

Virtual Human Influencer and Its Impact on Consumer Purchase Intention

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Abstract: Due to the extensive usage of online influencers by marketers, "influencer marketing", a form of which a business recruits and financially compensates social media influencers to spread stories about its product among their thousands of followers, is rising in popularity [1]. Among all kinds of influencer, virtual influencers are digital creatures who naturally love digital products like NFTs and video game skins, making them better spokespeople for metaverse themes. In response to customer demand, the number of effective and active virtual influencers is growing. There are 58 percent of US customers surveyed in March 2022 were already following a virtual influencer. The question in this study is whether customers bought products after virtual influencer recommended. In another word, virtual influencer contact may affect consumers' buying intentions. This study tends to present that in offline and online purchasing contests, virtual influencers improve customer buying intention. According to the finding of this study, the presence of a virtual influencer increases the consumer's propensity to make a purchase once this consumer has been exposed to the presence of the influencer.

Keywords: influencer marketing, virtual influencer, consumer purchase

1. Introduction

The widespread use of online influencers by marketers to promote products of certain brands on social media platforms like Facebook, Instagram and Twitter is driving the rise of "influencer marketing," an approach in which a corporation chose and pays internet influencers for utilizing their social media following for the purpose to promote the firm's products [1].

Among all kinds of influencer, virtual influencers are digital creatures, and the fact that they have a natural love for digital products (such as NFTs or video game skins), makes them more effective spokesmen for themes connected to the metaverse (such as Generation Z) [2].

The number of effective and active virtual influencers is already substantial and is expected to keep expanding in response to increased demand from consumers. According to the findings of a survey of consumers in the United States that was carried out in March 2022, there is 58 percent of respondents who have already followed a virtual influencer at the point of the survey [3]. The curiosity is undeniably that whether customers were purchasing things that were recommended by virtual influencers.

Therefore, this study indicated that consumers' buying intention could be affected by the virtual influencer interaction of the product. The virtual influencer tends to increase the consumer buying intention in the offline and online purchasing contests.

2. Literature Review

2.1. Influencer Marketing

Marketers' widespread use of online influencers to promote brands and products on social media platforms like Facebook, Instagram, and Twitter has led to the rise in popularity of "influencer marketing", a strategy where a company elects and rewards influential people on the internet to interact with their followers on social media platforms to promote the company's promising [1].

Whereas celebrities often have a background in a highly accredited field (such as film, music, or sports), influencers do not [4,5]. They build an audience by uploading and sharing material, and they encourage consumers to check out the endorsed brands by weaving them into their own stories and online content [6].

Meanwhile, more than seventy-five percent of marketers anticipate making an investment in the strategy, which leads to the projection that expenditure on influencer marketing will reach \$16.4 billion by the end of 2022 [7].

2.2. Virtual Human Influencer

The Metahuman is a powerful attempt by the brand to satisfy a consumer. Virtual influencers are digital beings, and their natural affinity for digital products (e.g., NFTs or video game skins) makes them stronger spokespeople for metaverse-related topics (e.g., Gen Z) [7]. 75% of Gen Z follow at least one virtual influencer, and up to 40% have purchased a product promoted by virtual influencers [8]. Because virtual agents appear human, they can influence decisions, purchases, and persuasion [9-11].

2.3. Virtual Human & Metaverse in Web 3.0

The word "Metaverse" was first used in Neal Stephenson's 1992 speculative novel Snow Crash [12]. Today, the metaverse is a fast-evolving new technology [13]. The metaverse is a virtual realm that is represented briefly. The metaverse impacts in social and cultural spheres become more appealing. We can get together with our pals and go to a virtual exhibition. We can attend metaverse performances or browse and shop the metaverse's stores. For example, the Travis Scott Fortnite online concert in 2020 was seen by 10.7 million people at the same time [14].

