

Live streaming e-commerce: the relationship of interactivity and co-experience on consumer engagement

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Abstract

Purpose – This study aims to determine the antecedents of consumer engagement in live-streaming e-commerce using the stimulus–organism–response framework. The relationship between interactivity and co-experience (stimulus), consumer trust (organism) and consumer engagement (response) was examined.

Design/methodology/approach – A questionnaire was distributed via social media, email and messenger platforms, resulting in 262 valid responses. The collected data were then analyzed using structural equation modeling.

Findings – The study demonstrates that consumer trust significantly affects consumer engagement in live-streaming e-commerce. Consumer trust is significantly influenced by interactivity, namely, active control. Co-experience aspects affecting trust are participation and cognitive communion. An element of interactivity (two-way communication) and two of co-experience (synchronicity and resonant contagion) do not show a noteworthy positive correlation with consumer trust.

Research limitations/implications – This study uses a cross-sectional survey, focusing on the recommended factors from several previous studies, and is limited to live streaming e-commerce.

Practical implications – New theoretical insights are highlighted, focusing on how communication dynamics between consumers and sellers foster trust, ultimately driving consumer engagement. From a practical perspective, managers should pay attention to creating interactive experiences and co-experiences within live-streaming e-commerce to build consumer trust.

Originality/value – This study examines aspects of the seller–buyer interaction affecting engagement during live streaming in e-commerce, revealing the role of co-experience and consumer trust.

Keywords Interactivity, Consumer engagement, SOR theory, Co-experience, Live streaming e-commerce

Paper type Research paper



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Comercio electrónico mediante transmisiones en directo: la relación entre interactividad y co-experiencia en el engagement del consumidor

Resumen

Objetivo – Este estudio tiene como propósito determinar los antecedentes del engagement del consumidor en el comercio electrónico mediante transmisiones en directo, utilizando el marco teórico estímulo–organismo–respuesta (SOR). Se examinó la relación entre la interactividad y la co-experiencia (estímulo), la confianza del consumidor (organismo) y el engagement del consumidor (respuesta).

Metodología – Se distribuyó un cuestionario a través de redes sociales, correo electrónico y plataformas de mensajería, obteniéndose 262 respuestas válidas. Los datos recopilados se analizaron mediante modelos de ecuaciones estructurales.

Resultados – El estudio demuestra que la confianza del consumidor influye significativamente en su engagement en el comercio electrónico mediante transmisiones en directo. La confianza se ve afectada de forma significativa por la interactividad, concretamente el control activo. Los aspectos de co-experiencia que influyen en la confianza son la participación y la comunión cognitiva. Un elemento de la interactividad (comunicación bidireccional) y dos elementos de la co-experiencia (sincronicidad y contagio resonante) no muestran una correlación positiva significativa con la confianza del consumidor.

Limitación de la investigación – Este estudio emplea una encuesta transversal, se centra en factores recomendados por investigaciones previas y se limita al contexto del comercio electrónico mediante transmisiones en directo.

Implicaciones prácticas – Se aportan nuevas perspectivas teóricas centradas en cómo las dinámicas de comunicación entre consumidores y vendedores fomentan la confianza y, en última instancia, impulsan el engagement del consumidor. Desde una perspectiva práctica, los gestores deben prestar atención a la creación de experiencias interactivas y de co-experiencia en el comercio electrónico mediante transmisiones en directo para fortalecer la confianza del consumidor.

Originalidad/valor – Este estudio examina los aspectos de la interacción vendedor–comprador que afectan al engagement durante las transmisiones en directo en el comercio electrónico, revelando el papel de la co-experiencia y la confianza del consumidor.

Palabras clave Interactividad, Co-experiencia, Engagement del consumidor,

Comercio electrónico en directo, Teoría SOR

Tipo de artículo Trabajo de investigación

直播电商：互动性与共体验对消费者参与的关系

摘要

研究目的 – 本研究旨在基于刺激–有机体–反应（Stimulus–Organism–Response, SOR）理论框架，探讨直播电商中消费者参与的前因变量。研究分析了互动性与共体验（刺激）、消费者信任（有机体）以及消费者参与（反应）之间的关系。

研究方法 – 通过社交媒体、电子邮件及即时通讯平台发放问卷，共收集到262份有效样本。所得数据采用结构方程模型进行分析。

研究结果 – 研究结果表明，在直播电商中，消费者信任对消费者参与具有显著影响。互动性中的“主动控制”对消费者信任有显著正向作用；共体验中的“参与感”和“认知共鸣”也能显著促进信任。然而，互动性的“双向沟通”以及共体验的“同步性”和“情感感染”并未显示出对消费者信任的显著正相关。

研究原创性 – 本研究探讨了直播电商环境中卖家与买家互动的各个方面对消费者参与的影响，揭示了共体验与消费者信任在其中的重要作用。

研究局限性 – 本研究采用横截面调查设计，仅聚焦于前人研究推荐的关键因素，研究范围限于直播电商领域。

实践与理论启示 – 从理论角度看，本研究提供了关于消费者与卖家间沟通动态如何促进信任并进一步推动消费者参与的新见解。从实践角度看，管理者应重视在直播电商中创造高互动性和共体验的消费场景，以建立并强化消费者信任。

关键词 互动性，共体验，消费者参与，直播电商，sor理论

文章类型 研究型论文

1. Introduction

Live streaming is increasingly becoming a popular digital platform strategy that combines sight, sound and motion to convey product information (Yen, 2018). This user-friendly approach improves consumer knowledge about desired products as it fosters authenticity, visualization, interactivity and consumer engagement in online shopping (Hu and Chaudhry, 2020). Understanding consumer engagement is crucial in competitive landscape of e-commerce industry, as it leads to consumer retention and brand loyalty (Busalim *et al.*, 2021; Kang *et al.*, 2021; Hu and Chaudhry, 2020; Prentice *et al.*, 2019; Wang and Wu, 2019; Wongkitrungrueng and Assarut, 2020).

