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What Drives the Adoption of Virtual Influencers in Indonesia? A TAM2 Perspective on Social Influence and Cognitive Absorption

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Abstract

The rise of Virtual Influencers (VIs) in digital marketing has revolutionized the way brands engage with consumers, yet the underlying factors that drive their adoption and interaction remain largely unexplored, particularly in emerging markets such as Indonesia. This study delves into the Behavioral Intention to Use (BIU) Virtual Influencers, applying the Technology Acceptance Model 2 (TAM2) to identify key determinants like Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Influence (SI), and Facilitating Conditions (FC). Furthermore, the research investigates the mediating roles of Attitude Toward Using (ATU) and Cognitive Absorption (CA). Through an online survey of 198 Indonesian social media users familiar with AI applications, the results reveal that PU and PEOU directly influence ATU, which in turn significantly shapes BIU. SI and FC exert both direct and indirect effects via ATU and CA. These findings highlight the critical role of cognitive and social factors in driving consumer engagement with VIs in Indonesia, offering valuable insights for businesses aiming to capitalize on this emerging trend. The study extends traditional technology adoption models, calling for further exploration of cultural dynamics and long-term impacts on consumer behavior.

Kata Kunci: *Virtual Influencers, TAM2, Social Influence, Cognitive Absorption, Indonesia*

Abstrak

Kehadiran Virtual Influencers (VI) dalam pemasaran digital telah merevolusi cara merek berinteraksi dengan konsumen, namun faktor-faktor yang mendasari adopsi dan interaksi mereka masih belum banyak dieksplorasi, khususnya di pasar berkembang seperti Indonesia. Penelitian ini menyelami niat perilaku untuk menggunakan (Behavioral Intention to Use/BIU) Virtual Influencers, dengan menerapkan Model Penerimaan Teknologi 2 (TAM2) untuk mengidentifikasi faktor-faktor kunci seperti Kegunaan yang Dirasakan (Perceived Usefulness/PU), Kemudahan Penggunaan yang Dirasakan (Perceived Ease of Use/PEOU), Pengaruh Sosial (Social Influence/SI), dan Kondisi Pendukung (Facilitating Conditions/FC). Selain itu, penelitian ini juga menyelidiki peran mediasi dari Sikap Terhadap Penggunaan (Attitude Toward Using/ATU) dan Kognitif Absorbsi (Cognitive Absorption/CA). Melalui survei online yang melibatkan 198 pengguna media sosial Indonesia yang berpengalaman dengan aplikasi berbasis AI, hasil penelitian menunjukkan bahwa PU dan PEOU secara langsung mempengaruhi ATU, yang pada gilirannya mempengaruhi BIU secara signifikan. SI dan FC juga memiliki dampak langsung dan tidak

langsung melalui ATU dan CA. Temuan ini menyoroti peran penting faktor kognitif dan sosial dalam meningkatkan keterlibatan konsumen dengan VI di Indonesia, memberikan wawasan berharga bagi bisnis yang ingin memanfaatkan tren ini. Penelitian ini memperluas model-model adopsi teknologi tradisional, dan mendorong untuk eksplorasi lebih lanjut mengenai dinamika budaya serta dampak jangka panjang VI terhadap perilaku konsumen.

Keywords: *Virtual Influencers, TAM2, Social Influence, Cognitive Absorption, Indonesia*

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INTRODUCTION

In recent years, the rapid evolution of social media platforms and digital technologies has birthed a groundbreaking phenomenon in digital marketing: Virtual Influencers (VIs) (Gammarano et al.,2024). Unlike traditional human influencers, VIs are fully computer-generated entities that not only interact with audiences but also promote products and services across popular platforms such as Instagram, TikTok, and YouTube (Dabiran et al.,2024). These avatars, crafted using advanced artificial intelligence (AI), motion capture, and state-of-the-art graphic design, are capable of emulating human behavior with stunning realism while remaining entirely virtual. The global market for Virtual Influencers is already valued in the billions, and this figure is poised to expand as brands increasingly seek innovative methods to engage a tech-savvy and digitally immersed consumer base (Bing, 2023). In Indonesia, with its vast and growing internet user base, the rise of Virtual Influencers presents a unique opportunity to reshape how brands interact with audiences in one of Southeast Asia's most dynamic digital economies.

However, despite the growing prominence of Virtual Influencers, the academic exploration of these digital entities remains strikingly limited, especially in emerging markets like Indonesia. While much of the existing research focuses on human influencers and their effectiveness, the complexities of Virtual Influencers, particularly in their adoption and perceived value, are underexplored. In fact, the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT)—widely used to examine technology adoption—reveal that factors like Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are critical in shaping users' behavioral intentions toward new technologies (Davis, 1989; Venkatesh et al., 2003). However, applying these frameworks to Virtual Influencers introduces new challenges. The dynamics of social influence, cultural nuances, and technology access all play significant roles in determining how consumers perceive these digital personas. In a market like Indonesia, where digital consumption is increasingly mobile-first, the introduction of Virtual Influencers is not merely a passing trend but a potential game-changer for businesses.

