Examining the Dynamics of Streamer-Viewer and Community Interactions in Live Streaming

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Year of lodgement: 2025

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A research component submitted to Auckland University of Technology in fulfilment of the requirements of the degree of PhD in Marketing

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Abstract

Live streaming commerce has emerged as a transformative force in online retail, combing real-time interaction with traditional e-commerce to create immersive shopping experiences. This thesis investigates how streamer types, characteristics, community interaction, and information dynamics shape consumer responses in live streaming context.

My PhD research makes several key contributions. First, it combines Theory–Context–Characteristics–Methodology (TCCM) framework and Stimulus–Organism–Response (SOR) model to generate the first dual-SOR model between streamers and viewers for live streaming commerce, offering a unified structure that captures both platform and individual factors. Second, it advances empirical understanding by clarifying how streamer type, perceived authenticity, and danmaku volume interact to influence trust, endorsement acceptance, continuance and purchase intention. Third, it extends theory on community interaction by uncovering its dual effects and identifies actionable strategies to balance engagement with information overload and sensitivity. In general, these contributions enrich marketing scholarship on online influencers, social interaction and information management, and provide practical guidelines for brands, platforms, retailers, and streamers to optimise live streaming strategies.

Chapter 2 presents a framework-based systematic literature review of 89 peer-reviewed articles, synthesising theories, contexts, characteristics, and methodologies (TCCM) of live streaming and live streaming commerce research. Using the Theory- Context- Characteristics-Methodology (TCCM) and dual Stimulus- Organism- Response (SOR) models, it maps key drivers of streamers and viewers on triggering the commercial impacts of live streaming and proposes a comprehensive future research agenda that spans commercial and social dimensions.

Chapter 3 empirically examines the roles of streamer type (macro versus micro), authenticity, and community interaction (danmaku) on consumer responses through four online experiments (N = 900). Study 1 demonstrates that macro-streamers lead stronger consumer responses by enhancing trust. Study 2 finds that micro-streamers with low to moderate authenticity can also boost trust and drive engagement. Study 3 shows that while macro-streamers suffer from overloaded community interaction, micro-streamers build trust regardless of interaction level. Study 4 reveals that excessive danmaku overloads viewers, reducing trust, endorsement acceptance and purchase intention.

Together, these studies illuminate two pathways to effective live commerce strategy: authoritative endorsement by macro-streamers with moderated interaction and relatable

authenticity by micro-streamers. Chapter 4 integrates these findings to demonstrate the theoretical and practical contributions, and Chapter 5 outlines emerging future research on value co-creation and co-destruction, social impact, and brand activism in the live streaming era. The thesis offers both theoretical advancements in understanding live streaming strategy and practical guidelines for brands and platforms to optimise this strategy.

Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor used artificial intelligence tools or generative artificial intelligence tools (unless it is clearly stated, and referenced, along with the purpose of use), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Yujun (Jojo) Xu
8th May 2025

Acknowledgements

If surviving a PhD were an Olympic sport, I would owe my gold medal to my top coaching team, Associate Professor Sommer Kapitan and Dr. Megan Phillips.

Sommer, as fellow ENFJs (The Protagonist personality in MBTI), I hope to be like you ten years from now. Meeting you was the first time I truly understood the kind of person I aspire to become. From the very moment I saw you on that Zoom call four years ago, I felt something stirring in my soul and I knew: this is the human I want to be. I often think of us as forming our department's own solar system, radiant and alive with energy. Your optimism, so boundless and generous, and your talent for turning my tangled thoughts into clarity, make you feel like both a cheerleader and a fairy godparent. But more than that, you guided me hand in hand through the long and uncertain road of this PhD. You taught me that this journey is not a road of hardship alone, but one illuminated with love, encouragement, and joy. You walked beside me, step by step, teaching not only the craft of research but the art of resilience, the joy of curiosity, and the grace of lifting others while climbing yourself. Every time I stumbled, you reached out with patience and pulled me back up. Every time I doubted myself, you carried some of the weight until I found the strength to carry it again. You never simply supervised my work; you cared for me with such generosity that I often felt like the luckiest student alive. Yes, I am! Your mentorship is not only intellectual, but profoundly human. I love and admire you more than words can capture, and your influence will stay with me long after these pages are bound.