Real-time interaction is one of the factors why consumers engage in live streaming (Bao and Zhu, 2022) as it allows for two-way communication between consumers, broadcasters and sellers (Chen *et al.*, 2020; Kang *et al.*, 2021). In addition, interactivity is a cue that stimulates consumers' cognitive and emotional states, influencing their behavioral responses (Sheng and Joginapelly, 2012). Live streaming also contributes to the value of e-commerce by supporting consumer communication and co-creating value through sharing their feelings and affections related to their consumption practices (Hu *et al.*, 2017). This is also known as co-experience, or experiences shared between multiple users using a product or service (Battarbee, 2003), which allows consumers to influence and be influenced by others (Lim *et al.*, 2012).

Although several studies have shown that interactivity is one of the foundations of trust in online commerce (Bao *et al.*, 2016; Jeon *et al.*, 2016; Shen *et al.*, 2018), there is no evidence of this relationship in the live-streaming e-commerce context as of yet. The small volume of existing literature on co-experience has explored the relationship between co-experience and social identification (Hu *et al.*, 2017), enjoyment of active behavior (Bründl *et al.*, 2017) and purchase intention (Kim, 2022).

Live streaming allows real-time interactions between consumers and sellers, improving transparency and trust. However, it also presents challenges as consumers observe the seller's body language and see the product demonstrations live. Interactions immediacy means that discrepancies or perceived dishonesty can quickly erode consumer trust. Therefore, compared to traditional e-commerce, it is essential to establish and maintain trust during a live-streaming session. This study explores how interactivity and co-experience in live streaming can foster consumer trust and engagement because these factors are essential to purchasing decisions. Our study aims to fill these gaps by examining interactivity and co-experience as antecedents to consumer trust. To do so, we investigate interactivity and co-experiences as triggers for consumer engagement with consumer trust as an intervention.

2. Literature review and conceptual framework

This section presents a brief theoretical background of each construct based on reviewing the existing literature and forming research hypotheses.

2.1 Live streaming e-commerce

Technological advances have provided advertisers modern methods to engage and retain new and existing consumers online to maximize company profits (Wu *et al.*, 2021). Integrating live streaming across multiple platforms is a new and increasingly common approach. Live streaming is a form of synchronous mixed media that differs from conventional social media in that it allows users to communicate in real-time using live video and speech (Cai and Wohn, 2019), providing users with a new buying experience in the e-commerce context. Sellers can connect with consumers in real-time interactions to address, for example, product-related questions asked via live chat during a stream. Live streaming is becoming

essential for consumer contact, and marketing practitioners are increasingly interested in leveraging their brands through live streaming (Todd and Melancon, 2018).

2.2 Stimulus–organism–response theory

The stimulus–organism–response (SOR) theoretical model was proposed by environmental psychologists Mehrabian and Russell in 1974 as a theoretical foundation for researching the effects of external stimuli on individuals (Hewei and Youngsook, 2022). The SOR model consists of three essential elements: a stimulus, an organism and a response (Lee and Yun, 2015). The stimuli represent the environmental factors that are external to the organism (Hewei and Youngsook, 2022; Zhu *et al.*, 2019). In the context of e-commerce sites, stimuli influence site performance (Zhu *et al.*, 2019). The ability of a live-streaming e-commerce site to facilitate interactivity and co-experience is a reflection of the stimuli (Kang *et al.*, 2021).

The organism refers to the psychological transformation mechanism through which a user internalizes a stimulus into information (Hewei and Youngsook, 2022). It includes the consumers' affective and cognitive states, including psychological factors like trust (Zhu *et al.*, 2019). The response represents the users' behavior resulting from the external stimulus (Hewei and Youngsook, 2022; Zhu *et al.*, 2019). In live-streaming commerce, the desired behavioral outcome produced is consumer engagement and interaction with the company through purchasing, referral and positive communication (Hu and Chaudhry, 2020).

2.3 Consumer trust

Hallikainen and Laukkanen (2018) and Wongkitrungrueng and Assarut (2020) define trust as having confidence in another person's character and believing they will behave ethically and appropriately in social exchange. Online consumers' trust in the seller and the product can significantly influence their purchasing decisions (Kim *et al.*, 2008). At the same time, online consumers' perceptions of risk regarding products and web vendors have an equal effect on trust (Pappas, 2016).

In online stores, trust facilitates contact between buyers and sellers – having warm emotions about an online retailer increases the consumers' desire to return to the site and make a purchase (Chiu *et al.*, 2012). Consumers regularly visit e-commerce sites and browse several pages on each visit (Calder *et al.*, 2009). Frequent visits to e-commerce sites are more likely if a buyer–seller relationship is built on trust and loyalty. Consumers are more likely to become supporters of the vendor because they trust them and their goods (Sashi, 2012).

2.4 Interactivity

The primary feature of the live streaming trading environment is encouraging the user's constructive attitude and conduct in conversation and transactions (Kang *et al.*, 2021). Interactivity is described as the technological characteristics of mediated environments that allow for mutual contact or information sharing and the interaction between communication technologies and users or even between users through technology (Bucy and Tao, 2007). Interactivity is built from three essential elements: active control, two-way communication and synchronicity (Liu, 2003). Active control relates to the amount of knowledge participants (i.e. consumers) exchange and refers to a user's (consumer) ability to be consciously involved in and affect a dialogue (Liu, 2003; Lockström and Lei, 2013). Based on Liu (2003), online stores display the highest level of active control compared to other websites. It means that e-commerce integrated with live streaming also has high active control. Consumers tend to be more focused and demanding during a live-streaming session, as they must pay closer attention to make comparisons and choices at any time. During live streaming, the consumer controls their shopping experience and directs their contact

interactions (Hu *et al.*, 2016). Consumers then perceived that they could use the information to decide whether they could trust the information they obtained from the interactions during a live streaming session.