Understanding earlier web iterations is critical to completely grasping Web 3.0. The Internet's technological capacity and capabilities constantly expanding and often altering to meet user demands. We are currently living in the Internet's social media era, courtesy to Web 2.0, often known as the social web [15]. The original GeoCities, message boards, LiveJournal, and Myspace platforms have been supplanted by Facebook, Twitter, TikTok, Instagram, YouTube, and Reddit. During this period, users had the chance to create content, establish community, and create an environment in which individuals could flourish online, which was empowering.

3. Conceptual Framework and Hypothesis

This paper hypothesizes that presence of a virtual influencer has an effect on the consumer's intent to make a purchase. This section presents a hypothesis linking the presence of virtual influencers to consumers and consumer purchase intention. Specifically, the model studies the impact of the presence of virtual influencers on consumer purchase intention through positive affect. As a result,

this study also anticipates that when presence of a virtual influencer, consumer's intention to make purchase will increase.

Hypothesis: The presence of a virtual influencer has a positive effect on the consumer's intent to make a purchase.

4. Methodology

4.1. Method and Data

The hypothesis of this study is that the presence of a virtual influencer has an effect on the consumer's intent to make a purchase. This research made the assumption of a model of customer buying intention in order to prove the major effect. In this case, the intention of the buyer to make a purchase serves as the dependent variable. This is a binary variable, meaning that it may take on just one of two possible values (0 or 1). The model operates as described below:

$$Y = \beta_1 * X_1 + \beta_2 * X_2 + \beta_3 * X_3 + \beta_4 * X_4 + \varepsilon \quad (1)$$

X1 is the independent variable, and it is the virtual influencer (a binary variable, which can take the values 0 or 1, and indicates whether the variable is a virtual influencer or not). The following is a list of the control variables: X2 indicates whether or not the customer has purchased this product in the past (this is a binary variable, so either 0 or 1 indicates that the consumer has purchased this product in the past), X3 reflects the attitude of the salesperson (either 0 or 1 indicates a positive or negative attitude), and X4 indicates whether or not the consumer is familiar with this brand. In this model, ε is the total of possible error terms. In addition to that, there are other terms that are incorrect in this model.

4.2. Analysis Plan

The Bayesian Probit Model is utilized for the purpose of beta estimation. The data used in this investigation were derived from simulations that were run through the R console. First, the R console was utilized in this research to mimic various types of size data. The preceding beta was then entered into the model while considering the assumptions. In the third step, an estimate of the beta was generated using Gibbs sampling in conjunction with the Metropolis-Hastings algorithm. Following the completion of the beta calculation, trace plots and histograms were constructed in order to investigate the reliability of the beta. The credential interval would, as a final step but certainly not the least important one, demonstrate how closely the generated betas match the actual betas.

5. Stimulated Studies

5.1. Study 1 In-Store Experiment

5.1.1. Study Design

The first study is an in-store shopping behavior experiment that is being carried out. This investigation will be carried out by the retail outlet in conjunction with the researchers. Customers in the central business district of a major Italian city have the option of making a purchase.

The design of the study consists of two distinct stages that are sequentially ordered.

Step 1: In the first step of the process, which is the collection of the participant's information, a standardized questionnaire is employed. The questions include a range of topics, including customers' ages and other basic demographic information, as well as whether or not they have previously purchased specific products and their level of brand identification.

Step 2: The participants will be informed that the marketing researchers are interested in their preferences for how virtual influencers connect with a brand. Because of this, their responses are analyzed after they watch the advertisement featuring the virtual influencer.

After seeing the virtual influencer encounter with the product, the participants were informed that they might be in a position to determine whether or not to purchase the product. At the same time, the factors such as the salesperson's attitude, brand awareness, and whether or not the consumer has previously purchased this product are control variables of this study.

In order to eliminate any other forms of possible interference, the shopping times of the participants will be manipulated during the days of the study. In order to ensure the step's credibility, the data collection took place in step 2, which came directly following step 1. We set up a candy bar stand, and from 8:00 in the morning until 4:00 in the afternoon, we made sure to distribute them evenly among all of the research conditions.

