

Impact of Customer Perceptions of Virtual Influencers on Value Co-Creation in Streaming Platforms [†]

Jing-Wen Huang ^{1,*}, Shan-Lin Yang ² and Shao-Lan Chang ³¹ Graduate Institute of Educational Administration, National Pingtung University, Pingtung 90003, Taiwan² Pingtung County Fang Liao High School, Pingtung 90003, Taiwan; youngshanlin@gmail.com³ Kaohsiung Municipal Sha-Luen Elementary School, Kaohsiung 813031, Taiwan; elizabeth690108@yahoo.com.tw

* Correspondence: jwhuang@mail.nptu.edu.tw

[†] Presented at the 2024 IEEE 7th International Conference on Knowledge Innovation and Invention, Nagoya, Japan, 16–18 August 2024.

Abstract: The continuous advancement and application of generative artificial intelligence (AI) allows for virtual influencers to be active. Therefore, how virtual influencers respond to customer needs and create value has attracted the interest of streaming platforms. Using the stimulus–organism–response model, we explored how customer perceptions of virtual influencers affect their involvement in streaming platforms and value co-creation behavior. Customer perceptions of virtual influencers are considered as the stimulus, including customer preferences, interactivity, and functionality. Enduring engagement is viewed as the psychological organism, and value co-creation is regarded as the behavioral response. A questionnaire survey was used to investigate the customer perceptions of virtual influencers on streaming platforms or applications to link their experiences into a virtual world and enhance value co-creation. Customer perceptions, including preferences, interactivity, and functionality, have positive effects on enduring involvement and value co-creation. Enduring involvement affects the relationship between customer perceptions and value co-creation. Such results help to understand customer perceptions and behaviors toward virtual influencers to enhance the service and user experience of streaming platforms.

Keywords: generative artificial intelligence; virtual influencer; value co-creation; streaming platform

Academic Editors: Teen-Hang Meen,
Chun-Yen Chang and Cheng-Fu Yang

Published: 27 February 2025

Citation: Huang, J.-W.; Yang, S.-L.; Chang, S.-L. Impact of Customer Perceptions of Virtual Influencers on Value Co-Creation in Streaming Platforms. *Eng. Proc.* **2025**, *89*, 29. <https://doi.org/10.3390/engproc2025089029>

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

The continuous advancement and application of generative artificial intelligence (AI) helps streaming platforms deliver personalized, timely, and relevant communications based on viewers' preferences, thereby enhancing customer experience, engagement, and loyalty [1,2]. Generative AI supports the ability of virtual influencers to enrich their forms, functionality, and interactivity. Virtual influencers on streaming platforms generate personalized content, user comments, and repeat visits [3]. Personalized content and user experiences provide virtual influencers with information on customer participation and involvement, increasing their platform stickiness and sustainable consumption behavior [4,5]. Therefore, how virtual influencers respond to customer needs and create value is important for streaming platforms.

The experience of enduring involvement enhances trust through psychological connection and relational interaction that go beyond purchasing [6,7]. Value co-creation is enabled by the importance of users' active participation and engagement in the creation of

business value [8,9]. Customers increase involvement through collaboration and communication with other customers, which provides solutions and content creation [1,10,11]. For example, Netflix utilizes generative AI (e.g., virtual influencers, avatars, AI intelligent customer service) to facilitate customers' continuous involvement. Streaming media promotes connectedness by gathering different parties to jointly collaborate, adopt solutions, and generate value creation within and outside the media.

Related issues in generative AI regarding consumer behavior in marketing have been researched [1]. However, the relationship between customer perception of virtual influencers and value co-creation is still lacking. Thus, we explored the effects of customer perception of virtual influencers (including regarding innovativeness, interactivity, and functionality) provided by streaming platforms on continuous involvement and examined the effect of continuous involvement on value co-creation. The mediating role of continuous involvement between customer perception and value co-creation was also explored.

