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Live Streaming as a Distribution Channel in Fashion Mobile Applications: Exploring Loyalty Models in the Modern Retail Era

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Abstract

Purpose: Market competition in the fashion industry is intensifying, pushing brands to strive for consumer preference and market leadership. Mobile fashion applications have emerged as key distribution channels, with live streaming being a common feature for product distribution and consumer loyalty. Therefore, this study will analyze the loyalty model in live streaming on mobile fashion applications by integrating the quality loyalty model, parasocial relationships, and uses and gratifications (U&G) theory. **Research design, data and methodology:** Data were collected from a survey of 427 respondents who are customers of a fashion product that had been purchased through live streaming on a mobile fashion application and processed using the PLS-SEM method. **Results:** The results of the study show that the live streamer and product quality significantly influence satisfaction and loyalty. Conversely, AR content and live streaming content do not directly influence loyalty but have an indirect effect through satisfaction. **Conclusions:** this study is the first to model loyalty in mobile fashion applications by integrating the quality loyalty model, parasocial relationship, and U&G theory. Practically, fashion companies are advised to conduct live streaming by considering aspects of content, live streamer, and product quality to enhance satisfaction and loyalty.

Keywords : Live streaming, Fashion mobile applications, Quality loyalty model, Parasocial relationship, Uses and gratification theory

JEL Classification Code: M31, D39, M31, M37

1. Introduction

The continuous advancement of technology year by year indirectly changes people's habits in communicating and seeking information. The increasing number of people using social media accounts supports this expansion (Rafdinal et al., 2024). One example is live streaming, a feature in mobile applications that combines real-time video broadcasting with interactive features, showcasing products,

interacting with viewers, and answering questions directly (Lee & Chen, 2021). The development of live streaming also accelerates the growth rate of online stores (Chen & Xiong, 2019). In the context of mobile fashion applications, live streaming has been proven to enhance consumer engagement with sellers, fostering relational ties and developing social bonds through live streaming in mobile fashion applications (Hwang & Lee, 2022).

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One of the largest live streaming markets in Southeast Asia is Indonesia. Indonesia has experienced the largest increase in the amount of time spent watching streaming videos (Databoks, 2022). As a result, shopping through live streaming has emerged as a new commerce channel, helping many businesses perform better (Sun et al., 2019). From live streaming sales data in Southeast Asia, 56% of people have made purchases through live streaming. By product category, the average live streaming purchases in Southeast Asia for fashion range from 51% to 72% (IPSOS, 2022). This figure indicates significant potential in the fashion market, particularly through live streaming in Indonesia. Therefore, it is important to analyze how purchasing behavior in live streaming through mobile fashion applications in Indonesia can increase loyalty. Additionally, understanding live streaming, especially in the fashion industry, will help fashion brands manage live streaming on mobile fashion applications. Research on purchasing behavior in live streaming through mobile fashion applications, particularly in Indonesia's rapidly growing market, remains limited. Therefore, it is crucial to analyze how this behavior can enhance customer loyalty in the fashion industry. This study will contribute to the marketing literature by providing new insights into managing live streaming in mobile fashion applications, especially in one of Southeast Asia's largest live streaming markets.

Various theories help explain the aspects of live streaming on mobile fashion applications, including the Uses and Gratifications (U&G) theory (Katz et al., 1973) and the Parasocial Relationship (PSR) theory. The U&G theory examines the motivations and behaviors of individuals in using media, where viewers actively seek content that fulfills their needs and desires (Rafdinal et al., 2024). This study analyzes live streaming content that uses augmented reality (AR) and general live streaming content. In digital retail, AR allows consumers to experience a blend of online and offline interactions through devices, enhancing interactivity and convenience in product selection (Kowalczyk et al., 2021). This suggests that understanding viewer motivations can help fashion companies tailor their content to match the preferences of their target audience. Meanwhile, the PSR theory distinguishes parasocial interactions (PSI), which are one-sided interactions between viewers and streamers, from deeper parasocial relationships (PSR), where viewers feel a meaningful connection, like friendship, with the streamer (Liu et al., 2024; McLaughlin & Wohn, 2021). Streamers can build viewer loyalty by providing authentic interactions, meeting expectations, and creating more personal connections (Ma et al., 2022). By understanding the motivations and gratifications sought by viewers through the U&G and PSR theories, this research explores how content

and streamer interactions significantly influence viewer interest and enhance loyalty towards live streaming platforms.

Another model is the quality loyalty model from a cognitive-rational approach (Cronin et al., 2000), which investigates the relationship between customer loyalty, satisfaction, and product quality. Product quality is essential for attracting and retaining viewers (Ma et al., 2022; Rafdinal et al., 2024). High-quality live streaming products can enhance viewer loyalty and sustained engagement (Li et al., 2020; Liu et al., 2024). This model suggests that brands consistently providing high-quality products are more likely to build a loyal and dedicated audience base.

The integration of the U&G theory, PSR theory, and the quality loyalty model provides a comprehensive framework for understanding viewer satisfaction and loyalty in live streaming on mobile fashion applications. The U&G theory highlights the motivations behind viewers' consumption of content, such as seeking entertainment, convenience, and interaction to enhance the shopping experience (Kowalczyk et al., 2021; Rafdinal et al., 2024). The PSR theory emphasizes the importance of building one-sided yet meaningful connections between viewers and streamers, fostering a sense of attachment that can drive viewer loyalty (Lim et al., 2020; Liu et al., 2024; McLaughlin and Wohn, 2021). Lastly, the quality loyalty model underscores the role of high-quality content in cultivating customer loyalty and satisfaction (Rafdinal et al., 2024; Suhartanto et al., 2020). In the context of AR in live streaming, the PSR theory helps explain the development of parasocial relationships between viewers and streamers, while the quality-loyalty model emphasizes the importance of high-quality content in building viewer loyalty. The U&G theory highlights the motivations and gratifications sought by viewers from live streaming media, whether through AR content or non-AR content. This integration of theories has not been previously explored in studies related to the use of AR in live streaming. Therefore, this study aims to address the gaps identified in previous literature and provide a more robust understanding of the topic.

Based on the identified research gaps and the increasing significance of live streaming in the fashion industry, this study seeks to address the following research questions:

1. To explore the direct and indirect impact of AR content, live streaming content, live streamers, and product quality on consumer satisfaction and loyalty in mobile fashion applications.
2. To integrate the U&G theory, PSR theory, and Quality Loyalty model to provide a comprehensive framework for understanding consumer loyalty in AI-driven live streaming on mobile fashion applications.

