

VIRTUAL INFLUENCERS IN THE CONTEXT OF ARTIFICIAL INTELLIGENCE: AN OVERVIEW OF THE EMERGING LITERATURE

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Abstract: *Virtual influencers, aided by artificial intelligence (AI) and computer-generated imagery (CGI), have emerged as key participants in the digital marketing scene. This study investigates their expanding importance, focusing on how AI technologies enable these digital personas to interact with audiences, personalize content, and optimize marketing strategies. Virtual influencers give marketers unprecedented control over messaging and audience engagement, making them a cost-effective and adaptive alternative to actual influencers. However, their popularity has created serious ethical questions, particularly about authenticity, transparency, and the manipulation of consumer trust via parasocial connections. This study examines the current literature on AI-powered virtual influencers, evaluating their effectiveness and the problems they offer to the future of marketing*

Keywords: *Virtual influencers, artificial intelligence, digital marketing, ethical concerns, authenticity*

1. Introduction

Virtual influencers have become an effective tool in digital marketing, providing unique chances for brand interaction. This tendency gained traction during the COVID-19 pandemic, which intensified the shift to internet engagement while traditional influences were prohibited by social distancing and lockdown measures. Virtual influencers, powered by artificial intelligence (AI), have emerged as adaptable alternatives, engaging audiences via platforms such as Instagram and TikTok without the challenges that human counterparts face, such as health risks or production constraints (Gretzel, 2020; Kim et al., 2023). The incorporation of AI into virtual influencer development has streamlined the process, allowing these digital personas to mimic human behavior, adjust content to audience preferences, and sustain constant engagement. AI's capability to analyze large datasets and fine-tune influencer strategies has significantly boosted the effectiveness of virtual influencers in personalized marketing. This became especially important during the pandemic, when consumer behavior shifted toward increased online content

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consumption (Lee & Ma, 2022; As a result, virtual influencers emerged as valuable assets for brands, offering cost-effective, easily controlled marketing strategies (Rauschnabel et al., 2019; Koetsier, 2020). This AI-driven innovation in influencer marketing not only reshapes brand-consumer interactions but also enhances strategic targeting and scalability. As AI continues to advance, virtual influencers are expected to play an even more prominent role in digital marketing's future.

Virtual influencers, also known as CGI (computer-generated imagery) influencers, are digital characters created using 3D modeling software and powered by AI. These influencers maintain active social media presences, engage with audiences, and collaborate with brands to promote products. What makes them unique is their ability to perform the same functions as human influencers while being entirely controlled by AI. With AI's assistance, these virtual personas can analyze audience preferences and interact with followers in highly personalized ways (Liu et al., 2023). Natural language processing (NLP) allows them to communicate smoothly with users, while machine learning algorithms help refine their messaging based on user feedback and interaction patterns (Fadhel et al., 2024).

AI's influence extends beyond character creation, playing a crucial role in shaping the marketing strategies of virtual influencers. By leveraging machine learning and data analytics, these digital personalities can gather valuable insights into consumer behavior, allowing brands to adjust their campaigns in real time for better outcomes. As a result, AI-powered influencers are adaptable, cost-effective, and offer greater control over content creation compared to human influencers, contributing to their growing popularity in digital marketing (Hoffman & Novak, 2018). Unlike human influencers, who may be susceptible to controversies or personal challenges, virtual influencers provide consistency. Additionally, younger consumers increasingly accept these AI-driven personas, viewing them as part of the broader digital evolution rather than a passing trend (Lou et al., 2022).

However, despite their rising popularity, the use of virtual influencers has raised ethical concerns, particularly around issues of authenticity and manipulation. Scholars have debated the impact of AI-driven, highly tailored content on consumer autonomy. With virtual influencers becoming more adept at reading emotional cues and tailoring their responses, there are concerns that consumers could be manipulated into forming parasocial relationships with these digital figures, unaware of the sophisticated AI mechanisms at work (Kim & Wang, 2023). Moreover, transparency around data usage and the role of AI in decision-making processes is a growing ethical issue, as consumers may not fully understand how their personal data is being used to influence their behavior.

