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Article

AI vs. Human Streamers on Consumer Purchase Intention: An Asymmetric Mechanism Model with Two Boundary Conditions among Malaysian Consumers

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Abstract: Simple comparisons of the effects of AI streamers and human streamers in live-streaming e-commerce have been widely examined, yet the differentiated psychological mechanisms underlying their effects remain unclear. This study proposes an asymmetric mechanism model: human streamers primarily form an affective advantage through perceived authenticity and social presence, whereas AI streamers form functional compensation through perceived professionalism. Product type and AI acceptance are incorporated as boundary conditions at the contextual and individual levels, respectively. A two-stage research design was adopted. Study 1, based on a survey of Malaysian consumers (N = 372), examined asymmetric mediation and preliminary robustness across ethnic backgrounds. Study 2, using a 2 × 2 online scenario experiment (N = 314), validated the causal effects. The results show that the advantage of human streamers mainly stemmed from the authenticity mechanism, which was the most stable mechanism across both studies. The social presence mechanism appeared only to a limited extent in the context of hedonic products. The professionalism-based compensation mechanism of AI streamers was significant mainly in the context of utilitarian products. AI acceptance primarily moderated the authenticity mechanism, indicating that consumers with higher AI acceptance were less sensitive to AI streamers' authenticity disadvantage. Its moderating effect on the professionalism mechanism was only marginally significant, suggesting that the role of AI acceptance in shaping professionalism evaluations requires further examination. This study shifts the research focus from "which type of streamer is more effective" to "through which mechanisms streamer effects occur," thereby providing implications for human–AI collaborative streamer strategies in Southeast Asia.

Keywords: AI streamers; human streamers; purchase intention; asymmetric mediation; AI acceptance; product type; live-streaming e-commerce in Malaysia.

1. Introduction

In recent years, live-streaming e-commerce has developed rapidly and become an important form of digital retail [1-2]. In Malaysia, the growth of platforms such as TikTok Shop and Shopee Live has made live-streaming e-commerce a key channel for consumers to obtain product information and form purchase judgments. Compared with traditional image- and text-based e-commerce, live-streaming e-commerce enhances consumer engagement through real-time explanations, interactive Q&A, and scenario-based demonstrations [1]. In this process, streamers not only transmit product information but also shape consumers' trust in products, brands, and platforms [3].

With the development of artificial intelligence and digital human technologies, AI streamers have been increasingly used for product demonstrations, routine promotions, and long-duration automated live streaming [4]. However, the roles of AI and human streamers cannot be reduced to a simple question of "which is more effective. [5]" Live-streaming e-commerce involves information transmission, trust formation, emotional interaction, and social presence [6-7]. Owing to their

non-human identity and technology-generated features, AI streamers may be disadvantaged in emotional expression and interaction depth, while offering advantages in information consistency and professional presentation. Therefore, this study focuses not on whether AI streamers outperform human streamers, but on the psychological mechanisms through which the two types of streamers influence purchase intention. Specifically, human streamers may form an advantage mechanism through perceived authenticity and social presence, whereas AI streamers may form a compensation mechanism through perceived professionalism.

Existing research has largely focused on main-effect comparisons or single mediating mechanisms, making it difficult to explain why the effects of the two streamer types differ. From the perspective of asymmetric mediation mechanisms, this study examines whether perceived authenticity, social presence, and perceived professionalism constitute differentiated mechanisms linking streamer type to purchase intention. Meanwhile, the effectiveness of AI streamers may depend on product attributes and individual consumer differences. For utilitarian products, consumers pay greater attention to functionality and professional explanations; for hedonic products, they emphasize experience and interactive atmosphere. Consumers' AI acceptance may also shape their evaluations of AI streamers. Accordingly, this study incorporates product type and AI acceptance as boundary conditions affecting these asymmetric mechanisms.

This study focuses on Malaysian consumers. Malaysia's multi-ethnic, multilingual, and multicultural consumer environment provides a distinctive context for examining this mechanism in Southeast Asian markets and helps address the limitation that existing studies have mainly focused on China, Europe, and the United States. Based on this, the study proposes three research questions. **RQ1:** Do AI streamers and human streamers differentially influence purchase intention through psychological mechanisms such as perceived authenticity, social presence, and perceived professionalism? **RQ2:** How do product type and AI acceptance influence these asymmetric mechanisms? **RQ3:** Does the asymmetric mechanism model demonstrate contextual applicability and robustness among Malaysia's multicultural consumer sample?

This study offers both theoretical and practical contributions. Theoretically, it proposes an asymmetric mechanism model of how AI and human streamers influence purchase intention, emphasizing that they may operate through different psychological mechanisms, with product type and AI acceptance serving as boundary conditions. Practically, it provides guidance for differentiated streamer deployment. Utilitarian products may be more suitable for AI streamers to deliver standardized information, whereas hedonic products may better suit human streamers, who can leverage authenticity and emotional expression. AI acceptance may also support consumer segmentation and help brands optimize streamer strategies.

2. Theoretical Foundations and Research Hypotheses

2.1. Theoretical Framework

This study adopts the Stimulus–Organism–Response (SOR) model as the overarching analytical framework [8-9]. In the context of live-streaming e-commerce, streamer type (AI vs. human) and product type (utilitarian vs. hedonic) constitute external stimuli (S); consumers' perceived authenticity, social presence, and perceived professionalism toward the streamer constitute internal psychological states (O); and purchase intention represents the behavioral response outcome (R).

To explain the differences in the psychological mechanisms through which AI streamers and human streamers operate, this study further integrates the CASA paradigm, Uncanny Valley theory, and the AIDUA model [10-12]. The CASA paradigm suggests that consumers may respond to technological objects with social cues in ways similar to interpersonal interactions, thereby providing a basis for AI streamers to elicit social presence. Uncanny Valley theory indicates that when human-like agents contain unnatural cues, consumers' evaluations of authenticity may be weakened. The AIDUA model emphasizes that consumers' acceptance of AI involves functional cognition, affective responses, and usage intention, providing a theoretical basis for incorporating AI acceptance as a moderating variable in this study.