2. Literature Review

2.1. Augmented Reality and Live Streaming Content in Live Streaming

AR is increasingly integrated into applications, including live streaming features, offering users a richer visual experience by adding interactive digital information to live streams (Chen et al., 2021). The use of AR in live streaming has been shown to enhance immersion and increase the intention to pay among viewers (Tu & Jia, 2024). This technology has the potential to revolutionize video broadcasting by providing low latency and reliable streaming, especially in applications like AR and virtual reality (Khan et al., 2022). AR technology has been extensively researched, highlighting its application and integration of virtual information into the real world to enhance user experience (Chen et al., 2021; Li, 2022). Integrating AR in live streaming not only enhances immersion and user engagement but also opens up new possibilities for delivering interactive and enriched content. In the context of live streaming, user behavior has been studied, with consumer satisfaction shown to positively impact repurchase intentions, emphasizing the importance of satisfaction in driving loyalty (Yi et al., 2024). Furthermore, the impact of AR on risk perception and purchase decision-making processes has been explored, highlighting its potential to influence comfort and confidence in decision-making (Barta et al., 2023). The visual quality presented in AR will affect satisfaction when shopping on mobile shopping apps (David et al., 2021). AR content quality also shows an impact on satisfaction and loyalty in mobile commerce (Yoo, 2020). However, previous research has largely focused on the technical applications of AR or its broad experiential benefits without fully examining its direct influence on consumer satisfaction and loyalty within live streaming contexts. This study addresses this gap by applying the U&G theory, which explains how users seek out content that meets their specific needs and gratifications. Thus, the hypotheses for this effect are:

H1: AR content has a positive and significant effect on satisfaction.

H2: AR content has a positive and significant effect on loyalty.

While AR technology has been shown to enhance the shopping experience, not all fashion companies have fully utilized AR in live streaming on mobile fashion apps, indicating a need for further investigation into its role in influencing consumer behavior (David et al., 2021). This study specifically examines how the quality of live streaming content, including AR-enhanced and standard

content, affects satisfaction and loyalty, grounding its approach in the U&G theory (Katz et al., 1973). The U&G theory provides a fundamental framework by explaining that users engage with media, including live streaming, to fulfill specific needs and obtain satisfaction (Rafdinal et al., 2024). Previous research has focused on various quality dimensions—such as information, service, and augmentation quality—showing that these factors significantly impact satisfaction in live shopping environments (Ma, 2021). Moreover, studies have demonstrated that perceived quality in live streaming, especially on Chinese social platforms, directly influences satisfaction and subsequently loyalty (Li & Lee, 2024). Other research identifies specific dimensions of live streaming, including physical and social cues, which enhance engagement and perceived value, ultimately leading to loyalty (Ye et al., 2023). This study differentiates itself by integrating these insights to test the direct impact of live streaming content on satisfaction and loyalty, thereby expanding on existing literature by linking the U&G theory to specific consumer outcomes in the context of fashion live streaming. Thus, the hypotheses are:

H3: Live streaming content has a positive and significant effect on satisfaction.

H4: Live streaming content has a positive and significant effect on loyalty.

2.2. Parasocial Relationship (PSR) (Live Streamer)

The PSR concept was first introduced by Horton and Richard Wohl (1956) in the context of TV viewers' responses to characters in media when seeing media personas through TV, making viewers feel a distant closeness due to frequent TV watching (Horton & Richard Wohl, 1956; Song et al., 2023). The live streamer (host) is an individual who operates and presents content through live streaming platforms. They play a crucial role in directing the broadcast, interacting with the audience in real-time, and often promoting products or services in the context of e-commerce (J. Chen & Liao, 2022). Therefore, the Parasocial Relationship (PSR) in the context of live streaming is the close relationship between the live host and the audience, forming a perceived attachment similar to talking to a friend in real-time (Lim et al., 2020; Liu et al., 2024). This relationship is characterized by the audience feeling close to the live host, even though there is no real-life interaction (Liu et al., 2024). Marketing activities through live streaming are a new marketing channel. During sales through live streaming, the live host helps introduce and recommend products to the audience, who can purchase the recommended products through third-party purchase links (Liu et al., 2024).

Research also shows that the effectiveness of hosts in driving purchase intentions is related to their ability to build

strong parasocial relationships with the audience (Liu et al., 2024). Previous studies have highlighted that viewer loyalty and engagement are significantly influenced by the sense of connection and familiarity viewers feel with live hosts during online sales (Hu & Chaudhry, 2020). PSRs play a crucial role in shaping viewers' perceptions, attitudes, and behaviors toward the products or services promoted during live broadcasts, making the relationship between hosts and viewers a key factor in the success of live streaming (Zheng et al., 2022). The interaction between live hosts and followers in streaming platforms exemplifies how PSRs can be cultivated, fostering reciprocal relationships that go beyond traditional one-way communication (Rungruangjit, 2022). Unlike previous research that mainly focuses on the general influence of PSRs, this study specifically investigates the impact of PSRs on consumer satisfaction and loyalty within the fashion industry, grounded in the U&G theory, which explains why viewers seek connections with streamers to fulfill their emotional and social needs. This connection underpins the research hypotheses that live streamers have a positive effect on satisfaction and loyalty.

H5: Live streamer has a positive and significant effect on satisfaction.

H6: Live streamer has a positive and significant effect on loyalty.

2.3. Quality-Loyalty Model

The quality-loyalty model describes the relationship between product/service quality, customer satisfaction, and customer loyalty (Rafdinal et al., 2024; Suhartanto et al., 2020). This model, originating from the cognitive-rational approach (Cronin et al., 2000), suggests that high-quality products or services can increase customer satisfaction, which in turn drives customer loyalty (Rafdinal et al., 2024; Suhartanto et al., 2020). The relationship between product quality, customer satisfaction, and loyalty is crucial in understanding customer behavior. This research also shows that good product or service quality can result in customer satisfaction, ultimately influencing customer loyalty (Khoa, 2020). The quality-loyalty model also states that quality plays a significant role as a driver of customer satisfaction, which indirectly impacts customer loyalty (Rafdinal et al., 2024; Suhartanto et al., 2020). Previous research also indicates that higher prices are often associated with higher perceived quality by customers, as price is considered an indicator of value and quality (Zhong & Moon, 2020). However, high prices do not always mean high quality. Additionally, research shows that perceived product quality is a key factor influencing customer loyalty and repurchase intentions (Frake, 2017). In a competitive market, companies can use product quality as a mechanism or signal to communicate value and differentiate the company from

competitors (Rafdinal et al., 2024). This study builds on these insights by applying the quality-loyalty model to live streaming environments, linking the U&G theory to demonstrate how product quality in live streams influences consumer satisfaction and loyalty. By hypothesizing that product quality positively affects satisfaction and loyalty, this study seeks to deepen our understanding of how perceived quality can shape consumer behavior and loyalty in the unique context of fashion live streaming

H7: Product quality has a positive and significant effect on satisfaction.

