Virtual Influencers and Consumer Engagement in Indonesia: Extending the Technology Acceptance Model

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Abstract: This research investigates the Indonesian consumers' adoption of Virtual Influencers (VIs) by extending the technology acceptance model (TAM) through the integration of relational constructs. This study examined the effect of perceived usefulness (PU) and perceived ease of use (PEOU) on attitude, the effect of attitude on behavioural intention (BI) and the mediating role of trust in consumer engagement. Data were collected through an online survey from 500 Indonesian social media users aged 18–35 years old who actively follow VIs on Instagram or TikTok. The analysis used structural equation modeling (SEM) using SmartPLS and AMOS. Reliability and validity were measured by using Cronbach's alpha, composite reliability, AVE, and discriminant validity, while the mediation analysis was tested by bootstrapping with 5,000 resamples. The results show that PU and PEOU significantly affect attitudes, which in turn affect behavioral intention. Behavioral intention is also a significant factor in the development of trust, and trust is found to be the strongest predictor of engagement. In addition, cultural aspects such as collectivism and religiosity are discussed as contextual factors. The model has good explanatory power with R^2 of 0.42-0.56. The results show that trust is a significant element in the intention-to-engagement process in the context of VIs. Practically, brands can prioritize transparency and cultural relevance when developing virtual influencers to increase engagement among

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Indonesian Millennials and Gen Z. This study contributes to the limited empirical literature on VIs in Southeast Asia by extending TAM with trust and engagement.

Keywords: Virtual Influencers, Technology Acceptance Model, Trust, Engagement, Consumer Behavior.

Introduction

The development of digital technology has brought significant changes in the way companies interact with consumers. One phenomenon that has started to attract attention in recent years is the rise of Virtual Influencers (VIs), digital entities that are created through artificial intelligence (AI) and computer-generated imagery (CGI) to mimic human behavior and social media interactions (Ahn et al., 2022; Drakopoulos et al., 2022). Unlike traditional influencers, VIs is entirely under the control of digital systems, yet they are still able to develop personas perceived as real by audiences. Examples from across the world such as Lil Miquela, Shudu Gram, and Imma illustrate the fact that this is not a passing trend but a fundamental part of the development of digital marketing that is increasingly combining technology with social interaction. Along with advancements in technology such as deep learning and natural language processing, the use of VIs is becoming increasingly widespread. For companies, the presence of VIs offers several advantages, such as full control over brand image, message consistency, and minimal risk that usually arises with human influencers. Also, VIs is considered to be more flexible and cost-effective. However, behind these various advantages, there are still important questions regarding the ability of VIs to build authentic consumer trust and engagement. Many consumers doubt whether digital models can create the same emotional intimacy as a human influencer (Arusell & Pettersson, 2022).

In the context of Indonesia, the phenomenon of Virtual Influencers is still relatively new, but it is showing quite rapid development. Indonesia itself is one of the countries with a very large number of social media users, making it a potential ground for influencer-based marketing strategies. The presence of figures like Thalasya as one of the local Virtual Influencers has paved the way for the emergence of other digital characters, such as Arbie Seo, Lav Caca, and Cahaya Gram. Their respective genres range from lifestyle content, music to social issues which reflect the diversity of the audience in Indonesia. The Vls in Indonesia tend to adapt local cultural values in their content delivery (Luppicini & Walabe, 2021). In this case, it can be seen from the use of elements of humor, music, and narratives that are close to the daily lives of the community (Khalfallah & Keller, 2025). Compared to global Vls, which are often associated with a luxurious lifestyle and Western cultural esthetics, this local approach actually becomes a unique strength in building closeness with the audience.

However, Indonesian consumers still have high expectations in terms of authenticity, trust, and emotional connection, which raises the question of whether Vls can meet those expectations (Ananda et al., 2025).