2. Influencer marketing in the context of virtual influencers

AI and CGI technologies have transformed virtual influencers, enabling them to exhibit lifelike human features, expressions, and interactions. The blend of natural language processing, AI-driven algorithms, and motion capture allows these digital personas to appear more relatable and interactive. Research shows that AI empowers virtual influencers to engage in real-time conversations, create personalized content, and

respond dynamically to followers' input, increasing their appeal (Gerlich, 2023; Mrad et al., 2022). Additionally, because virtual influencers are not bound by human limitations like fatigue or scheduling conflicts, they offer brands a cost-efficient solution, capable of consistently producing and posting content without interruption (Dabiran et al., 2024).

Virtual influencers have demonstrated a significant impact on consumer behavior. Studies suggest their carefully curated and predictable personas enhance perceived trustworthiness and reliability, in contrast to human influencers who may exhibit biases or unpredictable behavior (Gerlich, 2023; Zourrig et al., 2023). Furthermore, virtual influencers often achieve higher engagement rates, especially among younger audiences like Gen Z, who are more accustomed to digital environments (Jhawar et al., 2023).

However, challenges remain around the issue of authenticity. Consumers sometimes find it difficult to form deep emotional connections with virtual influencers, as they lack real-life experiences. This gap in emotional authenticity could limit their long-term effectiveness in building genuine trust and loyalty (Cao et al., 2023). Transparency about these influencers being AI-generated is essential to mitigate ethical concerns and maintain audience trust (Zourrig et al., 2023).

Ethical concerns surrounding AI and CGI in virtual influencers include the risk of perpetuating unrealistic beauty standards and stereotypes. Many prominent virtual influencers are designed with idealized physical features, which may reinforce harmful societal expectations, especially regarding gender and racial representation (Shin, 2023). Additionally, the lack of transparency about their AI-driven nature can lead to consumer deception, raising questions about accountability and ethical marketing practices (Mrad et al., 2022).

From a marketing standpoint, virtual influencers have become valuable assets for brands aiming to maintain control over their messaging. Their customizable nature allows brands to fine-tune their appearance, behavior, and interactions to align with specific marketing goals. This adaptability has led to their successful integration across industries such as fashion, technology, and entertainment (Gerlich, 2023; Mrad et al., 2022). Moreover, the ability of AI-powered influencers to collect and analyze data enhances their relevance, as they can adjust to shifting consumer trends and preferences in real-time (Cao et al., 2023).

2.1. Development of parasocial relationships with Virtual Influencers

The rise of virtual influencers has added complexity to the study of parasocial relationships (PSRs)—one-sided connections where audiences develop feelings of familiarity and intimacy with a figure who does not reciprocate. Virtual influencers, digital personas that engage with audiences on platforms like Instagram and YouTube, have transformed how brands market products and interact with consumers. However, forming PSRs with these influencers involves a unique blend of psychological and technological factors, such as perceived credibility, human-likeness, and the impact of social presence and new technology.

One key factor in developing PSRs with virtual influencers is their perceived attractiveness, prestige, and expertise. Research shows that these traits strongly

influence audience attachment and admiration. Attractiveness here goes beyond physical appearance; it also includes charisma and personal style, which are highlighted through the influencer's visual presentation and interactions (Aw & Chuah, 2021; Aw et al., 2022). Prestige, often linked to the influencer's affiliation with high-status brands, boosts their appeal, while perceived expertise—knowledge in areas like beauty, fashion, or technology—builds trust, a crucial component in fostering PSRs. As a result, the strategic design of virtual influencers to embody these traits enhances their ability to forge deeper connections with their audience (Aw & Chuah, 2021; Aw et al., 2022).

Another important factor in building PSRs with virtual influencers is perceived similarity and human-likeness. Despite being digital creations, virtual influencers can evoke strong emotional bonds. However, their lack of full human-likeness can limit the depth of these relationships. The uncanny valley phenomenon—the discomfort people feel when artificial beings are almost but not entirely human-like—plays a significant role here. When virtual influencers are seen as too mechanical or artificial, the strength of the PSR weakens (Stein et al., 2022). On the other hand, when these influencers display traits or lifestyles that reflect the audience's own experiences, perceived similarity strengthens the PSR, even compensating for the lack of human-likeness (Stein et al., 2022). Striking a balance between relatability and artificiality is therefore key to cultivating stronger PSRs.

