

Can Virtual Influencers Be Trusted Like Humans? A Social Psychological Study Using AIDUA's Primary and Secondary Appraisals in Indonesia

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Abstract. In Indonesia's collectivistic yet mobile first marketplace, virtual influencers have evolved from eye catching avatars into algorithmic peers whose persuasive power rests on a blend of social conformity and personal enjoyment. Leveraging the Artificial Intelligence Device Use Acceptance (AIDUA) model, this study isolates primary (cognitive) and secondary (affective) appraisals to explain why users embrace—or recoil from—synthetic personae. A cross sectional online survey of 286 Indonesian social media users (aged 18 to 35) was analyzed using PLS SEM (SmartPLS 4) to test a structural model linking social influence and hedonic motivation to performance expectancy, anthropomorphism to effort expectancy, and both cognitions to discrete positive and negative emotions. PLS SEM produced robust psychometrics and significant pathways: social influence ($\beta = 0.34$) and hedonic motivation ($\beta = 0.46$) jointly explained 45% of performance expectancy, while anthropomorphism increased effort expectancy, that is, ease of use ($\beta = 0.61$; $R^2 = 0.38$). Performance expectancy amplified positive emotion ($\beta = 0.48$) and effort expectancy mitigated negative emotion ($\beta = -0.41$), with the model accounting for 42% of positive and 29% of negative affect. These results uncover “utilitarian collectivism,” a dual cognitive–affective engine wherein peer validation and hedonic thrill sustain utilitarian value, and position anthropomorphism as a usability heuristic rather than a mere novelty cue. Practically, the findings inform marketers and policymakers and support digital well-being initiatives by indicating when and how anthropomorphic cues and social norms may be leveraged without prompting counterproductive emotional responses.

Keywords: *utilitarian collectivism, AIDUA model, anthropomorphism, virtual influencers, social influence, hedonic motivation*

Abstrak. Di pasar Indonesia yang kolektivistik sekaligus mobile first, virtual influencer telah berevolusi dari sekadar avatar yang menarik perhatian menjadi “rekan algoritmik” dengan kekuatan persuasif yang bertumpu pada kombinasi konformitas sosial dan kesenangan pribadi. Dengan menggunakan model Artificial Intelligence Device Use Acceptance (AIDUA), penelitian ini memisahkan appraisal primer (kognitif) dan sekunder (afektif) untuk menjelaskan mengapa

pengguna menerima—atau menolak—persona sintetis. Survei daring sekali waktu terhadap 286 pengguna media sosial Indonesia berusia 18–35 tahun dianalisis menggunakan PLS-SEM (SmartPLS 4) untuk menguji model struktural yang menghubungkan social influence dan hedonic motivation dengan performance expectancy, antropomorfisme dengan effort expectancy, serta kedua aspek kognitif tersebut dengan emosi positif dan negatif. Analisis PLS-SEM menunjukkan reliabilitas psikometrik yang kuat serta jalur yang signifikan: social influence ($\beta = 0,34$) dan hedonic motivation ($\beta = 0,46$) bersama-sama menjelaskan 45% varians performance expectancy, sementara antropomorfisme meningkatkan effort expectancy atau kemudahan penggunaan ($\beta = 0,61$; $R^2 = 0,38$). Performance expectancy memperkuat emosi positif ($\beta = 0,48$) dan effort expectancy menurunkan emosi negatif ($\beta = -0,41$), dengan model menjelaskan 42% varians emosi positif dan 29% varians emosi negatif. Temuan ini mengungkap “utilitarian collectivism,” yaitu mesin kognitif–afektif ganda di mana validasi sosial dan kesenangan hedonic menopang nilai utilitarian, serta menempatkan antropomorfisme sebagai heuristik kegunaan, bukan sekadar isyarat kebaruan. Secara praktis, hasil penelitian ini memberikan wawasan bagi pemasar dan pembuat kebijakan serta mendukung inisiatif digital well-being dengan menunjukkan kapan dan bagaimana isyarat antropomorfis dan norma sosial dapat dimanfaatkan tanpa memicu respons emosional yang kontraproduktif.

Kata kunci: Kolektivisme Utilitarian, Model AIDUA, Antropomorfisme, Influencer Virtual, Pengaruh Sosial, Motivasi Hedonik

Indonesia’s social media landscape is now populated not only by human tastemakers but also by algorithmically generated personae. Virtual influencers (VIs) such as Lentari van Loraine exchange jokes in Bahasa Indonesia, review local skincare brands, and cultivate six figure followings, weaving themselves into the everyday scrolling routines of young Indonesians (Azzahra & Christin, 2024). With roughly 170 million active users devoting an average of four hours per day to social platforms, the archipelago is among the most intensive digital markets worldwide (We Are Social & Hootsuite, 2023). From a social psychological viewpoint, the rise of VIs raises questions about how individuals construct social meaning, experience emotions, and regulate behaviour when the interaction partner is a synthetic agent rather than a flesh and blood peer.