Many previous studies have used the TAM approach to explain the acceptance of technology by users. This approach focuses on the significance of perceived use and perceived ease of use in building up attitudes and behavioral intentions (Alalwan et al., 2016; Tillinghast, 2021). However, the application of TAM in the context of Virtual Influencers is still limited. Most of the previous studies have focused on information systems, e-commerce or digital platforms in general and thus there has been not much research on how this model works on social digital entities like Vis. Moreover, research on VIs is still dominated by the contexts of Western and East Asian countries while studies in Southeast Asia, especially Indonesia, remain very limited. However, the variables such as trust and consumer engagement are very important aspects in digital marketing, but they have not been integrated into the TAM framework in a comprehensive way, especially for AI-based influencers. In fact, the consumer-VI interaction is not only technological but involves complex psychological and relational dimensions as well (Hassan et al., 2025).

In line with the objectives, this study poses two main questions: (1) how perceived usefulness and perceived ease of use affect consumer attitudes toward Virtual Influencers in Indonesia, and (2) does trust mediate the relationship between attitude and consumer engagement. The research is anticipated to make both theoretical and practical contributions. Theoretically, this research expands the application of TAM by adding relevant relational dimensions in the context of AI-based digital marketing. Practically, the results of this research can be a reference for industry players in developing more effective strategies for utilizing Virtual Influencers, especially in highlighting aspects of transparency, cultural relevance, and ease of interaction to improve consumer trust and engagement in Indonesia. Methodologically, this study adopts a quantitative approach using Structural Equation Modeling (SEM), which is considered appropriate for examining complex relationships among latent constructs such as perceived usefulness, perceived ease of use, trust, and engagement. SEM enables simultaneous assessment of measurement and structural models, making it suitable for extending TAM in emerging digital contexts such as Virtual Influencers. Despite its widespread use, limited studies have applied SEM to examine AI-based influencers in Southeast Asia, particularly Indonesia, highlighting a clear empirical gap addressed by this research.

Literature Review

Technology Acceptance Model

The TAM was originally developed to explain how users accept and adopt information technologies. At its core, TAM highlights two key determinants: perceived usefulness (PU), defined as the degree to which individuals believe that a technology enhances their performance, and perceived ease of use (PEOU), which refers to the extent to which using the technology is perceived as effortless (Musa et al., 2024; Patel et al., 2022). These factors influence users' attitudes toward the technology (ATT), which subsequently shape behavioral intention (BI) to adopt it (Battour et al., 2022; Hooda et al., 2022). Over time, TAM has been widely applied across various digital contexts, including e-commerce (Hendricks & Mwapwele, 2024), online banking (Mwiya et al., 2022), mobile applications (Chandran et al., 2022), and social media platforms (Vogels et al., 2022). Its flexibility allows researchers to extend the model by incorporating additional constructs such as trust, enjoyment, and social influence (Shah & Asghar, 2023). In digital marketing settings, TAM has also been used to examine emerging technologies such as AI chatbots, augmented reality, and live-streaming commerce. In the context of influencer marketing, TAM remains relevant because interactions with digital entities often involve both technological and social dimensions. This is particularly evident in the case of VIs, where users evaluate not only the functionality of the platform but also the perceived value and ease of engaging with the digital persona (Xu et al., 2025). While prior studies confirm that PU and PEOU significantly influence attitudes and behavioral intentions, the application of TAM to AI-generated influencers remains limited, indicating an important area for further investigation. In empirical research, TAM constructs are commonly operationalized using multi-item Likert scales and analyzed through Structural Equation Modeling (SEM). Prior studies emphasize the importance of evaluating measurement reliability and validity, including indicators such as Cronbach's alpha, composite reliability, and average variance extracted (AVE). In addition, discriminant validity is typically assessed to ensure that each construct is empirically distinct. This measurement approach supports the integration of additional constructs, such as trust and engagement, into the TAM framework in a rigorous and systematic manner.