H8: Product quality has a positive and significant effect on loyalty.

2.4. Satisfaction and Loyalty

This study uses the Quality-Loyalty Model, which is the most commonly used foundation to explain the formation of consumer loyalty (Fu et al., 2018; Jen et al., 2011; Rafdinal et al., 2024). This model has a conceptual basis formed to assess several determinants of loyalty towards products or services, proposing that quality products are the main drivers of perceived satisfaction value and can drive consumer loyalty itself (Rafdinal et al., 2024). Customer loyalty refers to repeated purchases over time due to satisfaction or meeting expectations after purchasing a product or experiencing company services and can help companies recommend to close individuals and others looking for the desired product and rarely switch to competitor products (Fu et al., 2018; Jen et al., 2011). Therefore, the researcher wants to understand the influence of satisfaction on consumer loyalty to fashion products through live streaming sales.

H9: Satisfaction has a positive and significant effect on loyalty

3. Research Methods and Materials

3.1. Sample and Data Collection

The data collection process for this study was conducted over a period of two months, from July to August 2024. The survey was distributed online via Google Forms, targeting individuals aged 17-50 who are active users of mobile fashion apps and have made purchases through live streaming. To ensure a sufficient sample size, in line with the guidelines by Hair et al. (2019), the study required a minimum of 400 respondents, calculated as ten times the number of indicators used in the model. A total of 500 invitations to participate in the survey were sent out through social media platforms and direct messages within fashion communities. Of these, 427 completed responses were

received, yielding a response rate of approximately 85.4%. The high response rate reflects the strong engagement of the target population with the survey topic. The study utilized purposive sampling, a non-probability method, to specifically include respondents who met the criteria of having made purchases via live streaming and AR features more than once. This targeted approach ensured that the data collected was relevant and reflective of the intended user experience for analysis (see Table 1).

3.2. Measurement and Instruments

The survey was conducted through a questionnaire distributed via Google Forms, serving as the primary data source for this study. The instruments for each variable in this research relate to what will be asked in the research questionnaire, which includes indicators of variables such as AR content, live streaming content, live streamer, product quality, satisfaction, and loyalty (see Table 2). Each item in the questionnaire was measured using a seven-point Likert scale, defined as follows: (1: strongly disagree and 7: strongly agree). The questionnaire consists of two parts: one part covers respondent demographics, and the second part contains questions related to the relationships between variables. Additionally, the secondary data used in this study comes from journals, books, and other sources relevant to this research.

Table 1: Respondents profile

Variables	Description	Frequency	Percentage (%)
Gender	Male	85	19.9%
	Female	342	80.1%
Age (Years)	17-20 years	41	9.6%
	21-25 years	364	85.2%
	26-35 years	17	4%
	>35 years	5	1.2%
Occupation	Students	354	82.9%
	Private employees	38	8.9%
	Government employees	8	1.9%
	Businessman	11	2.6%
	Other	16	3.7%
Previous Education	<High school	32	7.5%
	High school	265	62.1%
	Diploma	21	4.9%
	Bachelor degree	105	24.6%
	Postgraduate degree	4	0.9%
Monthly Income	<Rp500.000	77	18%
	Rp500.000 to Rp1.000.000	126	29.5%
	Rp1.000.000 to Rp3.000.000	126	29.5%
	Rp3.000.000 to Rp 5.000.000	67	15.7%
	>Rp5.000.000	31	7.3%

Table 2: Research Instrument

Variable	Operational definition	Indicators	Source
AR Content	AR Content refers to how augmented reality enhances product displays, making them visually impressive, realistic, and more attractive during live streaming presentations.	1. AR makes products visually impressive.	(Kowalczuk et al., 2021)
		2. AR displays products more realistically.	
		3. AR enhances the overall attractiveness of presentations.	
Live streaming Content	Live Streaming Content is the perceived quality of content during live sessions, including its interest, informativeness, product recommendations, and ability to meet viewer expectations.	1. The live streaming content I watch is interesting.	(Schivinski and Dabrowski, 2016)
		2. It provides comprehensive information.	
		3. It offers product recommendations.	
		4. It meets my expectations.	
		5. Overall, the live streaming content is good quality.	
Live streamer	Live Streamer refers to how a viewer's engagement and comfort are influenced by their perception of the streamer's authenticity, relatability, and personal connection.	1. I watch when my favorite live streamer appears.	(J. Li and Lee, 2024; Lim et al., 2020)
		2. My favorite live streaming channel is engaging.	
		3. My favorite streamer seems natural and humble.	
		4. Engaging streamers make me feel comfortable, like being with a friend.	
Product Quality	Product Quality is the consumer's perception of fashion products in live streaming, evaluated by packaging quality, choice availability, and product uniqueness.	1. Fashion products from live streaming should have good packaging.	(Rafdinal et al., 2024; Suhartanto et al., 2020)
		2. Fashion products from live streaming should offer various choices.	
		3. Fashion products from live streaming should be unique.	
Satisfaction	Satisfaction is defined as the overall positive emotional response and contentment that consumers experience when buying fashion products through live streaming.	1. I am happy buying fashion products in live streams.	(Rafdinal et al., 2024; Suhartanto et al., 2020)
		2. I gain many benefits from visiting live streamer accounts.	
		3. I feel satisfied shopping during live streams.	
		4. Engaging streamers make shopping more enjoyable.	

Variable	Operational definition	Indicators	Source
Loyalty	Loyalty, as an operational variable, is defined as the consumer's commitment to repeatedly purchase, recommend, and engage with live streaming content	1. I always shop through live streaming.	(Rafidinal et al., 2024; Suhartanto et al., 2020)
		2. I will buy again another time.	
		3. I will recommend live streaming shopping to friends and family.	
		4. I feel closer to my favorite live host than other hosts.	
		5. I will keep watching my favorite live streaming channels.	
		6. I watch longer when my favorite brand is featured.	

