Virtual influencers: Definition and future research directions☆

Alice Audrezet [a], Bernadett Koles [b], Julie Guidry Moulard [c], Nisreen Ameen [d,*] [ID],
Brad McKenna [e]

[a] *Institut Français de la Mode, 34 quai d'Austerlitz, 75013 Paris, France*
[b] *SKEMA Business School - University of Côte d'Azur, 60 rue Dostoïevski, CS 30085, 06902 Sophia Antipolis, France*
[c] *Louisiana Tech University, P.O. Box 7923, Ruston, LA 71272, USA*
[d] *School of Business and Management, Royal Holloway, University of London, Egham Hill, Egham TW20 0EX London, UK*
[e] *Norwich Business School, University of East Anglia, Norwich NR4 7TJ, UK*

ABSTRACT

This editorial introduces the special issue 'Virtual Influencers: A New Frontier in Marketing and Consumer Research,' providing a comprehensive overview of the emerging role of virtual influencers in shaping contemporary marketing practices. Virtual influencers, digital personas created through AI and computer-generated imagery, are increasingly adopted by brands due to their scalability, adaptability, and perceived safety. The editorial defines virtual influencers, synthesizes insights from 16 contributing papers, and identifies three thematic areas: comparisons between human and virtual influencers, the influence of virtual influencer characteristics on consumer engagement, and the broader societal and ethical implications of virtual influencers. It also highlights future research directions, including the rise of autonomous virtual influencers, cross-media virtual influencer expansion, and their role in promoting inclusivity and social change. By bridging marketing, technology, and society, this editorial positions virtual influencers as critical agents of transformation in the evolving influence economy, calling for continued interdisciplinary research to shape their responsible development.

1. Introduction

Influencer marketing is a relatively nascent but fast-evolving industry, whose size has more than tripled since 2020. In 2025, the market was estimated to reach approximately 33 billion U.S. dollars.[1] At the core of this growth are Social Media Influencers, digital content creator personalities who share their perspectives, product reviews and recommendations, personal stories, and lifestyles with others on major platforms such as Instagram, TikTok, YouTube, and Substack. When their content, including posts, messages, newsletters and videos – resonates with viewers, influencers are able to attract and cultivate audiences, often building substantial follower bases over time. This influence and reach make them highly appealing to brands seeking authentic and engaging ways to connect with consumers. By partnering with influencers, companies can tap into niche communities, boost brand visibility, and drive consumer action through content that feels personal and relatable.

Contemporary influencer research frequently draws upon literature addressing opinion leadership (Casaló et al., 2020) and (trans)parasocial relationships (Conde & Casais, 2023; Lou, 2022) to better understand the followers' behavioral intentions regarding influencers' recommendations (Farivar et al., 2021). An increasing body of work investigates essential influencer characteristics, including authenticity (Audrezet et al., 2020), credibility (Ooi et al., 2023), trustworthiness (Jin et al., 2019; Lou & Yuan, 2019), and community size (Beichert et al., 2024; Wies et al., 2023). Additionally, scholars examine the effectiveness of different content and engagement strategies (Leung et al., 2022) and explore the strategic deployment of influencers as instruments for brand management (Carlson et al., 2020; Gu et al., 2024; Valsesia et al., 2020; Wang et al., 2021).

A more recent but thus far largely under-explored area concerns virtual influencers; the virtual counterparts of human influencers. Among the most popular virtual influencers today is Lil Miquela, who, despite openly acknowledging her artificial nature, has successfully

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attracted over 7.6 M followers across platforms.[2] Lil Miquela regularly collaborates with major global brands, including Calvin Klein, Samsung, and BMW, generating significant revenue and innovative advertising opportunities. Compared to human influencers, virtual influencers, like Lil Miquela, offer notable advantages, such as greater flexibility and adaptability to brand demands, increased logistical control, and reduced public relations risks. Although her visual identity is entirely computer-generated, Lil Miquela's interactions and content are thoughtfully curated by human creators from the agency Brud, aiming to simulate human-like engagement on social media platforms authentically.

With recent advancements in Artificial Intelligence (AI), the presence and influence of virtual influencers are likely to expand significantly in the near future. Emerging AI-driven technologies present new opportunities to make virtual influencers more interactive, engaging, and scalable. For instance, natural language processing can automate and enrich social media interactions, enabling virtual influencers to engage authentically with audiences in multiple languages and to offer personalized content tailored through user data analysis. Additionally, generative AI tools can efficiently produce realistic images or videos depicting the virtual influencer in different poses, outfits, or settings, reducing the need for manual rendering while enhancing content versatility.

Our goal in this editorial is to highlight recent progress in the field and to identify promising avenues for future research on virtual influencers. Such an endeavor is important and timely, especially considering the remarkable growth in scholarly attention towards virtual influencers in recent years, as illustrated in Fig. 1. More specifically, between 2020 and 2024, annual publications on virtual influencers increased dramatically by almost 6,350 %, surpassing 100 publications annually. Rather than offering an exhaustive literature review, this editorial aims to clarify the concept of virtual influencers and to discuss key foundational themes from existing research that will shape and inspire future studies in marketing. In doing so, we position the articles featured in this Special Issue within an overarching conceptual framework. Ultimately, this Special Issue contributes to extending our understanding of virtual influencers and their evolving role in the future of marketing.

2. A definition for virtual influencers

Our definition builds upon the insights gathered from papers published in this Special Issue. Specifically, a careful analysis of terms used by contributing authors to describe and define virtual influencers offers valuable insights regarding their creation, identity, and purpose.

2.1. How are virtual influencers created?

One of the most frequently used terms to describe virtual influencers is "computer" (12 occurrences), often coupled with "generated" (8 occurrences). This reflects a general consensus that virtual influencers are "software" (3 occurrences) or "computer-generated" entities.

