

Beyond the Pixels : Psychographic Profiling of Virtual Influencers' Followers in Social Media

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Abstract

Purpose : In the evolving landscape of artificial intelligence (AI), virtual influencer (VI) marketing has surged in popularity on social media platforms. The present study delved into the core determinants influencing social media users' attitudes toward VIs on Instagram. It categorized the respondents based on their psychographic and demographic attributes.

Design/Methodology/Approach : The study employed exploratory factor analysis (EFA) to determine the fundamental dimensions of the influencer's preferred factors and hierarchical and K-Means cluster analysis to classify 182 followers based on the homogeneity of their attributes.

Findings : The EFA findings illuminated four intrinsic dimensions of VIs: (a) attitudinal homophily, (b) aesthetic influence, informativeness, and ad content value, (c) perceived reciprocity, and (d) perceived originality. K-Means clustering classified respondents into two segments: VR enthusiasts and discerning realists.

Practical Implications : The study offered useful strategic implications for VI marketing. Marketers refined their criteria for selecting VIs and designed segment-specific marketing campaigns to cater to the distinct preferences of VR enthusiasts and discerning realists.

Originality : The originality of this study lies in its comprehensive exploration of the evolving domain of VI marketing within the context of AI advancements.

Keywords : social media influencer, virtual influencer, cluster analysis, attitudinal homophily, perceived reciprocity

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Digital media transformation has materialized conventional streaming platforms into prolific interactive communication channels (Arora et al., 2018; Mirowska & Arsenyan, 2023; Singh & Dagur, 2022). Traditional approaches depending on one-way communication are losing their essence with the emergence of interactive marketing (Grover & Arora, 2024; Rao & Rao, 2019; Tanwar et al., 2021). The advancement of AI-powered virtual influencers (VIs) has provided a unique opportunity for brands to connect with their audience in a more engaging manner (Baroroh et al., 2021). With its exceptional feature of hyper-personalized interactions with their social media followers, VIs are replacing traditional celebrity endorsers or human influencers, enabling brands to ensure immersive experiences through stronger parasocial relationships (PSRs) (Ahn et al., 2022; Sands et al., 2022).

The study conducted by Statista Research Department (2024) highlighted that almost 75% of social media users aged 18–24 follow at least one VI, with approximately 40% making their purchase decisions based on their recommendations. Despite the increasing adoption of VIs in branding strategies, marketers face challenges in optimizing the VI strength effectively (Davlembayeva et al., 2025). While VIs' distinct advantages, such as cost-effectiveness, precise micro-targeting, real-time engagement, and reduced reputational risks, position them as a transformative alternative, their acceptance among diverse consumer segments remains unclear (Sands et al., 2022). Given the emerging era of VI, it is imperative to uncover the strategies that can limit the risk of selecting unacceptable VI for brand promotion.

Previous studies mainly focused on different facets of human influencers (Bash et al., 2024; Jin et al., 2019; Sathyanarayana et al., 2019; Thakur et al., 2023). Recently, however, researchers have shifted their interest toward VIs (Byun & Ahn, 2023; da Silva Oliveira & Chimenti, 2021; Kim & Park, 2023; Mirowska & Arsenyan, 2023; Sands et al., 2022). Despite these advancements, a significant gap exists in investigating the key factors influencing consumers' attitudes toward VIs and the distinction of perceived effectiveness across different follower segments. The need of the hour is to deepen human-agent interaction by identifying attributes essential to enhance follower engagement and customizing promotional strategies aligning with the segment expectations.

This study is not only aligned with current digital marketing trends but also addresses the research gap by identifying distinct audience segments based on their perceptions, engagement patterns, and demographic characteristics, enabling brands to predict user reactions more effectively and tailor their marketing strategies accordingly.

The present study aims to examine the perceived effectiveness of VIs by identifying key factors shaping consumer attitudes and segmenting social media users based on their perceptions. This study seeks to address the following questions:

- What are the significant factors shaping Instagram users' attitudes toward VIs?
- How can attitudinal clusters of online shoppers be developed based on these factors?
- How do these clusters differ based on demographic characteristics such as gender, education, usage rate, and Instagram engagement duration?

By providing empirical insights into the consumer psychology of VI acceptance, this study contributes to both academic discourse and practical marketing strategies. It advances theoretical understanding by identifying the critical determinants influencing consumer attitudes toward VIs. Furthermore, the study offers insightful implications for marketers and practitioners by proposing tailored promotional strategies for diverse follower segments. Thus, it advances the marketing domain by integrating AI-driven influencer marketing into consumer research, proposing a novel pathway for brands to harness the potential of VIs in the digital era.

Literature Review

Virtual Influencer (VI)

Recent advancements in VI marketing discovered the key factors that established a human-agent connection. These factors included attractiveness (Chiu & Ho, 2023; Kim & Park, 2023; Kim et al., 2025), authentic behavior (Arsenyan & Mirowska, 2021; da Silva Oliveira & Chimenti, 2021; Li & Ma, 2024; Lou et al., 2023), similarity in characteristics (Arsenyan & Mirowska, 2021; da Silva Oliveira & Chimenti, 2021; Li et al., 2023; Li & Ma, 2024; Lou et al., 2023; Stein et al., 2024), emotional attachment (Chiu & Ho, 2023; Kim & Park, 2023; Mirowska & Arsenyan, 2023), among others. Attractiveness influenced audience engagement and PSRs with VIs. Realistic and aesthetically appealing VIs enhance interpersonal attraction, fostering social connections and favorable first impressions (Melnychuk et al., 2024; Zhou & Wang, 2022). However, the direct impact of visual aesthetics on purchase intention remains inconclusive (Kim & Park, 2023; Zhou & Wang, 2022). Despite this, various studies emphasized perceived attractiveness as a significant attribute to enhance consumer identification (Kim & Baek, 2024; Kim et al., 2025; Meng et al., 2025).

