

Understanding Consumers' Attitude Toward Digital Humans In Influencer Marketing

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Abstract

This paper examines the evolving field of influencer marketing by offering a comprehensive understanding of consumers' attitudes towards digital humans in the context of influencer marketing during a social issue like the pandemic. We use Instagram data in this study to analyze how consumers respond to two different types of postings made by human and digital influencers, namely marketing posts, and regular posts pre-pandemic and post-pandemic declaration. The results show that the digital influencers received more negative attitude towards marketing posts in both time periods, but the negative responses decreased post-pandemic declaration compared to pre-pandemic declaration. The results show that consumers favor posts from human influencers more than from digital influencers overall.

Keywords: Digital human influencers, sentiment analysis

Introduction

In recent years, the digital human market has seen significant growth with the market estimated in billions of dollars. One of the main applications of digital humans is influencer marketing. Digital influencers (DIs) are defined as digital, anthropomorphic social media influencers that are controlled by humans or software. The emergence and unique characteristics are quickly catching the attention of both advertising practitioners and researchers. These digital influencers, like human influencers (HIs), have a large number of followers, endorse brands, display their own personalities and narratives in their posts, and actively interact with followers. Famous examples include Lil Miquela, Imma, and Knox Frost. Lil Miquela was named one of the "25 most influential people on the Internet" in 2018 (Time 2018) and has collaborated with fashion labels Prada and Calvin Klein (Hsu 2019).

Increase in the market estimate of digital influencers has led many advertisers to incorporate DIs in their influencer advertising campaigns because of some promising advantages of DIs over HIs (Bradley 2020). One of the main upsides is that advertisers have tighter control over the DI messages, which allows them to tailor messages more easily

and effectively based on individual consumers' characteristics and changing needs, avoid potential future transgressions or scandals involving influencers, and insert DIs digitally into digitally any locations and contexts at any time (Ragavan 2021). Furthermore, due to the novel nature of DIs, using DIs could increase consumers' curiosity and engagement as compared to using HIs (Molenaar 2021).

While there are many questions regarding the potential advantages, effects, and effectiveness of DIs as an advertising endorser in both product advertising and social marketing contexts, answers are hard to find due to a lack of research. Against this backdrop, we explore the consumer's attitude to social media posts by DIs compared to those by HIs a few weeks pre- and post-pandemic being declared.

Our main motivation is to answer some of the important questions regarding the effects and effectiveness of DIs vs. HIs as brand endorsers and advertising agents. Applying a computational research approach to analyze Instagram data, our study specifically aims at two objectives: (1) to examine and compare the sentiment expressed by users on Instagram toward posts by DIs vs. HIs pre and post-pandemic declaration; and (2) to explore patterns of followers' sentiment toward posts by DIs vs. HIs for marketing-related versus regular posts. We believe the results of our study will help assess whether the field of advertising is ready for wide-scale adoption of DIs, and what its impact is likely to be.

Background

Social media influencers (SMIs) are defined as individuals who have gained fame through the content they post on social media (Kim 2021). Despite the growing research on influencer advertising effects and different types of SMIs, most prior studies have focused on HIs. Thus, research on DI is rare. Furthermore, most prior research has investigated consumers' perceptions of influencers and the effectiveness of influencer marketing in general, using surveys, interviews, content analyses, or experiments (Hudders et al. 2021), and computational research analyzing real-world social media data is limited. Also, studies that focus on social

issues in the context of influencer advertising are rather scarce (Alampi 2020).

As DIs and their use in advertising are a rather new phenomenon, there is a dearth of research on this topic in general, and consumers' reactions to DIs and DI's effectiveness in advertising in particular. One of the few studies, Josie et al. (2021) interviewed social media users following DI to understand their perceptions and observed that followers considered DI creepy. However, this negative perception seemed to be mitigated when consumers perceived DI to be authentic and similar to humans, among others. This study suggested that DI could have positive effects on brand awareness and brand image, but they might not be effective in enhancing consumers' purchase intentions.

In another study, Yang et al. (2021) compared the effects of human-like and cartoon-like DI in the context of CSR messages through an experiment using a screenshot of an Instagram profile featuring a human-like versus cartoon-like DI. The results showed that a human-like DI was perceived to be more similar, trustworthy, attractive, and have higher expertise than a cartoon-like DI. Furthermore, a high level of homophily, trustworthiness, and expertise increased CSR engagement, whereas a high level of trustworthiness improved brand attitudes.