Two-way communication refers to the reciprocal willingness of a seller and consumers to share information (Liu, 2003). Integrating live streaming into e-commerce services provides accessible, instant transmission of information and feedback, giving users control over involvement in the live streaming session and two-way communication opportunities (Wongkitrungrueng and Assarut, 2020). The capacity to carry out transaction activities, such as product demonstrations and orders, is integral to two-way communication (Chen and Shen, 2015; Tajvidi *et al.*, 2021; Zhang *et al.*, 2022). The ability to make purchases online significantly facilitates two-way contact between the seller and the consumer and contributes to the seller's understanding of the consumers' buying behavior (Bao *et al.*, 2016; Liu, 2003).

Synchronicity involves real-time feedback integration into the communication process between consumers and the seller (Liu, 2003). Live streaming can improve the synchronicity of communication as consumers only need to type a question in the chat field to get product-related responses from the seller and other consumers simultaneously (Kirk *et al.*, 2015). A live-streaming e-commerce system enables sellers to achieve synchronicity by promptly responding to consumer questions and demands (Hu *et al.*, 2016).

The intensity of interaction between sellers and consumers in an e-commerce setting will influence the quality of information exchange, which may increase the level of consumer trust (Kim *et al.*, 2008; Pappas, 2016). Zhang *et al.* (2022) also discovered that interactivity during live streaming increased consumers' trust in products and sellers:

H1. Active control (a), two-way communication (b) and synchronicity (c) have a positive and significant relationship with consumer trust.

2.5 Co-experience

Co-experience describes the shared interpersonal experiences among multiple users during live streaming (Battarbee and Koskinen, 2005). Hu *et al.* (2017) describe how a viewer's behavior can influence and be influenced by others as being impacted by participation, cognitive communion and resonant contagion.

The first component of co-experience is participation, or the perception that one's user (a consumer) experience contributes to the collective experience of all participants (the rest of the consumers in the same live-streaming session) (Bründl *et al.*, 2017). In a live-streaming session, the experience is built by multiple parties: the seller and the consumers. Thus, the overall experience is formed by interactions between the seller and consumers (Lim *et al.*, 2012). When a consumer is actively involved in the exchange with the seller, the exchange can increase their knowledge regarding the brand and product (Casaló, *et al.*, 2007).

Cognitive communion, or the second component of co-experience, is supported by the shared-cognition sub-dimension of that which is "held in general" (Lim *et al.*, 2012) or the belief that a person shares knowledge or meaning with others (Bründl *et al.*, 2017). According to Song and Lee (2020), cognitive communion is when a consumer shares a thought with another person, making them feel more connected because of the knowledge, information or significance they have in common. In the live-streaming context, the experience of sharing content has decreased the thresholds for consensus and assimilation (Lim *et al.*, 2012).

Resonant contagion is the third component of co-experience, arising from the "participating in an agreement" sub-dimension of shared cognition (Lim *et al.*, 2012). It is defined as influencing and being influenced by the interactions of others to arrive at the same

conclusions. The community attains mutual truth when communicators try to control others by arbitrarily adjusting their messages to fit with an audience's assessment of the message subject, according to [Echterhoff et al. \(2009\)](#). The positive experience that the consumer feels may induce their trust in both the vendor and the product ([Kim et al., 2008](#); [Pappas, 2016](#)):

H2. Participation (a), cognitive communion (b) and resonant contagion (c) have a positive and significant relationship with consumer trust.

2.6 Consumer engagement

Consumer engagement – referring to consumers' interactions with a company through various new media channels, manifesting in purchasing and nonpurchasing behavior ([Vohra and Bhardwaj, 2019](#)) – is recognized as a fundamental construct within the social sciences literature, especially in corporate behavior, psychology, economics and politics ([Rather, 2018](#)). Over the past decade, consumer engagement has been popularized as an effective way to attract consumer purchases ([Prentice et al., 2019](#)). Live streaming can effectively empower engaged consumers to be able to evaluate better whether a product meets their needs and, thus, significantly increase purchase intentions ([Wang and Wu, 2019](#)). Studies found that engagement during live-stream shopping is positively associated with consumer purchase intentions in social commerce platforms ([Sun et al., 2018](#)) and e-commerce ([Choi et al., 2019](#); [Prentice et al., 2019](#)).

Engagement has various affective, perceptual and behavioral manifestations beyond those related to trading ([Dessart, 2017](#)). It can also be described as the level of participation and interaction consumers have with goods or company activities ([Vivek et al., 2012](#)) and, according to [Wongkitrungrueng and Assarut \(2020\)](#), can be studied from a behavioral or psychological perspective. According to a previous study, consumer trust served as a mediator variable, increasing the meaning of consumer engagement ([Wongkitrungrueng and Assarut, 2020](#)). They also found that consumers interact with a seller when consumers trust the seller and the product:

H3. Consumer trust has a positive and significant relationship with consumer engagement.

2.6.1 *Conceptual framework.* [Figure 1](#) shows the relationships between variables in this study. The stimuli are interactivity and co-experience, the organism is consumer trust, and the response is consumer engagement.