Taken together, this study argues that AI streamers and human streamers do not merely differ in strength along the same mechanism; rather, they may influence purchase intention through different psychological mechanisms. Human streamers are more likely to form advantages through authenticity and social presence, whereas AI streamers may form a compensation mechanism through professionalism.

2.2. Main-Effect Hypothesis

The main-effect hypothesis is used to establish a baseline for subsequent mechanism analysis, rather than representing the core innovation of this study. In the overall context where product type and individual differences are not distinguished, human streamers, owing to their real identity, natural facial expressions, and immediate responses, may be more easily perceived by consumers as authentic and socially present, thereby forming an overall advantage in purchase intention. Although AI streamers have advantages in expression stability and information standardization, their non-human identity and technology-generated characteristics may still lead some consumers to evaluate them with caution [13-14].

H1: In the overall context where product type and AI acceptance are not distinguished, human streamers will elicit higher consumer purchase intention than AI streamers.

It should be noted that H1 describes only the average net effect and does not exclude the possibility that AI streamers may show advantages under specific boundary conditions.

2.3. Asymmetric Mediation Hypotheses

This study argues that the psychological mechanisms through which AI streamers and human streamers influence purchase intention are not entirely the same. Perceived authenticity refers to consumers' perceptions of the streamer's real identity, sincere intentions, and natural expression [15]. The real identity and immediate responses of human streamers are more likely to be regarded as authenticity signals, whereas the anthropomorphic appearance and scripted expression of AI streamers may lead consumers to reserve judgment about their genuine intentions [16].

H2a: Perceived authenticity mediates the effect of streamer type on purchase intention; human streamers will enhance consumer purchase intention through higher perceived authenticity.

Social presence refers to the extent to which consumers perceive the presence of others and social connection during interaction. Although AI streamers may create a certain sense of interaction through speech synthesis, anthropomorphic appearance, or automated responses, their interactions may still be perceived as programmed. By contrast, the immediate responses and emotional expressions of human streamers are more likely to enhance social presence.

H2b: Social presence mediates the effect of streamer type on purchase intention; human streamers will enhance consumer purchase intention through higher social presence.

Perceived professionalism refers to consumers' perceptions of the streamer's product knowledge, clarity of explanation, and recommendation ability [17]. AI streamers have advantages in information standardization, expression stability, and parameter presentation, and are particularly suitable for structured product explanations [18]. This may become a compensation mechanism through which AI streamers offset their disadvantages in authenticity and social presence.

H2c: Perceived professionalism mediates the effect of streamer type on purchase intention; AI streamers will generate an indirect effect favoring AI through higher perceived professionalism, thereby compensating for their disadvantages in other mechanisms.

Taken together, H2a–H2c suggest that the three mediating mechanisms will exhibit an asymmetric pattern in direction: authenticity and social presence constitute advantage mechanisms for human streamers, whereas professionalism constitutes a compensation mechanism for AI streamers.

H2d: The indirect effects of the three mediating mechanisms will exhibit a directionally asymmetric structure: the authenticity and social presence mechanisms will favor human streamers (human > AI), whereas the professionalism mechanism will favor AI streamers (AI > human).

2.4. Moderation Hypotheses

The strength of the asymmetric mechanisms may depend on the consumption context and individual consumer differences. This study incorporates product type and AI acceptance as two boundary conditions to explain mechanism variations at the contextual and individual levels, respectively.

Product type may influence the information focus of consumers during live-streaming shopping. For hedonic products, consumers place greater emphasis on emotional experience and consumption atmosphere, making streamers' authentic expression and social presence more likely to influence purchase motivation [19]. For utilitarian products, consumers pay greater attention to functionality and information accuracy, and the advantage of AI streamers in standardized expression may strengthen the professionalism mechanism.

H3a: In the context of hedonic products, the mediating effects of perceived authenticity and social presence will be strengthened, and the advantage mechanisms of human streamers will become more salient.

H3b: In the context of utilitarian products, the mediating effect of perceived professionalism will be strengthened, and the compensation mechanism of AI streamers will become more salient, potentially

narrowing the overall advantage of human streamers.

Consumers' AI acceptance may also influence their evaluations of AI streamers [20]. This study defines AI acceptance as consumers' overall tendency to accept, interact with, and rely on AI streamers in the context of live-streaming e-commerce, encompassing functional trust, affective acceptance, and usage intention. Consumers with higher AI acceptance are more open to AI technologies and more likely to accept the non-human identity of AI streamers, thereby weakening AI streamers' disadvantages in the authenticity and social presence mechanisms and strengthening the professionalism mechanism.

H4a: For consumers with higher AI acceptance, the negative indirect effects of AI streamers through perceived authenticity and social presence will be weakened, while the indirect effect favoring AI through perceived professionalism will be strengthened.

Because authenticity is directly related to the core evaluation of "non-human identity," the openness of consumers with higher AI acceptance may produce the most salient buffering effect in this mechanism. By contrast, identity judgment carries relatively less weight in the social presence and professionalism mechanisms; therefore, the strength of moderation may be weaker than that in the authenticity mechanism.

H4b: AI acceptance will exert the strongest moderating effect on the perceived authenticity mechanism; compared with the social presence and professionalism mechanisms, it will produce a greater reduction in the difference between the indirect effects of human and AI streamers in the authenticity mechanism.

Whether a severe lack of authenticity may trigger a reverse "amplification effect" is treated in this study as an exploratory analysis rather than an a priori hypothesis.

Taken together, product type and AI acceptance constitute important boundary conditions for the asymmetric mechanisms, explaining in which contexts and among which consumer groups different psychological mechanisms are more likely to operate.

2.5. Conceptual Model and Operationalization of Variables

The conceptual model of this study takes streamer type as the independent variable and purchase intention as the dependent variable, with perceived authenticity, social presence, and perceived professionalism as three parallel mediating variables. Among them, authenticity and social presence mainly explain the advantage mechanisms of human streamers, whereas professionalism mainly explains the compensation mechanism of AI streamers. Product type and AI acceptance serve as moderating variables. The former is manipulated through experimental stimuli in Study 2 and is classified into utilitarian and hedonic products; the latter is treated as an individual-difference variable, measured through a questionnaire in Study 1 and measured before exposure to the experimental stimulus in Study 2. The overall conceptual model is presented in Figure 1, and the operational definitions of the main variables are shown in Table 1.