As the only prior research comparing DI and HIs, Arsenyan and Mirowska (2021) conducted a sentiment analysis to compare social media users' comments to a HI, human-like DI, and cartoon-like DI. The study found that both types of DI received more likes, views, and comments than the HI. However, the human-like DI received significantly more negative comments than the other types of influencers. More specifically, social media users used fewer positive emojis, fewer positive affective terms, more negative affective terms, as well as more swear words toward the human-like DI than the other influencers.

It is hard to draw any conclusion or prediction comparing DI and HIs in the context of influencer advertising due to the scarcity of relevant research. While some research suggests that DI need to display more human-like characteristics to lead to positive communication outcomes, other research suggests that DIs resemblance to humans can backfire and result in negative responses. Since consumers know digital humans don't have experiences of their own, there is a possibility of negative consumer reactions toward DIs and DI-based influencer advertising campaigns. Consumers may question the source and intention behind DIs and their posts. Furthermore, there are rising ethical and trust issues connected to DIs. If that is the case, consumers' negative perceptions and beliefs about DIs could have a negative impact on DI's effectiveness as brand endorsers and influencer advertising agents. Such presumed negative reactions toward DIs and DI-based influencer advertising campaigns might be particularly more pronounced when promoting social

causes or public health-related issues, subjects that involve genuine human experiences.

In order to study these, we aim to understand DIs in the context of influencer marketing during a social issue like the pandemic. Based on these previous studies in influencer marketing and applying computational methods to understand sentiment analysis, we pose the following research questions and hypotheses:

RQ1: Consumers attitude towards DIs to HIs

RQ2: Consumers attitude towards marketing and regular posts by DIs compared to HIs

H1: HIs receive more positive attitude towards marketing posts compared to DIs

Empirical Study

Data

We collected Instagram data using Instaloader (Graf & Koch-Kramer, 2019) for two different time periods in the early stages of the COVID-19 pandemic: pre-pandemic declaration and post-pandemic declaration. The pre-pandemic declaration time period spanned from January 21, 2020, when the Centers for Disease Control and Prevention confirmed the first COVID-19 case in the US, to March 10, 2020. The post-pandemic declaration time period is from March 11, 2020, when COVID-19 was declared a pandemic, to April 30, 2020. We used the influencer marketing platforms StarNgage and HypeAuditor(2022) to select 35 digital influencers (DIs), 26 macro-HIs (Ismail 2018) with the highest number of followers. We excluded influencers who (1) did not represent individual influencers (e.g., brands and websites), (2) did not post within the two time periods, (3) did not include any captions for their posts, or (4) did not receive any English comments on their posts. In addition, we excluded any non-English posts. As a result, our final data for analysis included posts and followers' comments from 24 DIs and 24 macro-HIs. Influencer postings were classified into marketing posts and regular posts. They were classified as marketing if they contained keywords such as #sponsored, #tag, # linkinbio and so on. The keyword list was curated manually and contained 81 keywords/phrases.

Descriptive Statistics:

The data contains comments to 1473 posts with 271 marketing posts and 1202 regular posts totally. Out of the 271 marketing posts, 71 posts were by DI and 200 posts were by HI. Out of the 1202 regular posts, 239 posts were by DI and the remaining 823 posts were by HIs.

The total number of comments considered for the analysis is 2064626, out of which 381365 comments were for marketing posts by DIs and HIs and 1683261 comments were for regular posts. Out of the 381365 comments, 8632 belonged to DI marketing posts, and 372733 belonged to the

HI marketing post. The DI and HI regular posts had 22440 and 1660821 comments out of 1683261 respectively.

During the pre-pandemic declaration, the number of marketing posts by DIs was 21 compared to 103 marketing posts by the HIs. During the post-pandemic declaration, the number of marketing posts by DIs was 50 compared to 97 marketing posts by the HIs. During the pre-pandemic declaration, the number of regular posts by DIs was 140 whereas the number of HI regular posts was 400. During the post-pandemic declaration, the number of regular posts by DIs was 239 whereas the number of HI regular posts was 423.