Virtual Influencers

The Vis are AI-generated, computer-modeled personas designed to replicate human characteristics and behaviors in digital environments (Papadonikolaki et al., 2022). Unlike avatars commonly used in gaming or virtual reality, VIs function as independent social media personalities who create content, collaborate with brands, and interact with

audiences. Globally recognized examples such as Lil Miquela, Shudu Gram, and Imma illustrate the rapid growth and commercial potential of this phenomenon. From a marketing perspective, VIs offers several advantages compared to human influencers. They provide brands with greater control over image and messaging, reduce risks associated with personal controversies, and allow for consistent content delivery across platforms (Syamimi Masrani & Nik Husain, 2022). Additionally, VIs offers scalability and cost efficiency, making them attractive for firms targeting digitally native audiences (Maier & Klotz, 2022). Despite these advantages, significant challenges remain. Consumers often question the authenticity and emotional depth of VIs, as their identities are artificially constructed and lack real-life experiences. Moreover, cultural acceptance varies across regions, with some audiences perceiving VIs as less trustworthy than human influencers (Nissen et al., 2023).

In Indonesia, the presence of Virtual Influencers is still emerging but continues to grow rapidly. Thalasya is widely recognized as the first prominent Indonesian VI, followed by other digital personas such as Arbie Seo, Lav Caca, and Cahaya Gram, each representing different content strategies and audience segments. Unlike global VIs that often emphasize luxury and Western aesthetics, Indonesian VIs tends to incorporate local cultural elements such as music, humor, and community-oriented storytelling. This cultural adaptation plays a crucial role in shaping consumer perception. While Indonesian audiences are highly engaged with digital content, they also place strong emphasis on authenticity, emotional relatability, and collectivist values. As a result, the acceptance of VIs depends not only on technological factors but also on cultural alignment and perceived social credibility (Tseng, 2023). Despite growing interest in Virtual Influencers, most prior studies remain descriptive and focus on consumer perception or branding outcomes. Limited research has empirically examined the underlying behavioral mechanisms using established theoretical frameworks such as TAM. This gap indicates the need for a more structured model to explain how technological and relational factors jointly influence user responses toward Virtual Influencers.

Consumer Trust and Engagement

Trust has long been recognized as a fundamental element in digital marketing, influencing consumers' willingness to adopt new technologies and engage with brands. In influencer marketing, trust is typically built through authenticity, transparency, and perceived expertise. However, in the context of Vls, trust becomes more complex due to the artificial nature of these digital personas (Ahmad et al., 2025). Consumers may question whether the identity and interactions presented by VIs are genuine or merely algorithmic representations. Previous studies suggest that transparency—such as clearly disclosing the virtual nature of an influencer—can help mitigate skepticism and enhance trust. In addition,

consistent narratives and alignment with brand values contribute to the perception of credibility. Nevertheless, in societies where interpersonal relationships are highly valued, such as Indonesia, skepticism toward artificial agents may persist.

Engagement represents another key outcome in digital marketing, encompassing behavioral responses such as liking, sharing, commenting, and purchasing. Beyond observable actions, engagement also reflects emotional and cognitive involvement with content or influencers. In the context of VIs, engagement is influenced by factors such as content relevance, interactivity, and perceived authenticity. While some studies indicate that VIs can generate high engagement when their personas align with audience preferences, others suggest that human influencers may still be more effective in fostering deeper emotional connections. Therefore, engagement with VIs is not solely determined by technological ease of use, but also shaped by trust, authenticity, and cultural context. While prior studies have examined trust and engagement separately, limited research has integrated these constructs within a unified analytical model. In particular, the role of trust as a mediating mechanism between user intention and engagement in the context of Virtual Influencers remains underexplored.

Research Model and Hypotheses Development

Based on the theoretical and empirical gaps identified in prior studies, this research proposes an extended TAM framework integrating trust and engagement. The conceptual framework is presented in Figure 1