Table 1. Operational Definitions of the Main Variables

Variable	Operational Definition
Streamer Type	The type of streamer, classified as AI streamers and human streamers
Product Type	The type of product, classified as utilitarian and hedonic products
Perceived Authenticity	Consumers' perceptions of the streamer's authenticity, sincerity, naturalness, and credibility
Social Presence	Consumers' perceptions of the streamer's social presence, sense of interaction, and sense of companionship
Perceived Professionalism	Consumers' perceptions of the streamer's product knowledge, explanatory ability, and recommendation ability
AI Acceptance	Consumers' overall tendency to accept, interact with, and rely on AI streamers, including functional trust, affective acceptance, and usage intention
Purchase Intention	Consumers' willingness to consider purchasing, learn about, or try purchasing the relevant products in the future

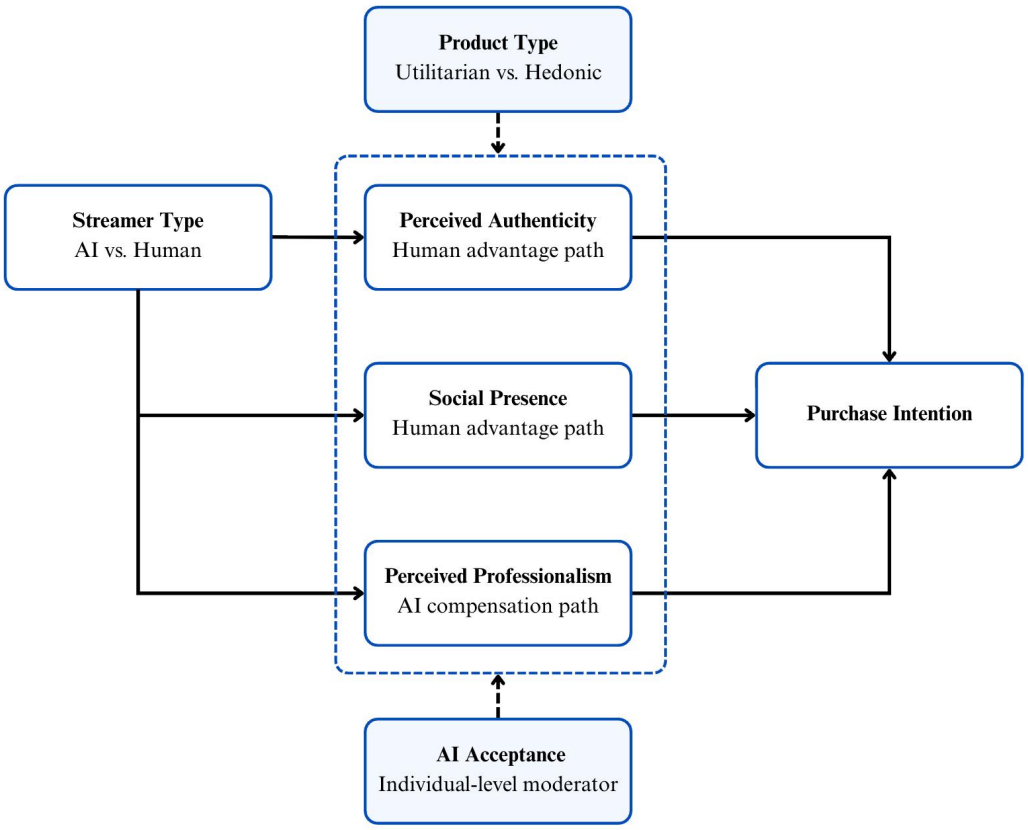

Figure 1. Conceptual Model of the Asymmetric mechanism Mechanism

3. Research Methodology

3.1. Overview of Research Design

This study adopted a two-study quantitative design: Study 1 was a survey study (Table 2), and Study 2 was an online scenario experiment. The two studies serve complementary functions. Study 1, based on Malaysian consumers' real experiences with live-streaming e-commerce, examines the asymmetric mediation mechanisms and preliminarily investigates the moderating role of AI acceptance, emphasizing external validity and contextual authenticity. Study 2 experimentally manipulates streamer type and product type to test causal relationships under more controlled conditions, emphasizing internal validity and causal inference. The two stages use consistent core variable scales to ensure comparability of results and cross-validation capability.

Table 2. Overview of the Two-Stage Research Design

Stage	Method	Sample Size	Main Focus	Emphasis
Study 1	Survey of Malaysian consumers	N ≈ 400	RQ1 and RQ3; preliminary examination of the moderating role of AI acceptance	External validity
Study 2	2 × 2 online scenario experiment	N ≈ 300	RQ1 and RQ2; examination of the causal effects of streamer type and product type	Internal validity

3.2. Study 1: Survey Study of Malaysian Consumers

3.2.1. Research Objective

Study 1 is based on real experiences with live-streaming e-commerce and aims to examine the three asymmetric mediation mechanisms (H2a–H2d) and the moderating role of AI acceptance (H4a and H4b). It also uses a multi-ethnic Malaysian sample to assess the contextual applicability and robustness of the model (RQ3). Ethnic background variables, including Malay, Chinese, and Indian, are used as a

basis for exploratory analysis rather than as core causal explanatory variables in this study.

3.2.2. Sample and Sampling

The target population consists of Malaysian consumers aged 18 and above who have watched live-streaming e-commerce content within the past six months and have been exposed at least once to an AI streamer, digital human streamer, or virtual streamer. The target sample size was approximately 400, and the final valid sample after data screening was N = 372. Cross-ethnic quota sampling is adopted to cover the three major ethnic groups: Malay, Chinese, and Indian. This study does not presuppose significant differences across ethnic groups; rather, it examines whether the asymmetric mechanism model has relatively stable explanatory power in a diverse consumer sample. Recruitment channels include online survey platforms, local consumer communities, university channels, and social media. The formal questionnaire includes only respondents who meet the screening criteria. Respondents who have not been exposed to AI streamers are not included in the main hypothesis testing, but may be used as descriptive supplements depending on the actual sample conditions.