Indonesia’s Gen Z constitutes the most connected cohort, with official statistics showing smartphone ownership among those aged 15–24 exceeding ninety percent, underscoring near-universal access to mobile internet (BPS, 2023). Complementing this picture at the ecosystem level, national surveys by APJII report more than 220 million

internet users and sustained multi-platform engagement across the archipelago (APJII, 2024). Recent evidence from the Indonesia Gen Z Report indicates that 73% of this cohort rely on social media as their primary gateway to information, reinforcing heavy short-form video consumption on Instagram, TikTok, and YouTube (IDN Research Institute, 2024). This youth-centered, creator-driven culture normalizes parasocial interaction, playful identity experimentation, and always-on scrolling, providing fertile ground for virtual influencers to be perceived as relatable peers rather than mere brand assets (Katadata, 2023).

Emerging empirical work suggests that VIs can match or even surpass human influencers in perceived credibility and engagement (Belanche et al., 2024; Dabiran et al., 2024). Meta analytic reviews highlight anthropomorphism, entertainment value, and social proof as salient psychological cues that guide user responses (Laszkiewicz & Kalinska Kula, 2023; Davlembayeva et al., 2025). Yet most studies are Western centric and often rely on aggregated global samples that overlook cultural scripts of collectivism, normative conformity, and pragmatic hedonism that shape Indonesian social life (Huwaida et al., 2024; Maulana et al., 2021; Firellsya et al., 2024). Consequently, we know little about how these culturally embedded motives translate into cognitive appraisals and discrete affective states—core constructs in social psychological theories of technology use and emotion.

While the Technology Acceptance Model (TAM; Davis, 1989) and the Unified Theory of Acceptance and Use of Technology and its consumer extension (UTAUT/UTAUT2; Venkatesh, Morris, Davis, & Davis, 2003; Venkatesh, Thong, & Xu, 2012) have been widely used in technology acceptance research, the Artificial Intelligence Device Use Acceptance (AIDUA) framework offers an integrative lens that models both utilitarian appraisals—performance expectancy and effort expectancy—and affective appraisals (Gursoy, Chi, Lu, & Nunkoo, 2019), aligning with our focus on links between cognition and emotion. To address this gap, the present study adopts a targeted application of AIDUA that foregrounds only its first two appraisal stages rather than the outcome stage. Anchored in appraisal theory of emotion and social cognitive accounts of technology adoption, we propose that (a) social influence and hedonic motivation, two motives amplified by

Indonesia's group oriented and playful online cultures, augment performance expectancy, while (b) anthropomorphic cues increase effort expectancy (i.e., perceived ease of use) by invoking familiar interpersonal scripts (Kembau et al., 2024; Cheng et al., 2022). These cognitive evaluations are then expected to elicit discrete positive and negative emotions, echoing calls to examine affective pathways in human–AI interaction (Yu et al., 2024; Zhang et al., 2021).

Accordingly, this research pursues three social psychological objectives: (1) Clarify how normative endorsement, intrinsic enjoyment, and perceived human likeness shape Indonesian users' cognitive appraisals of VIs, (2) Test whether those appraisals cascade into discrete emotional reactions, thereby linking cognition and affect in human–AI encounters, (3) Identify which appraisal routes most strongly predict acceptance within a mobile first emerging economy characterised by collectivistic values.

The study makes four contributions to the psychology of digital behaviour. First, by localising AIDUA to Southeast Asia, it demonstrates how Indonesian users blend collective social proof, hedonic thrill, and utilitarian reasoning when evaluating synthetic agents. Second, it reconceptualises anthropomorphism as a social cognitive usability heuristic rather than merely an affective garnish. Third, by disentangling positive from negative emotions, it adds nuance to appraisal based theories of technology elicited affect. Finally, the findings illuminate how culturally attuned humour, vernacular language, and frictionless interaction may foster adaptive, rather than maladaptive, emotional engagement with AI personae—an insight relevant to public discourse on digital well being.

Virtual Influencers

Virtual influencers (VIs) are computer generated personae that converse, joke, and display emotions on social platforms, thereby simulating interpersonal interaction (Kim et al., 2025; Kembau et al., 2024). From a social psychological angle, VIs function as symbolic interaction partners whose acceptance depends on the observer's cognitive appraisals (e.g., usefulness, ease) and affective responses (e.g., enthusiasm, discomfort). The Artificial

Intelligence Device Use Acceptance (AIDUA) model (Gursoy et al., 2019) captures these dynamics via a two stage appraisal process: users first judge expected benefits and costs (Primary Appraisal) and then experience emotions that guide behaviour (Secondary Appraisal).