2. Literature Review

2.1. Stimulus–Organism–Response (SOR) Model

The SOR model comprises a stimulus, organism, and response. The model states that the online environment stimulates individuals to respond to the online environment through all explicit behaviors, such as discovery, stay, affiliation, and connection or desire to inactively act [12]. Stimuli evoke customers' emotional states. Organisms mediate between stimuli and final actions or responses. Responses reflect behavioral outcomes such as subscription behavior or purchasing behavior [13]. Stimuli trigger cognitive and emotional reactions (organism), which in turn affect behaviors (response) [12,13]. Customer perceptions of virtual influencers are considered as a stimulus, including innovativeness, interactivity, and functionality; continuous involvement is viewed as a psychological organism and value co-creation is regarded as the behavioral response.

2.2. Customer Perceptions of Virtual Influencers

Prior research has indicated how cognitive appraisal influences a user's intention to use social media, as well as subsequent usage behavior [14,15]. Factors affecting the customer's cognitive appraisal include video content, text layout, visual imagery, and user interface [13]. Thus, we examine how customers evaluate the stimulus of generative AI applications in terms of innovativeness, interactivity, and functionality.

Innovativeness refers to unique, innovative, and engaging content created by virtual influencers on streaming platforms [4]. Generative AI application generates human-like and easily customized text, images, and videos, offering customers content creation processes and unique experiences [1]. Customers inspired by innovativeness enhance their willingness to engage in community interaction and build long-term relationships with other members [16]. They have an interest in involvement in community activities and enhance their behavior with regard to recommendations and paid subscriptions [2,4].

Interactivity represents a perception of connection to other customers, which increases active participation and exploration, and influences the content [4,17]. The value co-creation perspective emphasizes interaction as the nature of co-creation [8,18]. When customers perceive the interactivity of virtual influencers, they are inclined to spend time and enhance their involvement in the streaming platform for favorable value creation [11,19].

Functionality indicates the extent to which customers' judgment about a given site's overall excellence and fitness for use in assisting with the task and making an online decision [14,20]. Customers evaluate functionality based on their perceptions of usefulness, accessibility, and entertainment. Virtual influencers enhance customers' intention to give

feedback about entertaining content or make online decisions. Perceived functionality keeps customers' curiosity and motivates them to participate in streaming platforms [14,21].

According to the above, we formulated the following hypotheses.

- H1a: Customers' perceived innovativeness of virtual influencers has a significantly positive impact on continuous involvement.
- H1b: Customers' perceived interactivity of virtual influencers has a significantly positive impact on continuous involvement.
- H1c: Customers' perceived functionality of virtual influencers has a significantly positive impact on continuous involvement.

2.3. Continuous Involvement

Involvement reflects the personal relevance and importance of the target firm's service to customers [6,22]. The strength of customer involvement depends on their intrinsic interests, needs, and values. Continuous involvement refers to the ongoing concern with the product class association with the customers' self-concepts, values, or egos [7]. When customers have high levels of involvement, they tend to receive information related to products and services, and thus pay more attention to information [7,23]. Reference [10] explored the perceived value of a sharing platform adoption. The interactive discussions and activities on social media platforms allow for consumers' resource integration into co-creating brand meaning and value. Reference [11] revealed that engagement in Pokémon Go facilitates customer value creation comprising hedonic, achievement, and nostalgia value. The experience offered by continuous involvement enhances perceived trust through psychological connection and relational interaction that go beyond purchase, facilitating brand loyalty and value co-creation [6]. When customers are motivated to process the content of virtual influencers, they are involved in the community, giving suggestions on service improvement and participating actively in the co-creation of services [6,24]. Thus, we proposed the following hypothesis:

- H2: Continuous involvement has a significantly positive impact on value co-creation.

2.4. Mediating Effects

H1a, H1b, and H1c are related to customer perceptions (innovativeness, interactivity, and functionality) of virtual influencers on streaming platforms with continuous involvement. H2 links continuous involvement with value co-creation. Continuous involvement plays a mediating role in the relationship between customer perceptions (independent variable) and value co-creation (dependent variable).