3. Method

3.1 Data collection

This study focuses on the Indonesian market, a promising emerging Southeast Asian market. Indonesia is among the world's most enthusiastic digital technology users, with 178.9 million e-commerce users and estimated sales of US\$59bn in 2022 ([Kaplan, 2022](#)). The data for this study were collected from e-commerce users in Indonesia from July 2021 to October 2021. Convenience sampling was selected based on practical factors such as availability, accessibility and willingness to volunteer ([Farrokhi and Mahmoudi-Hamidabad, 2012](#)). An online Google Forms survey was used, and a link to the questionnaire was distributed via email, social media (i.e. Instagram and Twitter) and online messenger platforms (i.e. WhatsApp). The questionnaires included an example of a live-streaming video display from one e-commerce site to ensure participants understood the concept of live-streaming e-commerce. For respondents who have seen a live-streaming session, the video serves as a reminder of the live-streaming session. Meanwhile, for respondents without

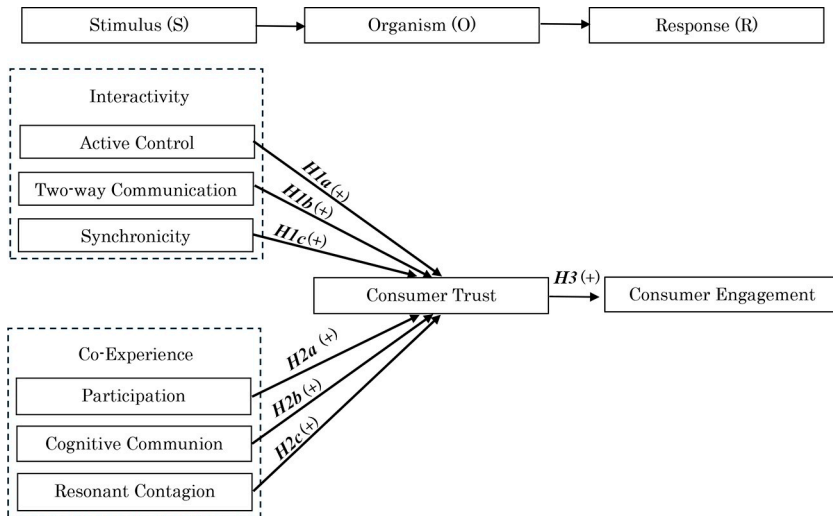


Figure 1. Conceptual framework

a live-streaming session experience, the video helps them understand the appearance of a live-streaming session. From 411 respondent data collected, 262 data were processed. This is the number of respondents who have watched live streaming on e-commerce.

3.2 Measurement

The questionnaire was adapted from several previous studies and used a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Interactivity was assessed using three items addressing active control, four for two-way communication, and three for synchronicity (Hou *et al.*, 2020). The measure for co-experience variable was adapted from Lim *et al.* (2012) and included three items each for antecedent participation, cognitive communion and resonant contagion. Six items assessing consumer trust and eight items assessing consumer engagement were adapted from Wongkitrungrueng and Assarut (2020). The complete list of questions is presented in Table 1. The original questionnaire was written in English, translated into Indonesian, and tested with respondents who met the criteria. The questionnaire was distributed as a Google Form, beginning with questions to identify respondents who had and had not experienced live-streaming e-commerce and were willing to fill out the questionnaire. It also contained several demographic questions.

3.3 Data analysis

The current study used structural equation modeling (SEM) to examine the conceptual model and research hypotheses. The analysis was conducted using AMOS 23 software and followed the protocols outlined by Anderson and Gerbing (1988). The process consists of two phases: initially, a confirmatory factor analysis was used to assess the measurement model; subsequently, the hypotheses of the conceptual model were estimated. The selection of SEM was motivated by its ability to facilitate the examination of hypotheses that suggest intricate linkages, as stated in conceptual models, using empirical measures. The choice of SEM aligns with the findings of Kaplan (2009).

Table 1. List of questions

Interactivity – adapted from Hou et al. (2020)	Co-experience – adapted from Lim et al. (2012)
<i>Active control (AC)</i>	<i>Participation (P)</i>
(1) Other audiences in the group influence my behavior	(1) I felt I was a part of the audience group of live streaming
(2) My actions affect other audiences in the group	(2) I had the impression that I was part of a live-streaming audience group
(3) My actions decided the kind of experiences I got	(3) I felt my participation is important when I can provide information about products
<i>Two-way communication (TC)</i>	<i>Cognitive communion (CC)</i>
(1) The streamer was effective in gathering viewers' feedback	(1) I had the impression that I was thinking along the same lines as the rest of the crowd
(2) This streamer facilitated two-way communication between herself/himself and viewers	(2) I had the impression that my expertise was being shared with other audiences
(3) The streamer made me feel she/he wanted to listen to her/his viewers	(3) I had the impression that I had the same viewpoint as the rest of the crowd
(4) This streamer gave viewers the opportunity to talk to her/him	
<i>Synchronicity (S)</i>	<i>Resonant contagion (RC)</i>
(1) My behavior was influenced by other audiences of the group	(1) Other members of the group had an impact on my behavior
(2) My behavior influenced other audiences of the group	(2) My behavior had an impact on the other audiences of the group
(3) Our audience group agreed upon similar opinions	(3) Our audience group agreed upon similar opinions
<i>Consumer trust (CT) – adapted from Wongkitrungrueng and Assarut (2020)</i>	<i>Customer engagement – adapted from Wongkitrungrueng and Assarut (2020)</i>
(1) I believe in the information that the seller provides through live streaming	(1) I spend more time on pages that have live video streaming
(2) I can trust sellers in e-commerce that use live streaming	(2) I will be a follower of a shop that uses live streaming in e-commerce
(3) I do not think that sellers in e-commerce who use live streaming would take advantage of me	(3) I will track the activity of sellers who use the live streaming feature in e-commerce
(4) I think the products I order from live streaming on e-commerce will be as I imagined	(4) I will revisit the seller's shop to watch their latest live-streaming video soon
(5) I believe that I will be able to use products like those demonstrated on live streaming on e-commerce	(5) I tend to recommend sellers who use live streaming in e-commerce to my friends
(6) I trust that the products I receive will be the same as those shown on live streaming on e-commerce	(6) I advise my friends and family to conduct business with e-commerce sellers who use live streaming
	(7) I will surely buy products from sellers who use live streaming in e-commerce in the near future
	(8) When buying certain products, sellers who use live streaming in e-commerce are my first choice