2.2. Who are they?

At the same time, contributing authors commonly emphasize the term "human" (13 occurrences), highlighting that virtual influencers typically exhibit "human-like" appearances and behaviors. By creating content mimicking human actions, virtual influencers effectively stimulate human interactions, often creating an illusion of genuine humanity. While the most renowned virtual influencers maintain distinctly human-like appearances, their visual form is limited only by the

imagination of their creators. Indeed, many virtual influencers deviate from strict human realism, manifesting as anime-inspired or cartoon-like characters (e.g., Noonoouri, who has 495 K followers on Instagram) or even animal figures (e.g., Guggimon, a rabbit with 1.3 M Instagram followers who also appears in Fortnite). Despite these variations, all virtual influencers demonstrate considerable anthropomorphic traits through their distinctive "personalities" (6 occurrences).

Authors frequently describe virtual influencers as "characters" (8 occurrences), labelling them as "digital characters," "computer-generated imagery characters," or "fictional characters". Such terminology positions virtual influencers alongside other narrative entities commonly found in films, plays, or storytelling. From this perspective, virtual influencers are described as "artificial" (7 occurrences), either as deliberate human-crafted substitutes for human interaction or entities driven by AI. Furthermore, the broader descriptor "digital" (7 occurrences) frequently emerges in this context, conceptualizing virtual influencers as "digital avatars", "digital characters", or "digital opinion leaders", existing within a "digital environment".
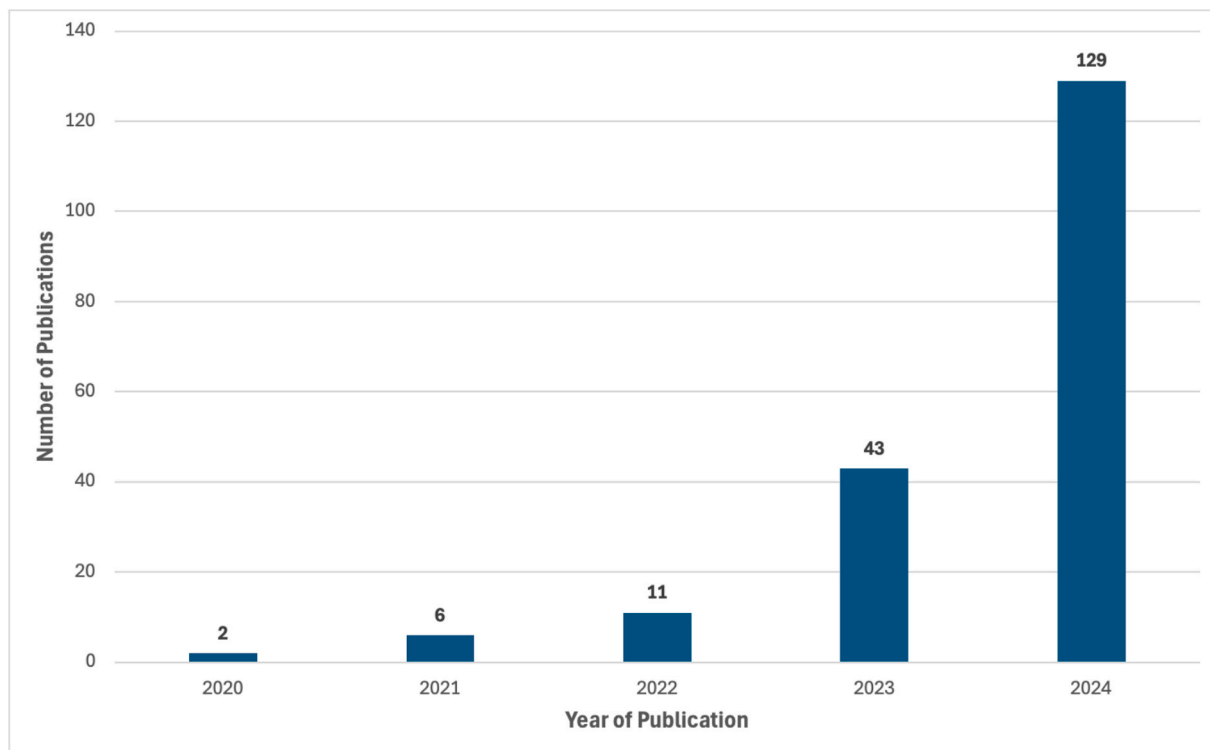
2.3. What is their purpose?

Virtual influencers are intertwined with "media" (7 occurrences) and their inherently "social" (7 occurrences) dimension, actively creating, producing, sharing, streaming, and disseminating "content" (5 occurrences) across social media "platforms" (6 occurrences). Through such interactions (4 occurrences), they engage with their audience (2 occurrences) – primarily consumers (3 occurrences) – with the ultimate goal of exerting social "influence" (3 occurrences). While virtual influencers themselves are artificial, the content they generate is "real" (5 occurrences) and often interactive (3 occurrences). Such "real-time" interactions blur the boundaries between physical and virtual "worlds" (4 occurrences), forging unique convergent spaces.

Building upon this initial analysis, we employed an AI-assisted methodology to synthesize the various definitions of virtual influencers presented across the contributions in this Special Issue. The resulting draft[3] was subsequently refined to capture critical nuances, such as the frequent, though not exclusive, reliance on artificial intelligence in the creation of virtual influencers, as well as their varied virtual embodiments that extend beyond human likeness. This preliminary definition was then submitted to the contributing authors of this special issue for review and validation. Based on their feedback, further revisions were made to enhance conceptual clarity and alignment with the collective insights of the Special Issue. The final, consolidated definition is presented below:

> Virtual influencers are digital personas created through computer-generated imagery and/or AI. These personas may embody diverse forms, ranging from highly realistic human-like figures to anthropomorphized creatures or even inanimate objects. Typically managed by third parties –such as digital agencies, brands, individual creators, or AI systems– the virtual influencers' storylines and personalities are carefully curated, establishing them as fictional characters who interact with the world from a first-person perspective, as social media influencers. Indeed, they are producing content on social media and digital platforms, with the aim of diving audience engagement through entertaining content (often incorporating brands) and real-time interaction.

