomed to the visual style of human-generated posts, which cultivates a deeper sense of connection. Notably, AI content did not yield any impressions from hashtags, whereas hashtags selected by humans consistently drove traffic (M = 3.54 impressions per human-created post).

In summary, the results reveal that AI and human-generated content exhibit comparable performance in terms of engagement, each possessing unique strengths: AI is proficient in reach and visibility, while human content maintains an edge in relational engagement and hashtag optimization.

4.2 Hypothesis testing

To evaluate (H1): A Mann-Whitney U test was performed to determine if there is a significant difference in engagement (likes, comments, reach, saves) between content created by humans and that generated by AI on Instagram.

Descriptive analyses revealed that human-generated content garnered slightly more likes (M = 42.58, SD = 17.63) and comments (M = 5.33, SD = 5.00) compared to AI-generated content (Likes: M = 39.58, SD = 6.58; Comments: M = 2.33, SD = 2.31). Nevertheless, these differences were not statistically significant.

The results from the Mann-Whitney U tests were as follows:

- Likes, U = 69.5, p = .91
- Comments, U = 102.5, p = .07
- Shares, U = 84.0, p = .17
- Saves, U = 67.5, p = .79
- Accounts reached, U = 69.0, p = .89
- Impressions, U = 60.0, p = .51
- Engagement rate, U = 80.5, p = .64
- Engagement score formula, U = 85.5, p = .45.

To assess the magnitude and direction of differences between groups, rank-biserial correlations (r_{rb}) were calculated for each Mann–Whitney U test that compared AI-generated posts with those created by

humans across eight engagement metrics. The correlations varied from r_{rb} = –.42 to +.17, indicating predominantly small effect sizes in both directions. The most significant effect was noted for comments (r_{rb} = –.42, p = .07), implying that posts generated by humans generally received more comments than those generated by AI, although this difference did not achieve statistical significance. Small negative effects were recorded for shares (r_{rb} = –.17), engagement rate (r_{rb} = –.12), and engagement score (r_{rb} = –.19), again favouring content produced by humans. Conversely, small positive effects were identified for impressions (r_{rb} = +.17), accounts reached (r_{rb} = +.04), and likes (r_{rb} = +.04), suggesting slightly better reach-related outcomes for AI-generated posts. In summary, these findings indicate that human-generated content may provoke somewhat stronger interaction-based engagement (such as commenting and sharing), while AI-generated content performs comparably or slightly better in terms of reach-based metrics.

However, none of the differences observed were statistically significant, underscoring that AI-generated and human-generated posts exhibit equivalent performance in quantitative engagement metrics (Figure 5). As a result, H1 was not supported.

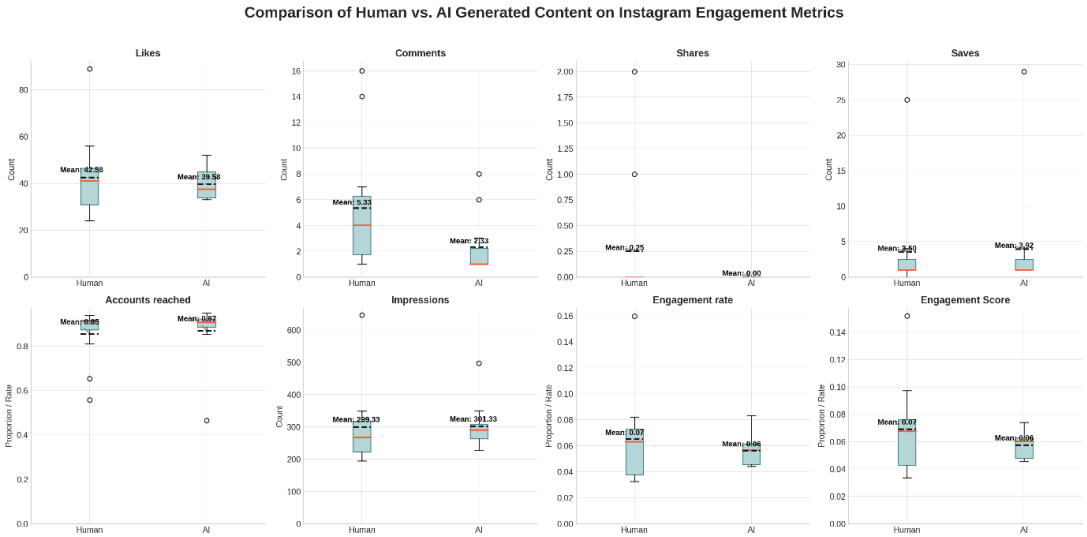

Figure 5. Comparison of engagement metrics between human and AI created content
Source: developed by the authors (2025)

To test (H2): A Mann-Whitney U test was performed on survey responses to assess consumer preferences for content created by humans versus that generated by AI, specifically focusing on pictures, captions, and recipes in the most successful posts.