3.2.3. Key Controls in Questionnaire Design

To ensure that respondents accurately understand the research objects, the questionnaire includes a three-step preliminary procedure. First, a brief conceptual explanation is provided: AI streamers are defined as virtual streamers generated by artificial intelligence or digital human technologies who can introduce products or interact with viewers in live-streaming e-commerce contexts; human streamers refer to streamers who are real human beings appearing on screen to explain products. Second, illustrative images or short video clips are provided to help respondents distinguish between the two types of streamers. Third, a screening question is included: "In the past six months, have you watched live-streaming e-commerce content featuring AI streamers, digital human streamers, or virtual streamers?" Only respondents who answer "yes" proceed to the main questionnaire.

After entering the main questionnaire, respondents are asked to recall their most recent experience of watching either an AI streamer or a human streamer in live-streaming e-commerce, and to complete items related to perceived authenticity, social presence, perceived professionalism, purchase intention, and other variables based on that experience. To reduce order effects and recall bias, respondents are randomly assigned to recall either an AI streamer experience or a human streamer experience.

3.2.4. Measurement Instruments

Study 1 uses a 7-point Likert scale for measurement, ranging from 1 = strongly disagree to 7 = strongly agree. The main variables and scale sources are shown in Table 3. All scales are moderately adapted from established scales to fit the contexts of live-streaming e-commerce and AI streamers. Among them, AI acceptance is operationalized through three dimensions: functional trust, affective acceptance, and usage intention, reflecting consumers' overall tendency to accept AI streamers. To adapt to the Malaysian sample, the questionnaire is provided in both English and Bahasa Melayu, and a back-translation procedure is used to ensure semantic equivalence.

Table 3. Main Variables and Measurement Sources in Study 1

Variable	Scale Source	Initial Number of Items
Perceived Authenticity	Audrezet et al. [21]	5
Social Presence	Gefen and Straub [22]; Hassanein and Head [23]	5
Perceived Professionalism	Ohanian [24]	5
AI Acceptance	Gursoy et al. [12]; Grassini [25]	8
Collectivism Orientation	Triandis [26]	5
Purchase Intention	Dodds et al. [27]	4

In the formal analysis, items with factor loadings clearly below acceptable standards were removed based on the measurement model evaluation results. The final number of retained items and the reliability and validity indicators are reported in the results section.

3.2.5. Data Analysis

The data analysis proceeded in three steps. The first step was descriptive analysis, which reported sample demographic characteristics, frequency of live-streaming e-commerce use, experience with AI

streamers, and ethnic distribution. The second step used PLS-SEM as the main analytical method. Measurement model evaluation included Cronbach's α, Composite Reliability, AVE, and HTMT; structural model evaluation included path coefficients, R^2, and the significance of mediation mechanisms. The third step used Hayes PROCESS as a robustness supplement to examine mediation, moderation, and moderated mediation effects. The contrast function in PROCESS was used to compare differences among the three indirect mechanisms, thereby testing the asymmetric mechanism proposition proposed in H2d. Ethnic variables were included in the model as control variables, and collectivism orientation was included as a covariate to control for the potential influence of cultural orientation. When the sample size allowed, exploratory multi-group analysis was conducted to examine whether the direction of the mechanisms remained consistent across the three major ethnic groups.

3.3. Study 2: Online Scenario Experiment

3.3.1. Research Objective

Study 2 employs an online scenario experiment to examine the causal effects of streamer type and product type on purchase intention under controlled conditions in terms of script, product information, and live-streaming scenario. It also validates the mediating roles of perceived authenticity, social presence, and perceived professionalism (H1, H2a–H2d, H3a, and H3b). At the same time, AI acceptance is incorporated into the analysis as a continuously measured individual-difference variable to further examine its moderating effect on the asymmetric mechanisms (H4a and H4b). Compared with the real-experience data in Study 1, Study 2 emphasizes internal validity and causal identification.

3.3.2. Experimental Design

Study 2 adopts a 2 (streamer type: AI vs. human) × 2 (product type: utilitarian vs. hedonic) between-subjects experimental design. Streamer type and product type are manipulated variables, while AI acceptance is a continuously measured moderating variable. The experiment included four experimental conditions, with approximately 75 participants in each group. After data screening, the final valid sample was N = 314, as shown in Table 4. The planned sample size was set to meet the basic requirements for testing main effects, interaction effects, and moderated mediation effects.

Table 4. Experimental Conditions in Study 2

Group	Streamer Type	Product Type	Sample Size
Group 1	AI streamer	Utilitarian product	N ≈ 75
Group 2	AI streamer	Hedonic product	N ≈ 75
Group 3	Human streamer	Utilitarian product	N ≈ 75
Group 4	Human streamer	Hedonic product	N ≈ 75

3.3.3. Stimulus Development

The experimental stimuli consist of four simulated live-streaming videos, each lasting approximately 60 seconds. The videos are kept consistent in terms of live-streaming background, script structure, amount of product information, promotional intensity, subtitle format, and duration, so as to ensure that the manipulated differences mainly arise from streamer type and product type. The AI streamer videos were produced using HeyGen, while the human streamer videos were recorded by real actors reading the same scripts. In terms of products, a power bank is selected as the utilitarian product, emphasizing functionality, specifications, and efficiency; premium chocolate is selected as the hedonic product, emphasizing pleasure, sensory experience, and gift-giving attributes. All products use fictitious brands to reduce interference from existing brand perceptions.

3.3.4. Pre-test

Before the formal experiment, a pre-test (N ≈ 40) was conducted to examine three aspects: (1) streamer type identification, namely whether respondents can accurately distinguish between AI streamers and human streamers; (2) product type perception, namely whether the power bank is perceived as more utilitarian and the premium chocolate as more hedonic; and (3) video quality, namely whether clarity, sound quality, speech rate, subtitle readability, and viewing experience are generally consistent. When problems were identified in the recognizability or quality of the stimuli, revisions were made before the formal experiment.