5.1.2. The Results and Evaluation

The figure 1 presents the summary information of the posterior marginal distributions of betas in study 1. Based on the findings of study 1, the prior beta was estimated to be as follows: beta 1 = 1.5, beta 2 = 0.7, beta 3 = 0.5, and beta 4 = 2. The data that was generated by R simulation include 400 observations, which is the same number of observations that were included in the original experiment design. X1 has a probability of 0.6, X2 has a probability of 0.5, X3 has a probability of 0.3, and X4 has a probability of 0.4.

Summary of Posterior Marginal Distributions						
Moments						
	mean	std dev	num	se	rel eff	sam size
1	1.19	0.19	0.0041	8.2	2000	
2	0.74	0.18	0.0034	6.8	2571	
3	0.79	0.26	0.0062	10.5	1636	
4	1.63	0.34	0.0143	32.0	562	

Figure 1: Summary of posterior marginal distributions of betas in study 1.

R then used an approach called Markov chain Monte Carlo (MCMC) sampling to execute sample drawings a total of 20000 times in order to estimate the betas. The figure 2 demonstrate the histograms of the beta draws in study 1. The following is an explanation of the findings of the estimation: beta 1 is 1.19 (s.e.=0.0041), beta 2 is 0.74 (s.e.=0.0034), beta 3 is 0.79 (s.e.=0.0062), and beta 4 is 1.63 (s.e.=0.0143). Each of the results carries statistical weight. To be more specific, we have determined that the estimated coefficient of our independent variable X1 is considerably 1.19. This substantiates the theory that the interaction of virtual influencer and the product has an effect on consumer propensity to make purchase of the product.

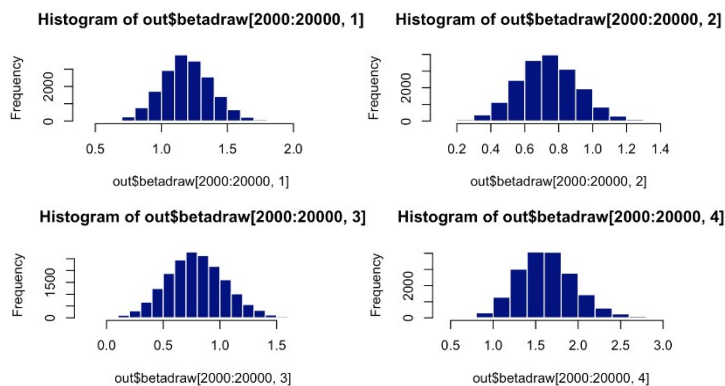


Figure 2: Histograms of betadraws in study 1.

Following the completion of the beta calculation, the trace plots were carried out as a second step to validate the accuracy of the beta estimation. The figure 3 indicate the trace plots of the beta estimations in study 1. Because the beta draw results of beta 1, beta 2, beta 3, and beta 4 all converged at the very beginning, as is shown by the trace plots, this indicates that the betas in the model are believable.

