Do virtual influencers really influence consumers' purchase intentions?

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Abstract

New technologies are transforming how companies interact with consumers and promote their products. In this context, virtual influencers (VI), computer-generated personalities designed to mimic humans, have emerged over the last decade. In light of the recent rise of virtual influencers, studies are needed in the literature investigating the effectiveness of VIs in marketing strategies to promote brands and their products. Therefore, adopting the S-O-R theoretical model and on the basis of source credibility theory, this study aims to investigate the relationship between virtual influencers' credibility and their influence in consumers' purchase intentions. Furthermore, it will explore whether this relationship is mediated by consumer involvement and the perceived usefulness of virtual influencers' recommendations. This study extends the scientific literature on the topic of virtual influencers and provides guidance to practitioners on their effectiveness in marketing strategies.

Keywords: virtual influencer; S-O-R model; source credibility; purchase intention; consumer involvement; influencer recommendation.

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1. Introduction

With the rapid advancement of interactive and immersive media technologies, the rise of Virtual Influencers (VIs) has the potential to transform the way brands engage with audiences and promote their products. VIs, defined as computer-generated personalities designed to mimic various human traits, including appearance and communication style, are able to perform the role of human influencers and establish emotional connections with users by sharing fictitious stories that simulate real-life experiences (Byun & Ahn, 2023; Franke & Klein, 2024; Kim et al., 2024). The employment of VIs represents an advantageous option for marketing strategies, offering a wide range of benefits that are expected to further increase with their development (Franke & Klein, 2024). The global market size of VIs is projected to reach $45.82 billion by 2030, indicating a growing relevance in the marketing landscape (Grand View Research, 2024). Furthermore, according to a recent report, 79% of respondents are familiar with VIs and 53% follow at least one of them on social media, indicating their growing importance among consumers as well (Influencer Marketing Factory, 2024).

VIs are becoming increasingly attractive, and many brands have already integrated them into their campaigns, such as Prada, Samsung, Porsche, Unilever, Calvin Klein, Ikea and KFC (da Silva Oliveira & Chimenti, 2021). According to Laszkiewicz & Kalinska-Kula (2023), major benefits of using VIs for brands include the lower perceived collaboration costs and the reduced risk of getting involved in activities that could threaten the brand image, such as promoting inappropriate and socially unacceptable values or behaviour. In accordance with this, Audrezet and Koles (2023) believe that the use of VIs leads to greater benefits for brands than human influencers, due to the possibility of employing, for example, innovative storytelling techniques, such as displaying flaming fashion items on a virtual stage, which lead to increased user engagement. Nevertheless, as stated by Sookkaew and Saephoo (2021), although VIs are cost-efficient and able to avoid personal scandals, they still face the challenge of being perceived as less trustworthy and accountable than human influencers. Consistent with this, Moustakas et al. (2020) state that VIs are perceived as less authentic than human influencers. However, Gerlich (2023) argues that virtual influencers are able to generate an increase in purchase intention by being perceived as highly credible. Therefore, the limited number of studies investigating VIs' credibility, together with the lack of concordance in the results of existing studies, suggests the need to further explore this issue. Based on the theory of source credibility, which states that one of the key factors in determining a source's persuasiveness lies in its credibility (Hovland et al., 1953), this study aims to shed light on VIs' influence on purchase intention. Specifically, using the Stimulus-Organism-Response (S-O-R) model, this study analyses how the stimulus (i.e. the credibility of a virtual influencer's posts) and the organism (i.e. consumer involvement and perceived usefulness of recommendations) can lead to a response (i.e. purchase intention). The findings of this research will contribute to marketing research by providing a greater understanding of the phenomenon of VIs and their impact on consumer purchase decision-making. From a practical point of view, the study provides useful insights for brands interested in using VIs in their marketing strategies.

2. Background

2.1. Virtual influencers

Virtual Influencers (VIs), also known as digital avatars or AI-generated personalities, are playing an increasingly significant role in digital marketing. These characters, created through artificial

intelligence algorithms and CGI (Computer-Generated Imagery), are designed to realistically replicate human traits and interact with users on major social platforms. Their growing popularity stems from their ability to combine engaging narratives with complete creative control by brands, offering distinct advantages over traditional human influencers (Ozdemir et al., 2023). One of the main advantages of VIs is their predictability and the total control brands can exert over them. Unlike human influencers, who may be prone to scandals or unpredictable behaviour, digital avatars operate within the boundaries set by companies, thus minimizing reputational risks for the brand (Thomas & Fowler, 2021). Additionally, long-term costs are reduced, as these influencers do not require high compensation, complex contractual management, or breaks for rest (Gerlich, 2023). Despite these benefits, the credibility and authenticity of VIs remain critical issues. While their predictability makes them more reliable in the eyes of brands, consumers tend to perceive them as less authentic compared to human influencers, with whom they form stronger, more emotionally intimate connections (Moustakas et al., 2020). The main challenge lies in overcoming the so-called "uncanny valley" – the discomfort felt when interacting with avatars that are too human-like but not entirely realistic, which undermines trust and acceptance from the public (Beer et al., 2015; Arsenyan & Mirowska, 2021). Moreover, the potential of VIs to influence purchase intentions is still an underexplored area of research. Initial studies suggest that, through parasocial relationships and transmedia storytelling, these avatars can positively affect brand loyalty and consumer purchasing decisions (Kádeková & Holienčinová, 2018). Moreover, an early study on the subject (Gerlich, 2023) shows that VIs are perceived as highly credible and can generate an increase in purchase intention. However, further research is needed to fully understand consumers' perception of the virtual influencers' credibility and the effects on purchase intention.