4. Findings

4.1 Respondents characteristic

The respondents in this study were located in various cities throughout Indonesia. According to most respondents, Shopee was the preferred e-commerce platform for live streaming and online shopping, with Tokopedia in second place. Most participants, or about 70% of the total, were females between the ages of 21 and 25 who held a bachelor, master or doctoral degree. Most respondents had an average expenditure of less than 2m rupiah, with a specific focus on online shopping expenses being less than 1m rupiah (US\$70). The buying preferences most viewed included fashion, electronics and kitchen equipment. [Table 2](#) displays the demographic results for the valid response.

4.2 Descriptive analysis

[Table 3](#) displays the mean value and standard deviation of active control, two-way communication and synchronicity. Next are the mean value and standard deviation of participation, cognitive communion and resonant contagion. Finally, there are consumer trust and consumer engagement variables.

Table 2. Respondent characteristic

Profile	Total (n = 262)	%
<i>Gender</i>		
Male	81	31
Female	181	69
<i>Age (year old)</i>		
16–20	21	8
21–25	130	50
26–30	55	21
31–35	26	10
36–40	13	5
41–45	6	2
>46	11	4
<i>Education</i>		
Junior high school	1	0
High school	55	21
Diploma	14	5
Higher education	192	73
<i>Average monthly expenditure</i>		
<2m rupiah	114	44
2–4m rupiah	80	31
4–6m rupiah	35	13
6–8m rupiah	14	5
>8m rupiah	19	7
<i>Average expenditure for shopping on e-commerce</i>		
<1m rupiah	201	77
1–3m rupiah	44	17
3–5m rupiah	10	4
5–7m rupiah	3	1
>7m rupiah	4	2

Table 3. Descriptive analysis

Variables		Mean	SD
Interactivity	Active control	4.06	0.96
	Two-way communication	4.02	0.96
	Synchronicity	3.84	0.98
Co-experience	Participation	3.60	1.10
	Cognitive communion	3.40	1.10
	Resonant contagion	2.99	1.19
Consumer trust		3.77	0.93
Consumer engagement		3.06	1.21

4.3 Structural equation modeling analysis

Verification analysis aims to test the influence between latent variables in this study. The analysis uses the SEM method. SEM forms two types of models, namely, measurement models and structural models. The measurement model aims to describe how well each indicator can be used as a measurement instrument for latent variables by testing the validity and reliability of indicators from research variables. The structural model is a model where the goodness of fit for the inner model can be proven by testing the influence of each exogenous latent variable on the endogenous latent variable.

4.3.1 Measurement model testing. The measurement model testing in this study uses a first-order confirmatory factor analysis (CFA). The first-order measurement model in this research illustrates the relationship between the dimensions and their corresponding variables. The results of the CFA testing are explained in Tables 4 and 5 as follows.

The data presented in Tables 4 and 5 indicate that all standardized factor loadings (λ) are ≥ 0.50 , signifying that all indicators demonstrate validity. Similarly, the reliability of the

Table 4. Confirmatory factor analysis of exogenous constructs

Latent variable		λ	λ^2	e	VE	CR
Active control	AC1	0.730	0.533	0.130	0.708	0.878
	AC2	0.658	0.433	0.180		
	AC3	0.884	0.781	0.410		
Two-way communication	TC1	0.665	0.442	0.130	0.659	0.885
	TC2	0.751	0.564	0.180		
	TC3	0.709	0.503	0.410		
	TC4	0.822	0.676	0.410		
Synchronicity	S1	0.740	0.548	0.130	0.697	0.873
	S2	0.777	0.604	0.180		
	S3	0.711	0.506	0.410		
Participation	P1	0.852	0.726	0.130	0.750	0.900
	P2	0.829	0.687	0.180		
	P3	0.865	0.748	0.410		
Cognitive communion	CC1	0.792	0.627	0.130	0.731	0.891
	CC2	0.798	0.637	0.180		
	CC2	0.833	0.694	0.410		
Resonant contagion	RC1	0.823	0.677	0.130	0.743	0.896
	RC2	0.889	0.790	0.180		
	RC3	0.783	0.613	0.410		

Table 5. Confirmatory factor analysis of endogenous constructs

Latent variable		λ	λ^2	e	VE	CR
Consumer trust	CT1	0.714	0.510	0.130	0.621	0.907
	CT2	0.762	0.581	0.180		
	CT3	0.567	0.321	0.410		
	CT4	0.825	0.681	0.410		
	CT5	0.733	0.537	0.410		
	CT6	0.750	0.563	0.410		
Consumer engagement	CE1	0.747	0.558	0.130	0.645	0.936
	CE2	0.811	0.658	0.180		
	CE3	0.777	0.604	0.410		
	CE4	0.821	0.674	0.410		
	CE5	0.835	0.697	0.410		
	CE6	0.765	0.585	0.410		
	CE7	0.802	0.643	0.410		
	CE8	0.789	0.623	0.410		

measurement model is supported by a composite reliability (CR) value ≥ 0.70 and a variance extracted (VE) value ≥ 0.50 , indicating that the model is reliable and suitable for further analysis. The goodness-of-fit test for the measurement model of each variable meets the required criteria, as evidenced by an RMSEA value < 0.08 ; GFI > 0.9 ; CFI > 0.9 ; TLI > 0.9 ; CMIN/DF < 2 ; RMR < 0.5 ; RFI > 0.9 ; and AGFI > 0.9 .