3.3. Data Analysis

After distributing questionnaires and gathering data from respondents, primary data is obtained directly from consumers buying fashion products via live streaming on mobile apps. This study uses the Partial Least Squares-Structural Equation Model (PLS-SEM), a multivariate statistical method that tests all construct relationships within the theoretical framework (Hair et al., 2019). The analysis evaluates measurement and structural models, assessing variable relationships and indicator variations through convergent validity, discriminant validity, and composite reliability. The structural model tests the proposed relationships and hypotheses, detailed further in the next section.

4. Results and Discussion

4.1. Measurement Model

The measurement model assesses the validity and reliability of this study's model. Data were processed using the PLS Algorithm in SmartPLS 3.2.9, measuring outer loading, rho_A, AVE, and composite reliability (see Table 3). Reliability is measured by rho_A and composite reliability, with values from 0.70 to 0.9 considered reliable (Hair et al., 2019). The data is reliable because it has values above 0.70. The CR value in this data is 0.842 for AR content, 0.867 for live streaming content, 0.872 for live streamer, 0.832 for product quality, 0.867 for satisfaction, and 0.924 for loyalty.

Table 3: Outer Model Testing

Construct Item	Outer Loadings	rho_A	Composite Reliability	AVE
AR Content		0.718	0.842	0.623
AC1	0.808			
AC2	0.774			
AC3	0.816			
Live streaming Content		0.809	0.867	0.566
LC1	0.769			
LC2	0.734			
LC3	0.756			

Construct Item	Outer Loadings	rho_A	Composite Reliability	AVE
LC4	0.747			
LC5	0.755			
Live streamer		0.806	0.872	0.631
LS1	0.804			
LS2	0.809			
LS3	0.806			
LS4	0.757			
Product quality		0.709	0.832	0.623
PQ1	0.769			
PQ2	0.838			
PQ3	0.759			
Satisfaction		0.797	0.867	0.621
ST1	0.789			
ST2	0.812			
ST3	0.815			
ST4	0.733			
Loyalty		0.905	0.924	0.670
LY1	0.794			
LY2	0.769			
LY3	0.786			
LY4	0.872			
LY5	0.858			
LY6	0.826			

Convergent validity and discriminant validity are used to evaluate the validity test. Here, the values generated by each indicator to measure the research constructs are outer loadings that form convergent validity. Outer loading values above 0.70 are considered sufficient (Hair et al., 2019). Validity testing can also be known in other ways, namely by looking at the Average Variant Value Extracted (AVE) where each indicator must have a value >0.50 to be considered a good model (Hair et al., 2019). As seen in Table 4.3 above, the AVE values are above 0.50, and above them, all indicators in those variables reflect 50% of the variables, so they can be considered valid, AR content (0.623), Live streaming content (0.566), Live streamer (0.631), Product quality (0.623), Satisfaction (0.621), and Loyalty (0.670).

Furthermore, discriminant validity ensures each latent variable is distinct from others. This study uses the Fornell-Larcker criteria, where good discriminant validity is indicated if the square root of AVE is higher than the highest correlation value (Fornell and Larcker, 1981). The square

root value of AVE must be greater than the diagonal elements in the table. The results show that the values below have higher values than the other elements, thus determining its discriminant validity (see Table 4).

Table 4: Fornell Larker Result

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Live streamer	0.794					
(2) AR content	0.435	0.800				
(3) Satisfaction	0.687	0.559	0.788			
(4) Loyalty	0.750	0.378	0.695	0.818		
(5) Product quality	0.639	0.560	0.719	0.635	0.790	
(6) Live streaming content	0.671	0.525	0.750	0.638	0.733	0.752

4.2. Structure Model

Structural model analysis predicts relationships between latent variables, using bootstrapping with 5000 resamples as recommended (Hair et al., 2019) to predict causal relationships. The measurement of the structural model is evaluated based on the percentage values explained in several assessments: effect size (f^2), cross-validation redundancy (Q^2), analysis of variance (R^2), and path coefficients (Hair et al., 2019). In addition to validating the PLS model as a whole, Tenenhaus et al. (2005) suggest evaluating the Goodness of Fit (GoF) value. The structural measurement model is shown in Table 5.

Table 5: Structural Model Testing

Variable	Average Variance Extracted (AVE)	R Square	Q Square
AR Content	0.623	-	-
Live streaming Content	0.566	-	-
Live streamer	0.631	-	-
Product Quality	0.623	-	-
Satisfaction	0.621	0.671	0.409
Loyalty	0.670	0.637	0.417
Average Score	0.622	0.654	-
AVE x R Square	-	0.406	-
GoF = $\sqrt{AVE \times R \text{ Square}}$	-	0.637	-

The Goodness of Fit (GoF) analysis assesses the model's fitness using structural analysis, evaluating R^2 values as strong (0.75), moderate (0.50), or weak (0.25), and Q^2 values as large (0.50), moderate (0.25), or small (0). The GoF value is calculated by multiplying the square root of the average variance extracted (AVE) by R^2 , categorized as small (0.10 - 0.24), moderate (0.25 - 0.35), or large (0.36 or higher). A GoF value of 0.637 indicates a large category, reflecting good model quality. The R^2 value for loyalty (0.637) is moderate, suggesting that AR content, live

streaming content, live streamers, product quality, and satisfaction contribute 63.7% to loyalty, with 36.3% from other factors. The satisfaction variable (0.671) is strong, showing that these factors explain 67.1% of satisfaction, with 32.9% from outside influences.

Effect size (f^2) measures the strength of the impact of an independent variable on a dependent variable within a statistical model, indicating the importance of the variable's contribution (Hair et al., 2019). In assessing effect size, there are three categories of values: small (0.02 – 0.15), moderate (0.15 – 0.35), and large (>0.35). The results show the f^2 value and its interpretation. The influence of live streamers on loyalty (0.276) has an effect size value that falls into the moderate category. Additionally, other effect sizes are small.