In the case of Netflix, virtual influencers refer to popular actors, directors, or content creators whose work influences customer viewing choices and preferences. Customers form opinions about virtual influencers on Netflix based on their perceptions of content innovativeness, character interactivity, and the overall viewing experience [3,4]. Continuous involvement on Netflix reflects customers' sustained interest and emotional connection to specific shows, actors, or genres over time [5]. Customers with strong continuous involvement are inclined to create fan art, discussion forums, or social media content related to their favorite shows, contributing to the value co-creation process.

Continuous involvement is a mediator because it influences how customer perceptions of virtual influencers translate into value co-creation. Customers with continuous involvement are likely to have a stronger emotional bond with virtual influencers, leading to a profound impact on their perceptions and the co-creation of value. Customer perceptions of virtual influencers are translated into favorable value co-creation via the intermediate effect of continuous involvement. Thus, this study proposes the following hypothesis.

- H3: Continuous involvement mediates the relationship between customer perceptions of virtual influencers and value co-creation.

3. Method

A questionnaire survey was conducted to collect data. The research subjects were audiences and users of streaming platforms, who were familiar with the video streaming platforms, and who were 18 years old or older. The questionnaire was used to investigate the application of generative AI into the streams of virtual influencers in streaming platforms, allowing customers to link their use experiences into a virtual metaverse. A Likert-type scale was used in the survey. A total of 500 questionnaires were distributed, and 486 were recovered, with a valid response rate of 97.2%.

The calculated t-statistics for gender, age, and viewing time were statistically insignificant ($p > 0.1$). In behavioral research, the method of Ref. [25] was used to test the common method biases problem. The Harman's one-factor test result showed that a single factor did not emerge, and one general factor did not account for most of the variance. Thus, common method bias was unlikely to be a serious problem in the data [25].

4. Results

The Cronbach alpha of the survey exceeded 0.70, showing acceptable reliability and internal consistency [26]. The average variance extracted (AVE) was higher than 0.61, exceeding the threshold of 0.50 [27]. The fit index of confirmatory factor analysis for the proposed model was adequate. The standardized loadings of all the measurement items were significant on their posited underlying construct, indicating convergent validity and discriminant validity [28].

Customer perceptions of virtual influencers, including innovativeness, interactivity, and functionality, showed positive effects on continuous involvement ($p < 0.05$). Thus, H1a, H1b, and H1c were supported. The continuous involvement in online streaming platforms had a positive effect on value co-creation ($p < 0.05$). Thus, H2 was supported. The mediating role of continuous involvement was verified in affecting the relationship between customer perceptions of virtual influencers and value co-creation. Thus, H3 was supported.

5. Conclusions and Implication

Customer perceptions of virtual influencers, including innovativeness, interactivity, and functionality, facilitate their continuous involvement in streaming platforms. The continuous involvement helps co-create value among customers or between customers and streaming platforms. The mediating role of continuous involvement in the relationship between customer perceptions of virtual influencers and value co-creation was verified.

The SOR model shows that customer perceptions of virtual influencers play a significant role in their continuous involvement with streaming platforms and their involvement in value co-creation activities. Factors such as innovativeness, interactivity, and functionality of virtual influencers positively impact customer continuous involvement, which in turn leads to enhanced value co-creation behavior.

Customer perceptions of virtual influencers are presented in live streaming, too [1,3]. Understanding and leveraging customer perceptions of virtual influencers improves the service quality and user experience of streaming platforms. To improve customer perceptions, streaming platform operators need to design and promote the innovativeness, interactivity, and functionality of virtual influencers. By recognizing the mediating role of continuous involvement in the relationship between customer perceptions and value co-creation, streaming platform operators can tailor their strategies to enhance customer engagement and promote collaborative value creation within the virtual influencer ecosystem.

By considering value co-creation, value creation highlights the importance of relation and user value, and regards customers as co-creators [8,9,18]. The collaborative nature of value creation in influencer–consumer interactions suggests that it is not solely driven by the influencer, but involves active participation from customers. Continuous involvement mediates customer perceptions and value co-creation, providing value co-creation in sustainable competitive advantages [10,29]. The results of this study contribute to consumer behavior literature [6,10,11] by highlighting the importance of customer engagement in influencer marketing and the subsequent impact on value creation. The importance of customer involvement enhances value co-creation for the media-streaming industry.