The results indicated a strong consumer preference for visual content, irrespective of the creator. Both AI-generated and human-generated posts exhibited the highest mean preference for pictures (AI: M = 0.52; Human: M = 0.56), with no significant difference noted.

In terms of recipe content, moderate preference levels were recorded for both groups (AI: M = 0.23; Human: M = 0.28), again showing no significant difference. The only notable difference was found in caption content, where consumers favoured AI-generated captions (M = 0.25, SD = 0.07) over those created by humans (M = 0.15, SD = 0.04), with U = 8.0, p = .045. Overall, visual elements were the most preferred (Figure 6). When comparing participants' preferences for visual content, a large positive effect was observed, r_{rb} = .54. This suggests that participants exhibited a strong preference for visuals

created by humans compared to those generated by AI. The magnitude of this effect implies that while AI images may perform similarly in quantitative engagement metrics, visuals created by humans evoke significantly greater perceptual appeal and authenticity among viewers.
Given that a significant difference was identified in consumer preference regarding captions, H2 was partially accepted.

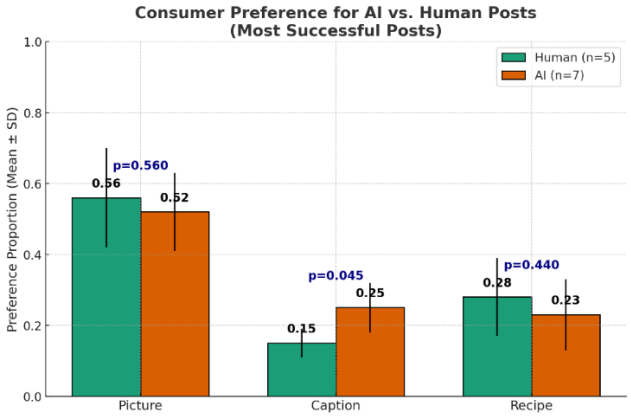

Figure 6. Comparing consumer preference on the three dimensions between human and AI created content
Source: developed by the authors (2025)

4.3 Survey insights on consumer engagement

To enhance the engagement metrics, two surveys were carried out through Instagram Stories. The aim was to ascertain which components of a post (image, caption, recipe) had the greatest impact on consumer engagement. The findings from the initial survey indicated that the majority of consumer engagement behaviors were stimulated by visual content (56%), followed by the recipe or informational content within the caption (24%), whereas the caption itself was the least impactful (20%) (Figure 7). These results are consistent with earlier studies that highlight Instagram's significant emphasis on visuals and storytelling (Vinerean & Opreana, 2019).

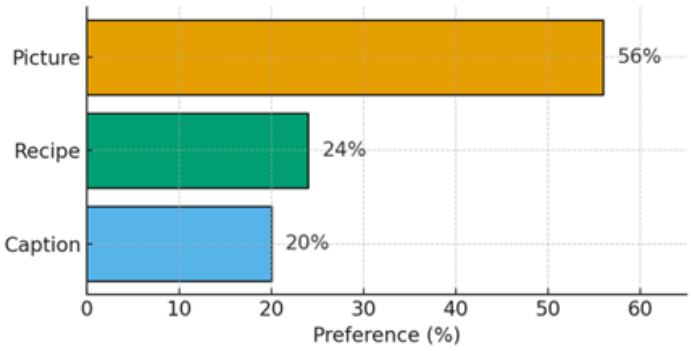

Figure 7. Distribution of the elements for a successful post
Source: developed by the authors (2025)

In light of these findings, a second survey was carried out to further assess the significance of post components. Respondents once again ranked the picture/visual element as the most crucial (55%), followed by the recipe/information in the caption (25%), and finally the caption itself (20%).