Grounded in appraisal theory (Lazarus, 1991; Suh, 2024; Nguyen et al., 2025) and the social cognitive tradition in technology adoption, we focus on three antecedents that are especially salient in Indonesian digital culture: social influence, hedonic motivation, and anthropomorphism. Each represents a distinct social psychological cue—normative pressure, intrinsic enjoyment, and human likeness—that shapes cognitive evaluations and downstream emotions. Figure 1 summarises the conceptual model.

Social Influence and Performance Expectancy

Social influence (SI) denotes the perceived expectation of significant others that one should engage with a technology (Venkatesh et al., 2012; Firellsya, et al., 2024). Under normative conformity theory, individuals internalise peer approval to maintain social harmony, an effect magnified in collectivistic cultures such as Indonesia. Empirical studies in AI mediated settings show that SI increases perceived usefulness because an endorsed tool signals collective validation of its efficacy (Vafaei Zadeh et al., 2024). In influencer marketing, popularity operates as a heuristic cue of credibility (Belanche et al., 2024). For VIs—whose expertise may be ambiguous—normative cues from friends and online communities legitimise the agent and raise expectations that interaction will yield valuable outcomes (Davlembayeva et al., 2025).

H1: Social influence is positively related to users' performance expectancy toward virtual influencers.

Hedonic Motivation and Performance Expectancy

Hedonic motivation (HM) captures the pleasure derived from an activity (Venkatesh et al., 2012). In self-determination theory, intrinsic enjoyment fosters autonomous engagement, which in turn amplifies perceptions of competence and utility. Consistently, research on AI avatars finds that entertainment value is a key driver of perceived usefulness,

especially in experience centric domains (Longoni & Cian, 2022; Jhavar et al., 2023; Lou et al., 2023). When VIs deliver creative storytelling, humour, and aesthetic novelty, users infer that the interaction will help fulfil their social or informational goals.

H2: Hedonic motivation is positively related to users' performance expectancy toward virtual influencers.

Anthropomorphism and Effort Expectancy

Anthropomorphism (ANT) refers to attributing human-like form or behaviour to non humans (Munnukka et al., 2022). According to social response theory, even minimal cues of humanness can trigger mind perception and activate well rehearsed social scripts, thereby lowering cognitive load (Cheng et al., 2022). Studies on chatbots show that facial expressions, first person language, and natural motion reduce perceived effort and increase conversational fluency (Uysal et al., 2023). For VIs, optimal anthropomorphism—enough to appear relatable but not uncanny—should signal intuitive interaction, while excessive realism might backfire (Dabiran et al., 2024).

H3: Anthropomorphism is positively related to users' effort expectancy toward virtual influencers.

Cognitive Appraisals and Affective Responses

Performance Expectancy towards Positive Emotion

Performance expectancy (PE) captures the belief that a technology will achieve valued outcomes (Venkatesh et al., 2012; Gursay et al., 2019). In appraisal theory, anticipated goal congruence evokes approach oriented emotions such as excitement or satisfaction (Chi & Hoang Vu, 2023). Empirical work confirms that higher PE toward AI robots or influencers heightens delight and trust (Feng et al., 2024; Yu et al., 2024).

H4: Performance expectancy is positively related to users' positive emotions toward virtual influencers.

Effort Expectancy towards Negative Emotion

Effort expectancy (EE) is the perceived ease of use (Venkatesh et al., 2012). High required effort signals potential autonomy threat and triggers avoidance oriented emotions

such as anxiety and irritation (Chi et al., 2021). Conversely, intuitive interfaces mitigate negative affect (Zhang et al., 2021). On frictionless social platforms, any perceived difficulty when engaging with a VI should translate directly into negative emotional arousal.

H5: Effort expectancy is negatively related to users' negative emotions toward virtual influenc.