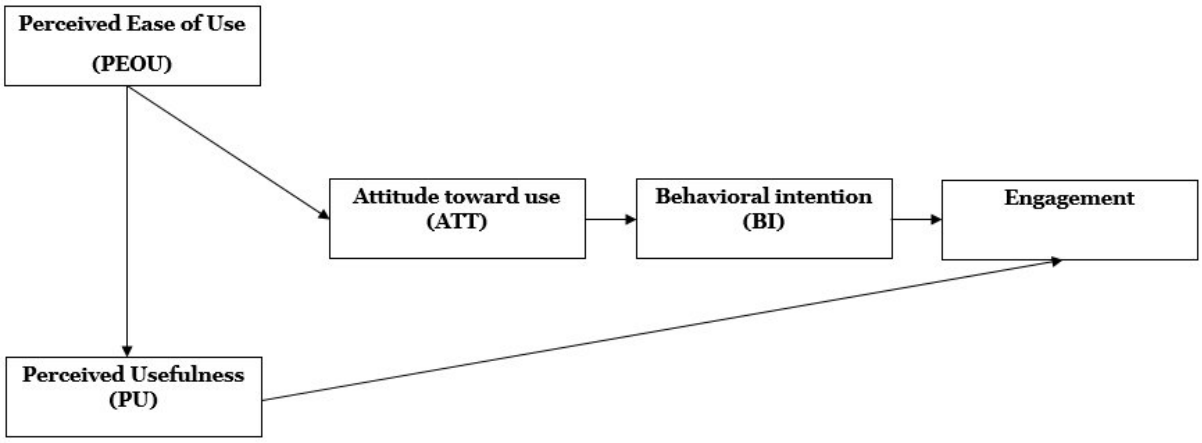

Figure 1 Conceptual Framework

H1: Perceived ease of use (PEOU) positively influences attitude toward use (ATT).

H2: Perceived usefulness (PU) positively influences attitude toward use (ATT).

H3: Attitude toward use (ATT) positively influences behavioral intention (BI).

H4: Behavioral intention (BI) positively influences consumer trust.

H5: Consumer trust positively influences consumer engagement.

Research Method

Research Design

This study adopts a quantitative research design with a cross-sectional survey approach to empirically examine the extended the TAM in the context of Vls in Indonesia. A quantitative approach is appropriate as the study aims to test relationships among constructs such as perceived usefulness, perceived ease of use, trust, and engagement through statistical modeling, The cross-sectional design indicates that data were collected at a single point in time, which is considered suitable given the relatively early stage of Virtual Influencer adoption in Indonesia. This approach also allows efficient data collection from a large sample in a rapidly evolving digital environment. The study focuses on Indonesian social media users aged 18–35, as this group represents the most active segment in digital engagement and influencer interaction (Ma et al., 2022; Musa et al., 2024). The SEM is particularly suitable for this study as it allows simultaneous examination of multiple relationships among latent constructs and provides a comprehensive assessment of both measurement and structural models. This approach is widely used in TAM-based studies to ensure robust empirical analysis.

Sample and Data Collection

The study employed purposive sampling to ensure that respondents met specific criteria relevant to the research context. The target population consists of Indonesian social media users who actively follow at least one Virtual Influencer on platforms such as Instagram or TikTok. Given Indonesia's large and highly engaged online population, particularly among Millennials and Generation Z, this group is considered appropriate for examining the proposed research model. Participants were selected based on the following criteria: they were between 18 and 35 years old, had an active Instagram or TikTok account, and followed at least one Virtual Influencer such as Thalasya, Arbie Seo, Lav Caca, Cahaya Gram, or similar digital personas. A total of 500 valid responses were collected, which exceeds the minimum requirement for SEM. This sample size is considered sufficient to ensure statistical power and reliability, particularly given the number of measurement items used in the study. The sample size of 500 is considered adequate for SEM analysis, exceeding the recommended minimum threshold for ensuring statistical power and model stability. The use of purposive sampling may introduce potential bias, as the sample is limited to individuals who actively follow Virtual Influencers. This limitation may affect the generalizability of the findings and should be interpreted with caution. The age range of

18–35 years was selected as this group represents the most active demographic in social media engagement and digital interaction in Indonesia.

Measurement and Instrument

The data were collected using a structured questionnaire consisting of several sections, including demographic information and the main constructs of the study: PU, PEOU, trust, and engagement. All variables were measured using previously validated scales adapted from established studies. Responses were recorded on a five-point Likert scale ranging from strongly disagree to strongly agree. PU and PEOU were measured using items adapted from Davis (1989) and Venkatesh and Davis (2000), while trust was measured based on dimensions such as authenticity, transparency, and reliability. Engagement was assessed using indicators that capture cognitive, emotional, and behavioral involvement. In addition, demographic variables such as gender, age, education level, preferred platform, and followed Virtual Influencers were included to provide descriptive insights.