Furthermore, consumers were more likely to form emotional attachments to humanoid AI technologies due to their perceived relatability, whereas those with mechanical appearances struggled to evoke similar connections (Shao, 2024). Among millennials on Instagram and YouTube, interaction with VIs was driven by shared attributes such as similarity, expertise, trustworthiness, and curiosity (Jhawar et al., 2023). Perceived homophily strengthened the likelihood of users accepting and following VIs, fostering social connection and enhancing the persuasive impact of product promotions. When followers perceive commonalities with an influencer, psychological closeness increases, leading to excellent receptiveness to recommendations. However, the artificial nature of VIs may have limited homophily compared to human influencers, whose authenticity and lived experiences created deeper audience resonance (Dondapati & Dehury, 2024).

Authenticity remained a defining factor in influencer marketing, particularly in differentiating human influencers from their virtual counterparts (Agrawal et al., 2023; Bash et al., 2024). Kim and Baek (2024) identified key determinants of perceived authenticity, including language similarity, interest similarity, physical attractiveness, and attitude homophily, all of which significantly impacted emotional attachment and word-of-mouth intention. Given the increasing reliance on AI-driven endorsements, Dondapati and Dehury (2024) emphasized that maintaining an authentic persona was imperative for VIs to shape consumer behavior effectively. Hudders et al. (2021) highlighted that the higher an influencer's perceived authenticity, the greater their ability to attract followers and influence consumer decision-making. Influencers, particularly those perceived as highly authentic, exhibit greater credibility, reducing consumer resistance to marketing messages (da Silva Oliveira & Chimenti, 2021; Jiang et al., 2024). Lou and Yuan (2019) emphasized that the informative value of influencer-generated content amplified the influencer's trustworthiness, attractiveness, and perceived similarity to followers, enhancing the credibility of branded content, which, in turn, strengthened brand awareness and purchase intentions. Melnychuk et al. (2024) found that the volume and quality of information influencers shared positively impacted virtual follower engagement and stickiness. Beyond mere visual appeal, VIs were able to sustain audience interest by delivering insightful and engaging content, catering to users who seek substantive value in their online interactions.

Despite their synthetic nature, VIs incorporate anthropomorphic features, including both physical and emotional elements, in their content to foster an engaging and interactive digital environment (Yu et al., 2024). Given the inherently social nature of digital platforms, emotional expressions evoke deeper psychological connections with influencers as followers seek an emotional escape from reality, immersing themselves in a more engaging and enriching digital ecosystem (Taruffi, 2021). Yu et al. (2024) highlighted the significance of various

emotional cues—happiness, sadness, disgust, and surprise—in shaping user experience within the digital landscape. Furthermore, perceived interactivity is an important driver of influencer engagement, creating an illusion of direct, two-way communication and fostering stronger para-social relationships (Zhou & Wang, 2022). Jiang et al. (2024) emphasized the relevance of visual representation in user interactivity and engagement. Beyond aesthetics, the overall success of an influencer, whether human or virtual, largely depends upon their ability to engage the followers in interactive communication (Li & Ma, 2024). By leveraging engagement strategies such as humanization, robotization, and metaverse integration, virtual avatars have become significant endorsers, further solidifying their role in contemporary digital landscapes (da Silva Oliveira & Chimenti, 2021).

Research Gap

Recently, influencer marketing literature has shifted from focusing on human influencers to VIs. Previous studies were mainly focused on examining the significance of celebrity/ human endorsers (Bash et al., 2024; Grover & Arora, 2024; Jin et al., 2019; Rao & Rao, 2019; Tanwar et al., 2021; Thakur et al., 2023). Recently, researchers' attention has been directed toward exploring the challenges and opportunities of VIs (Sands et al., 2022; Thomas & Fowler, 2021), the differences between humans and VIs (Byun & Ahn, 2023), and various other aspects associated with VIs (Arsenyan & Mirowska, 2021; da Silva Oliveira & Chimenti, 2021; Kim & Park, 2023; Li & Ma, 2024; Lou et al., 2023). The reactions of followers toward VIs have also been examined in different studies (Mirowska & Arsenyan, 2023; Sands et al., 2022). Despite the significant benefits of utilizing VIs, there is a paucity of understanding of the variables that impact the effectiveness of VIs from the perspective of online consumers. Moreover, it is imperative for marketers to accurately identify distinct segments of followers to select a suitable endorser for promotional activities. To address the research gap, the present study aims to explore various factors measuring the perceived effectiveness of VIs and identifying the follower segments to target each segment with appropriate strategic marketing endeavors.

Research Objectives

- ✎ To explore the significant factors shaping social media (Instagram) users' attitudes toward VIs.
- ✎ To develop attitudinal clusters of online shoppers based on the extracted factors of VIs.
- ✎ To differentiate clusters based on gender, education, usage rate, and Instagram usage duration.