To Megan, thank you for patiently unraveling my 3am emails filled with existential questions and panic, and for always responding with wisdom 3 hours later instead of telling me to wait until 3 days later. You gave me the gift of calm, of clarity, and of strength so steady it became my anchor. Your uncanny ability to notice a missing reference three paragraphs down is not only a skill, but also a reflection of how you see what others overlook, holding the whole picture when I am lost in fragments. You are the most important coolant when sometimes I am overheated by our everlasting ideas. You keep showing me that rigor and kindness are not opposites but companions, and that true mentorship lies in balancing both precision and compassion.

Together, you welcomed me not only as a student but as a whole person. You listened to my breakthroughs and my nightmares, steadied me after the harsh sting of reviewers' critiques, and wrapped me in laughter, encouragement, and support when I needed it most. In

moments of exhaustion, you reminded me that scholarship is not only about ideas but also about humanity, connection, and resilience.

I am endlessly grateful for your guidance, for your belief in me, and for the way you have shaped both my scholarship and my life. This thesis bears your imprint as much as mine. More importantly, I carry your example within me. I hope one day I can pass it forward, not only by teaching or publishing, but by becoming for someone else what you have been for me: a steady light, a wise guide, and an unshakable source of faith and support.

Also, to Professor Ekant and Dr Lin, thank you doesn't even begin to cover it. As my examiners, you've both been incredibly generous, not only with your time, but with the care and thoughtfulness you've shown in your feedback. It's rare to see scholars who bring such a perfect balance of intellect and kindness, and I've honestly felt so supported through this process. Thank you for helping me see my work in new and deeper ways, and for making what could have been a scary experience feel more like a conversation filled with insight and even joy. Moreover, I need to say thank you for our Erin Moloney and Ethical Committee for supporting and approving my ethical application "22/160" on 11th July 2022, and the following amendments on 2nd Nov, 2022, 19th April 2023, and 26th August 2024.

I must also thank my grandparents, the greatest scientists I've ever known, whose lab tales and tireless dedication fuelled my childhood dreams of discovery. Some of my happiest memories are perched on their design table, surrounded by scribbled blueprints, measure tools shimmering like promise, and their endless pep talks of "Follow your heart, we'll always be your safety net." Though Grandpa charted his course for the stars before this thesis could reach his desk, I like to imagine him peering down with a proud grin - and maybe a playful eye roll at my turn toward business studies instead of going on his aerospace - quietly cheering me on. This work is my tribute to his legacy, proof that his spirit of curiosity still guides me, and a promise that I'm carrying forward his dream of making a meaningful mark on the world

Finally, to my beloved Emma, whose love has been the constant rhythm beneath all the chaos. Thank you for holding my hand through sleepless nights, for reminding me of the world beyond my laptop, and for loving me even when my head was lost in theories and data. Your patience, logic, and faith in me have been my greatest source of strength, and I could not have made it through without you. To my amazing friends Lizzy and Jessie, and my crazy PhD buddies Viya, Kara, Nora, and Bohan, who endured my late-night rants about statistics, listened patiently to my "lightbulb" moments, and made sure I was still alive and remembered to eat. This thesis exists thanks to your kindness, your joy, and your unwavering belief in me. Thank you all for making this wild journey not only possible but truly memorable.

Publications from This Thesis

Chapter 2 Manuscript 1:

This manuscript has been published as:

Xu, Y., Kapitan, S., & Phillips, M. (2023). The commercial impact of live streaming: A systematic literature review and future research agenda. *International Journal of Consumer Studies, 47*(6), 2495-2527.

Chapter 3 Manuscript 2:

This manuscript has been used for ANZMAC 2023:

Xu, Y., Kapitan, S., & Phillips, M. (2023). *Make or break livestream shopping effectiveness: the impact of community collaboration* [live streaming session]. ANZMAC, Dunedin, NZ.