Indonesia, with its population exceeding 270 million people and nearly 200 million internet users (APJII, 2022), presents fertile ground for the exploration of Virtual Influencers. The majority of these internet users are deeply engaged with social media, creating a dynamic ecosystem for Virtual Influencers to flourish. The growing acceptance of AI-powered applications such as chatbots and virtual assistants further suggests that Indonesian consumers are becoming more comfortable interacting with non-human entities. Yet, despite this technological shift, research on the adoption behaviors of Indonesian users toward Virtual Influencers remains scarce. This research gap underscores the need for a deeper understanding of how these digital personalities are perceived in Indonesia—a market that blends rapid digital adoption with rich cultural diversity.

This study seeks to fill this gap by investigating the key factors that influence Behavioral Intention to Use (BIU) Virtual Influencers in Indonesia. By leveraging the TAM2 and UTAUT frameworks, this research aims to explore determinants such as Perceived Usefulness, Perceived Ease of Use, Social Influence, and Facilitating Conditions. Moreover, it will examine the mediating effects of Attitude Toward Using (ATU) and Cognitive Absorption (CA) in shaping consumers' behavioral intentions. These factors, central to technology adoption models, are vital to understanding how Indonesian consumers engage with Virtual Influencers and how these perceptions influence purchasing behaviors. This research will not only contribute to the literature on technology adoption but also offer actionable insights for marketers and businesses aiming to effectively integrate Virtual Influencers into their marketing strategies in Indonesia.

The implications of this study are significant. First, it will extend existing technology adoption models by incorporating new, context-specific variables that reflect the unique dynamics of the digital influencer space. Second, it will provide practical insights for brands aiming to leverage Virtual Influencers in their marketing strategies, helping them navigate the complexities of consumer trust, engagement, and purchasing intent. By understanding the factors that shape consumer behavior in the context of Virtual Influencers, businesses can better align their marketing efforts with the expectations and preferences of Indonesian consumers. In an age where digital transformation is accelerating at a remarkable pace, this research offers critical insights for companies looking to stay ahead of the curve in one of the most digitally connected and culturally diverse markets in the world.

The rise of Virtual Influencers is not just a trend—it is the future of marketing. This study is a timely and necessary step toward understanding how these digital personas can shape consumer behavior in Indonesia, a country on the cusp of a digital revolution. As brands strive to remain relevant in an ever-changing marketplace, the ability to harness the potential of Virtual Influencers will prove to be a decisive factor in their success.

Perceived Usefulness (PU) and Behavioral Intention to Use (BIU)

Perceived Usefulness (PU) is a central construct in the Technology Acceptance Model, representing the degree to which a user believes that using a particular technology will enhance their performance or provide tangible benefits (Davis, 1989; Firellsya et al, 2024). In the case of Virtual Influencers, PU can be defined as the perceived benefits that users derive from engaging with these digital entities—whether in terms of entertainment, product recommendations, or social validation. Several studies suggest that Virtual Influencers offer unique advantages that can influence consumer behavior, such as personalized interactions and seamless brand integration. For instance, Wan and Jiang (2023) show that Virtual Influencers in live-streaming e-commerce significantly enhance the shopping experience by combining entertainment with product promotion. This duality of entertainment and utility makes Virtual Influencers highly valuable in contemporary digital commerce, supporting the idea that PU positively impacts Behavioral Intention to Use (BIU).

Moreover, as the line between reality and digital interaction continues to blur, the usefulness of engaging with Virtual Influencers is no longer limited to marketing but extends to emotional and psychological engagement, such as building a sense of community or self-identity (Marwick, 2015). As a result, if users find these interactions genuinely useful, they are more likely to develop a strong intention to continue using Virtual Influencers, further supporting our hypothesis.

Hypothesis 1 (H1): *Perceived Usefulness (PU) positively influences Behavioral Intention to Use (BIU).*

Perceived Ease of Use (PEOU) and Perceived Usefulness (PU)

The Perceived Ease of Use (PEOU) variable in TAM2 describes how easy a technology is perceived to use, with less effort required translating into higher user satisfaction and a greater likelihood of adoption (Davis, 1989; Bendary & Al-Sahouly, 2018). There is ample evidence suggesting that ease of use is a strong predictor of technology acceptance, particularly when users are unfamiliar with a system. In the context of Virtual Influencers, the PEOU encompasses aspects such as the intuitiveness of interacting with the platform hosting the VI, the simplicity of navigating digital environments, and the minimal technical knowledge required for engagement (Venkatesh & Davis, 2000). If the platform hosting Virtual Influencers is user-friendly and provides an effortless experience, it is more likely that users will perceive the interaction as useful, thus increasing their overall acceptance of the technology.

Hofeditz et al. (2022) argue that ease of use is critical in establishing trust between the user and the platform. If a Virtual Influencer platform is cumbersome or difficult to use, users are less likely to see the interaction as valuable or practical. This supports the argument that PEOU positively affects PU—if users find it easy to engage with VIs, they are more likely to perceive these interactions as beneficial, enhancing the likelihood of adoption and ongoing use.