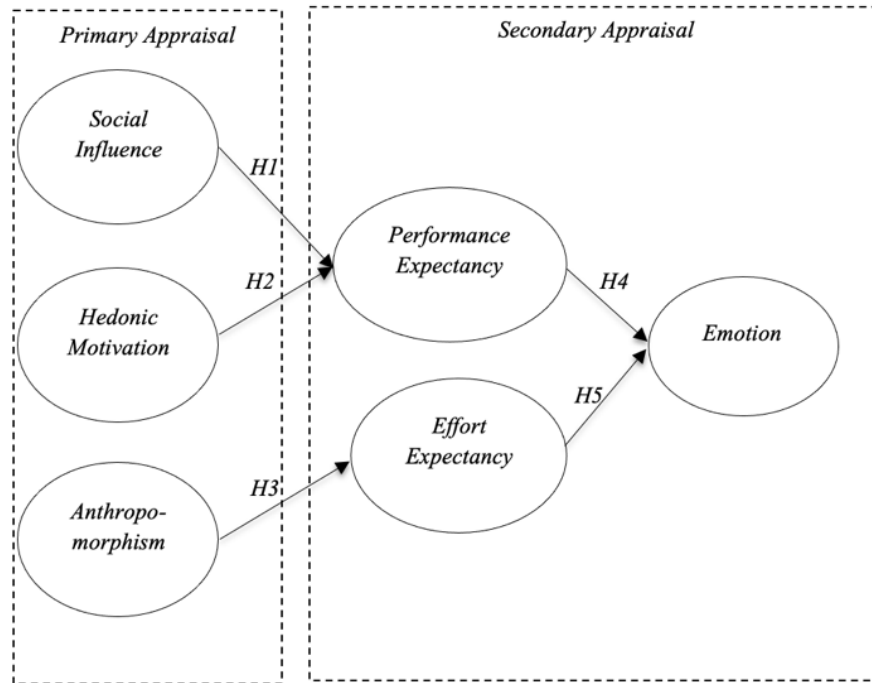


Figure 1. Research Paradigm of the AIDUA Model (adapted from Gursoy et al., 2019)

Figure 1 illustrates the research paradigm utilized in this study, adapted from the Artificial-Intelligence Device Use Acceptance (AIDUA) model proposed by Gursoy et al. (2019). The model distinctly separates the appraisal process into two stages: Primary Appraisal, comprising Social Influence, Hedonic Motivation, and Anthropomorphism, and Secondary Appraisal, capturing Performance Expectancy, Effort Expectancy, and resultant Emotional responses. Hypothesized paths (H1–H5) clarify the theorized relationships among these variables, delineating how cognitive assessments formed through social, hedonic, and anthropomorphic evaluations subsequently influence affective outcomes in the acceptance of virtual influencers

Methods

A cross-sectional, quantitative survey was employed to test the hypothesised causal paths among latent variables in a single consumer cohort. The model is rooted in the Artificial-Intelligence Device Use Acceptance (AIDUA) framework (Gursoy et al., 2019) and limits its scope to the Primary Appraisal constructs, social influence (SI), hedonic motivation (HM) and anthropomorphism (ANT), and the Secondary Appraisal constructs—performance expectancy (PE), effort expectancy (EE), positive emotion (PEM) and negative emotion (NEM). Data were collected through a self-administered questionnaire hosted on Qualtrics and promoted via targeted Instagram ads, thereby situating respondents in the same environment in which they ordinarily encounter virtual influencers (VIs).

Sampling and Data Collection

Purposive sampling targeted Indonesian social-media users aged 18–35 who (1) follow at least one VI, (2) have purchased a product endorsed by any influencer and (3) use AI-enabled applications such as Siri or ChatGPT. These criteria ensure experiential familiarity with the focal phenomenon. The final instrument contains 21 reflective indicators (seven constructs $\times$ three items). Applying the 10–15 cases-per-indicator heuristic for PLS-SEM (Hair et al., 2019) suggests a minimum of 210 observations; we therefore aimed for $N = 300$ to raise statistical power and curb non-response bias. The questionnaire was pre-tested with 20 eligible respondents to refine wording and remove ambiguities. All items used a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree) because of its superior sensitivity in attitudinal research (Garson, 2016). Participation was voluntary, anonymous and compliant with the Indonesian Code of Ethics for Social Research. Informed consent was obtained on the opening screen. Although self-reporting may induce social desirability bias, the anonymous online survey design aimed to minimize this risk.

Measurement Development

Table 1 summarizes the instruments and item wording adopted in this study. The seven latent constructs—Social Influence (SI), Hedonic Motivation (HM),

Anthropomorphism (ANT), Performance Expectancy (PE), Effort Expectancy (EE), Positive Emotion (PEM), and Negative Emotion (NEM), were modeled reflectively and operationalized with three items each, adapted from established scales (e.g., Venkatesh et al., 2012; Longoni & Cian, 2022; Cheng et al., 2022; Gursoy & Chi, 2019). We first delineated each construct's domain and mapped candidate indicators to ensure conceptual coverage; to balance content breadth with respondent burden, we retained three non-redundant items per construct, consistent with recommendations for reflective measurement in PLS-SEM. Before fielding, content validity was established via expert review (two subject-matter scholars and one methods specialist) who independently evaluated item relevance and clarity, leading to minor wording refinements where consensus indicated potential ambiguity or cultural mismatch. Face validity was then assessed in a 20-respondent pretest using brief cognitive debriefs (comprehension and terminology probes); feedback prompted small edits to improve clarity and readability. All adjustments were integrated into the final instrument reported in Table 1, and the validated items were subsequently evaluated for reliability and convergent/discriminant validity within the PLS-SEM measurement model.