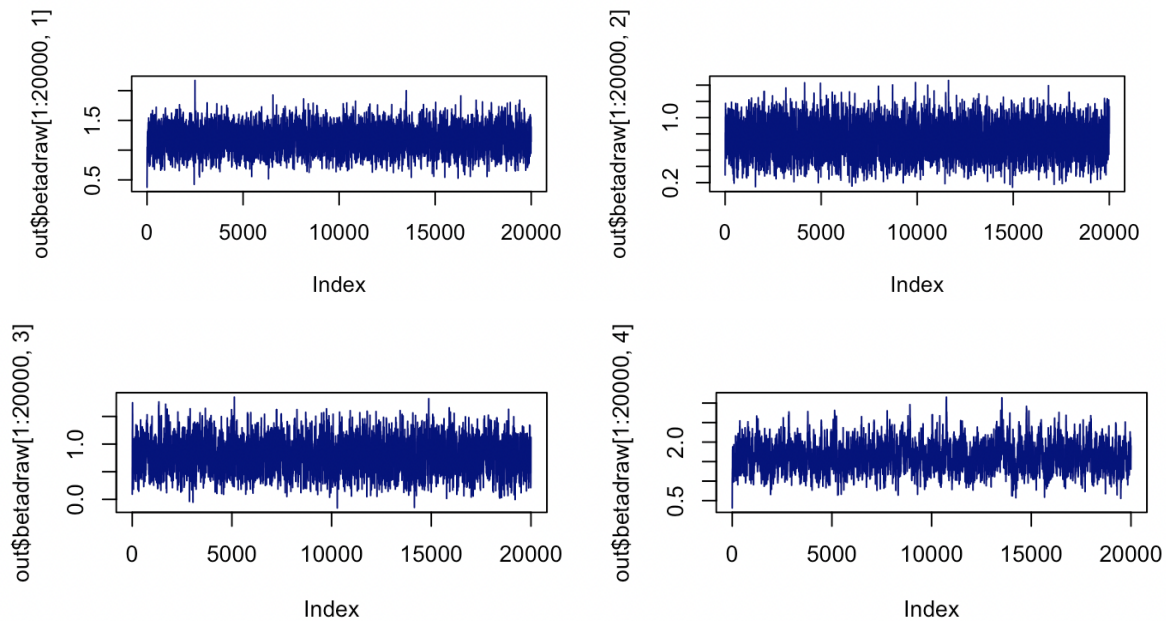


Figure 3: Trace plots of the beta estimations in study 1.

Additionally, the beta draw's histograms were analyzed and constructed. The correct distribution of beta draw may be seen in the histograms of beta 1, beta 2, beta 3, and beta 4, respectively. The histograms of beta contributed to an increase in the model's outcomes.

5.2. Study 2 Online Questionnaire Collection Attached after the Video Links

5.2.1. Study Design

By gathering additional information, the findings of this study will make the findings of Study 1 even more compelling. The investigation is broken down into two stages.

Step 1: An online link will be provided to the participants in the experiment, and each of them will receive a link to one of two separate videos. Following the viewing of the film, the participants were informed that they would get gifts. Both of these videos are ads for the same exact product, which is sold by the same manufacturer. The first video is a commercial that features the virtual influencer, and it can be found here. The second video is a straightforward commercial with no appearance from the virtual influencer.

Step 2: Immediately following the completion of the video, there will be a link that allows you to select a reward for watching the film. After viewing the films, the participants will deliberate and decide whether or not they intend to purchase the product. The information about the participant was gathered with the help of a standard questionnaire. The questions include a range of topics, including basic demographic information such as age and gender, as well as inquiries into whether or not customers have previously purchased specific products and their level of brand identification.

Consequently, the factors that are considered control variables in this research include brand awareness as well as the question of whether or not the consumer has previously purchased this particular product.

5.2.2. The Results and Evaluation

The figure 4 displays the summary information of posterior marginal distributions of the betas in study 2. Based on the findings of study 2, the prior beta was estimated to be as follows: beta 1 = 1.5, beta 2 = 0.7, beta 3 = 0.5, and beta 4 = 2. The desired design of the actual online questionnaire is set to include a total of 2000 observations, which is the same number as is included in the simulated data produced by R. X1 has a probability of 0.6, X2 has a probability of 0.5, X3 has a probability of 0.3, and X4 has a probability of 0.4.

Summary of Posterior Marginal Distributions					
Moments					
	mean	std dev	num	se	rel eff sam size
1	1.40	0.093	0.0026	13.7	1286
2	0.65	0.086	0.0017	7.0	2571
3	0.58	0.110	0.0026	9.8	1800
4	1.89	0.190	0.0096	46.3	383

Figure 4: Summary of posterior marginal distributions of betas in study 2.

R then used an approach called MCMC sampling to execute sample drawings a total of 20000 times in order to estimate the betas. The figure 5 display the histograms of the beta draw estimations in study 2. The results of the estimations indicate that beta 1 is 1.40 (s.e=0.0026), beta 2 is 0.65 (s.e=0.0017), beta 3 is 0.58 (s.e=0.0026), and beta 4 is 1.89 (s.e=0.0096). Each of the results carries statistical weight. And every one of the estimates of beta is very close to the one that was previously used. To be more specific, the estimation of the coefficient of our independent variable X1 is 1.40, which is a substantial value. This provides evidence in support of the hypothesis that the interaction between a virtual influencer and a product has an impact on the likelihood of a consumer to buy the product in question.