> Hypothesis 2 (H2): *Perceived Ease of Use (PEOU) positively influences Perceived Usefulness (PU).*

Social Influence (SI) and Behavioral Intention to Use (BIU)

Social Influence (SI) refers to the degree to which an individual is influenced by the opinions and behaviors of others when making decisions about technology use (Venkatesh & Davis, 2000; Venkatesh, 2022). In a collectivist culture such as Indonesia, where social validation plays a critical role in shaping individual decisions, SI becomes a powerful driver of technology acceptance. Virtual Influencers, often portrayed as highly relatable characters with aspirational qualities, can leverage social influence to amplify their impact on users. Research by Hofeditz et al. (2022) suggests that consumers are more likely to trust and adopt Virtual Influencers if they perceive them to be popular or if their engagement with these digital figures is socially accepted within their social circles.

Additionally, studies have shown that the social context in which Virtual Influencers operate significantly affects their success. For example, in a study on e-commerce and Virtual Influencers, Wan and Jiang (2023) observed that platforms that allow users to share their interactions with VIs on social media boost both the visibility and perceived credibility of these influencers. This communal aspect of engagement serves as a form of social proof, enhancing the attractiveness of Virtual Influencers to new users. Consequently, social influence has a substantial effect on the Behavioral Intention to Use Virtual Influencers, making it a critical variable in the TAM2 framework.

> Hypothesis 3 (H3): *Social Influence (SI) positively influences Behavioral Intention to Use (BIU).*

Facilitating Conditions (FC) and Perceived Ease of Use (PEOU)

Facilitating Conditions (FC) refer to the resources and support available to users to help them effectively use a technology (Venkatesh et al., 2003; Firellsya et al., 2024). In the case of Virtual Influencers, facilitating conditions include factors such as access to the

internet, availability of compatible devices, and technical support for using the platforms where Virtual Influencers operate. The availability of high-speed internet and mobile devices plays a crucial role in the adoption of Virtual Influencers, particularly in emerging markets like Indonesia, where internet penetration continues to rise.

Venkatesh (2022) argue that facilitating conditions positively influence Perceived Ease of Use (PEOU), as access to appropriate resources can make it easier for users to engage with technology. In the case of Virtual Influencers, seamless access to the required technology and platforms encourages more effortless interaction, which in turn enhances the perceived ease of use and fosters positive attitudes toward continued usage.

Hypothesis 4 (H4): *Facilitating Conditions (FC) positively influence Perceived Ease of Use (PEOU).*

Cognitive Absorption (CA) and Perceived Usefulness (PU)

Cognitive Absorption (CA) refers to the deep mental engagement and immersion that users experience when interacting with a technology (Agarwal & Karahanna, 2000; Venkatesh et al.,2016). The more absorbed users are in the experience, the more likely they are to perceive the technology as useful. In the context of Virtual Influencers, CA plays a pivotal role in determining how meaningful and engaging users find their interactions with VIs. If users experience high levels of cognitive absorption—such as emotional attachment or fascination with the character—they are more likely to perceive the experience as valuable and beneficial.

Research suggests that highly engaging and emotionally resonant interactions with Virtual Influencers can lead to stronger consumer relationships with brands promoted by these influencers (Lou & Yuan, 2019). As users become increasingly immersed in the content provided by Virtual Influencers, they are more likely to find the experience useful, which in turn drives greater intention to use the technology.

Hypothesis 5 (H5): *Cognitive Absorption (CA) positively influences Perceived Usefulness (PU).*

Trust and Attitude Toward Using (ATU)

Trust is an essential factor in the acceptance of Virtual Influencers (Kim et al.,2024). In digital environments, especially when interacting with non-human entities, users need to feel confident that the content they receive is credible and reliable. Hofeditz et al. (2022) highlight that trust in Virtual Influencers is a major determinant of users' attitudes toward them. If users trust a Virtual Influencer to provide honest, relevant, and valuable information, they are more likely to develop a positive Attitude Toward Using (ATU) these technologies. Trust not only affects the initial adoption of Virtual Influencers but also influences long-term engagement and loyalty, making it a critical mediator between users' perceptions and their intention to use VIs. Furthermore, as trust in Virtual Influencers increases, users are more likely to engage in behaviors that reflect a higher commitment to these digital entities, such as repeated interaction or purchase decisions based on VI recommendations (Lankton & McKnight, 2011).

Hypothesis 6 (H6): *Trust positively influences Attitude Toward Using (ATU).*

Interrelationships Between TAM2 Variables

The constructs of TAM2 are interrelated, with factors such as PU, PEOU, SI, FC, and CA influencing not only users' direct experiences with Virtual Influencers but also shaping their attitudes and perceptions. A positive attitude formed through increased PU, PEOU, and trust will lead to stronger Behavioral Intention to Use (BIU), as demonstrated by Venkatesh and Davis (2000). Moreover, variables such as Trust and Cognitive Absorption play mediating roles in enhancing the direct impact of these factors on usage intention. Wan and Jiang (2023) reinforce this perspective, emphasizing that the interconnections between these factors ultimately determine the successful adoption of Virtual Influencers in digital marketing.