This manuscript is currently under review in the Australasian Marketing Journal. It should be published as

Xu, Y., Kapitan, S., & Phillips, M. (2025). Drowning in danmaku: The double-edged sword of community interaction in live streaming commerce. *Australasian Marketing Journal*, forthcoming.

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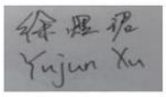
Student Name	Yujun (Jojo) Xu	**Signature**		**Date**	08.05.25
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Chapter Number:	2
	The commercial impact of live streaming: A systematic literature review and future research agenda
Publication Status:	**Accepted for Publication**
Reference if published:	

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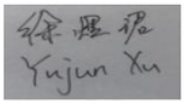
Student Name	Yujun (Jojo) Xu	**Signature**		**Date**	08.05.25
		Signature			
Supervisor Name	Associate Professor S Kapitan			**Date**	08.05.25

Chapter Number:	**3**
Manuscript Title:	Drowning in danmaku: The double-edged sword of community interaction in live streaming shopping
Publication Status:	**Submitted for Publication**
Reference if published:	

AUTHOR SURNAME: (order as per manuscript)	CONTRIBUTION (May copy from the guidelines above)
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Kapitan, S	Contribution of knowledge, Analysis or interpretation of research data and findings
Megan, P	Contribution of knowledge, Analysis or interpretation of research data and findings

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Chapter 1 Introduction

This chapter introduces the general background of my PhD research, followed by motivations and research questions. Following this, the chapter presents an overview of the methodologies used, incorporating information from two manuscripts. Theoretical and practical contributions are at the end of the introduction section.

1.1 Background

Live streaming has fundamentally transformed online sectors such as gaming, shopping, and entertainment by enhancing instant user engagement and creating new revenue opportunities (Lin et al., 2021b; Xu et al., 2023a). Through real-time interaction, live streaming fosters vibrant communities and enables direct monetisation from activities such as gifting, purchases, and donations, making streaming a popular profession today (Hu et al., 2017). Live streaming commerce, a fusion of live streaming and shopping, has radically altered retail by offering personalised, interactive shopping experiences where users can engage with streamers and other viewers, with the potential to accelerate the brand life cycle and co-create brand value. In China alone, live streaming commerce generated 5.6 trillion yuan in 2023 and is projected to reach 8.4 trillion yuan in 2025 (Fan et al., 2024). Platforms including TikTok and Kuaishou achieve conversion rates of 4.8%, effectively converting viewers into buyers (Pengpai News, 2024). During the 2024 “11.11” festival, 589 brands on Taobao’s live streaming platform surpassed 100 million yuan in transactions, generating over 150 million orders (Sina Finance, 2024b). Additionally, Douyin saw 168 streamers reach sales exceeding 100 million yuan during the same period (Sina Finance, 2024a).

Unlike previous forms of e-commerce and social commerce (s-commerce), live streaming provides a richer, more immersive experience through real-time interaction, vivid guidance, and memorable moments (Sun et al., 2019; Gu et al., 2023). Scholars have increasingly focused on understanding the success of live streaming commerce as a new marketing strategy. Research has explored streamer characteristics (Li & Peng, 2021; Jodén & Strandell, 2021), examined how live streaming impacts consumer decision-making (Wang et al., 2022; Wongkitrungrueng et al., 2020), and investigated the role of community interactions in driving sales (Zhang et al., 2024a, b; Zhao et al., 2024). Identifying additional factors that influence live streaming commerce’s effectiveness is essential for future growth, particularly the impact of community interactions, information overload and the relationship between

streamer types and consumer responses. As online retailing intensifies, it is necessary for both scholars and industry stakeholders to refine their strategies for engaging, co-creating and retaining customers, particularly as new live streaming platforms emerge (Gu et al., 2023).