Instrument Validation

Prior to the main data collection, a pilot test involving 50 respondents was conducted to evaluate the clarity and reliability of the measurement instrument. Minor adjustments were made to improve wording and ensure better alignment with the Indonesian context. The results of the pilot test indicated that all constructs achieved Cronbach's alpha values above 0.80, confirming acceptable internal consistency.

Data Analysis

Data analysis was carried out using SEM with SmartPLS 4.0. The analysis began with preliminary data screening, including checks for missing values, outliers, and normality. The analysis distinguishes between the measurement model and the structural model. The measurement model was evaluated using reliability and validity indicators, while the structural model was used to assess the hypothesized relationships among constructs. Cases with excessive missing data were removed, while skewness and kurtosis values were found to be within acceptable ranges. Common method bias was assessed using Harman's single-factor test, which indicated no significant bias. In addition, procedural remedies such as ensuring respondent anonymity and reducing item ambiguity were applied to minimize common method bias.

The measurement model was evaluated in terms of reliability and validity, including internal consistency, convergent validity, and discriminant validity. Subsequently, the structural model was analyzed to test the proposed hypotheses using bootstrapping with 5,000

resamples. The analysis also considered R^2 values, effect sizes, and predictive relevance to assess the explanatory power of the model. Model fit was evaluated using commonly accepted indices such as SRMR, RMSEA, CFI, and TLI, all of which met recommended thresholds. All model fit indices were within recommended thresholds, indicating a good overall model fit. Mediation analysis was conducted to examine the role of trust between behavioral intention and engagement using bootstrapping confidence intervals. Indirect effects were considered significant when the confidence intervals did not include zero. Additionally, subgroup analyses were performed based on demographic characteristics to explore potential differences across respondent segments. To assess potential multicollinearity, variance inflation factor (VIF) values were examined and found to be below the recommended threshold, indicating no significant multicollinearity issues.

Result

A total of 500 valid responses were obtained and included in the analysis. The demographic profile indicates a relatively balanced gender distribution, with 54% female and 46% male respondents. In terms of age, the majority of participants fall within the 18–30 age range, indicating that Millennials and Generation Z dominate engagement with Virtual Influencers (VIs). In terms of platform usage, Instagram emerges as the primary medium (63%), followed by TikTok (34%), while only a small proportion of respondents use both platforms.

Regarding familiarity with Virtual Influencers, Thalasya is the most recognized (47%), followed by Lav Caca (28%), Arbie Seo (17%), and Cahaya Gram (8%). This pattern suggests that local virtual influencers are more strongly embedded in the Indonesian digital context, likely due to cultural proximity. Overall, these findings are consistent with previous studies indicating that younger audiences are highly engaged with influencer-driven content.

The measurement model was then evaluated to assess reliability and validity. As shown in Table 1, all constructs meet the recommended thresholds. Cronbach's alpha values range from 0.84 to 0.91, while composite reliability values range from 0.88 to 0.93, indicating strong internal consistency. Convergent validity is also confirmed, as AVE values exceed 0.50 and factor loadings are generally above 0.65. In addition, discriminant validity is established using the Fornell–Larcker criterion and HTMT ratios, demonstrating that all constructs are empirically distinct. These results indicate that the measurement model is reliable and suitable for further analysis.