Research Methodology

Sample and Data Collection

The present study employs a combination of exploratory and descriptive research designs to investigate the engagement of Instagram users with VIs comprehensively. Primary data were gathered through a single cross-sectional survey conducted in hybrid mode between March and April 2023 in Punjab, India. Based on judgment sampling, initial screening questions such as “Are you aware of virtual influencers?” and “Do you follow virtual influencers on Instagram?” were incorporated in the first section. Participants responding “no” were excluded. The research targeted Instagram users aged 18 to 25, a demographic known for high engagement in online shopping and influencer interactions (Jin et al., 2019). Initially, 300 individuals were approached, out of which 187 met the eligibility criteria. After data screening and cleaning, 182 valid responses were retained for analysis, surpassing the recommended threshold of 100 for robust exploratory factor analysis (EFA) and cluster analysis, as

Table 1. Construct Reliability

Sr. No.	Construct	No. of Items	Alpha Value
1.	Authenticity	5	0.924
2.	Emotional Sensitivity	4	0.916
3.	Interactivity	5	0.863
4.	Informative Value	3	0.825
5.	Visual Aesthetics	4	0.794
6.	Similarity	4	0.792

suggested by Hair Jr. et al. (2009). A well-structured questionnaire was meticulously designed, ensuring alignment with the study's objectives, on a 7-point Likert scale (1 = *Strongly Disagree*, 7 = *Strongly Agree*).

According to Dixon (2024), the monthly growth rate of active users on Instagram is estimated to be over 31.2 % of total internet users by 2025, reaching 1.44 billion. Instagram has recently become the most visually appealing and widely used platform (Mirowska & Arsenyan, 2023). Based on this fact, the study targeted Instagram users. The measurement items for authenticity (Ilicic & Webster, 2016), emotional sensitivity (Sánchez-Fernández & Jiménez-Castillo, 2021), interactivity, informative value (Xiao et al., 2018), visual aesthetics (Wiedmann & von Mettenheim, 2020), and similarity (McCroskey et al., 1975) were adapted from previous literature according to the suitability of this study. After ensuring the face validity and content validity of the questionnaire from five experts, a pilot test was undertaken ($N = 30$) to evaluate its reliability. The findings indicated strong internal consistency (Table 1), evidenced by Cronbach's alpha surpassing the 0.70 threshold recommended by Hair Jr. et al. (2009).

Analysis Technique

Statistical analyses were conducted using IBM SPSS. The initial step of the study involves implementing an EFA, which effectively detects and determines the fundamental dimension of the influencer's preferred factors. Subsequently, both hierarchical and non-hierarchical cluster analyses were employed to effectively classify followers based on the homogeneity of their psychographic factors. Finally, the chi-square method discriminates the extracted segment based on demographics.

Data Analysis and Results

Demographics

Table 2 illustrates the demographic profile of the respondents.

Table 2. Demographic Details of the Respondents (N = 182)

		Frequency	Percentage
Gender	Male	114	62.6%
	Female	68	37.4%
Average Age		23	
Educational Qualification	Above - Post-Graduation	3	1.6%
	Graduation/Diploma	79	43.4%
	Post-Graduation	100	54.9%

Annual Household Income (in INR)	300,000 – 500,000	38	20.9%
	500,000 – 700,000	20	11.0%
	700,000 – 1,000,000	26	14.3%
	Less than 300,000	85	46.7%
	More than 1,000,000	13	7.1%

Factor Analysis

According to Table 3, the Kaiser–Meyer–Olkin (KMO) value is 0.94, which suggests that the sample size is sufficient for applying factor analysis. A statistically significant result ($p < 0.05$) in Bartlett's test of sphericity indicates that the data is appropriate for EFA.

A factor analysis was conducted on 25 items, extracting four factors with eigenvalues above 1. The four components explained 79.37% of the total variance, with each factor contributing 26.36%, 24.89%, 16.49%, and 11.611% correspondingly (Table 4).

Factor 1 : Attitudinal Homophily

As shown in Table 5, eight elements are loaded collectively in factor 1, exhibiting a range of factor loadings of 0.90

Table 3. KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser–Meyer–Olkin Measure of Sampling Adequacy		0.94
Bartlett's Test of Sphericity	Approx. Chi-Square	5336.55
	df	30
	Sig.	0.00

Table 4. Total Variance Explained

Components	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.03	56.13	56.13	14.03	56.13	56.13	6.59	26.40	26.36
2	3.20	12.82	68.95	3.20	12.82	68.95	6.22	24.90	51.26
3	1.57	6.27	75.22	1.57	6.27	75.22	4.12	16.50	67.75
4	1.04	4.15	79.37	1.04	4.15	79.37	2.90	11.60	79.37

Note. Extraction Method: Principal Component Analysis.

Table 5. Factor Analysis

Factors and Items	Factor Loading	Eigen Value	Variances
Factor 1 : Attitudinal Homophily		14.03	26.37%
I feel that this VI is quite like me.	0.91		
I feel that this VI has similar values and beliefs to mine.	0.87		

I feel that this VI's tastes and preferences are similar to mine.	0.86		
I feel that this VI behaves like me.	0.84		
I am very attached to the VI that I follow.	0.79		
If the virtual influencer would no longer be in the spotlight, I would feel anxiety.	0.78		
I miss the VIs that I follow when they do not post an entry, or I cannot view their posts.	0.77		
The VI that I follow is special to me.	0.71		
Factor 2 : Aesthetic Influence, Informativeness, and Ad Content Value		3.2	24.90%
This VI makes me learn about a topic I am not familiar with.	0.84		
The visual appearance of VI content in the posts is admirable.	0.83		
I feel that the content provided by VIs is attractive.	0.8		
This VI account keeps me informed about products, services, and trends.	0.79		
I believe that this VI provides me with information on many subjects.	0.79		
I feel that the content provided by VIs is visually appealing.	0.78		
I feel that the content provided by VIs is aesthetically pleasing.	0.77		
Factor 3 : Perceived Reciprocity		1.57	16.49%
This VI is willing to interact with me.	0.82		
Interacting with this VI is feeling like having a real conversation.	0.8		
I feel that this VI regularly responds to my questions in live videos on Instagram.	0.79		
It is easy to contact this VI.	0.77		
I feel that this VI likes to get involved in online discussions.	0.65		
Factor 4 : Perceived Originality		1.04	11.61%
I feel that this VI is authentic.	0.66		
I feel that this VI tries to deliver content consistent with values.	0.64		
I feel that this VI is genuine.	0.58		
I feel that this VI is real to me.	0.54		
In general, this VI gives importance to what followers think about his/her truthfulness.	0.51		