Table 2. Summary results for the second survey

Post	Org/AI	Picture - 55%	Caption - 20%	Recipe - 25%	Total	No of responses
1	Org	90%	2%	8%	100%	83
2	AI	50%	20%	30%	100%	70
3	Org	50%	19%	31%	100%	70
4	AI	65%	14%	21%	100%	72
5	Org	83%	1%	16%	100%	69
6	AI	71%	6%	23%	100%	66
7	Org	55%	8%	37%	100%	62
8	Org	54%	17%	29%	100%	63
9	AI	61%	9%	30%	100%	66
10	AI	62%	8%	30%	100%	66
11	AI	72%	7%	21%	100%	67
12	AI	59%	8%	33%	100%	66
Average		64%	10%	26%	100%	459

Source: developed by the authors (2025)

When the averages from both surveys were combined, the relative importance experienced a slight shift as well: 64% for visuals, 26% for recipe/information, and merely 10% for captions. These findings reinforce the notion that visuals are the primary catalyst for consumer engagement, while captions assume a minimal role (Table 2).

To conduct a more in-depth analysis of consumer responses, the experiment evaluated preferences for elements of posts generated by both humans and AI separately (Table 3).

Table 3. Overview of survey responses

Post	Org/AI	Picture	Caption	Recipe	Total
1	Org	80%	7%	13%	100%
2	AI	50%	17%	33%	100%
3	Org	38%	15%	47%	100%
4	AI	45%	33%	22%	100%
5	Org	86%	7%	7%	100%
6	AI	72%	22%	6%	100%
7	Org	50%	17%	33%	100%
8	Org	53%	18%	29%	100%
9	AI	50%	33%	17%	100%
10	AI	44%	31%	25%	100%
11	AI	40%	20%	40%	100%
12	AI	64%	15%	21%	100%
Average		56%	20%	24%	100%

Source: developed by the authors (2025)

The findings indicated that the visual appeal of human and AI content was comparable, with human content leading by a margin of 2%. Regarding captions, the text produced by AI was found to be more engaging (26%) compared to captions written by humans (15%). Conversely, recipes created by humans were favoured (28%) over those generated by AI (20%).
In summary, these surveys indicated that consumer engagement is predominantly influenced by the visual aspect of a post, followed by recipes, whereas captions have the least impact (Figure 8).

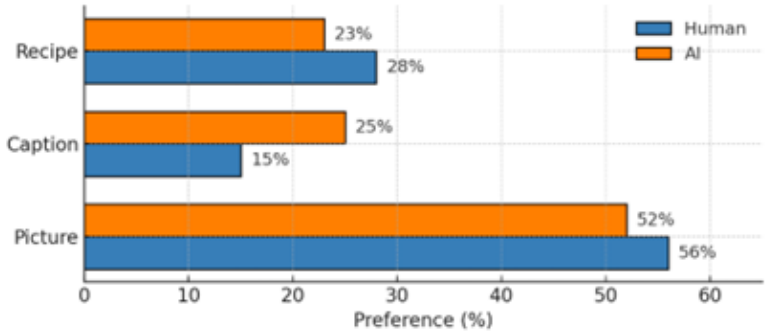

Figure 8. Comparison between the performance of human vs. AI created content
Source: developed by the authors (2025)

Generally, human-generated content was favoured for visuals and recipes, while AI demonstrated a strength in captions. These complementary advantages underscore that consumer responses vary based on the specific element of the post being evaluated.

5. Conclusions

5.1 Interpretation of results

This study analysed the engagement levels on Instagram for content generated by both humans and AI, uncovering a slight disparity in their performance: posts created by humans achieved an engagement rate of 6.73%, whereas those generated by AI reached 5.96%. Among the 12 highest-performing posts, five were produced by humans and seven by AI, indicating that AI-generated content can perform similarly to, and at times even surpass, human-generated content.
These results bolster recent claims that AI can effectively manage Instagram accounts with engagement metrics that are on par with those of human creators (Maynard, 2023; O'Brien, 2024). Furthermore, they contest the belief that AI lacks creative abilities, illustrating that, when provided with suitable inputs, even free AI tools can yield competitive outcomes (Sterne, 2017; Haleem et al., 2022; Davenport et al., 2020).
Significant distinctions were noted in the types of engagement. Content created by humans generated a greater number of comments and interactions driven by hashtags, indicating a more profound relational impact and a familiarity with its visual presentation. Conversely, content produced by AI was more successful in attracting non-followers and encouraging visits to profiles. These complementary

advantages emphasize that while AI can compete with humans in terms of reach and visibility, human-generated content cultivates deeper connections with consumers, highlighting concerns regarding the limited moral and emotional significance of AI in communication (Chintalapati & Pandey, 2021; Khatri, 2021; Marr, 2023).