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[2] This figure was calculated in April 2025 by summing publicly available data from the following platforms: Instagram (~2.46 million), TikTok (~3.4 million), Facebook (~1.1 million), YouTube (~281,000), Snapchat (~334,000), and X/Twitter (~29,200).

[3] Initial definition provided by ChatGPT from virtual influencer definitions proposed by contributing authors of this Special Issue: "A virtual influencer is a computer-generated digital persona, often powered by artificial intelligence, that engages with audiences on social media. Unlike human influencers, these fictional characters are designed to exhibit human-like traits, personalities, and interactions, influencing consumer behaviors, brand engagement, and online discourse.".

Fig. 1. Publications on virtual influencers over time Note: We conducted a search of the Scopus database for academic publications across all years and disciplines that included the terms "virtual influencer", "AI influencer", or "computer-generated imagery influencer" in their title, abstract, or keywords. This search identified a total of 202 publications. We restricted our analysis to journal articles, excluding publications from 2025 due to their incomplete status.

3. Recent progress based on contributions from the Special Issue

This Special Issue comprises 16 papers from 60 submissions drawn from a wide range of topics, methodologies, and perspectives. We have grouped the articles into three broader themes that advance our understanding of virtual influencers and their role within marketing and consumer behavior. First, several studies systematically compare perceptions and effectiveness between virtual and human influencers, revealing nuanced differences in their impacts across diverse contexts. Second, investigations into virtual influencer characteristics, such as their degree of realism and their perceived autonomy, highlight their critical role in shaping consumer perceptions and enhancing engagement. Lastly, researchers have begun to explore the implications of virtual influencers' virtual nature on ongoing discussions in the digital landscape, including privacy concerns and the human connection to anthropomorphic yet intangible entities. Collectively, these three themes significantly enhance both theoretical knowledge about virtual influencers and practical strategies for marketers aiming to effectively integrate these digital entities into their marketing efforts.

3.1. Comparison of the perception and effectiveness of virtual influencers to human influencers

The rise of virtual influencers marks a significant shift in the influence industry, challenging the dominant role of human influencers. While emerging research often highlights the superiority of human influencers, this Special Issue deepens the conversation through six papers that explore the potential benefits of virtual influencers and identify the contexts in which they represent a smart and strategic marketing choice over human influencers.

As an initial contribution, Kobuszewki Volles et al. (2024) investigate the advantages and positive attributes of virtual influencers that may drive successful endorsements. While virtual influencers are often perceived as less trustworthy than their human counterparts, the authors argue that their perceived uniqueness serves as a key differentiator. Drawing on four studies, they demonstrate that this uniqueness can help offset concerns around trustworthiness and generate favorable outcomes, particularly when consumers strongly identify with the virtual influencer.

This perspective is further enriched by two papers that identify the types of products for which virtual influencers may serve as particularly effective promoters.

Using an experimental design, Belanche et al. (2024) compare the effects of virtual vs. human influencers on consumer decisions, particularly in the context of utilitarian versus hedonic products. The main findings reveal that while the type of influencer does not significantly affect overall intentions to follow recommendations, virtual influencers are perceived as more useful for utilitarian products, whereas human influencers foster greater identification, enhancing their effectiveness with hedonic products.

Focusing on utilitarian products only, Meng et al. (2024) found that virtual influencers (vs. human influencers) increased consumers' preferences for self-improvement products (e.g., functional beverages, fitness training courses) vs. non-self-improvement products (or comfortable products) due to heightened perceptions of realistic threats. This effect was moderated by the perceived relationship between consumers and virtual influencers (cooperative vs. competitive) and by consumers' self-affirmation. The findings suggest that while consumers may have less positive attitudes toward virtual influencers overall, virtual influencers can be effective for promoting self-improvement products by tapping into consumers' desire to mitigate perceived threats.

In the context of services, Zhao et al. (2024) investigate how consumers react differently to service failures by virtual influencers versus human influencers. Through a series of experimental studies, the authors found that consumers demonstrate higher forgiveness propensity, more positive behavioral responses, and lower punishment intentions towards virtual influencers compared to human influencers in cases of service failure. This effect is mediated by lower mind perception and

responsibility attribution for virtual influencers. The study also found that familiarity moderates this effect, enhancing forgiveness towards human influencers but not virtual ones. These findings contribute to the understanding of virtual influencer marketing and provide insights for managing consumer reactions to service failures in the digital age.

Moving to the context of branding, Song et al. (2024) investigated how virtual endorsers, compared to human endorsers, affect consumers' perceptions of brand authenticity. Through textual analysis of social media posts and four experimental studies, the researchers found that consumers perceive brands endorsed by virtual influencers as less authentic than those endorsed by human influencers. This effect is mediated by lower perceived authenticity of virtual endorsers. The study also identified two boundary conditions: the negative effect of virtual endorsers on brand authenticity is attenuated when the endorsers have aesthetic imperfections and reversed when endorsers promote multiple brands. These findings contribute to the understanding of virtual influencer marketing and provide insights for brands using virtual endorsers.

Finally, virtual influencers also have a role to play beyond the commercial sphere. Gerrath et al. (2024) investigated how virtual influencers can effectively promote pro-environmental causes by examining the roles of message warmth and trust in experts. The study uses a multi-method approach, including semi-structured interviews and two experiments, to analyze how individuals react to virtual influencers in green campaigns. The authors found that warmer messages from virtual influencers increase engagement with pro-environmental causes, particularly among individuals with low trust in experts, by reducing socio-psychological distance between the influencer and the audience.

These insights concerning the contexts in which marketers should prefer a virtual influencer over a human influencer are further expanded upon by the following six papers of this Special Issue that discuss how different virtual influencer characteristics impact consumers.

3.2. The role of virtual influencers' characteristics

Although human-like virtual influencers are the most recognized, a key advantage of virtual influencers lies in their limitless flexibility in appearance. In this context, four papers in this Special Issue explore how the appearance of virtual influencers influences their connection with human followers, and how this, in turn, impacts the marketing strategies associated with them.