Influencer	Time period	Marketing	Regular
Digital Influencer	Pre pandemic	21	140
Digital Influencer	Post pandemic	50	239
Human Influencer	Pre pandemic	103	400
Human Influencer	Post pandemic	97	423

Table 1: number of posts for DIs and HIs

Influencer	Time period	Marketing	Regular
Digital Influencer	Pre pandemic	3380	8931
Digital Influencer	Post pandemic	5252	13509
Human Influencer	Pre pandemic	162423	780869
Human Influencer	Post pandemic	210310	879952

Table 2: number of comments for DIs and HIs

Tables 1 and 2 show the distribution of posts and comments for each time period and post-type for DIs and HIs. The median number of followers for DIs was 24,883 whereas the HIs had a median number of followers of 13,508,687. The median number of comments for marketing posts by DI was 9 and HIs was 730 for pre-pandemic declaration compared to 46 for DIs and HIs was 868 for post-pandemic declaration. The median number of comments for regular posts by DIs was 8 and HIs was 1053 for pre-pandemic declaration and 7 and 1080.5 for post-pandemic by DIs and HIs respectively.

Analysis:

We conducted a computational analysis using Instagram data (both SMI posts and followers' comment) collected for two different time periods: pre-pandemic declaration and post-pandemic declaration. In order to understand the consumers attitude towards the influencers, we used sentiment analysis. The comments considered for this study are in English. The total number of comments analyzed for this study is 2062626.

We used RoBERTa-large model (Liu et al, 2019) as a classifier for sentiment analysis. The training dataset used was the IMDB dataset. The test dataset was created by 2447 comments from the dataset, which was annotated by two annotators with the interrater agreeability of 0.701. The labels were chosen at random if the annotators didn't agree with each other. The final test dataset contained 1178 positive and 1269 negative comments. The RoBERTa-large model was trained over 5 epochs with batch size 16, 0.2 as warmup, and 1e-5 as the learning rate. The F1 score of the model was 0.86. Figure 1 shows the pipeline of the analysis.

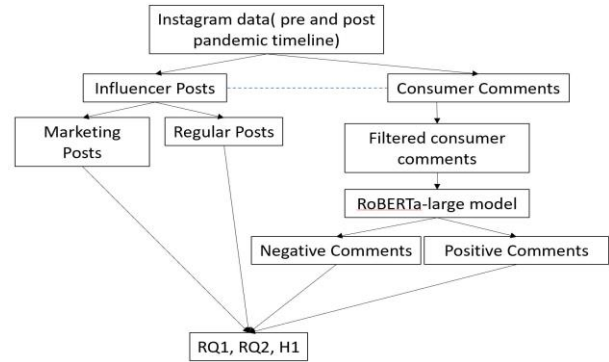


Figure 1: Analysis pipeline

RQ1: Consumers attitude towards DIs to HIs

A series of Chi-square tests were conducted with the sentiment analysis data as the dependent variable and the influencer type as the independent variable, to compare the percentages of positive and negative reactions for both DIs and HIs. Overall across both time periods, DIs (66%, n = 31072) received more negative attitude than HIs(46.7%, n = 1921244). Interestingly, it can be observed that DIs had reduced negative attitude post-pandemic compared to pre-pandemic. 74.6% of comments to DIs Post-pandemic DIs were negative(n= 12311) compared to 60.4% comments pre-pandemic (n = 18761). While the DIs had reduced negative comments from consumers, DIs (60.4%, n = 18761) still had more negative comments than HIs(41.9%, n =1090262) post-pandemic declaration.

In addition, followers had significantly more positive reactions toward HIs (53.28%, n =1921244) than DIs (33.95%, n =31072) ($X^2(1, N =1952316) = 4590.89, p < .001$). During the pre-pandemic declaration period, followers also tended to react more positively towards HIs (53.36%, n = 943292) than DIs (25.36%, n = 12311) ($X^2(1, N =955603) = 3823.98, p < .001$). Likewise, HIs (58.03%, n =1090262) received the most positive reactions, and DIs (39.58%, n = 18761) during the post-pandemic declaration period ($X^2(1, N = 1109023) = 2573.92, p < .001$).

RQ2: Consumers' attitude towards marketing and regular posts by DIs compared to HIs pre and post-pandemic declaration.

Observing the consumers' attitudes towards marketing posts by DIs and HIs, a similar pattern emerges. DIs (65.8%, n = 8632) had more negative reactions over both time periods compared to HIs (37.22%, n = 372733). Pre-pandemic declaration, the consumers had more negative responses towards DIs (77.8%, n = 3380) compared to that of HIs (26.44%, n = 162423). The negative responses towards HIs increased post-pandemic declaration (45.54%, n = 210310) compared to pre-pandemic (26.44%, n = 162423) whereas the negative responses towards DIs reduced post-pandemic (58.03%, n = 5252) compared to pre-pandemic (77.8%, n = 3380).