Table 1*Measurement instruments*

Construct (Code)	Item Code	Item statement (English version)	Source
Social Influence (SI)	SI1	"People who are important to me think I should follow this virtual influencer."	Venkatesh et al., 2012; Vafaei-Zadeh et al., 2024
	SI2	"Friends and family encourage me to engage with this virtual influencer."	
	SI3	"The virtual influencer is popular in my social circle."	
Hedonic Motivation (HM)	HM1	"Interacting with this virtual influencer is entertaining."	Venkatesh et al., 2012; Longoni & Cian, 2022
	HM2	"Using this virtual influencer is fun."	
	HM3	"I enjoy spending time with this virtual influencer."	
Anthropomorphism (ANT)	ANT1	"This virtual influencer looks like a real person."	Cheng et al., 2022; Munnukka et al., 2022
	ANT2	"The influencer's behaviour feels human-like."	

	ANT3	"The influencer's expressions seem lifelike."	
Performance Expectancy (PE)	PE1	"This virtual influencer provides accurate and relevant product information."	Venkatesh et al., 2012; Gursoy & Chi, 2019
	PE2	"The influencer enhances my social-media experience."	
	PE3	"Overall, the influencer is useful for my purchase decisions."	
Effort Expectancy (EE)	EE1	"Learning to interact with this virtual influencer is easy for me."	Venkatesh et al., 2012; Pandey & Rai, 2023
	EE2	"My interaction with the influencer is clear and understandable."	
	EE3	"It takes little mental effort to use the influencer's features."	
Positive Emotion (PEM)	PEM1	"I feel excited when engaging with this virtual influencer."	Chi & Hoang, 2023; Zhang et al., 2021
	PEM2	"The influencer makes me feel happy."	
	PEM3	"Interacting with the influencer is enjoyable."	
Negative Emotion (NEM)	NEM1	"I feel uncomfortable when using this virtual influencer."	Gursoy & Chi, 2019; Zhang et al., 2022
	NEM2	"The influencer makes me feel confused."	
	NEM3	"I feel anxious interacting with the influencer."	

Data Analysis Strategy

Variance-based structural-equation modelling (PLS-SEM) was executed in SmartPLS 4 following Hair et al.'s (2019) two-step procedure. (1) Measurement model. Indicator reliability (outer loadings ≥ 0.70), composite reliability ($CR \geq 0.70$) and convergent validity ($AVE \geq 0.50$) were assessed. Discriminant validity was inspected with the Fornell–Larcker criterion and the heterotrait–monotrait ratio ($HTMT \leq 0.85$; Henseler et al., 2015). (2) Structural model. Path coefficients were estimated with 5 000-sample bootstrapping to obtain bias-corrected confidence intervals. Predictive accuracy was gauged via R^2 and Stone–Geisser's Q^2 (Chin, 1998). Indirect effects (e.g., $SI \rightarrow PE \rightarrow PEM$) were tested with

percentile bootstrapping (Preacher & Hayes, 2008). Potential heterogeneity was explored through PLS multi-group analysis across gender; age, income and social-media intensity were included as controls. (3) Bias mitigation. Procedural remedies against common-method variance (CMV) included balanced question order, proximal separation of predictor and criterion blocks and guaranteed anonymity (Podsakoff et al., 2003). Post-hoc checks comprised Harman's single-factor test and full-collinearity VIFs (< 3.3 ; Kock, 2015). Non-response bias was examined by comparing early versus late respondents; independent-samples t-tests detected no significant differences ($p > .10$), indicating minimal attrition bias (Armstrong & Overton, 1977). Collectively, these safeguards enhance the credibility of the reported relationships.

Results

Three hundred invitations were issued; 286 complete questionnaires were retained for analysis, yielding a usable-response rate of 95.3%. Respondents were between 18 and 35 years old ($M = 24.8$, $SD = 4.2$). Just over half identified as female (56.6%), while 42.7% identified as male and 0.7% as non-binary. The average daily social media consumption among respondents was approximately 4.1 hours ($SD = 1.9$). All participants met the screening criteria by following at least one virtual influencer and having purchased at least one product promoted by an influencer within the preceding six months.