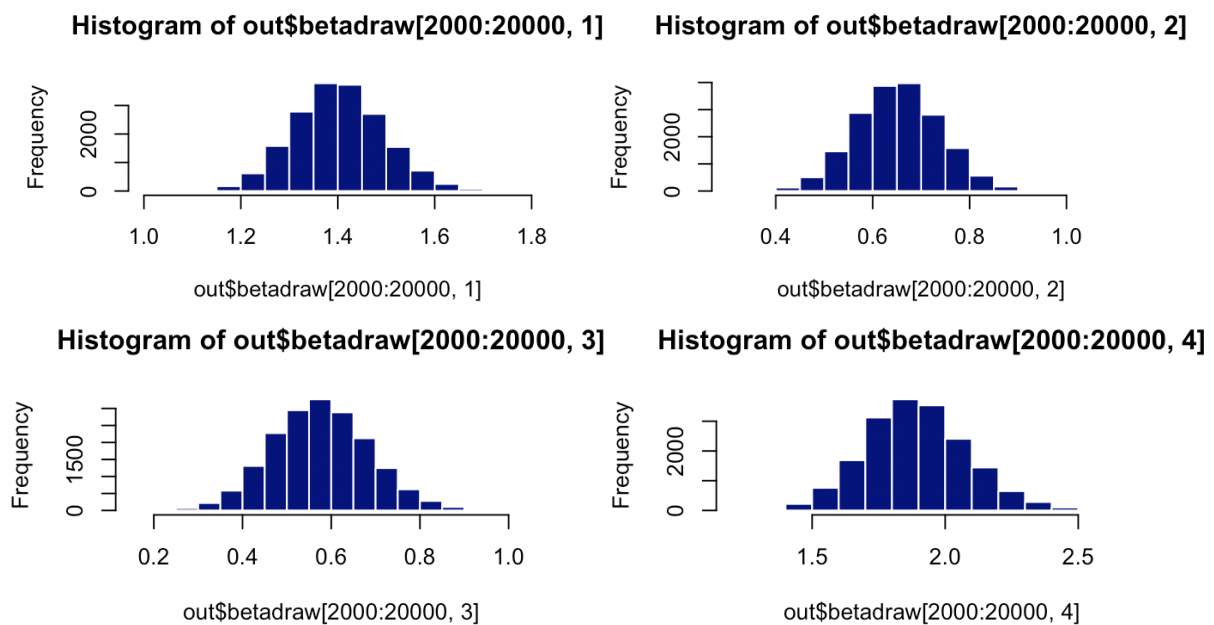


Figure 5: Histograms of betadraws in study 2.

After the beta calculation was finished, the trace plots were drawn as a second step to check the correctness of the beta estimation. The figure 6 present the trace plots of the beta estimations in study 2. This was done by comparing the plots to the original data. The fact that the results of the beta draw for beta 1, beta 2, beta 3, and beta 4 all converged at the very beginning, as seen by the trace plots, is evidence that the betas in the model are credible.