Social presence and the novelty of the technology used in creating virtual influencers also contribute to PSR development. In virtual reality (VR) shopping environments, for example, factors like physical attractiveness and a strong sense of social presence—where the influencer feels “present” with the audience—are crucial (Yuan et al., 2022). Additionally, the excitement generated by new technology, whether it is VR or augmented reality (AR), enhances audience engagement and deepens the PSR (Yuan et al., 2022). Virtual influencers who leverage cutting-edge platforms are often perceived as more dynamic and innovative, which strengthens their appeal and helps sustain long-term relationships with their audience. By combining advanced technology with a well-crafted persona, virtual influencers can create immersive experiences that foster a stronger sense of connection.

To sum up, the development of parasocial relationships with virtual influencers is influenced by their attractiveness, prestige, and expertise; their perceived similarity and human-likeness; and the role of social presence and technological novelty. These factors present both opportunities and challenges for building lasting audience attachments, offering valuable insights for marketers and researchers alike.

2.2. Authenticity and trust in Virtual Influencers

The challenge of authenticity is crucial when it comes to AI-driven virtual influencers. Compared to their human counterparts, virtual influencers are often perceived as less authentic and trustworthy, which can reduce their persuasive power and negatively impact consumers' purchasing decisions (Lou et al., 2022; Oliveira & Chimenti, 2021; Sands et al., 2022). This skepticism stems from the awareness that virtual influencers are artificial creations, lacking the spontaneity and relatability that characterize human interaction. When consumers sense that an influencer is “too artificial,” they are less likely

to trust them, a vital element for driving engagement and sales.

Despite their polished and sleek appearances, virtual influencers often struggle to replicate the subtle imperfections that make human influencers more relatable. This gap in perception leads to a trust deficit, posing a challenge for marketers. However, it's not an insurmountable issue—strategic content that highlights transparency about the virtual influencer's artificial nature, combined with creative storytelling, can help close the gap between artificiality and authenticity (Lou et al., 2022; Sands et al., 2022).

Finding the right balance between realism and virtuality is essential for maintaining authenticity. Virtual influencers need to carefully manage their engagement with real-world elements to avoid breaking the illusion of authenticity. Research shows that when virtual influencers overly integrate into real-world scenarios, they risk appearing inauthentic, which diminishes their effectiveness in marketing campaigns (Ham et al., 2023). When consumers become too aware of the character's artificial nature, it can lead to disillusionment and reduced engagement.

To avoid this, virtual influencers should operate within their digital limits while minimizing excessive real-world interactions. By doing so, they can continue to captivate and intrigue audiences without breaking the suspension of disbelief that is key to their success (Ham et al., 2023).

Transparency is also vital when using virtual influencers, especially in brand endorsements. Like human influencers, audiences appreciate honesty and authenticity in marketing messages. Transparent, well-disclosed, and creative brand partnerships can significantly boost the perceived trustworthiness of virtual influencers (Balaban & Szabolics, 2022). When brands fail to clearly disclose the virtual nature of their endorsers or use overly scripted endorsements, they risk alienating consumers who feel misled. On the other hand, when virtual influencers are upfront about their digital origins and engage in creative, non-intrusive endorsements, they can retain a sense of authenticity that resonates with audiences.

Additionally, the ethical implications of using virtual influencers cannot be overlooked. Maintaining ethical practices and transparency in brand collaborations is critical for building long-term trust between consumers and virtual influencers. By prioritizing transparency, marketers can alleviate the trust issues associated with the artificial nature of these figures, potentially increasing their influence (Balaban & Szabolics, 2022).

AI-driven virtual influencers represent a dynamic blend of technology and marketing, offering both exciting opportunities and significant challenges. While they provide unique ways to engage with audiences, the issues of authenticity and trust remain key hurdles. Successfully navigating these challenges involves addressing the uncanny valley effect, being transparent in brand endorsements, and finding the right balance between realism and virtuality. Despite these concerns, virtual influencers can be just as effective as human influencers, especially for niche audiences that value novelty and uniqueness in their consumption choices.

3. Methodology

3.1. Data Collection

This study utilizes secondary data from two main sources: Google Trends and Lens.org. Google Trends was used to track public interest in virtual influencers and artificial intelligence (AI) from 2022 to the present, offering insights into how these topics have evolved in public discourse. We analyzed the global frequency of search terms related to “virtual influencers” and “AI in marketing.” This allowed us to pinpoint periods of heightened interest and correlate them with key events or developments in the field.

In addition to Google Trends, data were gathered from the academic database Lens.org, chosen for its extensive coverage of both scientific publications and patent records. This provided a thorough overview of the latest research on virtual influencers and AI. The data collection focused on articles published between 2022 and the present, ensuring that the review captures the most current developments in the field.