The results of the survey supported these trends, revealing that visuals were the leading factor in driving engagement (64%), followed by recipe or informational content (26%) and captions (10%). Generally, consumers showed a preference for visuals and recipes created by humans, while captions generated by AI performed more effectively. These results affirm that engagement is predominantly visual (Vinerean & Opreana, 2019; Brafton, n.d.) and propose a complementary strategy: AI can improve efficiency, while human creators provide authenticity and emotional depth.

5.2 Managerial implications and recommendations

The study presents multiple implications for social media marketers. It is essential for practitioners to comprehend the capabilities of AI and to remain updated on new technologies, as neglecting this may undermine marketing effectiveness.

Furthermore, while content produced by humans continues to be effective in fostering engagement, this research indicates that AI can produce results that are similarly effective. The selection of content should be in harmony with business objectives: posts created by humans enhance relationships with current communities, whereas content generated by AI is more efficient in broadening reach and attracting new followers. Marketers ought to contemplate the integration of AI into the content creation process at stages that correspond with both business requirements and the comfort level of the creators.

Considering that consumers appreciate interactive content (Piller & Walcher, 2006), marketers may gain advantages by implementing regular surveys through Instagram Stories. For example, posing the question, "What do you love most about this post?" with choices related to the image, the caption, or the informational content can actively involve consumers in the brand development process, thereby enhancing loyalty (Aji et al., 2020; Cuevas-Molano et al., 2021). These insights also facilitate the allocation of marketing budgets towards the most effective components. In this study, Instagram engagement was found to be influenced 64% by visuals, 26% by informational content, and 10% by captions; however, these ratios necessitate further validation in sectors beyond the culinary field.

Ultimately, the incorporation of AI into business practices carries ethical obligations. Companies must guarantee that AI tools are sourced from ethical providers and trained on data that has been legally obtained and with consent, thereby avoiding data theft or other unethical practices.

5.3 Research limitations and future research

This study presents several limitations. First, users of social media frequently encounter fatigue and information anxiety due to the overwhelming amount of content generated daily, which may diminish their inclination to interact with posts and could account for the unexpectedly low levels of likes, comments, shares, and saves (Al-Youzbaky & Hanna, 2022; Sheng et al., 2023).

Second, the research concentrated exclusively on Instagram, omitting other social media platforms like Facebook, X, and TikTok. The demographics of these platforms differ; for example, 31.8% of Instagram users fall within the 18-24 age range, whereas 31% of Facebook users are aged 25-34 (Dixon, 2025a; 2025b). This discrepancy restricts the applicability of the findings to other social media

platforms. Third, the experiment was limited to culinary posts depicted as single images. This restriction affects the generalizability of the results, as the performance of AI was not evaluated for alternative formats, such as reels or carousel posts, nor in sectors outside of the culinary field.
Fourth, the account utilized in this experiment might have been subjected to shadow banning, which could have diminished visibility and led to decreased engagement rates.
Fifth, the experiment faced limitations due to the capabilities of the AI tool, which frequently struggled to produce the requested content accurately, requiring alterations to the uploaded recipes and thereby compromising the ecological validity of the comparison between human-generated and AI-generated content.
Finally, the study did not account for time-of-day or day-of-week effects, which are recognized to affect Instagram's algorithmic reach and user activity patterns. Posts were published at naturalistic times to maintain ecological validity; however, this may have resulted in variations in exposure and engagement outcomes.
Future research may seek to replicate this experiment across various industries and platforms, including Facebook, X, and TikTok, to improve the understanding of the performance of AI-generated content and to inform social media marketing strategies in different contexts. Longitudinal studies could investigate whether the engagement patterns linked to AI-generated posts versus those created by humans remain consistent or evolve over time. Future experiments might also explore the emotional valence of AI-generated content, assessing how the affective tone influences consumer reactions. Additionally, advanced analytical methods, such as thematic content analysis, sentiment-driven natural language processing of consumer feedback, or mixed-model statistical designs that consider within-subject variability, could yield deeper and more comprehensive insights. Further research could also explicitly account for temporal posting factors (e.g., time of day, weekday versus weekend) to distinguish algorithmic and behavioural effects on engagement. Lastly, integrating theoretical perspectives from cognitive science and behavioural economics — such as studies on algorithmic persuasion and trust disparities between human and machine-generated content — could enhance the understanding of why audiences react differently to AI-generated versus human-generated posts.