2.2. Stimulus-Organism-Response model

The Stimulus-Organism-Response (S-O-R) model originates from environmental psychology (Mehrabian & Russell, 1974) and constitutes a fundamental theoretical framework for understanding human behaviour in response to external cues. Stimuli are defined as external forces, whether tangible or intangible, that influence an individual's psychological state, potentially leading to behavioural changes (Mehrabian & Russell, 1974; Young, 2016). The organism represents the internal cognitive, emotional, and physiological processes that mediate the relationship between the stimulus and the final behavioural response (Eroglu et al., 2001; Fu et al., 2020).

The S-O-R model is highly flexible and has been widely applied to understand how stimuli influence purchasing intentions and consumer behaviour. For instance, several studies have employed the S-O-R model to analyse consumer behaviour in response to marketing communication strategies, such as influencer marketing (e.g. Zhou et al., 2021; Gamage & Ashill, 2022; Yousaf, 2022). In the context of this study, the S-O-R model is applied to explore the influence of new digital communication agents (Virtual Influencers, VIs) on consumers' purchase intentions, with a focus on two key mediators: consumer involvement (CI) and the perceived usefulness of recommendations (PUR). While numerous studies have demonstrated that the credibility of human influencers can positively impact consumer engagement and purchase intentions (Lou & Yuan, 2019; Sokolova & Kefi, 2020), research on virtual influencers remains limited. In light of this, the S-O-R model offers a robust theoretical framework for understanding how digital stimuli from Vis can influence purchase decisions through internal cognitive and emotional processing.

3. Research model and hypothesis development

Virtual influencers, as a marketing communication tool, enable companies to positively influence consumers' attitudes towards brands (Gerlich, 2023). The communication strategy is effective if the communicator has a persuasive effect on the receiver and is a credible source of information (Hovland et al., 1953). The source credibility theory explains precisely that credibility is one of the essential factors for the source's persuasiveness (Hovland et al., 1953). According to this theory, communicator credibility depends on two factors, trustworthiness and expertise. The first factor is related to concepts such as honesty, sincerity and truthfulness; on the other hand, the second factor is related to competence, knowledge and experience (Munnukka et al., 2016). The literature has amply demonstrated that there is a positive relationship between recipients' perception of the source's credibility and their behavioural intentions (Tripp et al., 1994; Kapitan et al., 2016). In this regard, in studies on influencer marketing, it emerges that the credibility of social media influencers positively influences purchase intention (Lou & Yuan, 2019; Sokolova & Kefi, 2020), i.e. a user's predisposition to buy a product or service sponsored by influencers (Kim & Park, 2023).

There are not many empirical studies focusing on VIs. However, a study by Gerlich (2023) shows that VIs are perceived as highly credible, more so than human influencers, and thus generate an increase in purchase intention. The author argues that this is probably due to the lack of bias in the behaviour of VIs, as they are controlled by the brands they represent.

Given the scarcity of studies on the topic, this study aims to investigate the relationship between virtual influencer credibility and purchase intention, proposing the following hypothesis:

H1: Virtual influencer credibility positively influences purchase intention.

According to a study by Nazir and Wani (2024), the credibility of social media influencers generates greater follower involvement in what the influencers promote. Kapferer and Laurent (1985) define consumer involvement as a state of motivation, excitement or interest, which is evoked by a particular stimulus or situation. Despite the absence of studies in the area of VIs, this study hypothesises that consumers' perception of the credibility of VIs may increase the involvement of social media users. According to consumer involvement theory (Kapferer & Laurent, 1985), involvement has a strong pull property and could generate behavioural responses. In this regard, in accordance with Rahman et al. (2018), consumer involvement can positively influence purchase intention. In the context of influencer studies, Trivedi and Sama (2020) argue that consumer involvement with the influencer may have an effect on consumer behaviour and purchase intention. In light of the above, this study hypothesises that consumer involvement may mediate the relationship between virtual influencer credibility and purchase intention, leading to the following hypotheses:

H2: Virtual influencer credibility positively influences consumer involvement.
H3: Consumer involvement positively influences purchase intention.
H4: Consumer involvement mediates the relationship between virtual influencer credibility and purchase intention.