3.2. Data Analysis

The data collected from Lens.org were analyzed using VOSviewer, a tool widely used for bibliometric analysis. After importing the data into VOSviewer, research trends were the scope of the examination. A keyword co-occurrence analysis was also conducted to identify the main themes and topics within the literature on virtual influencers and AI in marketing. This approach offered a comprehensive overview of the academic landscape, highlighting key areas of focus in recent years.

4. Results

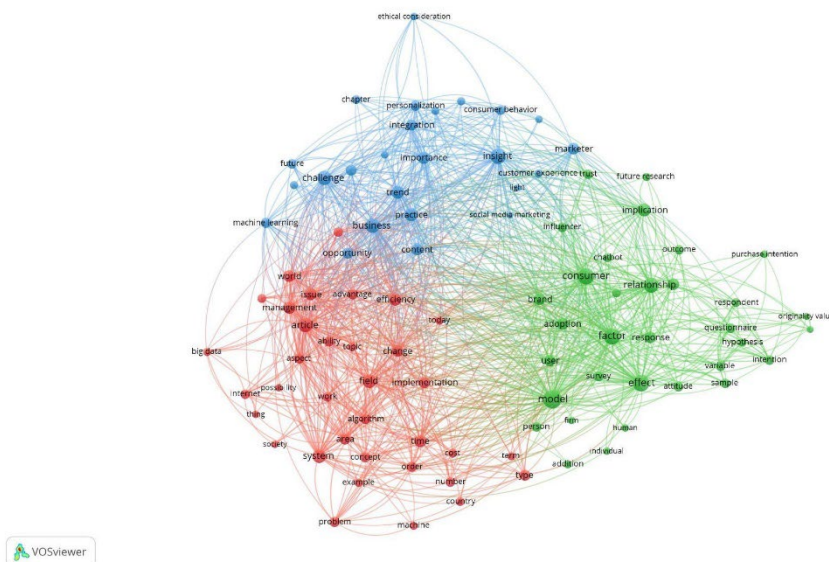


Fig. 1. Data visualization provided by “VOSViewer”, revealing three major thematic clusters in research

The VOSviewer visualization reveals three major thematic clusters in the research surrounding artificial intelligence (AI) in influencer marketing, each represented by a distinct color. These clusters represent different research domains: AI techniques and big data, ethical and behavioral considerations, and consumer relationships in the context of influencer marketing.

The **red cluster** focuses on the technical and conceptual aspects of AI, particularly its application in marketing through machine learning and big data. Keywords such as “big data,” “algorithm,” and “efficiency” highlight how AI is being used to enhance marketing efficiency, streamline management processes, and create competitive advantages for businesses. This cluster also addresses challenges in AI implementation, presenting both obstacles and opportunities for the marketing industry. Terms like “management,” “system,” and “implementation” indicate ongoing efforts to integrate AI into marketing frameworks, emphasizing its efficiency and the associated risks.

The **blue cluster** explores the ethical, practical, and behavioral aspects of AI in marketing. Keywords such as “ethical consideration,” “consumer behavior,” and “personalization” reflect rising concerns about how AI-driven marketing affects consumer privacy and trust. This cluster underscores the importance of ethical marketing practices as AI becomes more prevalent in predicting and influencing consumer behavior. It also addresses practical issues related to incorporating AI into existing marketing systems, with a focus on transparency and consumer protection.

The **green cluster** is centered around influencer marketing and its interaction with AI technologies, with a focus on the consumer-brand relationship. Key terms like “consumer,” “relationship,” and “adoption” suggest that AI is being used to shape consumer attitudes and behaviors through influencer marketing strategies. The analysis shows that AI tools influence how consumers engage with both brands and influencers, with a particular emphasis on trust-building and personalization. Terms such as “effect,” “response,” and “model” suggest the use of empirical studies, such as hypothesis testing and consumer surveys, to measure the outcomes of AI-enhanced influencer marketing campaigns.

Interconnections between these clusters reveal significant overlaps in research areas. For example, the strong links between the red and green clusters suggest that the technical implementation of AI is closely tied to its impact on consumer behavior and influencer marketing strategies. Similarly, the connections between the blue and green clusters highlight the growing importance of ethical considerations in influencing how consumers adopt AI-driven marketing practices, particularly in influencer marketing. These cross-cluster connections underscore the multidisciplinary nature of the field, where technical, ethical, and behavioral factors are increasingly intertwined.