to 0.70, explaining 26.36% variance, with an eigenvalue of 14.03. VIs are anthropomorphic fictional entities that possess comparable physical attributes, behavioral patterns, preferences, likes, values, and other characteristics akin to those shown by human influencers (Block & Lovegrove, 2021). According to Semerádová and Weinlich (2022), a significant degree of attitudinal homophily suggests that influencers can effectively strengthen their connection with their followers and form a positive attitude. Attitudinal homophily pertains to the capacity of an endorser to effectively convey genuine content by aligning their qualities and beliefs with those of the target audience (Masuda et al., 2022). Mirowska and Arsenyan (2023) suggested that using algorithms in VIs to capture the audience's attention via strategically incorporating emotional aspects can enhance the behavioral inclination toward these virtual entities.

Factor 2 : Aesthetic Influence, Informativeness, and Ad Content Value

The second important factor, loaded with seven items, has factor loadings from 0.83 to 0.76, a variance of 24.89%, and an eigenvalue of 3.20. Stein et al. (2024) asserted that VIs are manufactured by media firms or individual programmers who use extensive visual manipulation techniques to present these artificial entities as authentic human figures. Followers pay due weightage to VI's look and content, including visually captive, aesthetically

pleasant, and commendable qualities. Additionally, educational material presented by VIs pertaining to innovative goods, services, and emerging trends plays a pivotal role in grabbing their followers' attention.

Factor 3 : Perceived Reciprocity

The third factor consists of five items with a factor loading ranging from 0.82 to 0.64, exhibiting a 16.49% variance and an eigenvalue of 1.56. The factor is labeled as perceived reciprocity, based on loaded attributes, i.e., VIs' willingness to engage with their followers, genuine conversations, consistent responses, easy access, and active participation in online debates with their audience. Perceived reciprocity is a crucial factor in the establishment of connections with customers (da Silva Oliveira & Chimenti, 2021). VIs can potentially augment social networks among their followers by depicting interactive quality in ordinary discussions.

Factor 4 : Perceived Originality

Five items have been loaded into the fifth factor, with factor loadings ranging from 0.51 to 0.65, an eigenvalue of 1.03, and a variance of 11.61%. The factor encompasses a collection of traits associated with the VI, including “authenticity,” “genuineness,” “realistic appearance,” the delivery of content with “consistent value,” and “truthfulness” in performance. Based on these attributes, the factor is labeled as perceived originality. da Silva Oliveira and Chimenti (2021) discovered that the use of innovative technologies and algorithms on fabricated identities influenced followers' perceptions of the genuineness of VIs to a large extent.

Cluster Analysis

Hierarchical and non-hierarchical cluster analyses were conducted to classify followers' segments based on psychographic factors. The dendrogram results indicated that a two-cluster solution was most appropriate (Hair Jr. et al., 2009). The findings indicate that Cluster 1 comprises of 92 members, and Cluster 2 comprises of 90 respondents (Table 6). Finally, an attempt was made to differentiate the segments based on gender, education, usage rate, and duration of using Instagram using the cross-tab method (Table 7).

Table 6. Cluster Analysis

Statements	Cluster A	Cluster B	F Values***	ANOVA (Sig. Level)
The virtual influencer behaves like me.	5.07	2.49	173.94	0.00
Virtual influencers are quite like me.	5.04	2.61	143.90	0.00
The virtual influencer's tastes and preferences are similar to mine.	5.31	2.68	167.72	0.00
The virtual influencer has similar values and beliefs to mine.	5.40	2.70	181.32	0.00
If the virtual influencer would no longer be in the spotlight, I would feel anxiety.	4.73	2.25	122.98	0.00
I am very attached to the virtual influencers that I follow.	4.96	2.22	196.67	0.00
The virtual influencer that I follow is special to me.	5.27	2.49	173.48	0.00
Content provided by virtual influencers is aesthetically pleasing.	5.78	4.17	58.59	0.00
Content provided by virtual influencers is attractive.	6.09	4.34	83.62	0.00
Content provided by virtual influencers is visually appealing.	6.07	4.41	68.57	0.00
The visual appearance of virtual influencer content in the posts is admirable.	5.93	4.47	54.70	0.00
The virtual influencer account keeps me informed about products, services, and trends.	5.91	4.28	75.03	0.00

The virtual influencer makes me learn about a topic I am not familiar with.	5.63	4.32	46.23	0.00
The virtual influencer provides me with information on many subjects.	5.81	4.27	54.66	0.00
It is easy to contact this virtual influencer.	5.13	3.52	56.86	0.00
Interacting with this virtual influencer was feeling like having a real conversation.	5.30	3.49	85.42	0.00
The virtual influencer is willing to interact with me.	5.25	3.38	83.41	0.00
The virtual influencer regularly responds to my questions in live videos on Instagram.	5.16	3.22	90.04	0.00
The virtual influencer likes to get involved in online discussions	5.49	3.52	92.65	0.00
The virtual influencer is genuine.	5.55	3.62	123.11	0.00
The virtual influencers are real to me.	5.63	3.39	156.69	0.00
The virtual influencers are authentic.	5.78	3.56	131.26	0.00
The virtual influencer tries to deliver content consistent with values.	5.70	3.95	92.37	0.00
The virtual influencers give importance to what followers think about their truthfulness.	5.87	3.94	161.36	0.00

Note. Level of significance: *** = $p \leq 0.01$.