As a new source of recommendation, social media influencers recommend products to consumers through their content (Bawack & Bonhoure, 2023). The credibility of social media influencers is a crucial factor in explaining the persuasive power of recommendations (Cabeza-Ramirez et al., 2023). The perceived usefulness of the recommendation is the degree to which users believe that

adopting an influencer's recommendation would improve purchasing performance (Hsu et al., 2013). Users perceive the usefulness of the influencer's recommendation if they consider the influencer to be a credible and, therefore, reliable and expert source of information. This study, therefore, hypothesises that virtual influencer credibility positively influences the perception of the usefulness of the recommendation.

The perceived usefulness of the influencer recommendation may influence purchase intention (Chen et al., 2023). Individuals tend to adopt information when they think it is useful (Hussain et al., 2018), as they think following the recommendation can help them make better purchase decisions (Leung et al. 2022). Therefore, the perceived usefulness of the virtual influencer's recommendation may positively influence purchase intention.

In light of the above, this study hypothesised that the perceived usefulness of recommendations may mediate the relationship between credibility and purchase intention, leading to the following hypotheses:

H5: Virtual influencer credibility positively influences perceived usefulness of recommendations.
*H6: Perceived usefulness of recommendations positively influences purchase intention.*
H7: Perceived usefulness of recommendations mediates the relationship between credibility and purchase intention.

Using the S-O-R model, virtual influencer credibility (VIC) was identified as stimulus (S). The stimulus sequentially influences the organism (O) through consumer involvement (CI) and perceived usefulness of recommendations (PUR). Finally, the model concludes with a response (R) with purchase intention (PI).

The research model and hypotheses are described in Figure 1.

Fig. 1: Research model
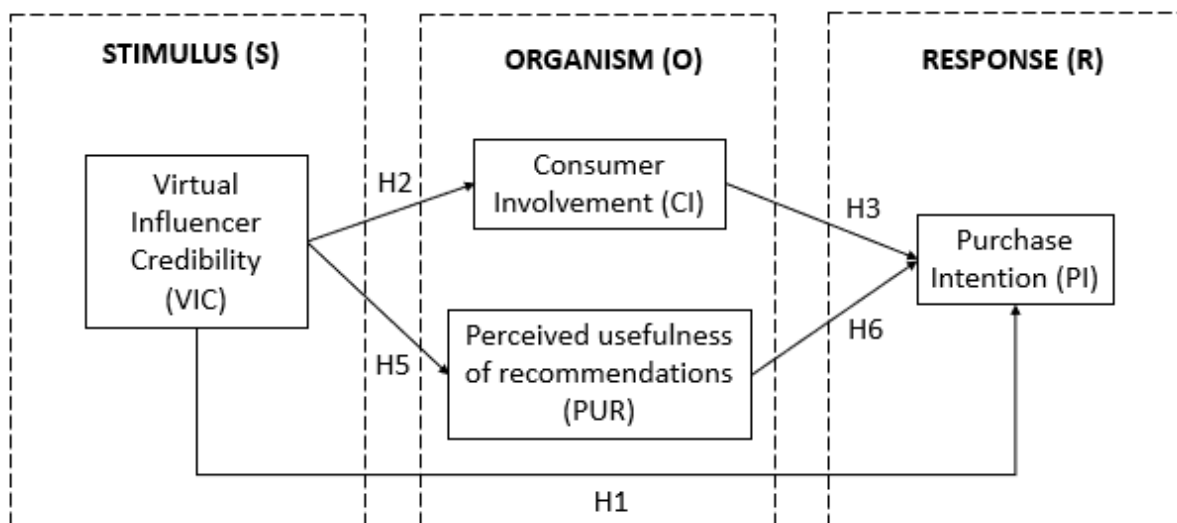
Source: our elaboration

4. Methodology

An empirical and quantitative study will test the proposed research model. In detail, the study will be conducted through an online questionnaire to be administered to a random sample. The well-known virtual influencer Lil Miquela was selected as the context of the study because she appears to be the most active and human-like influencer present on Instagram (Yu et al., 2024). Lil Miquela appeared on social media in 2016; she has become increasingly popular over the years and currently many brands use the influencer for endorsements (e.g. Prada, Calvin Klein). The questionnaire is structured in four parts. The first part is dedicated to the stimulus and, in detail, the presentation of Lil Miquela. The name and virtual nature of the influencer will not be made explicit until the end of the questionnaire. This choice is motivated by the desire to not condition the answers of participants who do not know the influencer. Furthermore, the study also does not want to condition the answers of participants who know the influencer, but who may not know the virtual nature of the influencer. Users will view some of the influencer's posts aimed at brand sponsorship. After viewing the stimulus, the virtual influencer's credibility construct (VIC) will be measured. The second part will be dedicated to measuring the mediating constructs, consumer involvement (CI) and the Perceived usefulness of recommendations (PUR). The third part, on the other hand, will be dedicated to measuring the behavioural response of the participants, through the construct of purchase intention (PI). At the end of this section of the questionnaire, the true nature of the virtual influencer will be revealed and participants will be asked whether they were aware of it. The final section of the questionnaire includes several control questions on demographic characteristics, such as age, gender and level of education.