4.3. Path Analysis

After calculating the structural model, path coefficients are tested using bootstrapping in SmartPLS to assess the significance of the hypotheses. Significance is measured through bootstrapping, evaluating t-values, p-values, and confidence intervals. A hypothesis is considered positive with a path coefficient > 0 and < 1, and significant at a 5% level if the t-value exceeds 1.96, indicating $p < 0.05$ but greater than zero (Hair et al., 2019). The relationship between variables is shown in Table 6, which displays the results of direct effects based on the tested model. The findings indicate that there is a significant and positive direct effect of AR content on satisfaction ($\beta=0.143$; $p < 0.01$). Similarly, live streaming content has a significant and positive effect on satisfaction ($\beta=0.336$; $p < 0.00$). Additionally, live streamers have a significant and positive effect on satisfaction ($\beta=0.250$; $p < 0.00$), and they also have a positive and significant effect on loyalty ($\beta=0.467$; $p < 0.00$). Furthermore, product quality has a significant and positive effect on satisfaction ($\beta=0.233$; $p < 0.00$), and it also has a positive and significant effect on loyalty ($\beta=0.145$; $p < 0.03$). Lastly, satisfaction has a significant and positive effect on loyalty ($\beta=0.276$; $p < 0.00$). Therefore, all seven hypotheses in this study yield positive and significant results.

On the contrary, this study found two unsupported hypotheses. First, the AR content variable does not have a significant effect on loyalty ($\beta= -0.092$; $p < 0.23$), and second, live streaming content does not have a significant effect on loyalty ($\beta=0.060$; $p > 0.171$). The t-value for one hypothesis, live streaming content's effect on loyalty, is below 1.96, but for AR content's effect on loyalty, the t-value is safe, indicating that the relationship between variables is not statistically significant. Based on the total effect calculations, it can be concluded that H1, H3, H5, H6, H7, H8, and H9 are accepted, while the other two hypotheses, H2 and H4, are rejected (see Table 6).

Table 6: Direct Effect

Hypotheses	β	T values	P values	Supported
AR content → satisfaction	0.143	3.290	0.001	Yes
AR content → Loyalty	-0.092	2.006	0.023	No
Live streaming content → satisfaction	0.336	5.802	0.000	Yes
Live streaming content → Loyalty	0.060	0.952	0.171	No
Live streamer → satisfaction	0.250	5.577	0.000	Yes
Live streamer → Loyalty	0.467	6.134	0.000	Yes
Product quality → satisfaction	0.233	3.936	0.000	Yes
Product quality → Loyalty	0.145	2.782	0.003	Yes
Satisfaction → Loyalty	0.276	4.339	0.000	Yes

The path coefficient results, alongside direct effects, show three acceptable indirect effects and one rejected effect (see Table 7). Live streaming content has the highest indirect effect on loyalty ($\beta = 0.093$), while AR content has

the lowest ($\beta = 0.040$). These findings indicate that although live streaming content does not directly impact loyalty significantly, its indirect and total effects are significant, highlighting its importance (see Figure 2).

Table 7: Indirect effect

Path	Indirect Effect			Total Effect		
	β	T values	P values	β	T values	P values
AR content → satisfaction	-	-	-	0.143	1.208	0.001
AR content → Loyalty	0.040	2.357	0.009	-0.053	3.256	0.109
Live streaming content → satisfaction	-	-	-	0.336	5.719	0.000
Live streaming content → Loyalty	0.093	3.486	0.000	0.153	2.361	0.009
Live streamer → satisfaction	-	-	-	0.233	5.437	0.000
Live streamer → Loyalty	0.069	3.250	0.001	0.209	7.798	0.000
Product quality → satisfaction	-	-	-	0.233	3.873	0.000
Product quality → Loyalty	0.064	3.076	0.001	0.209	3.721	0.000
Satisfaction → Loyalty	-	-	-	0.276	4.317	0.000

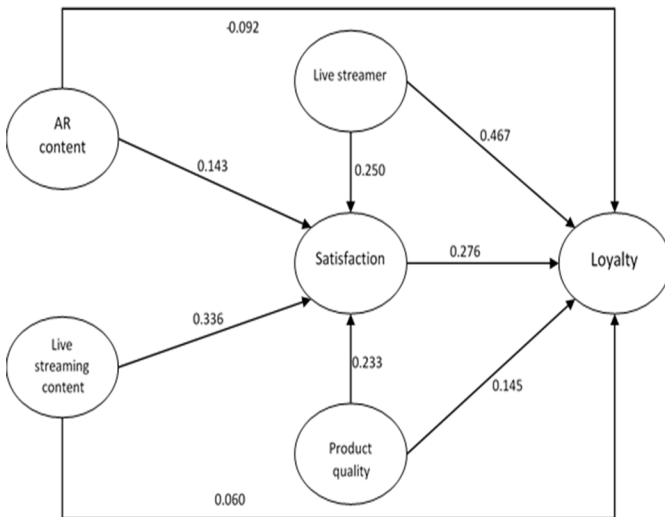


Figure 1: Result Model

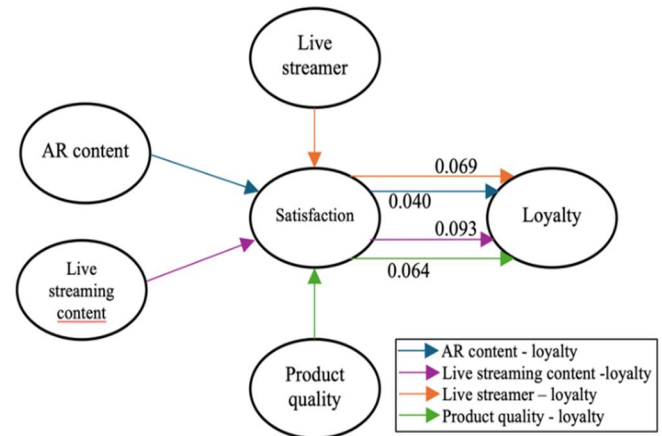


Figure 2: Result Model for Indirect Effect

4.4. Discussion

This study demonstrates that the integration of the U&G theory, PSR theory, and the quality loyalty model into a single framework can effectively predict user engagement

and loyalty in AI-driven live streaming on mobile fashion applications. The integration of these theories is supported by prior research (Lim et al., 2020; Liu et al., 2024; Rafdinal et al., 2024). The U&G theory specifically measures user motivations and the gratification they seek from live streaming content, providing insights into system-specific behaviors (Kowalczyk et al., 2021; Rafdinal et al., 2024), while the PSR theory delves into the individual-specific dynamics of viewer-streamer relationships (Lim et al., 2020; Liu et al., 2024; Rafdinal et al., 2024). Meanwhile, the quality loyalty model examines how high-quality content fosters viewer satisfaction and loyalty (Rafdinal et al., 2024; Suhartanto et al., 2020). The integration of these theories enhances their applicability and explanatory power in understanding live streaming environments. Although there have been studies on these theories separately, this integrated model has been tested and confirmed to provide a deeper understanding of how AI-driven content influences viewer engagement and loyalty, contributing valuable insights into the evolving landscape of digital media consumption.