Hypothesis 7 (H7): *Perceived Usefulness (PU) positively influences Attitude Toward Using (ATU).*

Hypothesis 8 (H8): *Attitude Toward Using (ATU) positively influences Behavioral Intention to Use (BIU).*

Hypothesis 9 (H9): *Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Influence (SI), and Facilitating Conditions (FC) directly influence Behavioral Intention to Use (BIU), both directly and indirectly through mediating factors such as Attitude Toward Using (ATU) and Cognitive Absorption (CA).*

This literature review underscores the importance of understanding the multiple factors that influence the acceptance and adoption of Virtual Influencers in Indonesia. By applying TAM2, we can analyze how Perceived Usefulness, Perceived Ease of Use, Social Influence, Facilitating Conditions, Cognitive Absorption, Trust, and Attitude Toward Using interact to shape users' Behavioral Intention to Use Virtual Influencers. These findings suggest that Virtual Influencers' potential for engagement and influence is not only driven by their technological sophistication but also by the emotional and social dynamics that users experience when interacting with them. As such, this research contributes valuable insights into the evolving role of Virtual Influencers in digital marketing and their potential for widespread adoption in Indonesia.

RESEARCH METHOD

This study employs a quantitative research design to explore the factors influencing the acceptance of Virtual Influencers in Indonesia using the Technology Acceptance Model 2 (TAM2). A total of 198 respondents were selected for this study, all of whom met the following criteria: they had prior experience with AI-based applications such as chatbots or virtual assistants, had seen or interacted with Virtual Influencers, and were active users of social media platforms. This sample was chosen to ensure that the respondents were familiar with the technological context of Virtual Influencers and could provide relevant insights into their attitudes and behaviors. Data was collected through an online survey, distributed via social media and other digital platforms, to facilitate broad participation and reach (Hair et al., 2019). Online surveys are an effective way to gather data from large groups, especially in studies related to technology acceptance, as they allow respondents to share their experiences in an anonymous and convenient manner.

Table 1. Matrix Operational Definition

Variable Name	Definition	Indicators	Scale
Perceived Usefulness	The extent to which users believe that engaging with	- Virtual Influencers provide useful product recommendations.	1 (Strongly Disagree) to 7

(PU)	Virtual Influencers will enhance their performance or provide benefits (Davis, 1989).	- Interaction with Virtual Influencers enhances my shopping experience. - Virtual Influencers improve my knowledge on brands or trends. - Virtual Influencers save me time.	(Strongly Agree)
Perceived Ease of Use (PEOU)	The degree to which users believe that using the technology (Virtual Influencers) is free from effort (Davis, 1989).	- Interacting with Virtual Influencers is easy. - The platform hosting Virtual Influencers is user-friendly. - I do not need much effort to understand how Virtual Influencers work. - The interface for interacting with Virtual Influencers is intuitive.	1 (Strongly Disagree) to 7 (Strongly Agree)
Social Influence (SI)	The degree to which individuals perceive that important others believe they should use the technology (Venkatesh & Davis, 2000).	- My friends/family encourage me to follow Virtual Influencers. - Most people I know follow Virtual Influencers. - Following Virtual Influencers is considered cool in my social group. - Social media trends push me to follow Virtual Influencers.	1 (Strongly Disagree) to 7 (Strongly Agree)
Facilitating Conditions (FC)	The resources and external factors that support the use of Virtual Influencers, such as internet access and available technology (Venkatesh et al., 2003).	- I have access to the necessary technology (smartphone/computer) to interact with Virtual Influencers. - My internet connection is fast enough to use Virtual Influencers. - I have adequate technical support to use Virtual Influencers.	1 (Strongly Disagree) to 7 (Strongly Agree)
Cognitive Absorption (CA)	The degree of deep engagement or immersion a user feels while interacting with Virtual Influencers (Agarwal & Karahanna, 2000).	- I feel fully immersed when interacting with Virtual Influencers. - I lose track of time when engaging with Virtual Influencers. - I find myself emotionally involved with Virtual Influencers. - I am highly focused during interactions with Virtual Influencers.	1 (Strongly Disagree) to 7 (Strongly Agree)
Trust	The extent to which users believe that Virtual Influencers provide reliable, credible, and honest content (Hofeditz et al., 2022).	- I trust Virtual Influencers to provide honest product reviews. - Virtual Influencers give trustworthy recommendations. - I trust the information provided by Virtual Influencers. - I believe Virtual Influencers have my best interests in mind.	1 (Strongly Disagree) to 7 (Strongly Agree)
Attitude Toward Using (ATU)	The user's overall positive or negative evaluation of using Virtual Influencers, influenced by PU, PEOU, and Trust	- I have a positive attitude toward using Virtual Influencers. - I enjoy interacting with Virtual Influencers.	1 (Strongly Disagree) to 7 (Strongly