3.3.5. Experimental Procedure

Participants first read the informed consent statement and complete screening questions confirming that they are Malaysian consumers aged 18 or above with experience watching live-streaming e-commerce. Subsequently, before watching the experimental video, participants complete the AI acceptance scale to avoid contamination of their overall AI acceptance judgments by the experimental stimulus. The system then randomly assigns participants to one of the four experimental groups and asks them to watch a 60-second simulated live-streaming video. After watching the video, participants complete manipulation checks for streamer type and product type, followed by items related to perceived authenticity, social presence, perceived professionalism, and purchase intention. The experiment also records low-risk auxiliary behavioral indicators, including whether participants click "learn more," choose "add to wishlist," and are willing to receive a simulated coupon. Finally, participants complete demographic questions and read a debriefing statement, which confirms that the video materials were created for research purposes and do not involve actual purchases.

3.3.6. Data Analysis

The data analysis for Study 2 proceeded in three steps. First, manipulation checks were conducted to confirm that participants accurately identified streamer type and distinguished between utilitarian and hedonic products. Second, a 2 × 2 ANOVA was used to examine the effects of streamer type, product type, and their interaction on purchase intention and the three mediating variables.

Third, mediation and moderated mediation analyses were conducted. Hayes PROCESS or SEM with interaction terms was used to separately examine the three mediation mechanisms of perceived authenticity, social presence, and perceived professionalism, and to investigate the boundary roles of product type and AI acceptance. Product type and AI acceptance were first tested separately as moderating variables, and an integrated moderated mediation model was considered when data conditions allowed. For the continuous moderating effect of AI acceptance, simple slope analysis was conducted, and the Johnson–Neyman technique was used when necessary. The auxiliary behavioral indicators served as supplementary validation for purchase intention.

3.4. Common Method Bias and Robustness Checks

To reduce common method bias, Study 1 adopted anonymous responses, random presentation of items, and separate presentation of different variables at the questionnaire design stage. Respondents were also explicitly informed that there were no right or wrong answers, in order to reduce social desirability bias and the tendency toward consistent responding. At the data analysis stage, Harman's single-factor test and the common method factor approach were used to assess the potential influence of common method bias. In addition, Study 1 and Study 2 provided cross-validation. The former offered evidence of external validity based on real experiences with live-streaming e-commerce, whereas the latter provided causal identification and evidence of internal validity through experimental manipulation. The consistency of the key mechanism results across the two studies strengthened the robustness of the study's conclusions.

3.5. Statement on Ethical Exemption

This study was designed to meet the criteria for ethical exemption or simplified ethical review. The study recruited only Malaysian adult consumers aged 18 and above and collected data through anonymous online questionnaires and simulated scenario experiments. It did not involve minors, vulnerable groups, medical interventions, physiological measurements, high-risk psychological stimuli, actual purchases, or real transactions, and therefore fell within the category of low-risk social science research. All participants read the informed consent statement before participation and were informed of the research purpose, the voluntary nature of participation, their right to withdraw at any time, and the anonymous handling of data. The study did not collect personally identifiable information such as names, telephone numbers, email addresses, identity card numbers, actual purchase records, payment information, or social media accounts. Ethnic information was used only for aggregate-level academic analysis. All experimental videos were simulated stimuli created for research purposes and did not involve real brands, real streamer identities, or actual purchase links. All data were anonymized, securely stored, and used solely for academic research.

4. Data Analysis and Results

4.1. Results of Study 1

4.1.1. Sample Profile and Common Method Bias

Study 1 distributed the questionnaire in Malaysia through Qualtrics Panel, yielding 438 initial responses. After excluding 28 responses that failed the attention checks, 11 responses with more than 10% missing values on key variables, 18 responses with completion times below one-third of the median, and 9 responses with a consecutive item repetition rate of ≥80%, the final valid sample was N = 372, with an effective response rate of 84.9%. Female respondents accounted for 56.4%, and respondents aged 25–34 accounted for 43.9%. The ethnic distribution was as follows: Malay 47.0%, Chinese 33.8%, Indian 15.4%, and others 3.8%. The Indian subsample contained only 57 cases, which was below the recommended threshold for PLS-SEM multi-group analysis; therefore, it was not included in the formal ethnic-group comparison and is reported only in the appendix.

Harman's single-factor test showed that the first factor explained 29.6% of the variance, which was below the 40% criterion. After adding an unmeasured method factor, changes in item loadings were all below 0.10, indicating that common method bias did not constitute a major threat.

4.1.2. Measurement Model Assessment

PLS-SEM was used to assess the measurement model. The loading of AUT4 in the authenticity scale was 0.532, and the loading of COL3 in the collectivism scale was 0.481; both were below the 0.60 threshold and were therefore removed. The loadings of the remaining items ranged from 0.642 to 0.873. The reliability and convergent validity of each construct are shown in Table 5.

Table 5. Measurement Model Assessment Results

Construct	Number of Items	α	CR	AVE
Authenticity	4	0.864	0.907	0.710
Social presence	5	0.798	0.860	0.553
Professionalism	5	0.831	0.882	0.601
AI acceptance	8	0.879	0.904	0.575
Purchase intention	4	0.896	0.927	0.762
Collectivism orientation	4	0.752	0.838	0.564

Regarding discriminant validity, most HTMT values ranged from 0.331 to 0.792, satisfying the 0.85 threshold. The HTMT between authenticity and social presence was 0.871, slightly exceeding the threshold. Considering that the two constructs are theoretically closely related, a comparison between the constrained model, in which the correlation coefficient was fixed at 1, and the unconstrained model showed a significant deterioration in model fit ($\Delta\chi^2(1) = 64.3$, $p < .001$), indicating that the two constructs remained structurally distinguishable.

4.1.3. Structural Model and Hypothesis Testing

A 5,000-sample bootstrap procedure was used to estimate path coefficients and confidence intervals. Streamer type was coded as 0 = AI and 1 = human (Table 6).