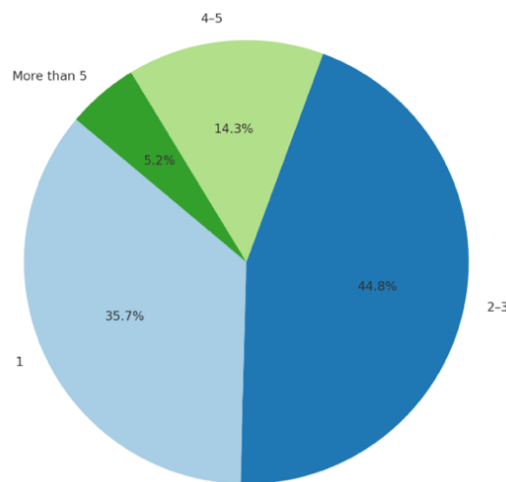


Figure 2. Distribution of Virtual Influencers Followed By Respondent (%)

Figure 2 further illustrates the intensity of respondents' engagement with virtual influencers, highlighting that a majority (44.8%) followed between two to three virtual influencers. Approximately one-third (35.7%) followed only a single influencer, while smaller segments reported higher engagement: 14.3% followed four to five influencers, and 5.2% followed more than five. This distribution underscores respondents' active participation and varied levels of interaction with virtual influencers, emphasizing the study's relevance in capturing nuanced consumer perceptions within Indonesia's digitally-driven marketplace.

Building on this engagement profile, we next establish the quality of the measurement model before estimating structural paths. Table 2 summarizes internal consistency (Cronbach's alpha, composite reliability), convergent validity (average variance extracted), and factor loadings for each construct used in the analysis.

Table 2

Reliability, Convergent Validity, and Factor Loadings of Measurement Constructs

Construct	α	CR	AVE	Loading range
Social Influence (SI)	.87	.92	.79	.78 – .90
Hedonic Motivation (HM)	.88	.93	.81	.80 – .91
Anthropomorphism (ANT)	.86	.91	.77	.75 – .89
Performance Expectancy (PE)	.88	.93	.80	.79 – .92
Effort Expectancy (EE)	.85	.90	.75	.74 – .88
Positive Emotion (PEM)	.90	.94	.83	.82 – .91
Negative Emotion (NEM)	.86	.91	.78	.76 – .88

All outer loadings exceeded .74, surpassing the .70 threshold. Composite reliability, Cronbach's α , and AVE values all satisfied recommended cut-offs, attesting to internal consistency and convergent validity (Hair, Risher, Sarstedt, & Ringle, 2019). Fornell–Larcker and HTMT diagnostics confirmed discriminant validity (highest HTMT = .70 < .85). Full-collinearity VIFs ranged from 1.27 to 2.94, dismissing multicollinearity and common-

method bias concerns (Kock, 2015). Collectively, the reflective measurement model is psychometrically sound.

The structural model exhibits solid explanatory and predictive capacity. Social Influence and Hedonic Motivation jointly accounted for 45 % of the variance in Performance Expectancy ($R^2 = .45$, $Q^2 = .31$). Anthropomorphism explained 38 % of Effort Expectancy ($R^2 = .38$, $Q^2 = .26$). Downstream, Performance Expectancy elucidated 42 % of Positive Emotion ($R^2 = .42$, $Q^2 = .29$), while Effort Expectancy explained 29 % of Negative Emotion ($R^2 = .29$, $Q^2 = .20$). All Q^2 values were positive, indicating meaningful predictive relevance (Shmueli et al., 2019). As shown in Table 3, all hypothesized paths are statistically significant and in the theorized directions, supporting a dual-route appraisal structure in which social influence and hedonic motivation increase performance expectancy, while anthropomorphism increases effort expectancy (i.e., perceived ease of use).

Table 3

Structural Model Results: Path Coefficients, Significance, and Effect Sizes

Hypothesised path	β	t	p	f^2
H1 SI $\rightarrow$ PE	.34	6.12	< .001	.15
H2 HM $\rightarrow$ PE	.46	8.02	< .001	.28
H3 ANT $\rightarrow$ EE	.61	11.45	< .001	.37
H4 PE $\rightarrow$ PEM	.48	9.33	< .001	.31
H5 EE $\rightarrow$ NEM	-.41	7.21	< .001	.22

All five hypotheses are supported. Effect sizes (Cohen's f^2) reveal that ANT exerts a large practical impact on EE, PE has a medium-large impact on PEM, and the remaining relationships fall within the small-medium range. Bootstrapped indirect-effect tests (5 000 resamples) examined whether cognitive appraisals channel the influence of primary drivers onto emotions.

Building on these findings, Table 4 reports the indirect effects: bias-corrected bootstrapped confidence intervals (5,000 resamples) exclude zero for all paths, indicating that performance expectancy partially transmits the effects of social influence and hedonic

motivation to positive emotion, whereas effort expectancy fully transmits the effect of anthropomorphism to negative emotion.