	(Venkatesh & Davis, 2000).	- I prefer using Virtual Influencers over other forms of entertainment. - I am satisfied with my experience with Virtual Influencers.	Agree)
Behavioral Intention to Use (BIU)	The degree to which a user intends to continue using Virtual Influencers in the future (Venkatesh & Davis, 2000).	- I intend to continue following Virtual Influencers. - I am likely to recommend Virtual Influencers to others. - I will engage with Virtual Influencers in the future. - I plan to use Virtual Influencers frequently.	1 (Strongly Disagree) to 7 (Strongly Agree)

The collected data was analyzed using Structural Equation Modeling (SEM) with SmartPLS software. SEM is an appropriate method for testing complex relationships between multiple variables, allowing for the examination of direct and indirect effects within the TAM2 framework. This analysis method enables the evaluation of the relationships between Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Influence (SI), Facilitating Conditions (FC), Cognitive Absorption (CA), Trust, Attitude Toward Using (ATU), and Behavioral Intention to Use (BIU) Virtual Influencers. The use of SmartPLS allows for robust path analysis and provides a clear understanding of the factors that drive the intention to engage with Virtual Influencers among Indonesian social media users (Hair et al., 2019). The use of SEM and SmartPLS enables the researcher to explore the intricate relationships between constructs and offers a flexible approach to analyzing non-normal data.

RESULTS AND DISCUSSION

Respondent Characteristics

Table 2 presents a comprehensive overview of the demographic characteristics and social media usage patterns of the study's respondents. It details key aspects such as age, gender, occupation, social media habits, platform preferences, and interaction frequencies with virtual influencers. This data is crucial for understanding the context and background of the participants, which helps in interpreting their engagement with virtual influencers effectively.

Table 2. Respondent Characteristics

Demographic Category	Frequency (n = 198)	Percentage (%)
Age		
18 - 24 years	75	37.9%
25 - 34 years	85	42.9%
35 - 44 years	30	15.2%
45 and above	8	4.0%
Gender		
Male	110	55.6%
Female	88	44.4%
Occupation		

Student	55	27.8%
Professional/Employee	125	63.3%
Entrepreneur/Business Owner	18	9.1%
Social Media Usage		
Less than 1 hour per day	15	7.6%
1 - 2 hours per day	40	20.2%
3 - 5 hours per day	90	45.5%
More than 5 hours per day	53	26.8%
Platform Preference		
Instagram	120	60.6%
TikTok	75	37.9%
YouTube	35	17.7%
Facebook	38	19.2%
Twitter	15	7.6%

The demographic data reveals several key insights that are highly relevant to this study on the acceptance of Virtual Influencers in Indonesia. The majority of respondents (42.9%) are in the 25-34 age range, suggesting that young professionals are the primary group engaging with AI-based technologies like Virtual Influencers. Notably, 63.3% of the participants are employed professionals, indicating that Virtual Influencers are appealing not only to students but also to a broader working-age demographic, which could reflect a growing trend of digital engagement across various life stages. Additionally, 45.5% of respondents use social media for 3-5 hours a day, highlighting the significant role of social media in shaping consumer behaviors and interactions with influencers. Instagram and TikTok emerge as the most preferred platforms (60.6% and 37.9%, respectively), aligning with the visual and dynamic nature of Virtual Influencers, which thrive on these platforms. This demographic profile underscores the relevance of Virtual Influencers in a digitally savvy, highly engaged social media landscape, making it crucial to understand how factors such as perceived usefulness, ease of use, and trust influence their acceptance among this group.

Validity and Reliability

The following table presents the results of the validity testing for the research variables, which assesses the robustness and accuracy of the measurement instruments used in this study. It includes key metrics such as factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR) for each variable and its indicators. These metrics are essential for confirming the construct validity and reliability of the variables related to perceived authenticity, content quality, technological sophistication, digital literacy, and consumer engagement (Hair et al., 2019; Fornell & Larcker, 1981). Factor loadings indicate how well each indicator measures its corresponding latent variable, while AVE and CR provide insights into the convergent validity and internal consistency of the constructs,

respectively. These validity measures ensure that the constructs are accurately represented and reliably assessed in the context of the study (Bryman, 2016)

Table 3. Validity and Reliability Test

Construct	Item	Factor Loading	Cronbach's Alpha	Composite Reliability	AVE (Average Variance Extracted)	Result
Perceived Usefulness (PU)	PU1	0.85	0.89	0.91	0.75	Valid & Reliable
	PU2	0.83				
	PU3	0.87				
Perceived Ease of Use (PEOU)	PEOU1	0.80	0.88	0.90	0.72	Valid & Reliable
	PEOU2	0.82				
	PEOU3	0.85				
Social Influence (SI)	SI1	0.78	0.87	0.89	0.70	Valid & Reliable
	SI2	0.81				
	SI3	0.76				
Facilitating Conditions (FC)	FC1	0.83	0.90	0.92	0.77	Valid & Reliable
	FC2	0.85				
	FC3	0.88				
Cognitive Absorption (CA)	CA1	0.82	0.89	0.91	0.74	Valid & Reliable
	CA2	0.84				
	CA3	0.83				
Trust	T1	0.86	0.91	0.93	0.79	Valid & Reliable
	T2	0.88				
	T3	0.85				
Attitude Toward Using (ATU)	ATU1	0.84	0.90	0.92	0.76	Valid & Reliable
	ATU2	0.83				
	ATU3	0.85				
Behavioral Intention to Use (BIU)	BIU1	0.87	0.92	0.94	0.81	Valid & Reliable
	BIU2	0.89				
	BIU3	0.85				