The fast-paced development of live streaming was accelerated by the global Covid-19 pandemic, spreading throughout Asian and European countries within the context of game, shopping, tourism, fitness, education and entertainment (Liu et al., 2022; Wilke et al., 2022). Initially gaining attention in 2020, live streaming has now matured into a robust field of research, spanning areas such as customer engagement across gaming, shopping, and tourism (Xie et al., 2022; Kim & Kim, 2022), and marketing involving virtual streamers in both shopping and entertainment live streaming (Gao et al., 2023). Live streaming shopping, in particular, has broken the mold of traditional e-commerce, offering retailers real-time engagement opportunities with viewers, enhancing omni-channel experiences, and driving increased engagement, stickiness, and purchase intentions through features such as one-click purchasing within live streaming rooms (Chen et al., 2022a; Pereira et al., 2019). Table 1 presents a comparison of the key differences among these forms of commerce.

Key factors	**E-commerce**	**S-commerce**	**Live streaming commerce**
Participants	Sellers; Retailers; Brands; Customers	Sellers; Retailers; Brands; Community members	Sellers; Products; Brands; Streamers; Community members; Random viewers
Information carriers	Sellers	Sellers; Partial community members	Streamers; Sellers; Brands; Major community members
Information types	Text; Static pictures; Pre-recorded and editable videos	Text; Static pictures; Pre-recorded and editable videos	Live streaming that hard to edit; Real-time Danmaku
Medium	E-commerce platform	Social media; E-commerce platform	E-commerce platform/apps with live streaming function; Social media/apps with live streaming function; Live streaming platform/apps
Interaction features	Human-computer interaction; Asynchronous	Human-computer interaction; Asynchronous	Real-time interaction; Synchronous
Interaction level	None to limited	Limited to moderate	Abundant
Time of popularity	Since 1995 (Tian & Stewart, 2006)	Around 2011-2013	Since 2019
Experience	Single channel - discontinuous	Multichannel - discontinuous	Omnichannel - Seamless

Table 1.1.1 Comparison among major online shopping types (adapted from Xu et al., 2023a)

1.2 Research Motivations

Given the rapid expansion of the live streaming industry, understanding its effects on live streaming exchanges is critical. Live streaming offers a unique and innovative means of both commercial (e.g., as an online marketing and selling tool) and social exchange (e.g., fostering real-time community interaction) that was previously unattainable through asynchronous media. However, stakeholders must also consider the potential limitations and negative consequences that may arise from improper use of live streaming. This requires an exploration of how various factors—such as social interaction, community-building, and technology—shape both streamer and viewer behaviours, and how these behaviours, in turn, influence one another.

As live streaming becomes an increasingly powerful marketing tool, it is important for scholars to understand the field of current scholarship. Table 1.1.2 highlights the live streaming literature that is directly related to my PhD thesis and suggests possible directions for further studies. These studies primarily focus on live streaming commerce from diverse perspectives, including technology, source characteristics, community-building, and strategic development. While these works are valuable for addressing specific aspects of live streaming, they remain somewhat fragmented.

Categories	Research Foci	Mechanisms	Antecedents	Outcomes	Findings	Study
Technology-related	Comparisons between pre-recorded videos and live streaming on consumers' viewing experiences and behaviour intentions	Social impact	Social presence; Synchronicity	Search/subscribe intention; Purchase intention	LVS authenticates viewing experience more than pre-record one, but no differences on the relationship between search/subscribe and Purchase intention.	Ang et al. (2018)
	The usage of social cues in live streaming commerce	IT support (Endogenous and Exogenous attention) on consumer behaviour	Social cues: Herding message; Interaction text	Purchase intention	Both herding message and the interaction text can positively influence exogenous attention; But only herding message positively influence endogenous attention and further impact Purchase intention.	Fei et al. (2021)
	IT technologies used in live streaming commerce effectively work on the engagement (immersion	IT affordance	Visibility; Metavoicing; Guidance shopping	Purchase intention	IT affordances have significant impacts on live streaming immersion and presence, which is positively associated with customer purchase intention.	Sun et al. (2019)