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Annex 1. Centralized data about the posts

Recipe	Org/AI	Like	Comment	Share	Save	Follows	Top post	Engagement			Tot No Inter	Engagement rate
								Number	Followers	Non-followers		
1	Org	89	14	2	25	2	Org	563	78.6%	21.4%	132	17.14%
	AI	45	1	0	1	0		231	91.1%	8.9%	47	6.10%
2	AI	52	1	0	29	0	AI	411	75.8%	24.2%	82	10.65%
	Org	40	7	0	1	0		208	90.7%	9.3%	48	6.23%
3	Org	51	2	1	1	0	Org	232	92.3%	7.7%	55	7.14%
	AI	40	3	0	4	0		231	88.6%	11.4%	47	6.10%
4	AI	46	1	0	1	1	AI	228	93.5%	6.5%	49	6.36%
	Org	42	4	0	2	0		241	88.4%	11.6%	48	6.23%
5	Org	56	4	0	4	0	Org	280	94.9%	5.1%	64	8.31%
	AI	45	6	0	1	0		290	91.5%	8.5%	52	6.75%
6	AI	44	2	0	1	0	AI	237	86.7%	13.3%	47	6.10%
	Org	35	6	0	0	0		213	89.2%	10.8%	41	5.32%
7	Org	43	16	0	4	0	Org	320	84.4%	15.6%	63	8.18%
	AI	33	8	0	4	0		222	84.4%	15.6%	45	5.84%

8	AI	33	1	0	1	0	Org	256	90.9%	9.1%	35	4.55%
	Org	45	6	0	1	0		236	97.8%	2.2%	52	6.75%
9	Org	26	2	0	1	0	AI	186	96.2%	3.8%	29	3.77%
	AI	35	2	0	1	0		213	97.1%	2.9%	38	4.94%
10	AI	33	1	0	2	0	AI	227	100%	0.0%	36	4.68%
	Org	24	1	0	1	0		196	100%	0.0%	26	3.38%
11	Org	28	1	0	1	0	AI	175	96.3%	3.7%	30	3.90%
	AI	34	1	0	1	0		190	100%	0.0%	36	4.68%
12	AI	35	1	0	1	0	AI	217	100%	0.0%	37	4.81%
	Org	32	1	0	1	0		174	100%	0.0%	34	4.42%
Average	Org	42.58	5.33	0.25	3.50	0.17		252.00	92.4%	7.60%	51.83	6.73%
	AI	39.58	2.33	0.00	3.92	0.08		246.08	91.63%	8.37%	45.92	5.96%

Source: developed by the authors (2025)

Annex 2. Centralized data about the posts after removing the first recipe of the experiment

Recipe	Org/AI	Like	Comment	Share	Save	Follows	Top post	Engagement			Tot No Inter	Engagement rate
								Number	Followers	Non-followers		
2	AI	52	1	0	29	0	AI	411	75.8%	24.2%	82	10.65%
	Org	40	7	0	1	0		208	90.7%	9.3%	48	6.23%
3	Org	51	2	1	1	0	Org	232	92.3%	7.7%	55	7.14%
	AI	40	3	0	4	0		231	88.6%	11.4%	47	6.10%
4	AI	46	1	0	1	1	AI	228	93.5%	6.5%	49	6.36%
	Org	42	4	0	2	0		241	88.4%	11.6%	48	6.23%
5	Org	56	4	0	4	0	Org	280	94.9%	5.1%	64	8.31%
	AI	45	6	0	1	0		290	91.5%	8.5%	52	6.75%
6	AI	44	2	0	1	0	AI	237	86.7%	13.3%	47	6.10%
	Org	35	6	0	0	0		213	89.2%	10.8%	41	5.32%
7	Org	43	16	0	4	0	Org	320	84.4%	15.6%	63	8.18%
	AI	33	8	0	4	0		222	84.4%	15.6%	45	5.84%
8	AI	33	1	0	1	0	Org	256	90.9%	9.1%	35	4.55%
	Org	45	6	0	1	0		236	97.8%	2.2%	52	6.75%