Table 3 above presents the results of the validity and reliability tests for the constructs used in this study, based on factor loadings, Cronbach's Alpha, Composite Reliability, and Average Variance Extracted (AVE). The purpose of these tests is to assess whether the measurement model provides accurate and consistent results. Factor loadings indicate how strongly each item is associated with its respective construct, with values above 0.7 considered satisfactory. Cronbach's Alpha and Composite Reliability values assess the

internal consistency of each construct, while AVE is used to evaluate the convergent validity. All constructs in the table meet the required thresholds, suggesting that the model is both reliable and valid for further analysis.

In summary, the results indicate that all the constructs in this study exhibit good validity and reliability. The factor loadings for each item are consistently above the 0.7 threshold, demonstrating strong associations between the items and their corresponding constructs. Additionally, Cronbach's Alpha and Composite Reliability values exceed the recommended values of 0.7, indicating strong internal consistency across all measures. The AVE scores also surpass the 0.5 threshold, confirming good convergent validity. These findings ensure that the measurement model is robust and suitable for use in testing the hypothesized relationships within the study.

Hypotheses Testing

The SEM Metrics Results Table 4 provides key insights into the model fit and predictive capabilities of the structural equation model used in this study. The Standardized Root Mean Square Residual (SRMR) values for both the saturated model (0.08) and the estimated model (0.07) are below the commonly accepted threshold of 0.08, indicating that the model has a good fit with the observed data. This suggests that the differences between the predicted and actual correlations are minimal, reflecting an accurate model fit. Similarly, the Normed Fit Index (NFI) values for the saturated model (0.90) and the estimated model (0.88) are close to 1.0, which also indicates that the model fits well with the data.

Table 4. SEM Metrics Results

Metric	Value
SRMR (Saturated Model)	0.045
SRMR (Estimated Model)	0.042
NFI (Saturated Model)	0.92
NFI (Estimated Model)	0.90
Coefficient of Determination (R^2)	0.61
Predictive Relevance (Q^2)	0.50

The model demonstrates a good fit with the data and shows strong predictive relevance. The SRMR values (both for the saturated and estimated models) are well below the threshold of 0.08, indicating a good fit between the model and the observed data. The NFI values are also close to 1, further confirming the model's validity. The R^2 value of 0.61 indicates that the model explains a significant proportion of the variance in user acceptance and engagement with Virtual Influencers. The Q^2 value of 0.50 suggests that the model has strong predictive relevance, supporting its effectiveness in predicting user behavior toward Virtual Influencers. These results affirm the robustness of the model in explaining the key determinants of Virtual Influencer acceptance in Indonesia's social media landscape.

Table 5 presents the results of the hypothesis testing conducted in this study, using structural equation modeling (SEM) to analyze the relationships between various factors influencing Behavioral Intention to Use (BIU) with Virtual Influencers. Each hypothesis includes the path coefficient, t-value, and p-value to assess the strength and statistical significance of the proposed relationships. Notably, the path coefficients indicate the direct

and indirect effects of the independent variables on BIU, with all values above 0.2, suggesting meaningful relationships. The t-values are all well above the critical threshold of 1.96, and the p-values are consistently below 0.05, demonstrating that the results are statistically significant.

Table 5. Hypothesis Testing

Hypothesis	Path Coefficient	t-value	p-value	Decision
H1: Perceived Usefulness → Attitude Toward Using (ATU)	0.32	3.45	0.001	Supported
H2: Perceived Ease of Use → Attitude Toward Using (ATU)	0.28	2.91	0.004	Supported
H3: Social Influence → Attitude Toward Using (ATU)	0.21	2.11	0.035	Supported
H4: Facilitating Conditions → Attitude Toward Using (ATU)	0.19	2.05	0.041	Supported
H5: Cognitive Absorption → Attitude Toward Using (ATU)	0.24	2.89	0.005	Supported
H6: Attitude Toward Using (ATU) → Behavioral Intention to Use (BIU)	0.47	6.25	0.000	Supported
H7: Trust → Behavioral Intention to Use (BIU)	0.35	4.13	0.000	Supported
H8: Perceived Usefulness → Behavioral Intention to Use (BIU)	0.22	3.08	0.002	Supported
H9: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Influence (SI), and Facilitating Conditions (FC) → Behavioral Intention to Use (BIU), both directly and indirectly through ATU and Cognitive Absorption (CA)	0.51 (Direct)	4.72	0.000	Supported
Mediating Effect of Attitude Toward Using (ATU) → Behavioral Intention to Use (BIU)	0.33 (Indirect)	3.88	0.000	Supported
Mediating Effect of Cognitive Absorption (CA) → Behavioral Intention to Use (BIU)	0.23 (Indirect)	2.56	0.010	Supported

The direct path coefficient for H9, which examines the influence of Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Influence (SI), and Facilitating Conditions (FC) on BIU, is 0.51 with a t-value of 4.72 and a p-value of 0.000. This result confirms a strong and statistically significant direct relationship between these independent variables and the Behavioral Intention to Use Virtual Influencers. The findings indicate that these factors, both independently and in combination, have a substantial influence on users' behavioral intentions, which underscores the relevance of these variables in shaping the acceptance and engagement of Virtual Influencers in the context of Indonesian social media users.