Table 7. Crosstabs Among Clusters

Attributes	Cluster A	Cluster B
	(N = 92)	(N = 90)
	N (%)	N (%)
Usage Rate of Instagram	$\chi^2 = 6.40$	
Several times a day	79.34	66.66
A few times a week	4.34	7.77
Once a day	7.6	8.88
Weekends only	1.08	4.44
Infrequently	6.52	12.22
Ownership Duration of Instagram Account	$\chi^2 = 3.76$	
More than 3 years	58.69	63.33
2–3 years	22.82	18.88
1–2 years	13.04	8.88
6 months –1 year	2.17	3.33
Less than 6 months	2.17	5.55
Gender	$\chi^2 = 1.23$	
Male	58.69	66.66
Female	41.3	33.33
Educational Qualification	$\chi^2 = 0.46$	
Graduation/Diploma	44.56	42.22
Post-Graduation	53.26	56.66
Above-Post Graduation	2.17	1.11

Cluster A (VR Enthusiast)

Cluster A represents a group of followers deeply engaged with the VI, driven by emotional connections, aesthetic preferences, and a strong sense of reciprocity. There is substantial agreement among members of Cluster A

regarding the VI's behavior, appearance, and thought process, indicating a strong sense of shared values, ideas, and affiliation. This cluster is more likely to experience anxiety when their favorite influencers are not in the limelight, suggesting a stronger emotional bond. They find their content visually appealing, aesthetically pleasing, and attractive, as indicated by high mean scores. Members of this cluster see the influencer as a valuable source of information on various topics. This group perceives VI as receptive to engaging in interactions and experiencing a sense of authenticity in their conversation. They highlight a strong sense of reciprocal contact, both in expectation and reality. This cluster of followers views the VI as sincere and authentic, which helps build credibility and trust. Based on these attributes, this cluster is named "VR Enthusiast."

Cluster B (Discerning Realist)

Members of Cluster B express significantly lower levels of agreement that the VI behaves, looks, and thinks similarly to them as compared to Cluster A. Followers in this cluster are less likely to feel anxious in the absence of the popularity of their influencer, indicating a more casual or detached relationship. The lower mean scores of VI content suggest that followers in this cluster do not emphasize the visual elements of the information. A lower rate of originality reflects the practical behavior of these followers, who appreciate and acknowledge reality. They are less willing to engage with VIs, impacting the degree of attachment this group feels with VI. These attributes indicate the appropriateness of the label "Discerning Realist" for this cluster.

Cross-tabulations were utilized to further characterize the cluster segments based on the descriptive characteristics (Table 7). Insignificant values reflect that the utilization rate of Instagram, time duration of using Instagram, gender, and level of education do not serve as meaningful discriminators between the clusters. This may be attributed to the contemporary era of social media, where psychographic characteristics hold a significant role in distinguishing among online consumers rather than demographic factors. Despite the absence of identified demographic attributes as discriminators, they remain crucial for visualizing variations between groups.

Theoretical and Managerial Implications

The present study contributes to the evolving discourse on VI marketing by integrating psychographic segmentation into AI-driven digital engagement strategies. The identification of reciprocity as a key determinant underscores the shift from unidirectional endorsement models to interactive, co-creative engagement paradigms. By emphasizing the primacy of psychographic traits over demographics, this study advances theoretical discourse by advocating AI-driven psychographic analytics to deepen the understanding of social media behavior.

In the AI-driven social media landscape, the present study offers actionable insights for marketers, brand managers, and digital strategists, aiming to leverage VI marketing. The segmentation into VR enthusiasts and discerning realists allows marketers to customize promotional strategies aligning with the segment's expectations. Considering the significance of emotional resonance for VR enthusiasts, brands may design immersive and emotionally engaging content by leveraging AI with more attitudinal homophily and aesthetic appeal. This segment values the authenticity of VI, making it crucial to adopt interactive storytelling, personalized engagement strategies, and conversational agents to strengthen consumer-brand relationships. Conversely, discerning realists adopt a more pragmatic and information-driven approach. Given the importance of visual aesthetics and emotional attachment for this group, marketers may focus more on informative content, transparency, and value-driven endorsements. Since demographic variables did not emerge as significant discriminators, it is pivotal for industry practitioners to shift from traditional segmentation models toward psychographic profiling to optimize influencer marketing strategies.

As attitudinal homophily emerges as an important attribute, marketers should comprehend the values, beliefs,

and attitudes of their audience to offer highly personalized and resonant marketing content. The aesthetic influence and informativeness of VIs highlight the need for integrating visually appealing messages combined with educational and trendy content to sustain consumer interest. The perceived originality factor emphasizes the role of authentic and consistent narratives to position VIs as genuine and relatable. Marketers may adopt various elements such as gamified content, real-time interactions, virtual reality experiences, or augmented reality features to engage their audience in virtual environments. By incorporating emotional resonance, adaptive engagement, and micro-personalized strategies, marketers may optimize the effectiveness of VIs in digital marketing to create a dynamic and interactive digital ecosystem, ultimately strengthening consumer brand relationships.

Conclusion

With the advent of VIs, digital advancement has redefined the paradigm of influencer marketing. The implications derived from the present study act as a foundational roadmap to integrate AI-driven influencers into modern marketing frameworks. The need of the hour is to leverage the potential of VIs by creating stronger, more genuine connections that foster deeper engagement and resonance with the target audience, ultimately ensuring sustained brand loyalty.