Similarly, consumers' attitude towards regular posts by DIs and HIs, a pattern emerges. DIs (66.14%, n = 22440) had more negative reactions over both time periods compared to HIs (45.68%, n = 1660821). Pre-pandemic declaration, the consumers had more negative responses towards DIs (73.39%, n = 8931) compared to that of HIs (50.83%, n = 780869). The negative responses towards HIs and DIs both decreased post-pandemic declaration (41.1%, n = 879952) compared to pre-pandemic (50.83%, n = 780869) and negative responses towards DIs post-pandemic (61.34%, n = 13509) compared to pre-pandemic (73.39%, n = 8931).

H1: HIs receive more positive attitude towards marketing posts compared to DIs

Consumers had significantly more positive reactions to HIs marketing posts (62.77%, n = 372733) than DIs' marketing posts (34.18%, n = 8632) over the entire time period ($X^2(1, N = 381365) = 2930.08, p < .001$). Similarly, consumers showed positive attitude towards marketing posts pre-pandemic declaration towards HIs (73.55%, n = 162423) compared to DIs (22.1%, n = 3380) ($X^2(1, N = 165803) = 4396.3, p < .001$). They showed similar attitude post-pandemic declaration with HIs (54.45%, n = 210310) receiving more positive attitude compared to DIs (41.9%, n = 5252) ($X^2(1, N = 215562) = 321.7, p < .001$).

Discussion

This study examined and compared consumers' attitudes towards DIs and HIs across marketing and regular posts pre and post-pandemic. The findings provide important new insight into the emerging digital human phenomenon and answers to questions about the effectiveness of digital humans for influencer marketing and across different message contexts (Appel et al. 2020). The results of this study demonstrate that compared to HIs, DIs received more negative reactions and less positive reactions from social media users over both the time periods. Though this is the actual representation of attitude towards the DIs, it might be because of

the latent knowledge about DIs being not human and consumers being less hesitant to express their negative attitudes. On the other hand, consumers may feel more cautious about expressing negative responses to HIs because HIs could be personally affected by such responses.

Furthermore, the findings of this study suggest that HIs seem to be more effective in promoting products or services than DIs. This could be explained by consumers' relatability with HIs compared to those of DIs. Lastly, the results showed that during the post-pandemic declaration period, HIs and DIs received more positive responses towards regular posts but showed more negative responses towards marketing posts. This might be because of the after-effects of the pandemic being declared and influencers not empathizing with the public.

This study provides insights into how digital humans are perceived in one of their main applications: influencer marketing. Theoretically, this is the first study that compares consumers' attitude toward real-world digital and human influencers across marketing and regular posts. To date, little is known about consumers' attitude to DIs vs. HIs, let alone reactions toward different types of posts, and whether DIs are more effective endorsers than HIs. This is important because Digital human influencers are increasingly used to promote brands and social issues, and they are expected to drastically change the influencer landscape (Sharma 2020). Though DIs show great promise, currently, consumers have less positive responses to them compared to HIs for marketing.

Limitations

Even though this study examines and compares consumers' responses to real-world DIs and HIs across different contexts, it has certain limitations. First, this study has only investigated consumers' sentiment toward different types of influencers and posts pre and post-pandemic declaration. With constant exposure to the evolving generative AI applications, consumers might be less negative towards digital human influencers in the near future. Second, this study has only examined human-like DIs. It may be worthwhile to compare different types of DIs and see which ones are more effective for marketing purposes. Third, we selected influencers based on their number of followers to avoid potential bias. However, we had limited access to the influencer list, which led to an unbalanced sample size. Finally, the comments considered in this study are all in English. Future research is encouraged to collaborate with influencer marketing platforms and analyze social media data using a more balanced sample size.

Conclusion

This study shows the level of acceptance of consumers of digital humans for one of the main applications: influencer marketing. We studied consumers' attitudes towards digital humans in the context of influencer marketing pre and post-pandemic declaration. The results showed that DIs received more negative responses than HIs for both marketing and regular posts. The study also shows that post-pandemic negative responses towards HIs and DIs reduced for regular posts but DIs received more negative responses for marketing posts.

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