The scales and corresponding items were meticulously developed by drawing on existing literature. A 7-point Likert-type scale was used to assess the items (1 = strongly disagree; 7 = strongly agree). To measure the credibility of virtual influencers (VIC), the scale of Ohanian (1990) was chosen, which includes the two 5-item constructs, trustworthiness and expertise. The 10-item scale of Zaichknowsky (1994) was chosen to assess consumer involvement (CI), while the 3-item scale of Hsu et al. (2013) was chosen to assess the perceived usefulness of recommendations (PUR). Finally, the 4-item scale of Lee & Watkins (2016) was chosen to assess purchase intention (PI). Appendix 1 (Table 1) contains the complete scales.

This research involves the collection of data through a questionnaire and the presentation of the general data from the questionnaire by the respondents through descriptive statistics. Next, a Confirmatory Factor Analysis (CFA) will be conducted to assess the reliability and validity of the data, followed by a multiple linear regression to test the research hypotheses.

5. Expected results and implications

The rise of VIs in marketing has prompted the literature to question the impact of influencers' credibility on consumer behaviour (e.g. Gerlich, 2023, Ozdemir et al., 2023). However, empirical studies on the topic are lacking. This research will provide new evidence on the efficacy of VIs in brands' product promotion strategies. Specifically, the research will shed light on the role of consumer engagement and the perceived usefulness of recommendations as potential mediators in the relationship between VIs' credibility and purchase intention, thus providing brands with valuable insights to optimize their strategies.

From a theoretical point of view, this study enriches the literature on the subject. Using the S-O-R theoretical model, the relationship between stimulus, i.e. virtual influencer's credibility, and behavioural response, i.e. purchase intention, will be studied. Moreover, the use of the S-O-R model

allows, for the first time in the literature, to hypothesise mediating variables between stimulus and response. From a managerial point of view, this study will offer a considerable contribution to companies. The research results will provide insight into whether VIs can be effective brand communication tools. Gerlich (2023) argues that social media users are increasingly attracted to virtual influencers, while a study by Ozdemir et al. (2023) shows a certain scepticism towards VIs and their ability to create a positive attitude towards brands. However, the discordant results and scarce empirical evidence in the literature fail to provide useful guidance for companies in making informed decisions in the area of marketing communication via VIs. This study sheds light on the topic and provides useful insights for marketing and social media professionals.

6. Limitations

The limitations of this research mainly lie in the responses provided by the study participants. Specifically, participants may hold pre-existing opinions derived from prior purchasing experiences or the brand's reputation established over time. Consequently, they might not respond objectively, being influenced by perceptions and judgements formed before participating in the study. This limitation may limit the accuracy and generalisability of the results obtained.

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Appendix 1

Table 1. *Constructs and Items*

Construct	Source	Item
Virtual Influencer Credibility (VIC)	Ohanian (1990)	**Trustworthiness** (VIC1) Undependable/dependable (VIC2) Dishonest/honest (VIC3) Unreliable/reliable (VIC4) Insincere/sincere (VIC5) Untrustworthy/trustworthy **Expertise** (VIC6) Inexperienced/experienced (VIC7) Not experts/experts (VIC8) Unknowledgeable/knowledgeable (VIC9) Unqualified/qualified (VIC10) Unskilled/skilled
Consumer involvement (CI)	Zaichkowsky (1994)	(CI1) Unimportant–important (CI2) Boring–interesting (CI3) Irrelevant–relevant (CI4) Unexciting–exciting (CI5) Means nothing–means a lot to me (CI6) Unappealing–appealing (CI7) Mundane–fascinating (CI8) Worthless–valuable (CI9) Uninvolving–involving (CI10) Not needed–needed
Perceived usefulness of recommendations (PUR)	Hsu et al. (2013)	(PUR1) Advice from virtual influencers will improve my online shopping performance (PUR2) Advice from virtual influencers will improve my effectiveness in online shopping (PUR3) Advice from virtual influencers can increase my productivity when shopping online
Purchase intention (PI)	Lee & Watkins (2016)	(PI1) It is very likely that I will buy products recommended by this influencer. (PI2) I will purchase the products recommended by this influencer the next time I need that type of product. (PI3) I will definitely try the products recommended by this influencer. (PI4) I intend to purchase products recommended by this influencer in the near future