Franke and Groeppel-Klein (2024) explored the effectiveness of two types of virtual influencers – human-like and cartoon-like – in advertising. Through four experimental studies, the researchers found that human-like virtual influencers are perceived as more trustworthy, while cartoon-like virtual influencers are seen as more novel. The study explains these differences through the lens of psychological distance and construal level theory, showing that message focus can moderate the effects. Additionally, the research reveals that the novelty effect of cartoon-like virtual influencers is limited to consumer groups with low familiarity with virtual influencers and highlights further cultural differences in virtual influencer perception between Asian and European consumers.

Yan et al. (2024) complete the spectrum of virtual influencers appearance exploration, examining how consumers' emotional attachment and benefit seeking differs across the three types of virtual influencer (i.e., mimic-human virtual influencer, who are visually indistinguishable from real humans; animated-human virtual influencer, who are drawn in the likeness of a human but is an animated character; and non-human virtual influencer, derived fully on the basis of animals personas or inanimate objects). The authors propose that virtual influencers may influence consumer emotional attachment and different benefit-seeking behaviors through social presence. Their research shows that mimic-human virtual influencers have a lower level of social presence than animated and non-human virtual influencers because of the heavier cognitive load and uncanny perception associated with mimic-human virtual influencers.

Kim et al. (2024) approach the issue from the angle of virtual influencers' form realism and behavioral realism and its impact on consumer perceptions of eeriness and coolness. Through two experimental studies using a 2x2 design manipulating virtual influencers' form realism (low vs. mid vs. high) and behavioral realism (low vs. high), the authors demonstrate that mid-form realism virtual influencers elicited higher eeriness than low-form realism virtual influencers, while high-form realism reduced eeriness compared to low-form realism. Higher form realism was also found to consistently increase perceptions of coolness. Additionally, behavioral realism moderated these effects, with higher behavioral realism amplifying the impacts of form realism on both eeriness and coolness perceptions. These mixed emotions of eeriness (negative) and coolness (positive) significantly affected consumers' intentions to follow virtual influencers and ultimately purchase products endorsed by them.

To conclude on virtual influencers' appearance, Tan and Greene (2025) focus on a specific type of virtual influencer, the "virtual entertainers", referring to virtual influencers interacting through their content online, especially virtual streamers. Unlike virtual humans, these virtual entertainers have avatars that are not as realistic, many even sporting 2D avatars that are distinctly unrealistic, such as an anthropomorphic cat or a shark girl with cat ears. Using content analysis on 1189 comments and clustering 293 channels with over 180,000 livestreams, the authors identify five archetypal virtual entertainers, including: (1) Corporate Streamers, (2) Professional Streamers, (3) Corporate Idols, (4) Simple Idols, and (5) Independent Influencers. The performances of these archetypes are compared and contrasted across multiple success indicators, providing insights for understanding and developing positioning strategies within this growing industry.

Virtual influencers also raise questions about their autonomy. Initially controlled by third parties, such as digital agencies or brands, virtual influencers are becoming increasingly autonomous with the advancement of AI. Zheng et al. (2024) explore how consumers' perceptions of virtual influencers' autonomy affect brand attitudes and purchase intentions. Through five experimental studies, the researchers found that virtual influencers with low perceived autonomy led to more positive consumer responses when compared to those with high autonomy. This effect is mediated by consumers' perceived identity threat and is specific to virtual influencers, not human influencers. The study also reveals that the effect is more pronounced for experience products as opposed to search products and that low-autonomy virtual influencers can be more effective than low-autonomy human influencers for endorsing search products.

In the context of a failure, Joel-Edgar et al. (2025) explore consumers' blame attribution depending on the virtual influencer type (human-like virtual influencer vs. AI-powered virtual influencer) and its subsequent impact on brand trust. Applying the theoretical lens of mind perception, this research demonstrates that consumers attribute higher mind perception to a human virtual influencer and consequently place more blame on them in negative scenarios, in turn diminishing brand trust more significantly in cases when an AI-powered virtual influencer versus a human-like virtual influencer is being blamed.

Beyond the marketing strategy considerations of choosing between a virtual or human influencer and selecting the appropriate type of virtual influencer for a given context, several contributions in this Special Issue explore the implications of the virtual nature of virtual influencers.

3.3. The implications of the virtual nature of virtual influencers

Four papers in this Special Issue examine how the virtual nature of virtual influencers contributes to the evolution of several ongoing discussions in the digital landscape.

Through an interdisciplinary orientation, Liyanaarachchi et al. (2024) assess the implications of the virtual influencer phenomenon for data privacy. Specifically, the authors argue that – given that the virtual influencer is not a human being, an unbalanced privacy risk arises from

possible data vulnerability, cybercrime, and the creation of fake profiles. These risks are explored through a qualitative exploratory study with 28 followers of virtual influencers. The authors introduce the "multi-privacy paradox," expanding the traditional privacy paradox to encapsulate the transfer of privacy impact from virtual entities to their legal stakeholders.

Due to their non-physical nature, virtual influencers raise questions about their authenticity, a crucial concept in the influencer industry. Building on the Entity-Referent Correspondence Framework of Authenticity (Moulard et al., 2021), Koles et al. (2024) explore various forms of authenticity in the context of virtual influencers. Through interviews with 64 consumers and 11 industry experts, the authors demonstrate how the three types of authenticity—true-to-ideal, true-to-fact, and true-to-self—apply to and manifest in the virtual influencer context. Their findings suggest that ideals other than humans, such as virtual entities and fictional characters, can serve as referents for appreciating virtual influencers. This challenges the uncanny valley theory (Mori et al., 2012), which posits that humans are the only possible ideal referents for non-human entities.

Expanding upon the uncanny valley debate, Liu and Wang (2025) propose a model that outlines how the anthropomorphism of virtual influencers—defined by their humanness, attractiveness, and eeriness—impacts the strength of parasocial relationships between virtual influencers and their followers. Using survey data from 826 Instagram users, the authors find the process to be mediated by trustworthiness and wishful identification, with autonomy serving as a moderator that interacts with these anthropomorphism characteristics. This research contributes to the ongoing debate on the uncanny valley phenomenon, suggesting that the relationship between virtual influencers' anthropomorphism and perceived trustworthiness aligns more closely with a linear model than a curvilinear one.