The visualization highlights distinct yet interconnected research themes within AI-driven influencer marketing. The field is primarily concerned with the technical implementation of AI, ethical implications, and consumer responses to AI-enhanced influencer marketing. These findings point to the need for further exploration of ethical frameworks and consumer protection measures as AI continues to play a larger role in marketing strategies.

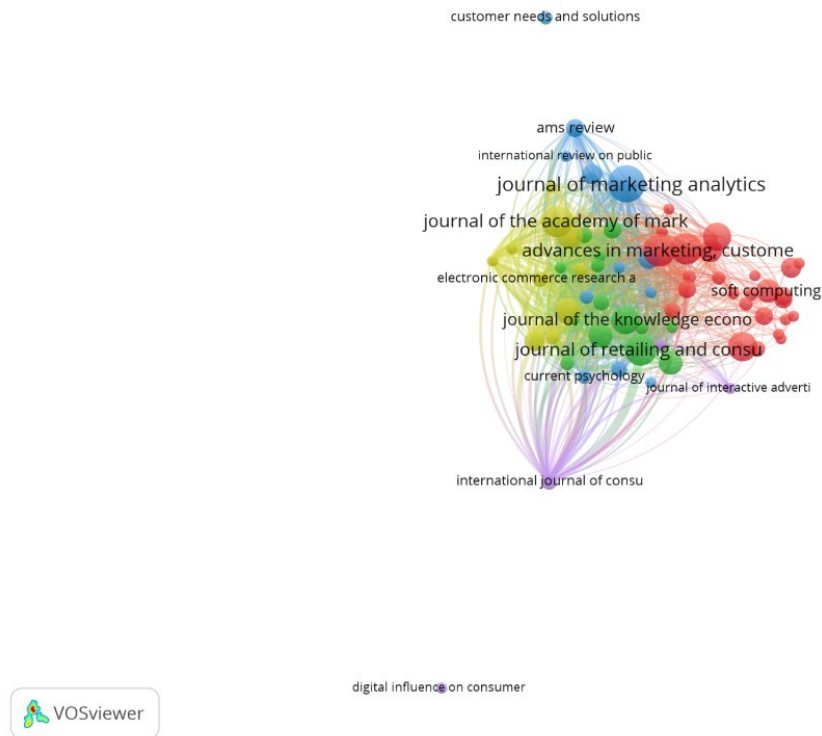


Fig. 2. Visualization of the most important journals related to artificial intelligence and influencer marketing

The bibliometric analysis of journals related to artificial intelligence (AI) and influencer marketing reveals strong interconnections among key publications, reflecting an interdisciplinary approach that bridges AI technology with marketing practices. Prominent journals such as *Advances in Marketing*, *Customer Relationship Management*, and *Journal of Marketing Analytics* exhibit high link strength and citation counts, indicating their significant influence in the field. These journals, particularly in **Cluster 1**, play a central role in connecting research on AI's role in marketing analytics with customer relationship management, highlighting their importance in shaping influencer marketing strategies.

Similarly, journals in **Cluster 2**, including *Journal of Retailing and Consumer Services*, are key in applying AI-driven insights to retail environments, showcasing the growing interest in how AI technologies personalize consumer experiences. The third cluster, featuring more technically focused journals like *Soft Computing*, emphasizes the importance of algorithmic innovations in enhancing influencer marketing platforms.

The close interconnections between these clusters demonstrate the symbiotic relationship between technical AI research and its practical marketing applications. Additionally, citation patterns underscore the central role of journals that integrate AI advancements with marketing analytics, suggesting that the use of machine learning and big data in marketing is not only shaping current research but also driving future developments in the field. The analysis highlights how AI's computational advancements

inform influencer marketing practices, optimizing consumer engagement and campaign effectiveness, and establishing AI as a key driver of innovation in modern marketing strategies.