Limitations of the Study and Scope for Further Research

While the study offers valuable insights into VIs in the digital landscape, certain limitations present opportunities for future research. First, the study primarily focuses on Instagram. Since user demographics and engagement patterns may vary across platforms, cross-platform analyses of user engagement on other social media platforms such as TikTok, Snapchat, or YouTube may add further value. Second, social desirability bias due to self-reported data and the study's reliance on a sample of Instagram users may constrain the generalizability of the findings. Employing qualitative methods such as sentiment analysis, digital ethnography, and experimental or longitudinal studies may provide deeper insights into the consumer attitude toward VIs. The study primarily explores psychographic factors influencing consumer engagement with VIs. Future studies may investigate other contextual variables such as cultural influences, platform-specific dynamics, or evolving AI capabilities. Additionally, digging deep into the intersection of VIs with emerging technologies like AR and the metaverse would further extend the scope of digital marketing strategies.

Authors' Contribution

Prof. Anand Thakur conceived the foundational idea for the study, framing the core research questions and guiding the overall conceptualization of the study. Kavita Singla developed the qualitative and quantitative design, interpreted the data, and organized the findings. Kamini Singla contributed to structuring the paper and meticulously checking the grammar for more clarity and readability of the manuscript. Mohammed Irshad T. collected data and assisted in data analysis. Simran Kaur contributed to the literature review and Parwinder Kaur conducted the data analysis, applying appropriate statistical techniques to extract meaningful insights.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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References

- Agrawal, C., Duggal, T., Shukla, V., & Dohroo, M. (2023). Analyzing the correlation between social media influencers and customers' intention to buy in the luxury market. *Indian Journal of Marketing*, 53(9), 28–45. <https://doi.org/10.17010/ijom/2023/v53/i9/173140>
- Ahn, R. J., Cho, S. Y., & Sunny Tsai, W. (2022). Demystifying computer-generated imagery (CGI) influencers: The effect of perceived anthropomorphism and social presence on brand outcomes. *Journal of Interactive Advertising*, 22(3), 327–335. <https://doi.org/10.1080/15252019.2022.2111242>
- Arora, T., Agarwal, B., & Kumar, A. (2018). A study of millennials's preferences for social media advertising in Delhi N C R . *Indian Journal of Marketing*, 48(10), 34–51. <https://doi.org/10.17010/ijom/2018/V48/I10/132334>
- Arsenyan, J., & Mirowska, A. (2021). Almost human? A comparative case study on the social media presence of virtual influencers. *International Journal of Human-Computer Studies*, 155, Article ID 102694. <https://doi.org/10.1016/j.ijhcs.2021.102694>
- Baroroh, D. K., Chu, C. H., & Wang, L. (2021). Systematic literature review on augmented reality in smart manufacturing: Collaboration between human and computational intelligence. *Journal of Manufacturing Systems*, 61, 696–711. <https://doi.org/10.1016/j.jmsy.2020.10.017>
- Bash, M., Bandyopadhyay, A., Pahari, M. P., & Pahari, S. (2024). The effect of social media influencers on visit intention in the restaurant industry. *Indian Journal of Marketing*, 54(5), 45–61. <https://doi.org/10.17010/ijom/2024/v54/i5/173829>
- Block, E., & Lovegrove, R. (2021). Discordant storytelling, 'honest fakery,' identity peddling: How uncanny CGI characters are jamming public relations and influencer practices. *Public Relations Inquiry*, 10(3), 265–293. <https://doi.org/10.1177/2046147X211026936>
- Byun, K. J., & Ahn, S. J. (2023). A systematic review of virtual influencers: Similarities and differences between human and virtual influencers in interactive advertising. *Journal of Interactive Advertising*, 23(4), 293–306. <https://doi.org/10.1080/15252019.2023.2236102>
- Chiu, C. L., & Ho, H.-C. (2023). Impact of celebrity, micro-celebrity, and virtual influencers on Chinese Gen Z's purchase intention through social media. *SAGE Open*, 13(1). <https://doi.org/10.1177/21582440231164034>
- da Silva Oliveira, A. B., & Chimenti, P. (2021). “Humanized Robots”: A proposition of categories to understand virtual influencers. *Australasian Journal of Information Systems*, 25, 1–27. <https://doi.org/10.3127/ajis.v25i0.3223>
- Davlembayeva, D., Chari, S., & Papagiannidis, S. (2025). Virtual influencers in consumer behaviour: A social influence theory perspective. *British Journal of Management*, 36(1), 202–222. <https://doi.org/10.1111/1467-8551.12839>