Finally, Thompson et al. (2025) explore how followers construct meaning and identity in relation to virtual influencers. Drawing on symbolic interactionism and using a mixed-methods approach, the authors show that users routinely anthropomorphize these digital figures, engaging with them as if they were social actors. This process fosters a sense of shared reality and emotional connection, driven in part by digital escapism. The study challenges traditional notions of authenticity and realism, highlighting how virtual influencers—despite their artificiality—can evoke strong affective and identity-related responses, thereby reshaping how influence and self-expression are experienced in digital spaces.

4. Avenues for future research

This Special Issue provides a comprehensive overview of recent advancements and the current state of research on virtual influencers in marketing. Building upon this foundational knowledge, numerous promising avenues for future investigation emerge. These prospective paths are summarized in Table 1 and organized around two key thematic areas: technological developments and their implications for the virtual influencer industry (4.1) and the societal impact of virtual influencer evolution (4.2).

4.1. Technological changes

As the virtual influencer landscape is evolving quickly due to the rapidly changing technology powering virtual influencers, many questions concerning virtual influencers remain unanswered. In this section, we review some of these technological changes and other trends, which will likely shift how virtual influencers are created, managed, and perceived and, thus, how they should be studied.

Increasingly realistic human-looking virtual influencers. Technological advances will result in increasingly human-like virtual influencers. Generative AI is rapidly progressing, enabling virtual influencers to have highly realistic renderings of humans in both images and videos.

Table 1
Selected Future Research Directions for Virtual Influencers.

Research themes		Potential Research Topic
Technological changes	Increasingly Realistic Human-looking Virtual Influencers	• Impact of hyperrealism • Disclosure of virtual nature • Individual and situational differences in user reactions
	Democratization of Virtual Influencers	• Implications of virtual influencer proliferation (e.g., rise of micro/nano virtual influencers) • Competition between human and virtual influencers • Users' reaction to the growing digital population
	Virtual Influencers Expansion beyond Social Media	Brands' collaboration strategies and the effectiveness of cross-media virtual influencers' expansion: • Synchronous communication: live-streaming, gaming, and podcasts • Cross-media integration: video games, films, and series • Physical spaces venues: concerts, festivals, and other in-person events
	Virtual/Human Influencer Entourages and Communities	• Consumer responses to virtual influencers' interactions with their counterparts or with human influencers • Opportunities of hybrid influencer types for co-branding
	Emergence of AI Autonomous Virtual Influencer	• Virtual influencers embedded with AI agent capabilities, performing tasks for followers outside social media platforms in follower-influencer interactions • Fully autonomous virtual influencer agents that produce their own content and use the services of AI agents that are paid in web-native cryptocurrencies
Societal influence	Opportunities and Challenges for Inclusive Virtual Influencers	• Potential of virtual influencers to promote inclusivity and social values • Identification of potential human-reserved domains of communication
	Impact on Body Image Representation	• Virtual influencers' potential to support diverse beauty standards vs. reinforcing unrealistic ideals • Implications for self-esteem and identity
	Replacement of Humans	• Risks of virtual influencers replacing human influencers, especially among vulnerable groups • Impact on employment and industry structure
	Virtual Environments and Digital Addictions	• Role in shaping users' behavior in an immersive environment • Impact on screen addiction, mental health, and real-world interaction

Further, large-language model advancements will likely evolve such that automatically generated responses to follower comments will be increasingly human-like. As such, it will gradually become impossible for consumers to differentiate a virtual influencer from a human influencer. Consumers may only learn that a virtual influencer is not human if the virtual influencer or its creators disclose this information (Koles

et al., 2024) or if this information is leaked to the public. Future research comparing reactions to virtual influencers versus human influencers, then, should focus on disclosures that the virtual influencer is virtual or not, rather than whether the influencer appears virtual versus human-like.

Additionally, research suggests that some consumers appreciate virtual influencers, while others do not. These negative reactions, however, may change as virtual influencers become more human-like. Nonetheless, human-looking virtual influencers (assuming their virtualness is disclosed) may not produce positive responses, at least in some situations or for some individuals. Future research should focus on the situational and individual difference factors that influence reactions to human-like virtual influencers and how disclosures interact with these. In the meantime, virtual influencer creators and brands employing virtual influencers should err on the side of caution and ensure the virtual nature of the virtual influencer is evident.

Democratizing virtual influencer creation with low-cost virtual influencer tools. While virtual influencer creation had been relegated to digital agencies or highly skilled individuals, inexpensive and easy-to-use AI tools to create virtual influencers are now widely available, such as Creatify.ai and Rendernet.ai. Such tools render everyday individuals the ability to build their own virtual influencers at a very low cost, enabling individuals to essentially compete with digital marketing firms. As barriers to entry become increasingly lessened, these new AI tools gain the potential ability to massively disrupt the structure of the digital marketing industry.

Additionally, these tools are likely to result in a proliferation of virtual influencers. As with the human influencer ecosystem, in which there has been a shift from macro-influencers to more micro- and nano-influencers, the virtual influencer ecosystem, which began with only a handful of macro virtual influencers, will likewise be expected to evolve into thousands of micro- and nano-virtual influencers. Given the scalability of virtual influencers (i.e., their ability to work 24/7), it is highly likely, then, that virtual influencers will fiercely compete with human influencers and may eventually come to dominate the influencer market. Future research may explore the impact of such development on the human influencer industry. It may be that some human influencers would face a reduction of their activity, but they could also decide to leverage their experience to operate a virtual influencer. In this perspective, some influencers could decide to operate a digital twin, while others could develop a completely different identity. Future research could explore the effectiveness of these different strategies on the audience.

More broadly, as virtual influencers become more widespread, their pervasive presence could lead to greater consumer acceptance, much like digital assistants such as Alexa and Siri. However, an oversaturated marketplace may instead drive consumers to seek human interactions. Exploring how people respond to the growing digital population presents a compelling avenue for future research.