First, the findings indicate that AR content has a significant effect on satisfaction but not on loyalty. This result supports previous research stating that content influences satisfaction in online shopping (Colicev et al., 2019; Yoo, 2020). On the other hand, for loyalty, there is no significant influence, supported by previous researchers (Sadek et al., 2018). This suggests that while consumer satisfaction in purchasing fashion products is influenced by the quality of the AR content they experience, this does not necessarily translate into loyalty. Higher-quality AR content tends to drive consumers to feel satisfied because it enhances the visual appeal and interactive nature of the shopping experience. However, these elements alone are not sufficient to build loyalty, as consumers also seek consistent positive interactions and credible experiences. Theoretically, these findings highlight the complex nature of consumer behavior, where satisfaction derived from engaging content does not automatically lead to loyalty. This reflects the evolving expectations of modern consumers, who are not only looking for impressive content but also value consistent, trustworthy, and personalized experiences (Rafdinal et al., 2024).

Second, complementing the U&G theory, this study found that live streaming content has a significant effect on satisfaction but not on loyalty. This result supports previous research stating that consumers satisfied with content created by users or influencers will choose the product when they want to purchase a product promoted by users or influencers (Bae, 2018; Colicev et al., 2019). However, the effect of live streaming content on loyalty is not significant, as supported by prior studies (Mainardes & Cardoso, 2019; Sadek et al., 2018). Consumers tend to prefer products when

they are satisfied with live streaming content. However, loyalty is often hindered due to factors like low relevance, lack of positive content influence, information overload, platform dependence, and competition from alternatives. This underlines the evolving consumer mindset, where satisfaction is necessary but not sufficient for building lasting loyalty. Modern consumers, influenced by vast content options and competition, are more discerning and seek relevance, trust, and value consistency beyond the content itself (Rafdinal et al., 2024). Although AR content and live streaming content do not have a significant effect, this study theoretically proves the U&G theory determined from AR content and live streaming content can shape satisfaction.

Third, this study found that live streamers have a significant influence on satisfaction and loyalty which proves the success of the PSR model in previous studies (Lim et al., 2020; Liu et al., 2024; McLaughlin and Wohn, 2021; Wulf et al., 2020). This result supports previous research stating that PSR influences satisfaction (Han & Yang 2018) and loyalty (Lim et al. 2020). Live streamers influence consumer satisfaction and loyalty because live streamers help explain fashion products sold through live streaming, usually consumers only see photos or videos in catalogs. With the presence of live streaming assisted by attractive live streamers, it can increase consumer satisfaction and loyalty in purchasing fashion products in live streaming on mobile fashion applications. This result proves that the PSR theory seen from live streamers is successful in predicting consumer satisfaction and loyalty in live streaming on mobile fashion applications.

Fourth, this study found that product quality has a significant effect on satisfaction and loyalty in purchasing fashion products through live streaming. This result also supports previous research stating that product quality influences satisfaction and loyalty (Fu et al., 2018; Rafdinal et al., 2024). Product quality influences satisfaction and loyalty because high-quality products can make consumers who buy through this live streaming feel satisfied when the product purchased matches what is described by the live streamer during the live streaming or meets their expectations. When consumers are satisfied with the product, they will be loyal by giving good ratings with evidence, recommending it to people around them, or making repeat purchases. This result theoretically successfully proves the quality-loyalty model that explains the influence of product quality on satisfaction and loyalty.

In conclusion, this study supports previous research on satisfaction and loyalty in shopping through live streaming on mobile fashion applications, especially, fashion products. However, AR content and live streaming content cannot be said to be significant for consumer loyalty in purchasing fashion products in live streaming due to insignificant

results. Furthermore, this study only focuses on the influence of consumers in increasing satisfaction and loyalty in purchasing fashion products in live streaming, which may be the cause of different findings. In addition, the majority of the demographics in this study are dominated by women (17-20 years old), which may affect the results of this study. Therefore, for further research, the authors suggest that research can be conducted in the industry in general to provide broader results.

5. Conclusions

The managerial implications of this research provide strategic guidance for fashion companies using mobile applications for live streaming to enhance consumer satisfaction and loyalty. First, although AR content does not significantly influence consumer loyalty, it has a strong positive impact on satisfaction. Therefore, marketing managers should prioritize the development of creative AR features that go beyond basic functionalities. For example, implementing virtual try-ons, interactive product customizations, or augmented reality fashion shows can deeply engage customers by allowing them to experience products in unique, personalized ways. Such innovations can enhance satisfaction and shape positive brand perceptions, making customers more likely to associate the brand with cutting-edge, enjoyable shopping experiences. By continually updating AR content to reflect current consumer preferences and trends, companies can maintain relevance and foster a deeper connection with their audience (Yoo, 2020), indirectly supporting loyalty.

Second, live streaming content has been shown to have a significant impact on consumer satisfaction, but not on loyalty. This suggests that while live streaming can be used as an effective tool to attract attention and satisfy consumer information needs, it is not sufficient to build long-term loyalty. While live streaming excels at showcasing products and engaging audiences in real-time, it should be coupled with tactics that encourage viewers to develop a long-term commitment to the brand (Chen & Liao, 2022; Hu & Chaudhry, 2020). Companies can enhance the impact of live streaming by offering exclusive promotions, early access to collections, and personalized shout-outs during streams, which create a sense of exclusivity and belonging among viewers. Additionally, leveraging live streamers who can build strong parasocial relationships with the audience is crucial; these streamers can connect emotionally with viewers, fostering a sense of friendship and trust. This emotional engagement turns casual viewers into loyal customers who feel personally connected to the brand. To maximize this effect, companies should carefully select streamers whose values align with the brand and who can

authentically engage with the target audience. Using live streamers who have a strong parasocial relationship with the audience has also been effective in building deeper emotional connections, which can contribute to increased consumer loyalty.