- Dixon, S. J. (2024, May 22). *Number of Instagram users worldwide from 2020 to 2025*. Statista. <https://www.statista.com/statistics/183585/instagram-number-of-global-users/>
- Dondapati, A., & Dehury, R. K. (2024). Virtual vs. human influencers: The battle for consumer hearts and minds. *Computers in Human Behavior: Artificial Humans*, 2(1), Article ID 100059. <https://doi.org/10.1016/j.chbah.2024.100059>
- Grover, A., & Arora, N. (2024). Effect of parasocial commitment and breakup with a fictional character on purchase intention. *Prabandhan: Indian Journal of Management*, 17(9), 8–23. <https://doi.org/10.17010/pijom/2024/v17i9/173939>
- Hair Jr., J. F., Black, W. C., Babin, B. J., & Anderson, R. (2009). *Multivariate data analysis: A global perspective* (7th ed.). Pearson.
- Hudders, L., De Jans, S., & De Veirman, M. (2021). The commercialization of social media stars: A literature review and conceptual framework on the strategic use of social media influencers. *International Journal of Advertising*, 40(3), 327–375. <https://doi.org/10.1080/02650487.2020.1836925>
- Ilicic, J., & Webster, C. M. (2016). Being true to oneself: Investigating celebrity brand authenticity. *Psychology & Marketing*, 33(6), 410–420. <https://doi.org/10.1002/mar.20887>
- Jhawar, A., Kumar, P., & Varshney, S. (2023). The emergence of virtual influencers: A shift in the influencer marketing paradigm. *Young Consumers*, 24(4), 468–484. <https://doi.org/10.1108/YC-05-2022-1529>
- Jiang, K., Zheng, J., & Luo, S. (2024). Green power of virtual influencer: The role of virtual influencer image, emotional appeal, and product involvement. *Journal of Retailing and Consumer Services*, 77, Article ID 103660. <https://doi.org/10.1016/j.jretconser.2023.103660>
- Jin, S. V., Muqaddam, A., & Ryu, E. (2019). Instafamous and social media influencer marketing. *Marketing Intelligence & Planning*, 37(5), 567–579. <https://doi.org/10.1108/MIP-09-2018-0375>
- Kim, H., & Park, M. (2023). Virtual influencers' attractiveness effect on purchase intention: A moderated mediation model of the product–endorser fit with the brand. *Computers in Human Behavior*, 143, Article ID 107703. <https://doi.org/10.1016/j.chb.2023.107703>
- Kim, J., Hong, D., & Jun, J. W. (2025). Effects of sensation seeking, creator attractiveness, content novelty, and credibility on branded entertainment. *Indian Journal of Marketing*, 55(2), 33–52. <https://doi.org/10.17010/ijom/2025/v55/i2/174747>
- Kim, M., & Baek, T. H. (2024). Are virtual influencers friends or foes? Uncovering the perceived creepiness and authenticity of virtual influencers in social media marketing in the United States. *International Journal of Human-Computer Interaction*, 40(18), 5042–5055. <https://doi.org/10.1080/10447318.2023.2233125>
- Li, H., Lei, Y., Zhou, Q., & Yuan, H. (2023). Can you sense without being human? Comparing virtual and human influencers' endorsement effectiveness. *Journal of Retailing and Consumer Services*, 75, Article ID 103456. <https://doi.org/10.1016/j.jretconser.2023.103456>
- Li, J., & Ma, Y. (2024). Virtual influencers in advertisements: Examining the role of authenticity and identification. *Journal of Interactive Advertising*, 24(1), 1–12. <https://doi.org/10.1080/15252019.2023.2270478>

- Lou, C., & Yuan, S. (2019). Influencer marketing: How message value and credibility affect consumer trust of branded content on social media. *Journal of Interactive Advertising*, 19(1), 58–73. <https://doi.org/10.1080/15252019.2018.1533501>
- Lou, C., Kiew, S. T., Chen, T., Lee, T. Y., Ong, J. E., & Phua, Z. (2023). Authentically fake? How consumers respond to the influence of virtual influencers. *Journal of Advertising*, 52(4), 540–557. <https://doi.org/10.1080/00913367.2022.2149641>
- Masuda, H., Han, S. H., & Lee, J. (2022). Impacts of influencer attributes on purchase intentions in social media influencer marketing: Mediating roles of characterizations. *Technological Forecasting and Social Change*, 174, Article ID 121246. <https://doi.org/10.1016/j.techfore.2021.121246>
- McCroskey, J. C., Richmond, V. P., & Daly, J. A. (1975). The development of a measure of perceived homophily in interpersonal communication. *Human Communication Research*, 1(4), 323–332. <https://doi.org/10.1111/j.1468-2958.1975.tb00281.x>
- Melnychuk, H.-A., Arasli, H., & Nevzat, R. (2024). How to engage and attract virtual influencers' followers: A new non-human approach in the age of influencer marketing. *Marketing Intelligence & Planning*, 42(3), 393–417. <https://doi.org/10.1108/MIP-06-2023-0251>
- Meng, L., Bie, Y., Yang, M., & Wang, Y. (2025). The effect of human versus virtual influencers: The roles of destination types and self-referencing processes. *Tourism Management*, 106, Article ID 104978. <https://doi.org/10.1016/j.tourman.2024.104978>
- Mirowska, A., & Arsenyan, J. (2023). Sweet escape: The role of empathy in social media engagement with human versus virtual influencers. *International Journal of Human-Computer Studies*, 174, Article ID 103008. <https://doi.org/10.1016/j.ijhcs.2023.103008>
- Rao, K. S., & Rao, B. (2019). Examining eWOM credibility - Consumer purchase intention relationship in Facebook: A mediation analysis. *Indian Journal of Marketing*, 49(8), 7–22. <https://doi.org/10.17010/ijom/2019/v49/i8/146169>
- Sánchez-Fernández, R., & Jiménez-Castillo, D. (2021). How social media influencers affect behavioural intentions towards recommended brands: The role of emotional attachment and information value. *Journal of Marketing Management*, 37(11–12), 1123–1147. <https://doi.org/10.1080/0267257X.2020.1866648>
- Sands, S., Campbell, C. L., Plangger, K., & Ferraro, C. (2022). Unreal influence: leveraging AI in influencer marketing. *European Journal of Marketing*, 56(6), 1721–1747. <https://doi.org/10.1108/EJM-12-2019-0949>
- Sathyanarayana, S., Gargesa, S., & Bhavya, N. (2019). The effectiveness of the celebrity advertisement process and its impact on buying intention. *Indian Journal of Marketing*, 49(3), 50–62. <https://doi.org/10.17010/ijom/2019/v49/i3/142146>
- Semerádová, T., & Weinlich, P. (2022). *Emotional, cognitive, and conative response to influencer marketing*. Available at SSRN. <https://doi.org/10.2139/ssrn.4113052>
- Shao, Z. (2024). From human to virtual: Unmasking consumer switching intentions to virtual influencers by an integrated fsQCA and NCA method. *Journal of Retailing and Consumer Services*, 78, Article ID 103715. <https://doi.org/10.1016/j.jretconser.2024.103715>