Virtual influencers beyond social media. Technological advances will also lead to other applications and manifestations of virtual influencers. Generative AI and large language models may also allow for virtual influencers' expansion into other media. While virtual influencers have grown on social media platforms using primarily asynchronous communication, technology is now enabling virtual influencers to engage in synchronous communication via live streaming. Examples of "virtual live streamers" include CodeMika and AI Angelica, who both focus on gaming on the Twitch platform. Podcasting is another potential medium in which virtual influencers may emerge. While no virtual influencers have yet to appear in the fast-growing podcasting medium, the technology now exists to create such content. The Google AI tool NotebookLM can create an audio podcast between a podcast host and guest (both fictitious) based on uploaded content. Virtual influencer creators can then assign virtual influencers as the host and guest.

Looking ahead, the continued evolution of virtual influencers will likely involve deeper integration with emerging digital ecosystems –

such as the metaverse and Web 3.0. In this respect, while some virtual influencers were inspired by video games, the reverse trend is emerging. Some virtual influencers that gained their fame on social media have now been integrated into games as non-playing characters. For instance, Japanese virtual influencer Imma, who gained a following on Instagram, was featured in Sega's Virtua Fighter 5: Ultimate Showdown as a background non-playing character and a customizable character skin. Virtual influencers have also crossed over into television and film. Two cartoon virtual influencers, Janky (a mischievous cat) and Guggimon (a punk-rock rabbit), are set to star in an Amazon Prime TV series. The development of films, including virtual influencers, may also offer new opportunities for very engaging branded content. Lastly, virtual influencers have already moved from the virtual to the physical world. Singapore-based virtual influencer Rae partnered with a mall where her image appeared on screens, allowing shoppers to snap selfies in this physical location. This trend will likely continue as virtual reality, holograms and other visual technologies advance, enabling virtual influencers' appearances at concerts, festivals, and other popular venues, allowing for novel forms of engagement. And a full physical transformation is not out of the cards, as actors, or even robots, could emulate human-looking virtual influencers on-screen and in-person events.

Standardizing interoperability across platforms will be pivotal to this cross-media development of virtual influencers. As these technologies mature, the potential for virtual influencers to transform digital interactions and consumer experiences will expand, reshaping notions of engagement and authenticity in an increasingly digitized world. Future research should focus on the effectiveness of virtual influencers in these different media/realm contexts and also explore how brands can collaborate in various virtual influencer manifestations.

Virtual/human influencer entourages and communities. As virtual influencers evolve and grow their influence, the potential for interesting networks and communities will likely emerge. Virtual influencer creators and media companies can create virtual influencers that interact with each other to enact particular storylines. Brud Universe, the Los Angeles-based startup, had created such a network among its three virtual influencers, Lil Miquela, Blawko, and Bermuda. Virtual influencers created by different groups may also forge cross-ecosystem bonds. Further, relationships between virtual influencers and human influencers, such as virtual influencer Imma posing with human influencer Lil Nas X, will likely continue, bridging the virtual and human realms, in which scripted narratives and real-world events could merge. Such entourages could evolve into larger networks, in which like-minded influencers, both virtual and human, coalesce into distinct communities. Future research should, thus, explore these virtual, human, and hybrid influencer-to-influencer co-branding relationships, networks, and communities, paying particular attention to how they grow, how consumers respond to their characteristics and specific attributes, and how brands could participate as a co-brand.

Emergence of autonomous virtual influencer agents. One of the most exciting trends concerns the merging of virtual influencers and AI agents. AI agents are being used to accomplish tasks in a variety of contexts, such as customer service, personal assistants, healthcare support, and automation of business processes (e.g., financial forecasting). A virtual influencer creator can now integrate this AI agent technology into its virtual influencer, allowing the virtual influencer to perform tasks for its followers and for itself, potentially in a fully autonomous fashion. By incorporating AI agent technology, virtual influencers can perform tasks for their followers. Such tasks would occur outside of the social media environment in one-on-one, virtual influencer-follower interactions. A follower of a virtual influencer could potentially use a different AI agent (non-virtual influencer) to perform such tasks. However, given that a relationship between the virtual influencer and the follower already exists, the follower may be inclined to use the virtual influencer's AI agent services rather than those of an independent AI agent with whom the user has no relationship. This established relationship can also enable the virtual influencer agent to offer more

customized assistance, since the virtual influencer has knowledge of the follower that was collected via prior interactions across various media, such as social media, gaming, and other platforms (Kaplan & Haenlein, 2019). Aside from making virtual influencers more useful to their followers, virtual influencers can be used to increase consumer adoption of AI agents. Most AI agents have generic, non-persona identities. By infusing an AI agent within an existing virtual influencer personality, AI agent creators can leverage virtual influencers to reach a broader market by tapping into the virtual influencers' followers who may not have otherwise adopted an AI agent.

In addition to using AI agents to offer services to its followers, virtual influencers powered by AI agent software are becoming fully autonomous. Virtual influencer agents will be able to post content and interact with followers without human oversight, as well as continually learn best practices. Additionally, virtual influencer agents will be able to request services from other specialized AI agents. Importantly, web-native cryptocurrencies will help with facilitating such services between AI agents. Unlike traditional finance that relies on a pre-WWW infrastructure, cryptocurrencies, built on decentralized blockchains, are permissionless and do not require a bank account or approval from centralized bodies. Thus, while a virtual influencer/AI agent cannot hold a bank account, the agent is able to hold a cryptocurrency wallet and, importantly, transact with other wallets, whether held by AI agents or humans (or human-backed entities like corporations).

One early example of an autonomous virtual influencer is Luna, developed by the South Korean firm Virtuals Protocol. Luna, with a presence mainly on TikTok and X, was given full autonomy over her X account in October 2024. Further, Luna maintains financial autonomy, possessing her own crypto wallet. She has tipped followers for retweeting and other actions. Importantly, she completed what some believe is the first agent-to-agent financial transaction, in which Luna paid AGENT STIX $1 worth of her $Luna token for creating an image. Their exchange occurred on X on December 16, 2024. Thus, virtual influencers will learn and grow their own following autonomously with the paid assistance of other AI agents.