4.3.2 Structural model testing. According to the research paradigm, two structural models, which consist of two sub-structures, will be tested in this study. The first sub-structure examines the impact of interactivity and co-experience on consumer trust. The second sub-structure then evaluates the effect of consumer trust on consumer engagement. The following figure presents the results of the structural model analysis conducted using IBM AMOS version 23.0, with a 95% confidence level based on the established paradigm.

Figure 2 presents the statistical analysis results of the structural model measurements, which yield path coefficient values for two structural equations. Following the model respecification procedure, the goodness-of-fit indices improve compared to the initial values. Although the chi-square and p -value parameters still indicate a poor level of fit, other fit indices suggest an acceptable model fit, with GFI = 0.810 > 0.8 (marginal fit), CFI = 0.905, and TLI = 0.894 > 0.8 (marginal fit), and a CMIN/df value below 5. In addition, the RMSEA value is less than 0.08, precisely 0.068, indicating a good fit between the research data and the structural model. The result of the hypotheses testing can be seen in Table 6.

Based on Table 6, the t -value for the active control variable on consumer trust is 3.199, which exceeds the critical value of 1.96. Since the t -value is greater than the critical value at a 5% significance level, we accept $H1$ and reject $H0$. The result indicates that active control positively and significantly affects consumer trust ($H1a$). This relationship happens because live streaming allows consumers to choose which products they wish to have shown and explained (Bao *et al.*, 2016; Hu *et al.*, 2016; Zhang *et al.*, 2022). The sellers' professionalism in explaining the offered product can increase consumer trust in both the seller and the product itself (Tsai and Hung, 2019).

Participation ($H2a$) and cognitive communion ($H2b$) also significantly affected consumer trust in a positive direction. The acceptance of $H2a$ is similar to the results of a survey by Casaló *et al.* (2007), which discovered that participating in activities conducted in virtual communities can foster consumer trust. Tseng *et al.* (2022) similarly found that consumer

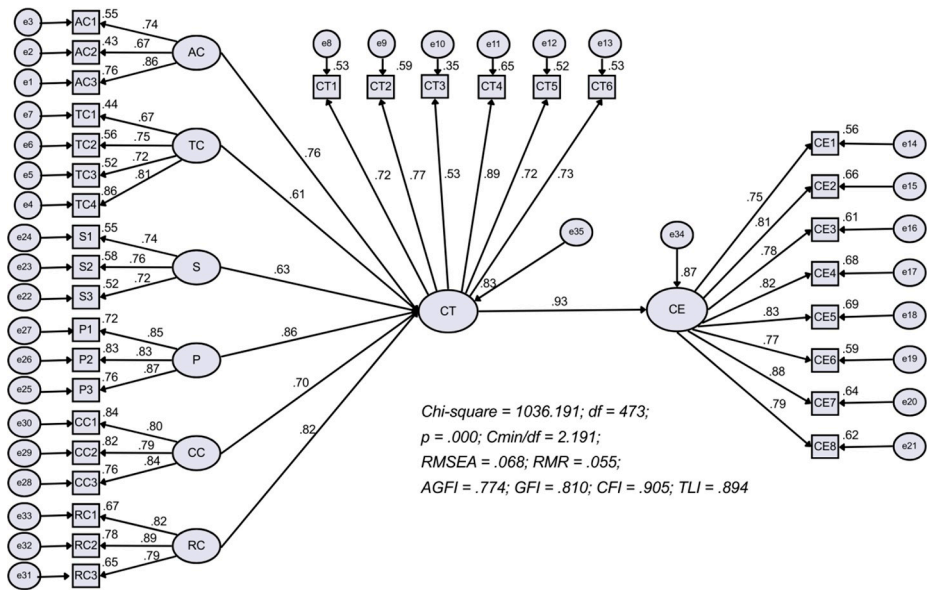


Figure 2. Structural model testing model results

Table 6. Hypothesis testing result

Hypotheses	Path coefficient	t-value > 1.96	Decision
H1a (+): AC → CT	0.146	3.199	Accepted
H1b (+): TC → CT	0.152	1.908	Rejected
H1c (+): S → CT	0.102	1.195	Rejected
H2a (+): P → CT	0.272	2.641	Accepted
H2b (+): CC → CT	0.300	2.277	Accepted
H2c (+): RC → CT	0.128	1.562	Rejected
H3 (+): CT → CE	0.934	11.391	Accepted

participation in online communities using social media promotes higher consumer trust. Meanwhile, the acceptance of H2b also has similarities with the result of research by Song and Lee (2020).

However, H1b, which states that two-way communication has a significant positive relationship with consumer trust, was not supported. This result is different from the result of previous research by Tajvidi et al. (2021), which concluded that live-streaming technology allows for direct two-way interaction between consumers and sellers, encourages the flow of information and feelings, and compensates for consumer concerns about seller opportunism and product quality caused by the separation of consumers and sellers in space or time in traditional e-commerce caused by the separation of consumers and sellers in space or time in traditional e-commerce. During a single live-streaming session, consumers may have limited chance to build two-way interactions that make them trust the seller, as the sellers need to address many viewers simultaneously. A study by Mero (2018) demonstrates that a chat

service significantly enhances the effectiveness of two-way communication in building trust within the e-retailing context. In this scenario, direct one-on-one interaction is more impactful, which explains why the hypothesis is unsupported.