Table 1 Measurement Model Results

Variable	Cronbach's Alpha	CR	AVE
PU	0.87	0.90	0.61

PEOU	0.85	0.89	0.59
ATT	0.88	0.91	0.66
BI	0.86	0.90	0.63
Trust	0.91	0.93	0.72
Engagement	0.84	0.88	0.56

The structural model was subsequently analyzed to test the proposed hypotheses. As presented in Table 2, all relationships are positive and statistically significant. Perceived usefulness (PU) shows a strong effect on attitude ($\beta = 0.41$, $p < 0.001$), while perceived ease of use (PEOU) also significantly influences attitude ($\beta = 0.32$, $p < 0.001$). Attitude strongly affects behavioral intention ($\beta = 0.47$, $p < 0.001$), which in turn influences trust ($\beta = 0.39$, $p < 0.001$). Among all variables, trust has the strongest effect on engagement ($\beta = 0.52$, $p < 0.001$), highlighting its central role in the model. This finding highlights the central role of trust as the most influential factor in driving consumer engagement, suggesting that relational aspects may outweigh purely technological considerations in the context of Virtual Influencers. The explanatory power of the model is considered satisfactory. The R^2 values indicate that attitude is explained by PU and PEOU at 0.56, behavioral intention at 0.44, trust at 0.42, and engagement at 0.49. According to established benchmarks, R^2 values of 0.25, 0.50, and 0.75 are considered weak, moderate, and substantial, respectively. The values observed in this study indicate moderate explanatory power across the model. These findings suggest that the model provides a meaningful explanation of consumer behavior in the context of Virtual Influencers.

Table 2 Structural Model Results

Hypothesis Path	β	t-value	p-value	Result
H1: PEOU → ATT	0.32	6.47	<0.001	Supported
H2: PU → ATT	0.41	8.12	<0.001	Supported
H3: ATT → BI	0.47	9.21	<0.001	Supported
H4: BI → Trust	0.39	7.45	<0.001	Supported
H5: Trust → ENG	0.52	10.34	<0.001	Supported

All proposed hypotheses are supported, confirming the validity of the extended TAM framework in this study. As summarized in Table 3, each hypothesized relationship (H1–H5) is supported by the empirical data, indicating that both technological and relational factors significantly influence consumer engagement.

Table 3 Hypothesis Testing Summary

Hypothesis	Statement	Supported
H1	PEOU → ATT	Yes
H2	PU → ATT	Yes
H3	ATT → BI	Yes
H4	BI → Trust	Yes
H5	Trust → Engagement	Yes

The results demonstrate that perceived usefulness and perceived ease of use shape attitudes, which subsequently influence behavioral intention. More importantly, trust plays a critical role in translating intention into engagement, highlighting the importance of relational factors in the adoption of Virtual Influencers. The results suggest that while perceived usefulness and ease of use are important in shaping user attitudes, engagement is more strongly driven by trust, indicating the importance of relational mechanisms in the adoption process.

Discussion

Results suggest that the TAM is still a useful model for understanding the adoption of VIs, especially when considering trust and engagement. Perceived usefulness and perceived ease of use seem to affect users' assessment of VIs, which in turn influences their willingness to engage with them. This pattern is consistent with earlier work on technology adoption, although in this case the interaction involves not only a system, but also a digital persona. A more notable aspect emerges after intention is formed. The findings indicate that intention alone does not necessarily translate into meaningful engagement. However, trust appears to play a more decisive role. Users may express interest or even hold positive attitudes toward VIs, but deeper interaction tends to occur only when a sense of credibility and reliability is established. In this sense, trust functions less as an additional variable and more as a turning point that connects intention with actual engagement.

Looking at the Indonesian context, the role of culture becomes quite apparent. Respondents seem more receptive to Virtual Influencers that reflect familiar values and social cues. Rather than focusing purely on technological novelty, users appear to respond to elements such as relatability, emotional tone, and cultural alignment. This may help explain why locally developed VIs are more visible and accepted compared to global ones, even when the latter are more advanced in terms of production quality. Another point to keep in mind is that technological sophistication alone is not sufficient to guarantee engagement. The results indicate that users are sensitive to the consistency with which a Virtual Influencer represents

itself, including the credibility of its narrative over time. Content may grab attention in a crowded digital space, but it is perceived authenticity that appears to sustain user engagement. This implies that managing a virtual influencer is not just a technical operation, but also a form of narrative construction. Taken together, these observations point to a more nuanced understanding of Virtual Influencer adoption. While ease of use and usefulness continue to be important, they cannot fully account for why people are engaged with this phenomenon. Trust seems to be at the heart of the process linking evaluation with action. In the absence of trust, interaction may remain superficial; however, when trust is established, engagement is more likely to become sustained and meaningful. This finding is consistent with prior studies on technology adoption, which highlight the importance of perceived usefulness and ease of use in shaping user attitudes. However, the current study extends this understanding by demonstrating that relational factors, particularly trust, play a more decisive role in translating intention into actual engagement in the context of Virtual Influencers. While this study positions trust as a consequence of behavioral intention, alternative model specifications—such as treating trust as an antecedent—may also provide valuable insights. Future research is encouraged to explore and compare alternative structural relationships to further validate the robustness of the model.