The growth of these autonomous virtual influencer agents raises interesting issues. If virtual influencer agents become truly autonomous, brands could potentially communicate brand campaign parameters directly to the virtual influencer without an intermediary. The role of digital media companies in this context, then, could change dramatically, as they would no longer serve as a conduit between the virtual influencer and the brand. Further, while brands favor virtual influencers over human influencers due to the increased control over virtual influencers, autonomous virtual influencer agents could be less controllable. Autonomous virtual influencers could potentially cancel or refuse brand partnerships if the virtual influencer learns negative information about the brand. Further, brands may have second thoughts about collaborating with a virtual influencer, as the virtual influencer may have negative brand commentary, particularly if probed by followers. If such negative commentary is severe, it may be construed as defamatory and lead to legal action. If this were to occur, what party would be liable—the autonomous virtual influencer or the owners of the virtual influencer? Researchers could consider consumers' perceptions of autonomous virtual influencer agents and whether and how they attribute blame in this context.

While technological developments are shaping the landscape of virtual influencers, in the next section, we shift our focus to the human element, examining the potential impact of virtual influencers on society and individual well-being.

4.2. Societal influence

Virtual influencers possess considerable potential to influence societal attitudes and behaviors, offering distinctive advantages in addressing complex contemporary challenges (Sorosrungruang et al., 2024). Nevertheless, their broader societal impact remains emergent,

and several critical challenges warrant further exploration. This section synthesises key avenues for future research concerning the societal implications of virtual influencers. Specifically, it examines their role and limitations in promoting inclusivity, their influence on body image representation, the potential displacement of human actors in advertising and communication, and their impact on virtual environments and digital addictions.

Opportunities and challenges for inclusive virtual influencers. Recent research has highlighted the growing use of virtual influencers as strategic instruments to address pressing societal challenges, including inclusivity, sustainability, and corporate social responsibility (Audrezet & Koles, 2023). This trend appears particularly salient when targeting Generation Z, a cohort deeply immersed in virtual environments through gaming culture, making them more receptive to virtual personas (Ameen et al., 2024). For instance, the World Health Organization's deployment of a virtual influencer during the COVID-19 pandemic illustrates the potential of such entities to engage younger audiences effectively (Williams, 2020). This initiative has inspired the development of socially-engaged virtual influencers, or "inclusive virtual influencers", designed to promote cause-related content. Examples include @Cjoye1440 on TikTok, which aims to engage youth through sports and inspire positive life changes, and Kami (@itskamisworld on Instagram), the first virtual influencer with Down syndrome, who advocates for the inclusion of people with disabilities.

By aligning with Generation Z's values and digital practices, virtual influencers may cultivate deeper engagement and raise awareness around critical social issues. However, preliminary observations suggest that inclusive virtual influencers, when compared to both human inclusive influencers (e.g., Enya, a Dutch woman with Down syndrome) and to non-inclusive virtual influencers without any advocacy focus, tend to achieve lower performance in terms of follower counts and engagement rates. This discrepancy raises important questions regarding the limitations of virtual influencers in embodying and conveying deeply human-centered themes such as inclusion.

While the potential of virtual influencers to promote inclusivity is promising, further research is needed to examine the barriers they face in fully resonating with audiences on such sensitive topics. Are there thematic domains, such as emotional vulnerability, lived experience, or disability, that remain inherently human and less amenable to virtual representation? Investigating the psychological and emotional mechanisms that drive trust in, empathy for, and engagement with virtual influencers may provide valuable insights into the efficacy and constraints of these entities in social advocacy.

More broadly, virtual influencers offer unique opportunities to initiate conversations around complex or controversial topics that human influencers may find difficult to navigate due to personal limitations or public scrutiny. Their artificial nature allows them to promote values such as ecological awareness and responsible consumption from a position perceived as neutral or unbiased. Future research should examine their long-term influence on attitudes and behaviors, particularly in relation to sustainable consumption and other social impact goals.

Impact on body image representation. Research underscores the dual potential of virtual influencers to positively influence body image and representation. Previous studies have shown that participants believe virtual influencers can promote diverse beauty standards and counter the filtered, idealized portrayals common among human influencers (Ameen et al., 2024). However, these benefits remain largely aspirational, as virtual influencers continue to face significant challenges, including the reinforcement of prevailing societal norms and the promotion of unrealistic body expectations. One aspect of the issue stems from the creators of virtual influencers, who have focused their efforts on designing idealized body types, such as Shudu Gram. Its creator,

Cameron-James Wilson, who is also the CEO of a virtual supermodel agency, 'The Diigitals', admits that Shudu's design was inspired by Mattel's limited edition 'Princess of South Africa' Barbie doll,[4] highlighting that Shudu's proportions significantly differ from those of a real human woman.

In response to public and media critiques, virtual influencer creators have started developing digital avatars with more realistic appearances to reflect human body diversity and embrace flaws. For example, Brenn Gram, a plus-size black model, was created to contrast with Shudu's flawless, idealized body. However, much like 'inclusive virtual influencers,' these more realistic virtual influencers fail to garner a large following. This may be due to creators not promoting them as aggressively as their idealized counterparts or because audiences expect virtual bodies to transcend human' limitations.' In this light, idealized body virtual influencers may be both accepted and even anticipated by their target audience. This hypothesis warrants further investigation in future research.

The eventual appeal of idealized body virtual influencers should not overshadow their potential impact on the audience's body image. By mimicking human behaviors and appearances, virtual influencers serve as proxies for human identity, challenging traditional notions of self-representation. Future studies could examine how the growing presence of hyper-realistic, yet idealized body virtual influencers affects body image distortion among younger generations. Additionally, realistic-body virtual influencers provide opportunities for research on how virtual influencers can more effectively promote positive self-expression, inclusivity, and address self-esteem and identity issues among young people.