Author Contributions: Conceptualization, all authors; methodology, all authors; investigation, all authors; writing—original draft preparation, J.-W.H.; writing—review and editing, J.-W.H. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: No new data were created.

Acknowledgments: The authors thank the National Science and Technology Council for its support, and the authors are solely liable and responsible for this derived work.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Kshetri, N.; Dwivedi, Y.K.; Davenport, T.H.; Panteli, N. Generative artificial intelligence in marketing: Applications, opportunities, challenges, and research agenda. *Int. J. Inf. Manag.* **2023**, *75*, 102716. [\[CrossRef\]](#)
2. Rahman, M.S.; Bag, S.; Hossain, M.A.; Abdelfattah, F.; Gani, M.O.; Rana, N. The new wave of AI-powered luxury brands online shopping experience: The role of digital multisensory cues and customers' engagement. *J. Retail. Consum. Serv.* **2023**, *72*, 103273. [\[CrossRef\]](#)
3. Chen, H.; Shao, B.; Yang, X.; Kang, W.; Fan, W. Avatars in live streaming commerce: The influence of anthropomorphism on consumers' willingness to accept virtual live streamers. *Comput. Hum. Behav.* **2024**, *156*, 108216. [\[CrossRef\]](#)
4. Hussain, K.; Khan, L.M.; Malik, A.A. Exploring audience engagement with Chat GPT-related content on YouTube: Implications for content creators and AI tool developers. *Digit. Bus.* **2024**, *4*, 100071. [\[CrossRef\]](#)
5. Xu, Y.; Ruan, Y. AI and human broadcasters: Relative impact on consumer engagement in live streaming commerce. *Electron. Commer. Res. Appl.* **2023**, *62*, 101335. [\[CrossRef\]](#)
6. Cheung, M.F.Y.; To, W.M. Effect of customer involvement on co-creation of services: A moderated mediation model. *J. Retail. Consum. Serv.* **2021**, *63*, 102660. [\[CrossRef\]](#)
7. Sharma, P.; Roy, R.; Rabbanee, F.K. Interactive effects of situational and continuous involvement with perceived crowding and time pressure in pay-what-you-want (PWYW) pricing. *J. Bus. Res.* **2020**, *109*, 882100. [\[CrossRef\]](#)
8. Prahalad, C.K.; Ramaswamy, V. Co-creation experience: The next practice in value creation. *J. Interact. Mark.* **2004**, *18*, 5–14. [\[CrossRef\]](#)
9. Vargo, S.L.; Lusch, R.F. From repeat patronage to value co-creation in service ecosystems: A transcending conceptualization of relationship. *J. Bus. Mark. Manag.* **2010**, *4*, 169–179. [\[CrossRef\]](#)
10. Liang, T.P.; Lin, Y.L.; Hou, H.C. What drives consumers to adopt a sharing platform: An integrated model of value-based and transaction cost theories. *Inf. Manag.* **2021**, *58*, 103471. [\[CrossRef\]](#)
11. Wu, J.H.; Robinson, S.; Li, Q.; Huang, T.Y.; Chen, Y.C. Online gaming: Mediation of situational engagement in facilitating player value. *J. Electron. Commer. Res.* **2021**, *22*, 382–402.
12. Jacoby, J. Stimulus-Organism-Response reconsidered: An evolutionary step in modeling (consumer) behavior. *J. Consum. Psychol.* **2002**, *12*, 51–57. [\[CrossRef\]](#)
13. Perez-Vega, R.; Kaartemo, V.; Lages, C.R.; Razavi, N.B.; Mannist, J. Reshaping the contexts of online customer engagement behavior via artificial intelligence: A conceptual framework. *J. Bus. Res.* **2021**, *129*, 902–910. [\[CrossRef\]](#)
14. Friedrich, T.; Schlauderer, S.; Overhage, S. The impact of social commerce feature richness on website stickiness through cognitive and affective factors: An experimental study. *Electron. Commer. Res. Appl.* **2019**, *36*, 100861. [\[CrossRef\]](#)