Table 1

A representation of ten top journals with a minimum of 3 documents published on the topic of Virtual Influencer and Artificial Intelligence

Journal	Cluster	Links	Documents	Citations
Advances in Marketing, Customer Relationship Management	1	59	14	25
Journal of Retailing and Consumer Services	2	58	13	231
Journal of Marketing Analytics	3	56	17	54
Electronic Commerce Research	3	54	7	38
Information Systems Frontiers	1	54	6	34
European Journal of Marketing	5	53	3	149
Psychology & Marketing	4	53	10	74
Journal of Research in Interactive Marketing	4	52	4	21
Electronic Markets	4	51	10	124
Industrial Marketing Management	2	51	6	28

The analysis of the top ten journals in the fields of artificial intelligence (AI) and influencer marketing highlights key publications that play a pivotal role in shaping the research landscape. *Advances in Marketing* and *Customer Relationship Management*, part of **Cluster 1**, lead with the highest number of links (59), emphasizing their importance in bridging AI with customer management strategies. This suggests a strong focus on enhancing customer relations through AI technologies. *Journal of Retailing and Consumer Services* (**Cluster 2**) follows closely with 58 links and a high citation count of 231, indicating its significant influence on the retail applications of AI, particularly in improving customer experiences.

Journal of Marketing Analytics (**Cluster 3**), with 56 links, underscores the growing role of data-driven AI applications in marketing analytics. Similarly, *Electronic Commerce Research* (**Cluster 3**) and *Information Systems Frontiers* (**Cluster 1**), both with 54 links, contribute notably to e-commerce and technological advancements in marketing. Their high connectivity highlights their importance in the technical development of AI systems applied to marketing strategies. The *European Journal of Marketing* (**Cluster 5**) boasts 149 citations from just three documents, reflecting its strong academic impact, particularly in strategic marketing enhanced by AI. *Psychology & Marketing* (**Cluster 4**) integrates psychological insights with AI-driven marketing techniques, with 53 links and 74 citations, emphasizing its role in understanding consumer behavior in AI-powered marketing.

Other key contributors include the *Journal of Research in Interactive Marketing* and *Electronic Markets* (both in **Cluster 4**), which focus on interactive marketing and e-commerce platforms, respectively. Finally, *Industrial Marketing Management* (**Cluster 2**) links AI innovations to industrial and B2B marketing, rounding out the list with 51 links and 28 citations. Collectively, these journals reflect a multidisciplinary approach, bridging technical AI advancements with practical marketing applications, particularly in consumer behavior, retailing, and analytics. Their centrality in the network underscores their significant influence in shaping AI and influencer marketing research.

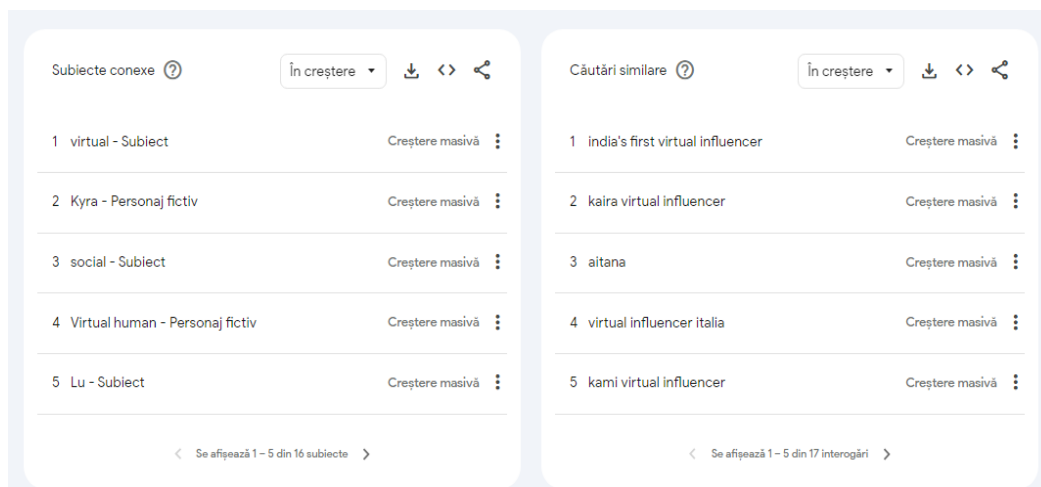


Fig. 3. A screenshot of Google Trends associated terms with the term *Virtual Influencer*

Virtual influencers are rapidly becoming a major trend in the digital and social media landscapes, as evidenced by the increasing number of related search queries. A key driver of this trend is the term “virtual,” reflecting the rise of digital environments and virtual personas. These influencers are non-human, digitally created characters that engage with audiences much like human influencers. The growing popularity of terms like “virtual human” and “virtual influencer” suggests that these digital personalities are gaining acceptance and recognition as influential figures in the online world.