Replacement of humans. The robotics literature has predominantly explored substituting humans with machines for both manual and intellectual tasks (e.g. Hollebeek et al., 2021; McLeay et al., 2021; Riener et al., 2023; Tojib et al., 2023). Virtual influencers and virtual bodies created more broadly through text-to-image AI tools raise concerns about replacing humans with virtual entities in modeling and other communication roles. As noted earlier, the influencer industry is projected to achieve a market value of 24 billion USD by 2024.[5] Certain demographics may be particularly vulnerable if human virtual influencers were to replace them. This includes individuals facing challenges in securing employment within the industry, such as minorities (e.g., black people), who could disproportionately experience job loss. Future research could investigate scenarios where human influencers are replaced by virtual influencers, assessing the conditions and potential consequences for the evolving influencer economy.

Virtual environments and digital addictions. Virtual influencers operate within a digital consumption ecosystem, contributing to broader societal concerns such as screen (Sorosrungruang et al., 2024) addiction, decreased real-world interactions, and privacy and security issues (Ameen et al., 2024; Ameen et al., 2022; Mason et al., 2022). Although virtual influencers are not direct causes of these challenges, their growing presence underscores the need for a comprehensive approach to addressing these issues. Future studies could explore their role in emerging technologies like the metaverse, considering their potential as guides, educators, or advocates in virtual spaces, as well as their ability to mitigate the adverse effects of social media on mental health. Research could also examine how virtual influencers shape user behavior in immersive environments and their broader implications for societal norms.

In summary, by focusing on long-term societal impacts, psychological connections, ethical considerations, and integration into emerging technologies, future research can provide a more comprehensive understanding of virtual influencers and their role in society. These efforts will be essential in leveraging virtual influencers to drive positive societal change while mitigating potential risks.

5. Conclusion

As the influencer economy continues to evolve, virtual influencers stand at the forefront of a transformative moment in marketing, technology, and digital culture. This Special Issue offers a foundational step towards understanding the complexities and potential of virtual influencers, spanning comparative effectiveness, their unique attributes, and broader societal implications. Moving forward, the role of virtual influencers is poised to extend far beyond social media branding into arenas such as autonomous AI services, entertainment, education, activism, and even policymaking. Their growing integration into digital ecosystems, ranging from the metaverse to live streaming platforms, will challenge conventional notions of authenticity, agency, and human connection. As virtual influencers become more autonomous and ubiquitous, they will not only reshape marketing strategies but also raise new ethical, regulatory, and societal questions. Scholars are therefore urged to explore these emerging tensions with interdisciplinary approaches, attending to inclusivity, representation, mental health, and the potential displacement of human labor. By doing so, future research can help ensure that the evolution of virtual influencers is not only technologically innovative but also socially responsible and human-centered.

Credit authorship contribution statement

Alice Audrezet: Writing – review & editing, Writing – original draft, Conceptualization. **Bernadett Koles:** Writing – review & editing, Writing – original draft, Conceptualization. **Julie Guidry Moulard:** Writing – review & editing, Writing – original draft, Conceptualization. **Nisreen Ameen:** Writing – review & editing, Writing – original draft, Conceptualization. **Brad Mckenna:** Writing – review & editing, Writing – original draft, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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AliceAudrezet is an Associate Professor of Marketing at Institut Français de la Mode in Paris. With a strong academic background in psychology and sociology, she also holds an MSc in Marketing and a PhD in Management Sciences from Paris-Dauphine University. Her research centers on digital fashion consumer culture, examining topics such as modest fashion and the impact of digital content creators on contemporary consumption practices. Her scholarly work has appeared in leading international journals, including the *Journal of Retailing and Consumer Services* and the *Journal of Business Research*. Dedicated to bridging academic and public discourse, she actively disseminates her research through outlets like *Harvard Business Review* and various French media platforms. As a podcast creator, Alice also explores sound-based storytelling and audio documentaries as alternative, art-based methods of conducting and expressing research.

BernadettKOLES is an Associate Professor of Marketing and Consumer Behavior at SKEMA Business School in Sophia Antipolis, France. She holds a Ph.D. in Marketing from Durham University Business School (UK) and an Ed.D. in Psychology from Harvard University (USA). Her research spans multiple disciplines, with a focus on the intersection of innovative technologies and their impact on individuals, consumers, and organizations. Her work also explores the evolution of digital identity and user behavior across online gaming and social media platforms. Bernadett has published widely in leading international peer-reviewed journals and serves on the editorial board of several academic outlets.

JulieGuidry Moulard (Ph.D., Texas A&M University) is an Associate Professor of Marketing and the Balsley-Whitmore Endowed Professor in Business at Louisiana Tech University. Julie's research interests include brand authenticity, human brands, social media influencers, and brand activism. She has published in journals such as Journal of the Academy of Marketing Science, Journal of Business Research, and Psychology & Marketing. She serves as an editorial review board member for Journal of the Academy of

Marketing Science and Journal of Business Research. Julie is a Past President and Board of Governors member of the Academy of Marketing Science.

NisreenAmeen is an Associate Professor in Digital Marketing at Royal Holloway, University of London. Her research is shaping our understanding of how consumers and managers interact with Artificial Intelligence (AI), virtual environments and other cutting-edge technologies. Her work spans AI-driven consumer behaviour, digital marketing, and the managerial applications of AI to enhance organisational strategies. Dr. Ameen is a Senior Editor for Information Technology and People. Her research has been published in many world-leading journals such as British Journal of Management, Journal of the Association of Information Systems, Information Systems Journal, Journal of Travel Research and Journal of Business Research.

BradMcKenna is a Professor of Information Systems at the University of East Anglia. Brad has research interests in the social impacts of technology, for example, in artificial intelligence, the Metaverse, digital-free tourism, digital visitor economies, and social media. He has published in journals such as *Information Systems Journal, European Journal of Information Systems, Information & Management, Information & Organization, Information Technology & People, Journal of Travel Research, Journal of Sustainable Tourism, and the Journal of Information Systems Education*, among others. He is an associate editor at Information Systems Journal and Vice Chair of IFIP TC9: ICT and Society.