H1 concerns the overall difference in purchase intention caused by streamer type and should therefore be evaluated based on the total effect. Study 1 mainly served to examine mediation mechanisms, while the core evidence for H1 was provided by Study 2. The group mean comparison showed that the human streamer group (M = 4.87, SD = 1.09) scored higher than the AI streamer group (M = 4.56, SD = 1.15), $t(370) = 2.67$, $p = .008$, $d = 0.28$. The total effect was $\beta = 0.184$, 95% CI [0.082, 0.282], consistent with H1. The R^2 for purchase intention was 0.342. The R^2 values for authenticity, social presence, and professionalism were 0.211, 0.073, and 0.038, respectively.

Table 6. Path Coefficients, Indirect Effects, and Moderating Effects

Type	Path / Effect	β	95% CI / p-value	Conclusion
H1 total effect	ST → PI	0.184	[0.082, 0.282]	Direction supported
H2a	ST → Authenticity	0.423	[0.334, 0.508]	Significant
H2b	ST → Social presence	0.247	[0.142, 0.348]	Significant
H2c	ST → Professionalism	-0.183	[–0.281, –0.083]	Significant (AI > human)
Second-stage path	Authenticity → PI	0.298	[0.198, 0.394]	Significant
Second-stage path	Social presence → PI	0.094	[–0.011, 0.198]	Not significant
Second-stage path	Professionalism → PI	0.157	[0.053, 0.258]	Significant
Indirect effect	ST → Auth → PI	0.126	[0.079, 0.180]	Human advantage mechanism
Indirect effect	ST → SP → PI	0.023	[–0.004, 0.057]	Not significant
Indirect effect	ST → Prof → PI	-0.029	[–0.061, –0.003]	AI compensation mechanism (weak)
H4a (auth)	AI acceptance × ST → Auth	-0.179	p = .003	Significant

H4a (SP)	AI acceptance × ST → SP	0.067	p = .218	Not significant
H4a (prof)	AI acceptance × ST → Prof	-0.094	p = .087	Marginally significant

Regarding the mediation mechanisms, all three first-stage paths were consistent with expectations. However, the path from social presence to purchase intention was not significant (β = 0.094, p = .081), resulting in a non-significant indirect effect; therefore, H2b was not supported. This may indicate that Malaysian consumers regard live-streaming shopping more as an information-acquisition context than as a companionship-based interaction context. H2a was supported. The indirect effect of ST → Prof → PI was consistent with H2c but small in magnitude (–0.029), indicating weak support for H2c.

Regarding H2d, the authenticity mechanism was significant and in the expected direction (0.126), the professionalism mechanism was also in the expected direction and significant but small (–0.029), while the social presence mechanism was not significant. Thus, H2d received partial support: the asymmetric structure was verified in the authenticity and professionalism mechanisms, but not in the social presence mechanism.

Regarding moderation, AI acceptance significantly moderated the authenticity mechanism (β = –0.179, p = .003), indicating that higher AI acceptance reduced the authenticity gap between AI and human streamers. Its moderating effect on social presence was not significant (β = 0.067, p = .218). Its moderating effect on professionalism was marginally significant (β = –0.094, p = .087). Given the coding of streamer type, this negative coefficient suggests that higher AI acceptance may further strengthen AI streamers' relative professionalism advantage, although this effect should be interpreted cautiously.

Overall, H4a was clearly supported in the authenticity mechanism, not supported in the social presence mechanism, and only marginally supported in the professionalism mechanism. The coefficient pattern suggests that AI acceptance exerted its clearest moderating role in the authenticity mechanism, indicating that consumers with higher AI acceptance were less sensitive to AI streamers' authenticity disadvantage. Therefore, H4b received partial support.

4.1.4. Cross-Ethnic Robustness

After ethnic variables (Malay vs. Chinese) were included as control variables, changes in the main path coefficients were all below 0.03, indicating that the core results remained stable. The Indian subsample (n = 57) was below the recommended threshold, and the Indian subsample was not included in the formal ethnic-group comparison. Including collectivism orientation as a covariate did not change the core conclusions. Overall, the authenticity mechanism was the most stable; the social presence mechanism did not reach significance in any subsample; and the professionalism mechanism showed a consistent direction, although its magnitude was relatively small.

4.2. Study 2: Experimental Study

4.2.1. Sample and Manipulation Checks

The experiment recruited 320 Malaysian consumers through Qualtrics Panel, who were randomly assigned to one of the four conditions in a 2 (streamer type: AI vs. human) × 2 (product type: utilitarian vs. hedonic) design. After excluding participants who failed the attention check (n = 4) and those with excessively short response times (n = 2, < 90 seconds), the final valid sample was N = 314, with group sizes of n = 79/77/79/79.

All manipulation checks were successful. The accuracy rate for streamer type identification was 86.3%. The perceived human-likeness score was M = 4.28 (SD = 1.21) for the AI streamer and M = 6.04 (SD = 0.97) for the human streamer, t(312) = 14.13, p < .001, d = 1.60. The product type manipulation was also effective: the power bank received a significantly higher utilitarian rating than hedonic rating (M = 5.71 vs. 3.78, t = 13.21, p < .001), whereas premium chocolate received a significantly higher hedonic rating than utilitarian rating (M = 5.88 vs. 3.62, t = 14.42, p < .001).

4.2.2. Main Effects and Interaction Effects

The descriptive statistics and simple effects from the 2 × 2 between-subjects ANOVA are shown in Table 7, and the interaction effect is visualized in Figure 2. The main effect of streamer type was significant, F(1, 310) = 5.18, p = .024, η^2_p = .017, supporting H1. The main effect of product type was not significant, F(1, 310) = 1.36, p = .244. The streamer × product interaction was significant, F(1, 310) = 7.92, p = .005, η^2_p = .025. Simple effects analysis showed that, for hedonic products, human streamers were significantly superior to AI streamers (Δ = 0.62, p < .001), whereas for utilitarian products, there was no significant difference between the two groups (Δ = –0.12, p = .493). This

interaction pattern is consistent with the predictions in Chapter 3.