Conclusions

The findings indicate that perceived usefulness ($\beta = 0.41$, $p < 0.001$) and perceived ease of use ($\beta = 0.32$, $p < 0.001$) shape users' attitude toward Virtual Influencers that in turn affects behavioral intention ($\beta = 0.47$, $p < 0.001$) related to trust formation ($\beta = 0.39$, $p < 0.001$). Among all the variables, trust is the strongest predictor of engagement ($\beta = 0.52$, $p < 0.001$). The model accounts for a large amount of variance with R2 of 0.56 for attitude, 0.44 for behavioral intention, 0.42 for trust and 0.49 for engagement. Instead of terminating at intention, the pattern here indicates that engagement is more likely to occur when users feel confident of the credibility of the virtual figure they interact with. The results also indicate the importance of context in the perception of Virtual Influencers. In the context of Indonesia, users seem to be more open to characters which are in line with local cultural values and social norms. This may help explain why locally developed VIs are more visible and accepted compared to global ones. It further implies that technical sophistication is not a sufficient condition for stronger engagement, but rather the degree of consistency with which the virtual persona is presented, and its ability to sustain a sense of credibility over time. From a pragmatic point of view, this means that Virtual Influencer development is not only about functionality but about the maintenance of trust and cultural relevance in the process of ongoing interaction. This study contributes to the literature by extending the TAM through the integration of trust and engagement in the context of AI-based Virtual

Influencers, particularly within a Southeast Asian setting. This study has several limitations. First, the use of purposive sampling may limit the generalizability of the findings. Second, the cross-sectional design does not allow for strong causal inference over time. Third, potential endogeneity or omitted variable bias cannot be entirely ruled out. Future studies are encouraged to adopt longitudinal approaches and broader sampling techniques.

References

Ahmad, A., Ghani, N. A., & Hamid, S. (2025). Examining the predictors of consumer trust and social commerce engagement: A systematic literature review. *Journal of Theoretical and Applied Electronic Commerce Research*, *20*(3), 247.

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.

Alalwan, A. A., Dwivedi, Y. K., Rana, N. P., & Williams, M. D. (2016). Consumer adoption of mobile banking in Jordan: Examining the role of usefulness, ease of use, perceived risk and self-efficacy. *Journal of Enterprise Information Management*, *29*(1), 118-139.

Ananda, A. R., Putra, M. N. T., & Azhar, M. I. Y. (2025). Virtual influencers, real impact: A narrative review on credibility, generational trust, and purchase intention in digital marketing. *Sinergi International Journal of Communication Sciences*, *3*(2), 99-112.

Arusell, M., & Pettersson, M. (2022). Fake Existence, Real Influence?: Computer Generated Imagery (CGI) Influencers' Impact on Consumers' Purchase Intentions. In.

Battour, M., Noviyani, N. A., Ratnasari, R. T., Aboelmaged, M., & Eid, R. (2022). The impact of HDA, experience quality, and satisfaction on behavioral intention: empirical evidence from west Sumatra province, Indonesia. *Sustainability*, *14*(8), 4674.

Chandran, V. P., Balakrishnan, A., Rashid, M., Pai Kulyadi, G., Khan, S., Devi, E. S.,...Thunga, G. (2022). Mobile applications in medical education: A systematic review and meta-analysis. *PLOS ONE*, *17*(3), e0265927.

Drakopoulos, G., Giannoukou, I., Mylonas, P., & Sioutas, S. (2022). Self organizing maps for cultural content delivery. *Neural Computing and Applications*, *34*(22), 19547-19564.