15. Lee, D.; Moon, J.; Kim, Y.J.; Yi, M.Y. Antecedents and consequences of mobile phone usability: Linking simplicity and interactivity to satisfaction, trust, and brand loyalty. *Inf. Manag.* **2015**, *52*, 295–304. [\[CrossRef\]](#)
16. Kim, E.; Tang, L.R.; Bosselman, R. Measuring customer perceptions of restaurant innovativeness: Developing and validating a scale. *Int. J. Hosp. Manag.* **2018**, *74*, 85–98. [\[CrossRef\]](#)
17. Pinto, R.D.; Peixoto, B.; Melo, M.; Cabral, L.; Bessa, M. Foreign language learning gamification using virtual reality—A systematic review of empirical research. *Educ. Sci.* **2021**, *11*, 5222. [\[CrossRef\]](#)
18. Priem, R.L. A consumer perspective on value creation. *Acad. Manag. Rev.* **2007**, *32*, 219–235. [\[CrossRef\]](#)
19. Cheung, M.L.; Pires, G.D.; Rosenberger, P.J.; Leung, W.K.S.; Ting, H. Investigating the role of social media marketing on value co-creation and engagement: An empirical study in China and Hong Kong. *Australas. Mark. J.* **2020**, *29*, 118–131. [\[CrossRef\]](#)
20. Lee, J.; Kim, J.; Choi, J.Y. The adoption of virtual reality devices: The technology acceptance model integrating enjoyment, social interaction, and strength of the social ties. *Telemat. Inform.* **2019**, *39*, 37–48. [\[CrossRef\]](#)
21. Xu, Y.; Chen, Z.; Peng, M.Y.; Anser, M.K. Enhancing consumer online purchase intention through gamification in China: Perspective of cognitive evaluation theory. *Front. Psychol.* **2020**, *11*, 581200. [\[CrossRef\]](#) [\[PubMed\]](#)
22. Liu, J.; Jo, W. Value co-creation behaviors and hotel loyalty program member satisfaction based on engagement and involvement: Moderating effect of company support. *J. Hosp. Tour. Manag.* **2020**, *43*, 23–31. [\[CrossRef\]](#)
23. Zhang, Y.; Hua, L.; Jiao, Y.; Zhang, J.; Saini, R. More than watching: An empirical and experimental examination on the impacts of live streaming user-generated video consumption. *Inf. Manag.* **2023**, *60*, 103771. [\[CrossRef\]](#)
24. García-Jurado, A.; Torres-Jiménez, M.; Leal-Rodríguez, A.L.; Castro-González, P. Does gamification engage users in online shopping? *Electron. Commer. Res. Appl.* **2021**, *48*, 101076. [\[CrossRef\]](#)
25. Podsakoff, P.M.; MacKenzie, S.B.; Lee, J.Y. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *J. Appl. Psychol.* **2003**, *88*, 897–903. [\[CrossRef\]](#)
26. Hair, J.F.; Black, W.C.; Babin, B.J. *Multivariate Data Analysis: A Global Perspective*; Prentice-Hall: Upper Saddle River, NJ, USA, 2010.
27. Barclay, D.W.; Thompson, R.; Higgins, C. The Partial Least Squares (PLS) approach to causal modeling: Personal computer adoption and use an illustration. *Technol. Stud.* **1995**, *2*, 285–309.
28. Anderson, J.C.; Gerbing, D.W. Structural equation modeling in practice: A review and recommended two-step approach. *Psychol. Bull.* **1988**, *103*, 411–423. [\[CrossRef\]](#)
29. Wang, Y.; Li, C.; Zhang, D.; Wu, J.; Liu, Y. A deeper investigation of different types of core users and their contributions for sustainable innovation in a company-hosted online co-creation community. *J. Clean. Prod.* **2020**, *256*, 120397. [\[CrossRef\]](#)

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.