	and presence) and Purchase intention					
Content marketing	Content marketing in live streaming commerce	Social presence	User-generated content vs. Market-generated content	Purchase intention; Willingness to buy	Live streaming is not as effective as other content marketing channels in increasing the sales and willingness to buy because viewers may send gift to streamers rather than purchasing products. Fan-fan relationship works in 2 ways: persuasive and informative, while celebrity-fan relationship works in 1 way: persuasive.	Geng et al. (2020)
	Content versus community focus in live streaming services (game)	Self-determination	Community-focused communication; Content-focused communication	Viewing; Donation	Community-focused communication has a positive effect on viewing but having negative effect on donating. Content-focused communication has a negative effect on viewing but having a positive effect on donating.	Giertz et al. (2022)
Influencer marketing and user motivation	Key factors influence the trust in live streaming commerce, and the following results	Elaboration likelihood model; Trust transfer (Trust in product/streamer)	Perceived product value; Brand awareness; Perceived product knowledge of streamers; Other members' endorsement; Value similarity	Purchase intention; Willingness to pay	Other members' endorsement is the most important factor for trust in streamer, followed by value similarity and perceived product knowledge of streamers. Trust in a product is shaped more by consumers' perceptions of its quality than by their awareness of the brand.	Chen et al (2022a)
	Swift guanxi as the mediator to connect interpersonal interaction and Purchase intention	Swift Guanxi	Social interaction; source characteristics	Purchase intention	Perceived expertise, perceived similarity and perceived likeability are found to be the essential interpersonal interaction factors that significantly affect purchase intention through the mediation of swift guanxi.	Chen et al (2022b)
	The dynamic effect of interactivity on customer engagement behaviour through tie strength	Tie strength	Interactivity: Responsiveness; Personalization	Customer engagement	Interactivity has an inverted U-shape effect on tie strengthen and engagement in Live streaming; Tenure of membership strengthen the U-shape effect, while popularity weaken the U-shape.	Kang et al (2021)

	The role of streamer's similarity with viewers on reducing the uncertainty	Signaling theory and uncertainty avoidance	Physical characteristics similarity; Value similarity	Purchase intention	Streamers' physical characteristics conveyed through vicarious product trials and values shared via instant interaction as two signals that can help reduce product uncertainty and cultivate trust for the consumers with similar physical traits and values.	Lu and Chen (2021)
	How do virtual streamers affect purchase intention in the live streaming	Social presence; Telepresence	Likeability; Animacy; Responsiveness	Purchase intention	Likeability, animacy, and responsiveness enhance social presence and telepresence, which further impact purchase intention. Likeability and responsiveness directly increase purchase intention, but animacy does not. There are differences between the effects of humanoid and zoonotic virtual streamers on social presence and telepresence	Gao et al (2023)
	Social motivations of live-streaming viewer engagement on Twitch (game)	Uses and gratifications	Entertainment; Information seeking; Sense of community. Meeting new people; Social interaction; Social support; Social anxiety; External support	Live-stream engagement: Emotional connectedness to platform; Time spent; Time subscribed; Amount donated to channels	Emotional connectedness: Sense of community > Entertainment > Info seeking > Social interactions > Meeting new people. Time spent: Entertainment > Social interaction, while External support has reverse effect. Subscription: Social interaction > Sense of community. Donation: Social interaction > Sense of community. Social motivation was greater with smaller channel participant.	Hilvert-Bruce et al (2018)
Relationship building	Swift guanxi as the mediator to connect customer trust and engagement in live streaming commerce	Swift Guanxi and trust transfer	Trust in community members; Trust in broadcasters; Trust in products	Customer engagement	Trust in streamer cannot directly lead to the engagement but can influence indirectly through swift guanxi. Swift guanxi is mostly influenced by trust in streamer, followed by trust in community members, and products.	Guo et al (2021)
	Enhancing consumer engagement in e-commerce live streaming via relational bonds	Affective commitment to broadcaster and online marketplace	Financial bonds; Social bonds; Structural bonds	Customer engagement	Social and structural bonds were positively associated with consumer engagement but no direct effect for financial bonds. Affective commitment to the broadcaster cannot transfer to the online marketplace	Hu and Chaudhry (2020)