Table 7. Descriptive Statistics and Simple Effects (N = 314)

Streamer Type	Utilitarian Product	Hedonic Product	Difference (Hedonic – Utilitarian)
AI streamer	M = 4.81, SD = 1.19, n = 79	M = 4.54, SD = 1.28, n = 79	–0.27, p = .175
Human streamer	M = 4.69, SD = 1.14, n = 77	M = 5.16, SD = 1.10, n = 79	+0.47, p = .010
Simple effect	–0.12, p = .493	+0.62, p < .001	—

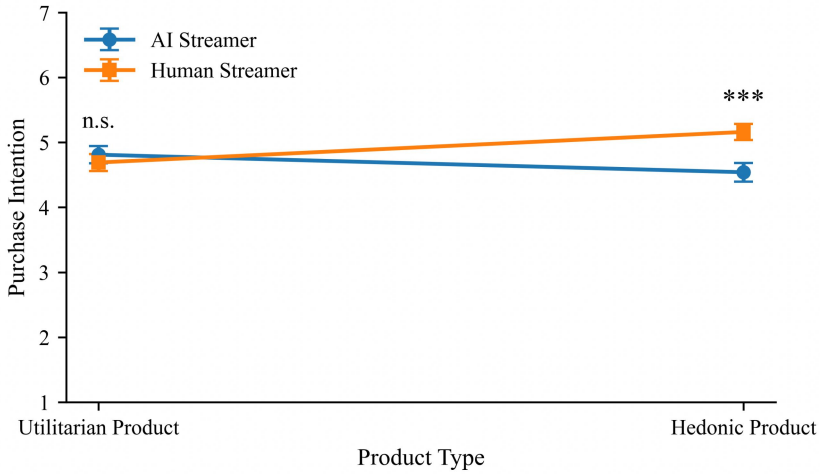

Figure 2. Interaction Effect of Streamer Type and Product Type on Purchase Intention

4.2.3. Mediation and Moderated Mediation Analyses

PROCESS Model 8 with 5,000 bootstrap samples was used to test the conditional indirect effects of the three psychological mechanisms under the two product conditions. The results are summarized in Table 8. In the hedonic condition, the authenticity mechanism was the strongest and significant, the social presence mechanism was significant but small, and the professionalism mechanism was not significant. In the utilitarian condition, the authenticity mechanism weakened but remained significant, the social presence mechanism was not significant, and the professionalism-based compensation mechanism of AI streamers was significant (–0.061, [–0.114, –0.014]). Product type significantly moderated the authenticity mechanism (Δ = 0.104, [0.029, 0.187]), weakly moderated the professionalism mechanism (Δ = –0.040, [–0.091, –0.002]), and did not significantly moderate the social presence mechanism. Thus, H3a was partially supported, whereas H3b was supported.

Table 8. Conditional Indirect Effects

Condition	mechanism	Indirect Effect	95% CI	Conclusion
Hedonic	ST → Auth → PI	0.173	[0.105, 0.246]	Significant
Hedonic	ST → SP → PI	0.058	[0.009, 0.118]	Weakly significant
Hedonic	ST → Prof → PI	–0.021	[–0.058, 0.012]	Not significant
Utilitarian	ST → Auth → PI	0.069	[0.013, 0.132]	Weakly significant
Utilitarian	ST → SP → PI	0.014	[–0.024, 0.057]	Not significant
Utilitarian	ST → Prof → PI	–0.061	[–0.114, –0.014]	Significant
Product type difference	Auth mechanism	0.104	[0.029, 0.187]	Significant
Product type difference	SP mechanism	0.044	[–0.014, 0.110]	Not significant
Product type difference	Prof mechanism	–0.040	[–0.091, –0.002]	Weakly significant

The moderating role of AI acceptance varied across mechanisms. It significantly moderated the authenticity mechanism (β = –0.162, p = .009), indicating that higher AI acceptance reduced the human–AI difference in perceived authenticity, consistent with H4a. Its moderation of the social presence mechanism was not significant (β = 0.058, p = .305). Its moderation of the professionalism mechanism was marginally significant (β = –0.087, p = .081). Given that streamer type was coded as 0 = AI and 1 = human, the negative coefficient suggests that higher AI acceptance may further strengthen

AI streamers' relative professionalism advantage, although this effect should be interpreted cautiously.

Johnson–Neyman analysis showed that when AI acceptance was higher than the mean by 1 SD, the difference between the two streamer types in the authenticity mechanism decreased from 0.22 to 0.07 and became non-significant. Therefore, H4a was clearly supported only in the authenticity mechanism, while the evidence for the professionalism mechanism was marginal. Overall, AI acceptance showed its clearest moderating role in the authenticity mechanism, suggesting that consumers with higher AI acceptance were less sensitive to AI streamers' authenticity disadvantage. Thus, H4b received partial support.

4.2.4. Auxiliary Behavioral Indicators

Among the four low-risk behavioral indicators, no significant differences were found in video completion rate ($\chi^2 = 0.38$, $p = .537$), "Learn more" click-through rate (27.8% vs. 23.1%, $\chi^2 = 0.92$, $p = .337$), or coupon redemption rate ($\chi^2 = 1.62$, $p = .203$). However, the "Add to wishlist" rate was significantly higher in the human streamer group (18.6% vs. 11.4%, $\chi^2 = 3.84$, $p = .050$). Differences in low-threshold information-seeking behaviors were relatively small, whereas behaviors related to emotional engagement tended to favor human streamers. This pattern is consistent with the direction of the interaction effect observed for purchase intention.

4.2.5. Summary of Hypothesis Testing

The combined hypothesis-testing results from the two studies are presented in Table 9. Overall, Study 2 supports the core asymmetric mechanism model: the advantage of human streamers in the authenticity mechanism was the most stable and extended to social presence in the hedonic product context; the professionalism-based compensation mechanism of AI streamers mainly emerged in the utilitarian product context. However, the social presence mechanism was generally unstable, the magnitude of the professionalism mechanism remained small, and the moderating effect of AI acceptance on the professionalism mechanism was only marginally significant. Therefore, the role of AI acceptance in shaping professionalism evaluations should be interpreted cautiously and requires further examination. The relevant boundary conditions are discussed in depth in Chapter 5.