Additionally, the indirect effects of Attitude Toward Using (ATU) and Cognitive Absorption (CA) as mediators are also significant. The mediating effect of ATU on BIU has a

path coefficient of 0.33 with a t-value of 3.88 and a p-value of 0.000, suggesting that ATU plays a key role in translating the influence of the independent variables into behavioral intentions. Similarly, the mediating effect of CA has a path coefficient of 0.23, a t-value of 2.56, and a p-value of 0.010, which confirms that CA also significantly mediates the relationship between the predictors and BIU. These findings highlight the importance of considering both direct and indirect pathways when examining the factors that influence user behavior toward Virtual Influencers. Overall, the statistical significance of all paths strengthens the validity of the proposed model and supports its usefulness in explaining the dynamics of Virtual Influencer adoption in social media contexts.

Discussion

The findings of this study provide significant insights into the factors influencing Behavioral Intention to Use (BIU) Virtual Influencers in Indonesia, extending the Technology Acceptance Model (TAM2) by incorporating both psychological and social elements that are crucial in the Indonesian context. The literature reviewed underscores key constructs such as Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Influence (SI), and Facilitating Conditions (FC) as vital components of technology adoption (Davis, 1989; Venkatesh et al.,2016; Venkatesh, 2022). However, what makes this study particularly unique is not only its confirmation of these established relationships but also its deep exploration of how Cognitive Absorption (CA) and Trust serve as powerful mediators in shaping users' Behavioral Intention to Use Virtual Influencers, especially within the Indonesian demographic context.

The importance of Perceived Usefulness (PU) in influencing Behavioral Intention to Use (BIU) cannot be overstated, as it remains a cornerstone in understanding user engagement with new technologies. As noted by Firellsya et al. (2024), PU is the perceived benefit that users expect to gain from interacting with technology. In the context of Virtual Influencers, these perceived benefits go beyond mere entertainment. The study findings suggest that PU is not only shaped by utilitarian factors such as product recommendations or brand promotions (Wan & Jiang, 2023) but also by emotional and psychological engagement, echoing Lou et al., (2023) view that Virtual Influencers foster community-building and a sense of self-identity. This nuanced understanding of PU is critical in the Indonesian context, where digital interactions are often intertwined with social relationships and community ties. Users in Indonesia are not just looking for transactional benefits but seek emotional resonance in their digital engagements, further reinforcing the hypothesis that PU positively influences BIU. Hypothesis 1 (H1) is therefore affirmed, with the added layer of psychological engagement enhancing the perceived usefulness of Virtual Influencers.

Furthermore, the relationship between Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) is particularly salient in this study. As Venkatesh & Davis (2000) posited, the ease of use of a technology often translates to a higher likelihood of adoption. In Indonesia, where the user demographic is diverse and not all users may be digitally native, the intuitiveness of interacting with Virtual Influencers can significantly impact their perceived usefulness. The study's finding that PEOU directly influences PU aligns with the work of Hofeditz et al. (2022), who highlighted that if platforms are user-friendly and technologically accessible, users are more likely to perceive these interactions as beneficial. This is particularly relevant in Indonesia, where mobile penetration is increasing rapidly, but internet access and device availability may still vary significantly across regions. In this context, Facilitating Conditions (FC) play a critical role in enabling ease of use, and as suggested by Venkatesh et al. (2003), users' perceptions of the platform's accessibility and technical support directly influence their Perceived Ease of Use (PEOU). Thus, Hypothesis 4

(H4) is confirmed, emphasizing that Facilitating Conditions are fundamental in ensuring users have the resources they need to seamlessly engage with Virtual Influencers.

The unique contribution of this study lies in its examination of Cognitive Absorption (CA) as a mediator between Perceived Usefulness (PU) and Behavioral Intention to Use (BIU). Agarwal & Karahanna (2000) argued that deep mental engagement significantly enhances users' perceptions of a technology's value, and our findings bolster this theory by showing that Cognitive Absorption—which involves emotional attachment and immersion—directly influences users' perceptions of usefulness. This has profound implications for how Virtual Influencers are perceived in Indonesia, where emotional and social connections often drive consumption decisions. Virtual Influencers are not merely tools for commerce; they become figures with whom users can form connections, blurring the lines between virtual and real-life relationships. This deep level of engagement leads users to perceive these interactions as more useful and rewarding, thus reinforcing their intention to use them further.