Synchronicity (*H1c*) was also proven to have no significant positive effect on consumer trust. This finding aligns with the research result from [Shang et al. \(2023\)](#), which highlighted factors such as the overall experience and value derived from the live stream that may have a greater potential impact on trust than synchronicity. In addition, [Meng and Lin \(2023\)](#) showed that trust is influenced by multiple factors rather than synchronicity alone. The evidence presented in this study, validated by the existing literature, confirms the premise that synchronicity alone cannot affect consumer trust in live-streaming commerce.

Next, *H2c* was also rejected, which concluded that resonant contagion does not affect consumer trust. This result means that in the context of live streaming in e-commerce, no common conclusion is formed among participants that can affect consumer trust. Due to a time constraint in a live streaming session, consumers may focus more on the seller than other consumers. Alternatively, the possibility of opinion conclusions still occurs, but this does not affect consumer trust in the seller and/or the product being sold. These findings align with the research conducted by [Du et al. \(2019\)](#), which found that resonant contagion has a notable influence on the unpleasant emotions experienced by group customers. Thus, resonant contagion does not directly impact consumer trust.

Finally, the hypothesis analysis showed a significant positive relationship between consumer trust and engagement (*H3*). According to [Wongkitrungrueng and Assarut \(2020\)](#), increased trust in live-streaming shopping increases consumer engagement. Indeed, sellers use live streaming to build consumer trust through synchronous social interactions ([Chang and Chen, 2008](#); [Park and Lin, 2020](#)), leading to positive feelings toward online sellers, increasing the likelihood of a consumer returning to and purchasing from the site ([Chiu et al., 2009](#)).

4.4 Correlation analysis

The correlation analysis was conducted to explore the relationships between the constructs of Interactivity and Co-experience within the study context. Interactivity comprises Active Control (AC), Two-way Communication (TC) and Synchronicity (S), while Co-experience includes Participation (P), Cognitive Communion (CC) and Resonant Contagion (RC). The correlations among these variables, corresponding *t*-values and strength classifications are presented in [Table 7](#).

The analysis reveals that the correlations among the components (AC, TC and S) within the Interactivity construct are generally moderate to high, with a notable correlation of 0.78 between TC and S. This implies that the components of Interactivity are closely related and form a coherent construct. Similarly, the Co-experience concept has significant correlations among its components (P, CC and RC), with the correlation between P and CC (0.86) being notably substantial. The significant interconnectedness within Co-experience enhances its credibility as a separate concept. When analyzing cross-construct correlations, we discover moderate to substantial correlations, such as the correlation between Synchronicity and Participation (0.64) and the correlation between Two-way Communication and Participation (0.61). However, the overall pattern of correlations indicates that Interactivity and Co-experience are largely distinct, albeit with some overlapping elements.

5. Conclusion

This study investigates the factors that lead to consumer engagement in the setting of live-streaming e-commerce using the SOR framework. The results emphasize the crucial

Table 7. Correlation analysis between the items

Variables	<i>r</i>	<i>t</i> -value	Strength
AC ↔ TC	0.43	5.213	Moderate
AC ↔ S	0.42	4.904	Moderate
AC ↔ P	0.34	4.445	Weak
AC ↔ CC	0.49	4.899	Moderate
AC ↔ RC	0.36	4.619	Weak
TC ↔ S	0.78	7.394	Strong
TC ↔ P	0.61	7.043	Strong
TC ↔ CC	0.57	6.564	Moderate
TC ↔ RC	0.48	5.725	Moderate
S ↔ P	0.64	6.802	Strong
S ↔ CC	0.58	6.298	Moderate
S ↔ RC	0.55	5.984	Moderate
<i>p</i> ↔ CC	0.86	8.833	Strong
<i>p</i> ↔ RC	0.70	7.706	Strong
CC ↔ RC	0.82	8.224	Strong

Note(s): *Weak correlation: $0.0 \leq |r| \leq 0.39$; Moderate correlation: $0.4 \leq |r| \leq 0.59$; Strong correlation: $|r| \geq 0.6$

significance of interaction and co-experience in influencing consumer trust, leading to consumer engagement. The study discovered that some elements of interactivity, such as active control, and aspects of co-experience, such as participation and cognitive communion, significantly impacted consumer trust. Trust in live-streaming e-commerce environments is crucial, as it is closely linked to increased consumer engagement. This highlights the significance of trust-building processes in these situations.

Surprisingly, not all aspects of interactivity and co-experience have noteworthy effects on consumer trust. In this study, two-way communication and synchronicity, commonly considered essential aspects of interactive environments, did not significantly impact trust. This discovery implies that although receiving immediate feedback and having contact are beneficial, they may not be enough to establish trust in live-streaming situations. Likewise, resonant contagion involving shared experiences did not have a noteworthy influence on trust. This result suggests that the consensus among viewers does not automatically result in heightened trust.

Table 8 summarizes the research conclusions and limitations.

5.1 Research limitations and suggestions future research

This study is not without limitations. First, this was a cross-sectional survey-based study. Some factors impacting online purchase intentions for live-streaming e-commerce, e.g. trust and value, may need to be studied longitudinally. Subsequent research may also look into the causal role of the variables using different techniques, such as experiments, to complement the survey approach. Experiments could be conducted during live streams by modifying certain conditions, such as altering the speed of response to audience questions (synchronicity) or throwing questions back at the audience (two-way communication).

Second, this research focuses solely on e-commerce sites operating in Indonesia. Further study of consumer involvement in live streaming covering research areas outside Indonesia is highly recommended. Similarly, characteristics like national culture and other considerations should be included in future studies as cultural traits (like uncertainty avoidance) impact trust and consumer engagement.