9	Org	26	2	0	1	0	AI	186	96.2%	3.8%	29	3.77%
	AI	35	2	0	1	0		213	97.1%	2.9%	38	4.94%
10	AI	33	1	0	2	0	AI	227	100.0%	0.0%	36	4.68%
	Org	24	1	0	1	0		196	100.0%	0.0%	26	3.38%
11	Org	28	1	0	1	0	AI	175	96.3%	3.7%	30	3.90%
	AI	34	1	0	1	0		190	100.0%	0.0%	36	4.68%
12	AI	35	1	0	1	0	AI	217	100.0%	0.0%	37	4.81%
	Org	32	1	0	1	0		174	100.0%	0.0%	34	4.42%
Average	Org	38.36	4.55	0.09	1.55	0.00		223.73	93.65%	6.35%	44.55	5.79%
	AI	39.09	2.45	0.00	4.18	0.09		247.45	91.68%	8.32%	45.82	5.95%

Source: developed by the authors (2025)

AI u odnosu na ljudsko stvaranje sadržaja na Instagramu: ishodi angažmana i percepcije potrošača

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Sažetak: U radu se istražuje usporedna učinkovitost sadržaja nastalog kao rezultat ljudskog stvaranja i sadržaja generiranog pomoću AI na Instagramu, fokusirajući se na metrike angažmana i preferencije potrošača. Cilj je utvrditi može li AI izjednačiti ili nadmašiti ljudsko stvaranje sadržaja u pogledu dosega, interakcije i percipirane kvalitete. Provedeno je istraživanje na Instagram računu s 770 pratitelja. Ukupno je objavljeno dvanaest postova s jednom slikom (12 ljudski stvoreno, 12 generirano pomoću AI) u izmjeničnom slijedu. Podaci o angažmanu prikupljeni su putem Instagram Insights-a i analizirani pomoću Mann-Whitney U testa. Osim toga, provedene su dvije ankete putem Instagram Storyja kako bi se utvrdilo koji su elementi postova (slika, opis, recept) imali najznačajniji utjecaj na angažman. Rezultati su pokazali da sadržaj generiran pomoću AI može proizvesti usporedive rezultate u pogledu lajkova, komentara, dijeljenja, spremanja, dosega, impresija, stope angažmana i rezultata angažmana. Sadržaj stvoren ljudskim stvaranjem izazvao je više komentara i impresija hashtagova, dok je sadržaj generiran pomoću AI rezultirao većim brojem posjeta profilu i većim dosegom među osobama koje nisu pratitelji. Rezultati anketa pokazali su da su vizualni prikazi bili glavni faktor koji je pokretao angažman sa 64%, slijedeći recept/informacije s 26% i opisi s 10%. Potrošači su pokazali veću preferenciju prema ljudskim vizualnim prikazima i receptima, iako su opisi generirani pomoću AI bili privlačniji. Ovi rezultati sugeriraju komplementarne rezultate, što ima utjecaja na strategije sadržaja. Važno je napomenuti da je istraživanje bilo ograničena na jedan Instagram račun unutar kulinarske niše, koristeći statične postove sa slikama. Stoga rezultati možda nisu primjenjivi na druge industrije, platforme ili formate sadržaja. Također, mogući učinci platforme, poput shadow banning-a, zajedno s ograničenjima AI alata u generiranju specifičnih jela, mogli su utjecati na rezultate. Buduća istraživanja trebala bi ispitati različite industrije, platforme i formate sadržaja kako bi istražila dugoročne učinke AI u stvaranju sadržaja.

Ključne riječi: marketing na društvenim mrežama, angažman na Instagramu, umjetnička inteligencija, stvaranje sadržaja, preferencije potrošača
JEL klasifikacija: M37, M31