One prominent virtual influencer is Kyra, a fictional character whose popularity is quickly rising. Her presence across multiple platforms likely explains the surge in searches related to her name. Similarly, Lu, another virtual persona, is attracting attention, highlighting the increasing diversity of characters in this space. These influencers thrive in highly social environments, interacting with users and followers, which contributes to their growing influence. Interest in virtual influencers spans across different regions. For example, there is notable curiosity around “India's first virtual influencer,” underscoring the global spread of this trend. Searches for specific characters like Kaira and Kami indicate that audiences are beginning to distinguish between various virtual influencers. Additionally, searches such as “Virtual Influencer Italia” demonstrate that this digital phenomenon is not confined to one region but is expanding worldwide.

Summing up, virtual influencers are becoming a powerful part of the social media ecosystem, driving engagement and brand interaction. With characters like Kyra, Lu, and

Kami gaining prominence, it is clear that this trend is here to stay, shaping the future of digital marketing and social interactions globally.

5. Conclusion and discussion

The rise of virtual influencers marks a transformative shift in the digital marketing landscape. These AI-driven entities, created using advanced CGI and machine learning, provide brands with unique opportunities to connect with their audiences in ways human influencers cannot. Virtual influencers do not face the same logistical issues as human influencers—like scheduling conflicts, personal controversies, or physical limitations—and they can maintain a consistent online presence. Brands also have complete control over their messaging, appearance, and interactions, allowing for more customized and effective marketing strategies.

In addition, AI-powered influencers can analyze large datasets to engage with audiences in more personalized ways. Using machine learning and natural language processing (NLP), these digital personas constantly refine their communication styles and content based on real-time feedback. This ability makes them particularly valuable in industries where precise targeting and consumer engagement are critical, such as fashion, beauty, and technology.

However, the growing use of virtual influencers does raise challenges. Concerns about authenticity and transparency are significant. Unlike human influencers, who bring personal experiences and spontaneity to their content, virtual influencers are completely fabricated, leading to doubts about their ability to build genuine trust with consumers. While younger generations, like Gen Z, are more open to engaging with these digital personas, the lack of emotional authenticity may limit the development of long-term, meaningful relationships between virtual influencers and their audiences. Additionally, as AI becomes more adept at analyzing emotional cues and tailoring interactions, there is a risk of consumers being manipulated into forming parasocial relationships with virtual influencers, which blurs the line between marketing and exploitation.

Ethical concerns surrounding virtual influencers are also pressing. These digital figures often promote unrealistic beauty standards and can manipulate consumer behavior through hyper-targeted, AI-driven content. If it's not made clear that these influencers are AI-generated, consumers may mistakenly believe they are interacting with real people, raising transparency issues in advertising. Brands must navigate these ethical concerns carefully to maintain trust and avoid potential backlash.

Looking ahead, virtual influencers have a promising future, but their success will depend on how well brands handle the issues of authenticity, ethical transparency, and consumer trust. As AI advances, virtual influencers will likely become more sophisticated, possibly gaining more human-like qualities and forming stronger emotional connections with audiences. For long-term success, however, companies will need to establish clear guidelines for using AI in marketing and prioritize transparency in their communications with consumers.

In conclusion, virtual influencers offer significant advantages in terms of scalability, control, and engagement. Yet, their success will rely on addressing the ethical, emotional,

and social challenges they pose. As the technology continues to evolve, both researchers and practitioners must ensure that the use of virtual influencers remains responsible and benefits both consumers and brands.

6. Limitations and further research

This study primarily relies on secondary data sources like Google Trends and academic literature. As a result, it may not capture the most recent developments in virtual influencer technologies or the latest shifts in consumer behavior. Furthermore, the study offers a broad overview of virtual influencers, potentially overlooking specific strategies used by different brands and industries. The ethical concerns discussed are based on theoretical and empirical insights but lack primary research such as consumer surveys or interviews with industry professionals.

Future research should explore consumer perceptions of virtual influencers through qualitative methods like focus groups or interviews to better understand trust, authenticity, and engagement. It is also important to examine the long-term viability of virtual influencers and their capacity to form genuine connections with consumers. Moreover, developing ethical guidelines for the use of AI-driven virtual influencers in marketing will be crucial for ensuring transparency and safeguarding consumer autonomy. A comparative analysis between human and virtual influencers across various industries could offer valuable insights into their strengths and limitations.

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