Hassan, N., Jamaludin, J., Shawalludin, S., & Hasan, A. (2025). The role of virtual influencers in shaping fashion preferences among Malaysian generation alpha: perceptions, engagement and consumer trust. *Voice of Academia (VOA)*, *21*(2), 87-105.

Hendricks, S., & Mwapwele, S. D. (2024). A systematic literature review on the factors influencing e-commerce adoption in developing countries. *Data and Information Management*, *8*(1), 100045.

Hooda, A., Gupta, P., Jeyaraj, A., Giannakis, M., & Dwivedi, Y. K. (2022). The effects of trust on behavioral intention and use behavior within e-government contexts. *International journal of information management*, *67*, 102553.

Khalfallah, D., & Keller, V. (2025). Authenticity, ethics, and transparency in virtual influencer marketing: A cross-cultural analysis of consumer trust and engagement: A systematic literature review. *Acta Psychologica*, *260*, 105573.

Luppicini, R., & Walabe, E. (2021). Exploring the socio-cultural aspects of e-learning delivery in Saudi Arabia. *Journal of Information, Communication and Ethics in Society*, *19*(4), 560-579.

Ma, B. M., Tam, A. R., Chan, K. W., Ma, M. K. M., Hung, I. F. N., Yap, D. Y. H., & Chan, T. M. (2022). Immunogenicity and safety of COVID-19 vaccines in patients receiving renal replacement therapy: a systematic review and meta-analysis. *Frontiers in medicine*, *9*, 827859.

Maier, U., & Klotz, C. (2022). Personalized feedback in digital learning environments: Classification framework and literature review. *Computers and education: Artificial intelligence*, *3*, 100080.

Musa, H. G., Fatmawati, I., Nuryakin, N., & Suyanto, M. (2024). Marketing research trends using technology acceptance model (TAM): A comprehensive review of researches (2002–2022). *Cogent Business & Management*, *11*(1), 2329375.

Mwiya, B., Katai, M., Bwalya, J., Kayekesi, M., Kaonga, S., Kasanda, E.,...Muyenga, A. (2022). Examining the effects of electronic service quality on online banking customer satisfaction: Evidence from Zambia. *Cogent Business & Management*, *9*(1), 2143017.

Nissen, A., Conrad, C., & Newman, A. (2023). Are you human? Investigating the perceptions and evaluations of virtual versus human Instagram influencers. Proceedings of the 2023 CHI conference on human factors in computing systems,

Papadonikolaki, E., Krystallis, I., & Morgan, B. (2022). Digital technologies in built environment projects: review and future directions. *Project Management Journal*, *53*(5), 501-519.

Patel, A., Bilinska, J., Tam, J. C., Fontoura, D. D. S., Mason, C. Y., Daunt, A.,...Tuudah, C. (2022). Clinical features and novel presentations of human monkeypox in a central London centre during the 2022 outbreak: descriptive case series. *BMJ*, *378*.

Shah, S. S., & Asghar, Z. (2023). Dynamics of social influence on consumption choices: A social network representation. *Heliyon*, *9*(6).

Syamimi Masrani, A., & Nik Husain, N. R. (2022). Digital environment: An evolutionary component in environmental health. *Journal of Public Health Research*, *11*(2), 22799036221103125.

Tillinghast, B. (2021). Using a technology acceptance model to analyze faculty adoption and application of open educational resources. *The International Journal of Open Educational Resources*, *4*(1).

Tseng, H.-T. (2023). Shaping path of trust: the role of information credibility, social support, information sharing and perceived privacy risk in social commerce. *Information Technology & People*, *36*(2), 683-700.

Vogels, E. A., Gelles-Watnick, R., & Massarat, N. (2022). Teens, social media and technology 2022. *Pew Research Center*, *10*, 1-30.

Xu, B., Dastane, O., Aw, E. C.-X., & Jha, S. (2025). The future of live-streaming commerce: understanding the role of AI-powered virtual streamers. *Asia Pacific Journal of Marketing and Logistics*, *37*(5), 1175-1196.