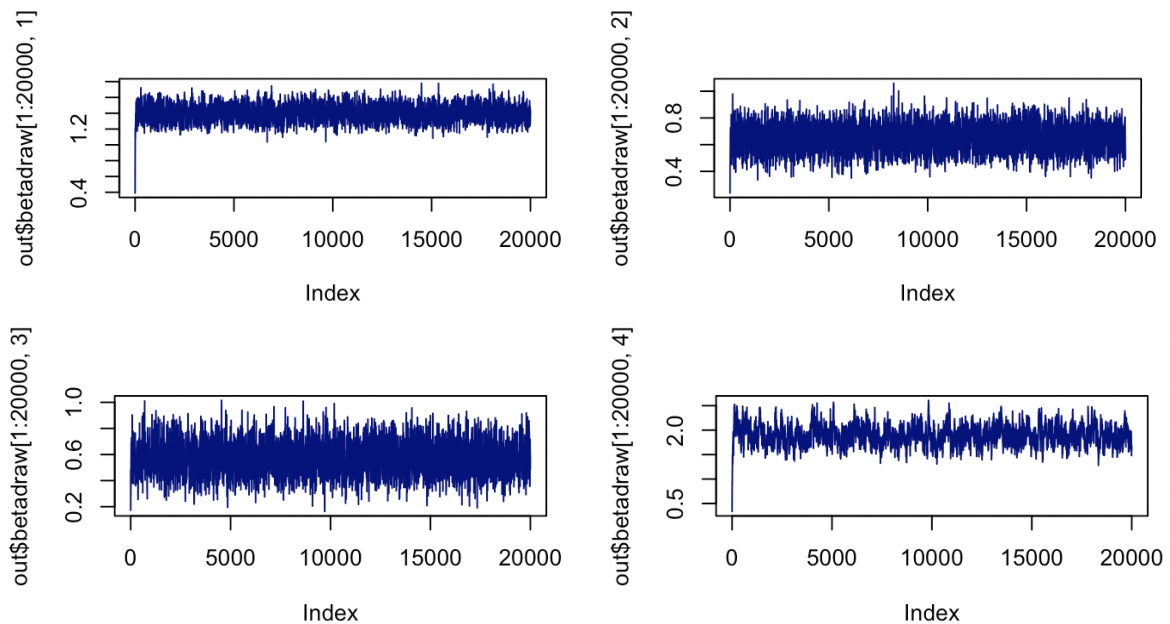


Figure 6: Trace plots of the beta estimations in study 2.

In addition to that, the histograms generated by the beta draw were evaluated and created. It is possible to get an accurate picture of the beta draw distribution by looking at the histograms for beta 1, beta 2, beta 3, and beta 4, in that order. Beta's histograms helped the model provide more accurate results, which led to an overall improvement.

6. Discussion

The majority of marketers today have taken notice of the virtual reality technology that has emerged in the Web 3.0 era. According to the findings of this study, a brand-new effect has been discovered, and that effect is the influence that virtual influencers have on the consumer purchasing intention.

In this work, an investigation into the interaction between virtual influencers has been carried out. The effect on customer buying intention was investigated in this study, and the findings highlight an important management implication. This study looked at the effect on consumer buying intention both online and offline.

This paper also looked at shopping behaviour in both traditional stores and online via the lens of two separate research. The number of people who participated in the offline trial makes up the sample size of 400, whilst the number of people who shopped online makes up the sample size of 2000. A further factor that contributes to the research's overall trustworthiness is the extensive number analysis shown here.

The output realizations generated have the desired property of honouring both the large-scale structure imposed by study 2 as well as the structure provided by the study 1 which were both simulated data by R language.

It is important to note that the presence of virtual influencer will clearly have an influence on the consumer purchase intention. Understanding the impact that virtual influencers have on the

consumers' willingness to make a purchase is generally advantageous for businesses. This conclusion is important for marketers to take note of since it illustrates how new technology, such as the virtual influencer, could drastically change the behaviour of customers.

7. Conclusions

Using a consumer questionnaire, this study attempts to quantify the level of consumer interest in making a purchase. The decision of whether or not to buy rests with the consumer. As indications, the author of this article chose consumers who watched the virtual influencer as well as consumers who did not watch the virtual influencer.

On the other hand, the conditions that exist in real life might not be as ideal as those that were designed for the experiments. As a result, there is still a gap to be narrowed between the experiment designs and the real conditions. Also, there is a possibility that there are more reliable ways to acquire this information. In addition, the effect of a virtual influencer on the consumer's intention to buy is investigated using binary variables in this study so that the model can be simplified. Therefore, future research could also expand to investigate more exact assessments of the consumer's intention to make a purchase.

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