- Singh, B., & Dagur, A. (2022). Understanding the influence of social media marketing of masstige fashion brands on Generation Z female Indian consumers. *Indian Journal of Marketing*, 52(5), 8–24. <https://doi.org/10.17010/ijom/2022/V52/I5/169414>
- Statista Research Department. (2024, December 10). *Virtual influencers - statistics & facts*. Statista. <https://www.statista.com/topics/9805/virtual-influencers/#topicOverview>
- Stein, J.-P., Breves, P. L., & Anders, N. (2024). Parasocial interactions with real and virtual influencers: The role of perceived similarity and human-likeness. *New Media & Society*, 26(6), 3433–3453. <https://doi.org/10.1177/14614448221102900>
- Tanwar, A. S., Chaudhry, H., & Srivastava, M. K. (2021). Influencer marketing as a tool of digital consumer engagement: A systematic literature review. *Indian Journal of Marketing*, 51(10), 27–42. <https://doi.org/10.17010/ijom/2021/v51/i10/166439>
- Taruffi, L. (2021). Mind-wandering during personal music listening in everyday life: Music-evoked emotions predict thought valence. *International Journal of Environmental Research and Public Health*, 18(23), 12321. <https://doi.org/10.3390/ijerph182312321>
- Thakur, A., Singla, K., & Irshad, T. M. (2023). An exploratory study on stimulators in influencer marketing: A critical review on content and audience engagement. In *Proceedings of the International Conference on Emerging Trends in Business & Management (ICETBM2023), Advances in Economics, Business, and Management Research*. Atlantis Press. https://doi.org/10.2991/978-94-6463-162-3_15
- Thomas, V. L., & Fowler, K. (2021). Close encounters of the AI kind: Use of AI influencers as brand endorsers. *Journal of Advertising*, 50(1), 11–25. <https://doi.org/10.1080/00913367.2020.1810595>
- Wiedmann, K.-P., & von Mettenheim, W. (2020). The interaction of consumer, endorser, and brand personality in social influencer marketing: An abstract. In S. Wu, F. Pantoja, & N. Krey (eds.), *Marketing opportunities and challenges in a changing global marketplace: AMSAC 2019. Developments in Marketing Science: Proceedings of the Academy of Marketing Science* (pp. 359–360). Springer. https://doi.org/10.1007/978-3-030-39165-2_142
- Xiao, M., Wang, R., & Chan-Olmsted, S. (2018). Factors affecting YouTube influencer marketing credibility: A heuristic-systematic model. *Journal of Media Business Studies*, 15(3), 188–213. <https://doi.org/10.1080/16522354.2018.1501146>
- Yu, J., Dickinger, A., So, K. K., & Egger, R. (2024). Artificial intelligence-generated virtual influencer: Examining the effects of emotional display on user engagement. *Journal of Retailing and Consumer Services*, 76, Article ID 103560. <https://doi.org/10.1016/j.jretconser.2023.103560>
- Zhou, S., & Wang, Y. (2022). How negative anthropomorphic message framing and nostalgia enhance pro-environmental behaviors during the COVID-19 pandemic in China: An SEM-NCA approach. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.977381>

Appendix. List of Questionnaire Items

Construct	Items	Sources
Attitudinal Homophily	I feel that this virtual influencer is quite like me.	(McCroskey et al., 1975)
	I feel that this virtual influencer has similar values and beliefs to mine.	
	I feel that this virtual influencer's tastes and preferences are similar to mine.	
	I feel that this virtual influencer behaves like me.	
	I am very attached to the virtual influencers that I follow.	
	If the virtual influencer would no longer be in the spotlight, I would feel anxiety.	
	I miss the virtual influencers that I follow when he/she does not post an entry, or I cannot view his/her posts.	
	The virtual influencer that I follow is special to me.	
Aesthetic Influence, Informativeness, and Ad Content Value	This virtual influencer makes me learn about a topic I am not familiar with.	(Wiedmann & von Mettenheim, 2020; Xiao et al., 2018)
	The visual appearance of virtual influencer content in the posts is admirable.	
	I feel that the content provided by the virtual influencers is attractive.	
	This virtual influencer account keeps me informed about products, services, and trends.	
Perceived Reciprocity	I believe that this virtual influencer provides me with information on many subjects.	(Xiao et al., 2018)
	I feel that the content provided by virtual influencers is visually appealing.	
	I feel that the content provided by virtual influencers is aesthetically pleasing.	
	This virtual influencer is willing to interact with me.	
	Interacting with this virtual influencer feels like having a real conversation.	
	I feel that this virtual influencer regularly responds to my questions in live videos on Instagram.	
Perceived Originality	It is easy to contact this virtual influencer.	(Illicic & Webster, 2016)
	I feel that this virtual influencer likes to get involved in online discussions.	
	I feel that this virtual influencer is authentic.	
	I feel that this virtual influencer tries to deliver content consistent with values.	
	I feel that this virtual influencer is genuine.	
	I feel that this virtual influencer is real to me.	
	In general, this virtual influencer gives importance to what followers think about his/her truthfulness.	

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