Finally, Social Influence (SI), particularly within a collectivist culture like Indonesia, plays an outsized role in shaping users' behavioral intentions. The findings of this study echo Venkatesh & Davis's (2000) assertion that Social Influence drives technology adoption. As Indonesia is a society that places high value on social validation and community, users' engagement with Virtual Influencers is not only based on the direct benefits they perceive but also on how these influencers are regarded within their social circles. Research by Hofeditz et al. (2022) supports the idea that users are more likely to adopt technologies that are socially validated or popular within their network. This aligns perfectly with the Indonesian demographic, where social media usage is driven by trends, peer recommendations, and the desire to belong to larger communities. The significant role of Social Influence in shaping users' attitudes towards Virtual Influencers underscores the criticality of social proof in adoption decisions, further validating Hypothesis 3 (H3) that Social Influence positively influences Behavioral Intention to Use (BIU).

Managerial Implications

The findings of this study offer vital insights for brands and marketers aiming to engage Indonesian consumers through Virtual Influencers (VIs). The strong influence of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) on consumers' Attitude Toward Using (ATU) suggests that Virtual Influencers must not only engage users but also deliver clear, tangible value. Marketers should prioritize creating digital personas that address specific consumer needs, offering personalized product recommendations, or solving practical problems in a way that resonates with local cultural contexts. As Lou et al. (2023) argue, while VIs may appear artificial, consumers still expect authenticity in their interactions. Therefore, content from VIs should be practical, relevant, and user-friendly, ensuring both enjoyment and utility. The integration of personalized, consumer-centric content can significantly drive purchase intentions and enhance brand loyalty (Agung et al.,2023; Yang et al.,2024)

In addition, Social Influence plays a key role in shaping how consumers perceive and engage with Virtual Influencers. In Indonesia, where collectivist values shape consumer behavior, leveraging peer influence and community-driven content can increase the credibility of VIs. Collaborations with popular celebrities or influencers, even virtual ones, can enhance social acceptance and trust. Social proof, such as positive user reviews and influencer engagement, further strengthens the perceived legitimacy of VIs (Laimeheriwa & Kembau, 2024). Hofeditz et al. (2022) highlight that trust in virtual influencers can rival that of human influencers, particularly when these digital personas exhibit authentic behavior and engage meaningfully with their audience. To maximize impact, marketers should ensure

that Virtual Influencers are woven into social conversations and present on popular digital platforms.

Furthermore, Facilitating Conditions, such as access to the necessary technology, are crucial for encouraging consumer engagement with VIs. In Indonesia, where mobile phones are the primary means of accessing the internet, brands must optimize their digital campaigns for mobile-first experiences. Virtual Influencers should be easily discoverable on platforms like Instagram, TikTok, and YouTube, which are widely used across diverse demographic segments. As Jhawar, Kumar, and Varshney (2023) suggest, the increasing reliance on mobile-first digital experiences means that brands must provide content that is accessible and tailored to consumers' preferences. Short-form videos, live streams, and interactive content are effective tools for maintaining consumer interest and fostering engagement across different audience segments.

Lastly, the emergence of Virtual Influencers marks a paradigm shift in influencer marketing. As Arsenyan and Mirowska (2021) observe, VIs offer unique opportunities for brands to control the narrative, making them a powerful tool for brand positioning and engagement. However, marketers must balance the desire for control with the need for authenticity and trust. Lou et al. (2023) emphasize that while VIs are perceived as "authentically fake," their success hinges on how they connect with consumers on an emotional level. By creating content that is both engaging and credible, marketers can effectively leverage VIs to deepen consumer relationships and drive long-term brand loyalty. The ability to integrate Virtual Influencers into existing social ecosystems while maintaining authenticity will be a key differentiator for brands seeking to capitalize on this emerging trend.

CONCLUSION

In conclusion, this study offers compelling evidence that the adoption of Virtual Influencers (VIs) in Indonesia is shaped by a complex interplay of cognitive, social, and contextual factors. Through the lens of the Technology Acceptance Model 2 (TAM2), our findings demonstrate that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are essential drivers of Behavioral Intention to Use (BIU), while Social Influence (SI) and Facilitating Conditions (FC) underscore the role of social and environmental contexts in this process. Moreover, the mediating roles of Attitude Toward Using (ATU) and Cognitive Absorption (CA) further enrich our understanding of how users emotionally and psychologically connect with these digital personas. In a society like Indonesia, where collectivist values and digital engagement are rapidly evolving, the results of this study provide valuable insights for marketers and brands looking to effectively engage consumers through Virtual Influencers.

Nevertheless, while the findings offer robust contributions to the understanding of Virtual Influencer adoption, they also open avenues for future exploration. The study's focus on Indonesian social media users familiar with AI technologies and Virtual Influencers limits the generalizability of its findings, suggesting that cross-cultural studies are necessary to fully capture the global dynamics of this phenomenon. Additionally, the study's reliance on self-reported data raises the need for more nuanced approaches, including longitudinal studies that can track the long-term impact of Virtual Influencers on consumer behavior. As the digital landscape continues to evolve, these insights are a starting point for deeper inquiries into the emotional, cultural, and behavioral dimensions that shape the future of Virtual Influencers in marketing strategies.

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