Table 4

Mediation Analysis: Indirect Effects, Confidence Intervals, and Mediation Types

Indirect path	β indirect	95 % CI	Mediation type
SI → PE → PEM	.16	[.10, .24]	Partial
HM → PE → PEM	.22	[.15, .31]	Partial
ANT → EE → NEM	-.25	[-.34, -.17]	Full

Performance Expectancy partially transmits the effects of Social Influence and Hedonic Motivation onto Positive Emotion, whereas Effort Expectancy fully conveys the influence of Anthropomorphism onto Negative Emotion. Multi-group analysis found no significant path differences by gender ($\Delta\chi^2 = 3.87, p = .144$). Controlling for age, income and social-media intensity left substantive coefficients virtually unchanged; only social-media intensity displayed an auxiliary positive effect on Positive Emotion ($\beta = .18, t = 3.04, p = .002$). These robustness checks bolster confidence in the invariance and generalisability of the proposed dual cognitive–affective mechanism in Indonesia’s mobile-first market.

Discussion

This study enriches the AIDUA framework (Gursoy et al., 2019) by confirming that Indonesian users integrate collective social proof, intrinsic enjoyment, and perceived humanness into a dual route cognitive–affective appraisal of virtual influencers (VIs). Social influence and hedonic motivation jointly explained 45 % of performance expectancy, while anthropomorphism accounted for 38 % of effort expectancy; these cognitions, in turn, predicted 42 % of positive and 29 % of negative emotions. Such magnitudes attest to an appraisal process consistent with appraisal theory of emotion (Lazarus, 1991; Suh, 2024; Nguyen et al., 2025) yet coloured by local cultural scripts.

The strong SI → PE and HM → PE paths expose what might be called “utilitarian collectivism” (Venkatesh et al., 2012; van Berkel et al., 2022): Indonesian users fuse normative conformity with hedonic self expression (Huwaida et al., 2024;

Longoni & Cian, 2022; Fauzi & Sheng, 2021) to evaluate usefulness, diverging from individualistic contexts where intrinsic motives often dominate. These findings extend prior AI research (Belanche et al., 2024; Davlembayeva et al., 2025) by showing that, within a collectivistic, high context society (Maulana et al., 2021), social endorsement can elevate utilitarian beliefs without crowding out hedonic pleasure, a nuance that advances cross cultural technology acceptance theory.

While our data are situated in Indonesia, the degree to which this “utilitarian collectivism” generalizes to other collectivist or emerging-market settings remains an open question). Boundary conditions may include cultural dimensions (e.g., power distance, uncertainty avoidance), market maturity, and platform ecologies that shape social proof and entertainment norms (Hofstede et al., 2010; van Dijck, Poell, & de Waal, 2018). Future comparative work (e.g., ASEAN subregions or Global South contexts) is needed to test whether similar dual-route appraisals arise when normative endorsement and hedonic play co-occur, or whether different mixes of motives prevail.

Equally salient is the ANT → EE link, which reinforces social response theory: minimal human-like cues trigger mind perception and reduce cognitive load (Cheng et al., 2022). Our Gen Z dominated sample, fluent in AR filters and avatar play (Kembau & Lendo., 2025)—likely imports familiar scripts into VI interactions, translating anthropomorphism into cognitive fluency (Munnukka et al., 2022). The result complements Dabiran et al.’s (2024) proposition that anthropomorphism operates as a usability heuristic, and it highlights a cross cultural constant: when human-likeness is perceived as “just right,” its facilitative effect on ease transcends market maturity.

The appraisal–emotion mapping also bears directly on digital well-being. Elevated performance expectancy aligns with enthusiasm and satisfaction, whereas higher effort costs relate to discomfort and anxiety; in always-on, youth-heavy feeds this pattern may aggravate specific risks documented in the literature, such as fear of missing out (FOMO), upward/toxic social comparison, and social media fatigue. Prior studies link FOMO to problematic engagement and mood volatility (e.g., Przybylski et al., 2013), show that

algorithmically curated ideals fuel adverse comparisons and affect (e.g., Vogel et al., 2014; Verduyn et al., 2017), and identify overload/strain pathways to fatigue and disengagement (e.g., Bright et al., 2015; Dhir et al., 2018). In our context, anthropomorphic cues that increase perceived ease may lower friction and intensify exposure cycles; conversely, poorly calibrated “almost human” cues risk unease, potentially amplifying fatigue. Designing for balance—clear labelling of synthetic agents, bounded anthropomorphic expressivity, and choice architectures that temper compulsive loops, could mitigate these hazards while preserving positive affect.