Third, the finding that product quality has a significant influence on satisfaction and loyalty underscores the importance of maintaining high-quality standards. Companies should guarantee that the products showcased during live streams meet or exceed the quality expectations set by their presentations. Any mismatch between what is shown and what is delivered can severely damage credibility and customer trust. Regular quality checks, detailed product descriptions, and transparent communication during live streams help align customer expectations with reality. Furthermore, actively seeking customer feedback and swiftly addressing any quality issues can turn potential negative experiences into positive ones, reinforcing the brand's commitment to customer satisfaction. By consistently delivering high-quality products, fashion companies can build a loyal, satisfied customer base that continues to purchase and advocates for the brand, thereby driving sustained growth.

While this study integrates the three models well, it has limitations. AR and live streaming content significantly enhance satisfaction but have a less pronounced effect on loyalty, suggesting other factors like trust and interaction quality might be more influential. Future research should explore these variables for a deeper understanding of loyalty in live streaming. The study's sample, primarily young females aged 17-20, limits the diversity of responses, highlighting the need for broader demographic inclusion. Additionally, focusing on mobile fashion applications narrows the findings, as effects on satisfaction and loyalty may vary across other industries like electronics or beauty. Expanding research to different sectors and regions could offer insights into tailoring live streaming to diverse market needs, enhancing its potential as a tool for consumer loyalty.

References

- Bae, M. (2018). Understanding the effect of the discrepancy between sought and obtained gratification on social networking site users' satisfaction and continuance intention. *Computers in Human Behavior*, 79, 137–153. <https://doi.org/10.1016/j.chb.2017.10.026>
- Barta, S., Gurra, R., and Flavián, C. (2023). How augmented reality increases engagement through its impact on risk and the decision process. *Cyberpsychology, Behavior, and Social Networking*, 26(3), 177–187. <https://doi.org/10.1089/cyber.2022.0087>
- Chen, J., and Liao, J. (2022). Antecedents of viewers' live streaming watching: A perspective of social presence theory.

- Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.839629>
- Chen, N., Zhang, S., Quan, S., Ma, Z., Qian, Z., and Lu, S. (2021). VCMaker: Content-aware configuration adaptation for video streaming and analysis in live augmented reality. *Computer Networks*, 200, 108513. <https://doi.org/10.1016/j.comnet.2021.108513>
- Chen, Y., and Xiong, F. (2019). The business model of live streaming entertainment services in China and associated challenges for key stakeholders. *IEEE Access*, 7, 116321–116327. <https://doi.org/10.1109/ACCESS.2019.2935005>
- Colicev, A., Kumar, A., and O'Connor, P. (2019). Modeling the relationship between firm and user generated content and the stages of the marketing funnel. *International Journal of Research in Marketing*, 36(1), 100–116.
- Cronin, J. J., Brady, M. K., and Hult, G. T. M. (2000). Assessing the effects of quality, value, and customer satisfaction on consumer behavioral intentions in service environments. *Journal of Retailing*, 76(2), 193–218. [https://doi.org/10.1016/S0022-4359\(00\)00028-2](https://doi.org/10.1016/S0022-4359(00)00028-2)
- Databoks. (2022). *Many Consumers Prefer E-Commerce for Fashion Shopping*. Databoks. <https://databoks.katadata.co.id/infografik/2022/09/08/banyak-konsumen-lebih-pilih-e-commerce-untuk-belanja-fashion>
- David, A., Senn, W. D., Peak, D. A., Prybutok, V. R., and Blankson, C. (2021). The value of visual quality and service quality to augmented reality enabled mobile shopping experience. *Quality Management Journal*, 28(3), 116–127. <https://doi.org/10.1080/10686967.2021.1920868>
- Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18, 39–50.
- Frake, J. (2017). Selling out: The inauthenticity discount in the craft beer industry. *Management Science*, 63(11), 3930–3943. <https://doi.org/10.1287/mnsc.2016.2517>
- Fu, X., Zhang, J., and Chan, F. T. S. (2018). Determinants of loyalty to public transit: A model integrating Satisfaction-Loyalty Theory and Expectation-Confirmation Theory. *Transportation Research Part A: Policy and Practice*, 113, 476–490. <https://doi.org/10.1016/j.tra.2018.05.012>
- Hair, J. F., Risher, J. J., Sarstedt, M., and Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Horton, D., and Richard Wohl, R. (1956). Mass communication and para-social interaction: Observations on intimacy at a distance. *Psychiatry*, 19(3), 215–229.
- Hu, M., and Chaudhry, S. S. (2020). Enhancing consumer engagement in e-commerce live streaming via relational bonds. *Internet Research*, 30(3), 1019–1041. <https://doi.org/10.1108/INTR-03-2019-0082>
- Hwang, R., and Lee, M. (2022). Korean fashion and beauty livestreaming commerce before and after COVID-19. *Businesses*, 2(3), 339–354.
- IPSOS. (2022). *IPSOS sea ahead: Shifts & sentiments*. https://www.ipsos.com/sites/default/files/ct/news/documents/2022-03/IpsosSEAAhead-Shift%2BSentiments_20211209.pdf
- Jen, W., Tu, R., and Lu, T. (2011). Managing passenger behavioral intention: an integrated framework for service quality, satisfaction, perceived value, and switching barriers. *Transportation*, 38(2), 321–342. <https://doi.org/10.1007/s11116-010-9306-9>
- Katz, E., Blumler, J. G., and Gurevitch, M. (1973). Uses and gratifications research. *The Public Opinion Quarterly*, 37(4), 509–523.
- Khan, M. A., Baccour, E., Chkirbene, Z., Erbad, A., Hamila, R., Hamdi, M., and Gabbouj, M. (2022). A survey on mobile edge computing for video streaming: Opportunities and challenges. *IEEE Access*, 10, 120514–120550. <https://doi.org/10.1109/ACCESS.2022.3220694>
- Khoa, B. T. (2020). The antecedents of relationship marketing and customer loyalty: A case of the designed fashion product. *Journal of Asian Finance, Economics and Business*, 7(2), 195–204. <https://doi.org/10.13106/jafeb.2020.vol7.no2.195>
- Kowalczyk, P., Siepmann, C., and Adler, J. (2021). Cognitive, affective, and behavioral consumer responses to augmented reality in e-commerce: A comparative study. *Journal of Business Research*, 124(August 2019), 357–373. <https://doi.org/10.1016/j.jbusres.2020.10.050>
- Lee, C.-H., and Chen, C.-W. (2021). Impulse buying behaviors in live streaming commerce based on the stimulus-organism-response framework. *Information*, 12(6), 241. <https://doi.org/10.3390/info12060241>
- Li, J., and Lee, G. (2024). The role of broadcasters and brand image in improving consumer loyalty - Evidence from live streaming on Chinese social platforms. *SAGE Open*, 14(1), 1–15. <https://doi.org/10.1177/21582440241239457>
- Li, Y. (2022). A design method of virtual folk museum roaming system based on visual interaction technology. *Mathematical Problems in Engineering*, 2022, 1–9. <https://doi.org/10.1155/2022/5059511>
- Li, Y., Wang, C., and Liu, J. (2020). A systematic review of literature on user behavior in video game live streaming. *International Journal of Environmental Research and Public Health*, 17(9), 3328. <https://doi.org/10.3390/ijerph17093328>
- Lim, J. S., Choe, M.-J., Zhang, J., and Noh, G.-Y. (2020). The role of wishful identification, emotional engagement, and parasocial relationships in repeated viewing of live-streaming games: A social cognitive theory perspective. *Computers in Human Behavior*, 108, 106327. <https://doi.org/10.1016/j.chb.2020.106327>
- Liu, W., Wang, Z., Jian, L., and Sun, Z. (2024). How broadcasters' characteristics affect viewers' loyalty: the role of parasocial relationships. *Asia Pacific Journal of Marketing and Logistics*, 36(1), 241–259. <https://doi.org/10.1108/APJML-10-2022-0856>
- Ma, Y. (2021). Elucidating determinants of customer satisfaction with live-stream shopping: An extension of the information systems success model. *Telematics and Informatics*, 65, 101707. <https://doi.org/10.1016/j.tele.2021.101707>
- Ma, Z., Song, L., Zhou, J., Chong, W., and Xiong, W. (2022). How do comeback Korean pop performers acquire audience empathetic attachment and sustained loyalty? Parasocial interactions through live stream shows. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.865698>
- Mainardes, E. W., and Cardoso, M. V. (2019). Effect of the use of social media in trust, loyalty and purchase intention in physical stores. *The International Review of Retail, Distribution and Consumer Research*, 29(4), 456–477.