Table 9. Summary of Hypothesis Testing

Hypothesis	Brief Description	Study 1	Study 2	Overall Conclusion
H1	Human streamers generate higher overall purchase intention than AI streamers	Direction supported	Supported	Supported
H2a	Authenticity constitutes a human-streamer advantage mechanism	Supported	Supported	Supported
H2b	Social presence constitutes a human-streamer advantage mechanism	Not supported	Weakly supported in the hedonic context	Partially supported
H2c	Professionalism constitutes an AI-streamer compensation mechanism	Weakly supported	Supported in the utilitarian context	Partially supported
H2d	The three mechanisms show a directionally asymmetric structure	Partially supported	Partially supported	Partially supported
H3a	Hedonic products strengthen affective mechanisms	—	Partially supported (auth only)	Partially supported
H3b	Utilitarian products strengthen the professionalism mechanism	—	Supported	Supported
H4a	AI acceptance weakens the negative mechanisms of AI streamers	Supported only for auth	Supported only for auth	Partially supported
H4b	AI acceptance has the strongest moderating effect on the auth mechanism	Partially supported	Partially supported	Partially supported

5. Discussion

5.1. Summary of Findings

Across Study 1 (N = 372) and Study 2 (N = 314), three key findings emerged.

First, AI streamers and human streamers influenced purchase intention through asymmetric mechanisms. The advantage of human streamers was mainly driven by perceived authenticity, which remained the most stable mechanism across both studies. The social presence mechanism appeared only modestly in the hedonic product context.

Second, AI streamers showed a professionalism-based compensation mechanism, but the effect was relatively weak. This mechanism was small in Study 1 and became significant mainly for utilitarian products in Study 2. In this context, purchase intention did not differ significantly between AI and human streamers, suggesting that AI streamers may be more suitable for products emphasizing functionality and standardized information.

Third, AI acceptance primarily moderated the authenticity mechanism, while its effects on social presence and professionalism were weak or only marginally significant. Specifically, consumers with higher AI acceptance were less sensitive to AI streamers' authenticity disadvantage. The moderating effect of AI acceptance on the professionalism mechanism was marginal and should be interpreted cautiously, suggesting that the role of AI acceptance in professionalism evaluations requires further examination.

5.2. Theoretical Contributions

This study contributes to the literature in three ways. First, it proposes an asymmetric mechanism model, shifting attention from "which streamer is more effective" to "through which mechanism streamer effects occur." Human streamers mainly rely on affective mechanisms such as authenticity, whereas AI streamers form limited functional compensation through professionalism.

Second, the study incorporates product type and AI acceptance into the same framework as boundary conditions. The findings show that product type shapes the relative importance of different psychological mechanisms, while AI acceptance mainly affects consumers' sensitivity to the authenticity disadvantage of AI streamers. This highlights the need to examine individual differences in a mechanism-specific rather than overall manner.

Third, by focusing on multi-ethnic Malaysian consumers, this study provides evidence from a Southeast Asian market context. The authenticity mechanism remained stable after controlling for ethnic background and in the Malay–Chinese comparison, while findings involving the Indian subsample should be interpreted as exploratory due to its limited size.

5.3 Practical Implications

For e-commerce platforms, AI streamers and human streamers should be viewed as complementary rather than substitutive. AI streamers are more suitable for utilitarian products requiring standardized explanations, whereas human streamers are better suited to hedonic products that rely on authenticity and emotional expression.

For brands, AI acceptance can inform consumer segmentation. Consumers with higher AI acceptance may be more tolerant of AI streamers' authenticity limitations, but this does not mean that AI streamers will automatically outperform human streamers. Therefore, brands should match streamer type with product attributes and ensure high-quality explanations when deploying AI streamers. For technology developers, optimization should move beyond anthropomorphic appearance and focus more on natural interaction, coherent emotional responses, and real-time feedback.

5.4. Limitations and Future Research

This study has several limitations. The sample was limited to Malaysian consumers, so cross-cultural generalizability requires further validation. Study 1 used cross-sectional data, and Study 2 relied on simulated videos, which may limit causal inference and ecological validity. In addition, this study did not distinguish between different types of AI streamers or systematically control for gender, appearance, and voice.

Future research should further examine the AI streamer compensation mechanism and the moderating role of AI acceptance using larger samples, real platform behavioral data, or longitudinal designs. Greater attention may also be paid to human–AI collaborative strategies across different products, consumers, and purchase stages.

6. Conclusion

This study examined how AI streamers and human streamers influence purchase intention through different psychological mechanisms, as well as the boundary roles of product type and AI acceptance. Rather than simply comparing their relative effectiveness, this study proposed an asymmetric mechanism model: human streamers form a stable advantage through perceived authenticity, whereas AI streamers may form limited compensation through perceived professionalism in utilitarian product contexts.

A two-stage design was adopted. Study 1 (N = 372), based on real-experience data from Malaysian live-streaming e-commerce consumers, examined the robustness of asymmetric mediation mechanisms in a multi-ethnic sample. Study 2 (N = 314) used a 2 × 2 online scenario experiment to validate the causal effects of streamer type and product type and to examine the moderating role of AI acceptance.

The results show that human streamers exerted a stronger overall influence mainly due to higher perceived authenticity. The social presence mechanism appeared only modestly in hedonic product contexts. For utilitarian products, the professionalism mechanism of AI streamers was strengthened, narrowing the gap between AI and human streamers. AI acceptance mainly moderated the authenticity mechanism, suggesting that higher acceptance reduces sensitivity to AI streamers' authenticity disadvantage. Its moderating effect on the professionalism mechanism was only marginally significant, indicating that the role of AI acceptance in shaping professionalism evaluations requires further investigation.

Theoretically, this study shifts the focus from "which type of streamer is more effective" to "through which mechanisms streamer effects occur." It also integrates product type and AI acceptance into one framework, identifying contextual and individual boundary conditions. The multi-ethnic Malaysian sample further provides Southeast Asian market evidence for AI streamer research.

Practically, AI streamers are more suitable for standardized explanations and long-duration promotions of utilitarian products, whereas human streamers are better suited to hedonic products that rely on emotional expression and interactive atmosphere. The value of AI streamers lies not in replacing human streamers, but in enabling more effective human–AI collaboration based on product attributes, consumer characteristics, and usage scenarios.

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