Finally, the mapping of cognitive appraisals onto valence specific emotions underscores a pathway with implications for digital well being (Sattar et al., 2025; Yu et al., 2024). Elevated performance expectancy elicited enthusiasm and satisfaction (Chi & Hoang Vu, 2023), whereas heightened effort expectancy provoked discomfort and anxiety (Pandey & Rai, 2023). Given that 71 % of respondents are heavy scrolling Gen Z and young millennials, such negative affect may foreshadow FOMO, social media fatigue, or reduced self esteem, concerns documented in broader digital stress literature (Zhang et al., 2021). By situating these emotional repercussions within an Indonesian cohort, the present study bridges technology acceptance research with emerging inquiries into mental health outcomes.

Practical Implications

For brands and content creators, the results highlight the importance of orchestrating a careful balance between social proof, playful storytelling, and moderate human likeness (van Berkel et al., 2022; Christanti & Kembau, 2024). Campaigns should deliberately seed peer endorsement—through user generated duets, friend tag challenges, or community polls, to satisfy the collectivistic need for normative validation while simultaneously showcasing tangible utility (e.g., product tutorials, personalised tips). At the creative level, anthropomorphic cues such as natural facial micro expressions and culturally resonant humour should be calibrated to a “just right” threshold that maximises cognitive fluency without triggering uncanny discomfort (Jhavar et al., 2023; Laszkiewicz, &

Kalinska-Kula, 2023), Such design choices will not only boost perceived usefulness and ease of interaction but also amplify positive emotions, thereby deepening engagement and purchase intent among Indonesia's Gen Z and millennial cohorts.

For technology practitioners and UX designers, the findings recommend operational design guidelines that translate anthropomorphism into usability rather than unease. First, calibrate the fidelity of human-like features (facial expressivity, voice prosody, turn-taking) below the “almost human” zone that risks uncanny responses, while retaining the micro cues that facilitate cognitive fluency (Cheng et al., 2022; Munnukka et al., 2022; Jhawar et al., 2023). Second, embed transparency and control: persistent “synthetic agent” badges, clear sponsorship labels, and simple toggles to adjust the degree of personification support autonomy and reduce perceived effort (Hamby et al., 2022; Maulana et al., 2021, Kembau et al., 2025). Third, design for healthy engagement loops by pairing friction reduction with safeguards—session break nudges, frequency caps for push prompts, and cooling-off intervals on high-arousal content—so that increased ease of use does not escalate compulsive exposure. Finally, evaluate prototypes on dual metrics (usability and affect), not engagement alone, to ensure anthropomorphic elements improve interaction quality without elevating anxiety or fatigue (Dabiran et al., 2024).

For policy makers, educators, and mental health advocates, the dual-route appraisal uncovered here flags both opportunities and risks. While elevated performance expectancy can foster enthusiasm and digital empowerment, high perceived effort magnifies anxiety and potential social media fatigue. Digital literacy programmes should therefore teach users to critically evaluate VI content, distinguishing playful narrative from persuasive intent—and to recognise early signs of adverse affect (e.g., doom scrolling, FOMO). Platform teams can complement these efforts by implementing clear labelling, simplified navigation, and easy opt-out pathways that lower effort expectancy and protect users' autonomy (Hamby et al., 2022; Maulana et al., 2021). Taken together, these measures can help integrate VIs into Indonesia's digital ecosystem in ways that promote consumer well being alongside commercial innovation.

Conclusion

This study brings fresh evidence that Indonesian social media users do not passively accept algorithmic personae; they actively weigh collective endorsement, intrinsic enjoyment, and human-likeness before deciding whether a virtual influencer deserves their trust and emotion. The discovery of utilitarian collectivism, a blend of pragmatic usefulness and normative conformity, demonstrates that technology acceptance in a collectivistic society follows its own logic rather than mimicking individualistic patterns. By showing that calibrated anthropomorphism smooths interaction and that cognitive appraisals feed directly into discrete emotions, the research forges a bridge between social psychological theory and the fast moving world of AI mediated persuasion.

The argument advanced here is straightforward, if digital agents can mobilise the same social mechanisms that once belonged solely to human interaction, then psychologists must rethink the boundaries of interpersonal influence. Virtual influencers are not merely marketing novelties; they are socially embedded tools that can ignite enthusiasm or trigger anxiety, with direct repercussions for digital well being. By situating these dynamics in Indonesia's mobile first, high context culture, the study enriches global debates on technology and emotion while giving voice to an emerging economy that is often peripheral in scholarly conversations.

Naturally, the work is not without constraints. A cross sectional snapshot and an urban Gen Z sample limit causal inference and generalisability, and self report data cannot capture the full texture of emotional arousal. Future research should track these appraisal–emotion cycles over time, widen the demographic lens to older and rural cohorts, and incorporate behavioural or physiological measures. Comparative studies across Southeast Asia would clarify whether utilitarian collectivism is uniquely Indonesian or regionally pervasive. Future research must continue to examine how synthetic agents shape and are shaped by the emotional and social lives of users across cultural contexts.

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