- McLaughlin, C., and Wohn, D. Y. (2021). Predictors of parasocial interaction and relationships in live streaming. *Convergence: The International Journal of Research into New Media Technologies*, 27(6), 1714–1734. <https://doi.org/10.1177/13548565211027807>
- Rafdinal, W., Setiawardani, M., Raharso, S., and Hardiyanto, N. (2024). Brand loyalty model for halal fashion brands: integrating quality-loyalty model, information sources and religiosity-loyalty model. *Journal of Islamic Marketing*. <https://doi.org/10.1108/JIMA-08-2023-0244>
- Rungruangjit, W. (2022). What drives Taobao live streaming commerce? The role of parasocial relationships, congruence and source credibility in Chinese consumers' purchase intentions. *Heliyon*, 8(6), e09676. <https://doi.org/10.1016/j.heliyon.2022.e09676>
- Sadek, H., Elwy, S., and Eldallal, M. (2018). The impact of social media brand communication on consumer-based brand equity dimensions through Facebook in fast moving consumer goods: The case of Egypt. *Journal of Business and Retail Management Research*, 12(2), 107–120. <https://doi.org/10.24052/jbrmr/v12is02/tiosmbcoccbedtfifmcg tcoe>
- Schivinski, B., and Dabrowski, D. (2016). The effect of social media communication on consumer perceptions of brands. *Journal of Marketing Communications*, 22(2), 198–214. <http://eprints.bbk.ac.uk/2588/1/2588.pdf>
- Song, H., Yang, H., and Sthapit, E. (2023). Robotic service quality, authenticity, and revisit intention to restaurants in China: extending cognitive appraisal theory. *International Journal of Contemporary Hospitality Management*. <https://doi.org/10.1108/IJCHM-11-2022-1396>
- Suhartanto, D., Marwansyah, Muflih, M., Najib, M. F., and Faturohman, I. (2020). Loyalty formation toward Halal food: Integrating the Quality–Loyalty model and the Religiosity–Loyalty Model. *British Food Journal*, 122(1), 48–59. <https://doi.org/10.1108/BFJ-03-2019-0188>
- Sun, Y., Shao, X., Li, X., Guo, Y., and Nie, K. (2019). How live streaming influences purchase intentions in social commerce: An IT affordance perspective. *Electronic Commerce Research and Applications*, 37, 100886. <https://doi.org/10.1016/j.elerap.2019.100886>
- Tenenhaus, M., Vinzi, V. E., Chatelin, Y. M., and Lauro, C. (2005). PLS path modeling. *Computational Statistics and Data Analysis*, 48(1), 159–205. <https://doi.org/10.1016/j.csda.2004.03.005>
- Tu, J.-C., and Jia, X.-H. (2024). A study on immersion and intention to pay in AR broadcasting: Validating and expanding the hedonic motivation system adoption mode. *Sustainability*, 16(5), 2040. <https://doi.org/10.3390/su16052040>
- Wulf, T., Schneider, F. M., and Beckert, S. (2020). Watching players: An exploration of media enjoyment on Twitch. *Games and Culture*, 15(3), 328–346. <https://doi.org/10.1177/1555412018788161>
- Ye, X. M., Batool, H., and Huang, S. Z. (2023). The effect of e-commerce livestreaming services on customer loyalty: a test of the chain mediation model. *Journal of Innovation and Entrepreneurship*, 12(1), 1–21. <https://doi.org/10.1186/s13731-023-00310-2>
- Yi, M., Chen, M., and Yang, J. (2024). Understanding the self-perceived customer experience and repurchase intention in live streaming shopping: evidence from China. *Humanities and Social Sciences Communications*, 11(1), 202. <https://doi.org/10.1057/s41599-024-02690-6>
- Yoo, J. (2020). The effects of perceived quality of augmented reality in mobile commerce—An application of the information systems success model. *Informatics*, 7(2), 1–14. <https://doi.org/10.3390/informatics7020014>
- Zheng, X., Luo, J. M., and Shang, Z. (2022). Effect of parasocial relationship on tourist's destination attitude and visit intention. *PLOS ONE*, 17(4), e0265259. <https://doi.org/10.1371/journal.pone.0265259>
- Zhong, Y., and Moon, H. C. (2020). What drives customer satisfaction, loyalty, and happiness in fast-food restaurants in China? Perceived price, service quality, food quality, physical environment quality, and the moderating role of gender. *Foods*, 9(4), 460. <https://doi.org/10.3390/foods9040460>