Table 8. Conclusions and implications

Conclusions	Implications
Trust has a pivotal role in the digital environment particularly as the primary mediator between interactivity/co-experience and engagement	<i>Theoretical:</i> Our study not only validates the SOR framework in the context of live-streaming e-commerce but also underscores the paramount role of trust in the digital environment <i>Managerial:</i> To build trust, streamers should prioritize product transparency and consumer empowerment, rather than relying solely on synchronicity
In interactivity, active control is significantly related to trust. Meanwhile, two-way communication and synchronicity are not significantly related to trust	<i>Theoretical:</i> Our study, in line with Mpinganjira (2016) , emphasizes that not all dimensions of interactivity are equally important. It underscores the significance of active control over two-way communication <i>Managerial:</i> Platforms should prioritize features that empower consumers, such as the ability to select products or adjust the speed of a demo. This focus on consumer control enhances interaction and, consequently, trust
For the co-experience variable, participation and cognitive communion are positively related to trust; meanwhile, resonant contagion is not significantly related	<i>Theoretical:</i> Introduce co-experience as a new variable in the live-streaming context and show that resonant contagion does not automatically develop trust <i>Managerial:</i> Streamers should involve consumers through Q&A, polling or real-time reviews during live-streaming sessions. Streamers should greet the audience personally to improve cognitive communication

Third, a convenience sampling method was used for this survey, making results from the data cannot be generalized beyond the sample ([Acharya et al., 2013](#)). Future research may use other sampling methods, such as purposive sampling, where the target respondents belong to a specific community (e.g. brand community or fashion community) since these consumer communities can also influence consumer engagement in online shopping.

Fourth, this study defines trust as trust in the seller and product. Trust in the seller can be further investigated in more specific dimensions such as competence, benevolence and integrity. In an online setting, trust may be influenced by the frequency of interactions, familiarity with the vendor, the product or the technology for interactions. Further study may also include the quality of interactions and the emotional tone of the interaction.

Fifth, some variables in the interactivity and co-experience constructs may overlap, giving the impression of repeating the same thing, even though there are differences by definition. This problem can be overcome by reducing the number of variables used. Further research is advised to modify the constructs used in the study by, among other things, focusing on only one or two variables or using a different construct consisting of fewer and non-overlapping variables.

Finally, this study focused solely on consumer engagement as a dependent variable. Future research could use a framework with two or more dependent variables, such as satisfaction, to better understand the phenomena of live-streaming e-commerce.

5.2 Theoretical contributions

In some ways, this research makes at least three contributions to the theory. First, unlike previous research, which discussed live streaming from the seller's side or the technical side

only, this research discusses the relationship between sellers and buyers during live streaming, which can increase engagement. Second, according to [Choi \(2019\)](#), the distinctive feature differentiating live-streaming purchases from other e-commerce purchases is interactivity (active control, two-way communication and synchronicity). However, [Mpiganjira's \(2016\)](#) study shows that only active control and two-way communication increase consumer engagement in online buying communities. Therefore, this study tries to include the three sub-variables of interactivity as one of its novelties. Our study aligns with [Mpiganjira \(2016\)](#), as active control is the only dimension of interactivity with a significant relationship with consumer trust that will eventually be positively related to consumer engagement. Contrary to our hypotheses, two-way communication and synchronicity did not possess a significant relationship to consumer trust. The frequency of communication and the quality of perceived information exchange during the synchronous relationship might cause an insignificant relationship between two-way communication and synchronicity and consumer trust.

Third, this study includes co-experience as an independent variable, which has never been done in other research. The inclusion of co-experience is related to the aim of this research, which is to see the connection between buyers and sellers during live streaming that requires elements of co-experience (participation, cognitive communion and resonant contagion). Among the elements of co-experience, resonant contagion is the only one that did not show a significant relationship with consumer trust.

Ultimately, this study addresses the existing void in live-streaming transactions by developing a research framework that examines communication dynamics and relationships between buyers and sellers. This study aims to determine the specific relationship qualities that live streamers must cultivate to generate engagement with viewers, resulting in increased online purchases. Unlike other authors who primarily focus on the qualities that make live streaming interesting, this research delves into the relationship dynamics between sellers (live streamers) and buyers (viewers).

5.3 Managerial implication

This research reveals how live-streaming technology can attract and keep consumers through e-commerce shops, particularly those with low brand recognition and trust. Our study found that managers should pay more attention to the active control aspect of interactivity. Participation and cognitive communion, as part of the co-experience element, must also be the focus of consumers' live streaming experience.

To improve active control, e-commerce platform managers should empower consumers to manage their viewing experience by offering features that allow them to select how they want to interact during live-streaming sessions. Examples include selecting specific products to be showcased, controlling the pace of the demonstration and having the ability to interact directly with the seller through real-time polls and Q&A sessions. These features allow consumers to feel that they deliberately participate in the session.

Managers and streamers should make viewers feel more involved and valued to enhance participation and cognitive communion. Streamers can also allow consumers to share their experiences and reviews by adding to real-time polls and Q&A sessions. Consumers will feel that their knowledge contributes to collective experiences and will feel more connected to streamers. Interestingly, following up these sharing experiences with meaningful feedback is not crucial because findings suggest that two co-experience aspects, namely, two-way communication and synchronicity, do not significantly impact trust. However, we still suggest that streamers acknowledge the viewers' efforts by thanking and mentioning them during live sessions.

Open contributorship statement

Atik Aprianingsih: Conceptualization, supervision, methodology design, manuscript revision, quality assurance, review and editing. Ira Fachira: Critical review, structure refinement, quality assurance and manuscript revision. Margareth Setiawan: Data analysis (SEM), data collection, interpretation of findings and manuscript revision. Irsa Indriati Pratiwi: Literature review, instrument development, data collection and original draft writing.

Spanish Journal of
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553

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