	How attachment affects user stickiness on live streaming platforms by using social-technical approach	Emotional attachment; Social-technical system	Social system: Interaction; Identification Technical system: Synchronicity; Vicarious expression	Stickiness	Social factors can significantly affect emotional attachment to streamers, while technical factors can significantly affect platform attachment. Platform attachment has a larger impact on user stickiness than emotional attachment to streamers	Li et al (2021b)
Live streaming strategy development	Using live streaming as an effective relationship management strategy	Relational orientation dimensions; Online relationship marketing model	N/A	N/A	Live streaming is effective in increasing sales leads, enhancing customer experience, and building customer engagement. A transaction- and persuasion-based approach can help build customer relationships in the short run while a content- and relationship-based approach can help retain customers in the long run.	Wongkitrungrueng et al (2020)
	The roles of streamer identity and level strategy in helping the live streaming strategy	Source credibility	Online celebrity count; E-shop seller count	Online celebrity live streaming sales; E-shop seller live streaming sales	The use of more online celebrities and sellers yields greater live streaming sales. Streamer level moderates the effects of online celebrity count, and e-shop seller count on live streaming sales.	Li et al (2023)
	Using live streaming shopping features to create a memorable experience	Information richness; Social presence; Interactivity; Vividness; Newness	Perceived diagnosticity; Perceived enjoyment; Perceived social support	Continuous intention	Memorable experience triggered by the live streaming commerce characteristics is a strong indicator of continued shopping behaviours.	Gu et al (2023)
Value co-creation	How Live streaming commerce features influence consumer's value co-creation and co-destruction	Perceived value	Information quality; Functional quality; Interactive quality	Value co-creation and co-destruction	Platform information quality, functional quality, and interactive quality all can positively affect consumers' value co-creation behaviour and negatively affect value co-destruction behaviour directly or indirectly through perceived value. Promotional incentives enhance the positive relationship between platform features and perceived value.	Wang et al (2024)

	The role of co-creation experiences by virtual interactions in live streaming service (sports)	Service-Dominant Logic (S-D logic); Social identity	Viewer-viewer interactions; Viewer-streamer interactions	Watch intention	Distinct effects of virtual interactions on co-creation experiences and platform involvement, as well as further influence the engagement. Viewers' follow status was found to moderate the impacts of co-creation experiences and platform involvement on watching intentions.	Qian and Seifried (2023)
	How different types of viewers (Content consumers, Super co-creators, Co-creators, Tourists) perceive the value of their viewing experience. (sports)	Service-Dominant Logic (S-D logic)	Value proposition: Streamer endorsement; Viewers passion; Player performance; Platform information quality	Perceived value: Emotional value (Flow, Enjoyment); Social value (Self-identity, Sense of community, Player identification, Streamer proximity); Epistemic value (Knowledge acquisition)	Value propositions significantly contribute to viewers' experiences. And viewer can acquire unique perceived value from the viewing experience.	Liu et al (2024)

Table 1.1.2 Summary of previous live streaming mechanisms research

Currently, there is no systematic review that provides an interdisciplinary framework to demonstrate the commercial impact of live streaming. Such a framework could encompass the journey from streamer and platform factors to viewer and consumer behaviours, addressing both external and internal processes, and culminating in the final response process. With the fast-evolving live streaming literature, a comprehensive review of the existing knowledge on live streaming is essential to give scholars a clear understanding of the current landscape and to identify future research directions.

While existing research offers valuable insights into the evolution of live streaming, the findings remain fragmented. To address this, I draw upon information management, consumer psychology, marketing and retailing literature to identify key trends and emerging insights within live streaming. Given the broad scope of industries impacted by live streaming, it is essential to first develop a comprehensive understanding of how it influences viewers (external stimuli), triggers specific cognitive or affective states in viewers (internal processes), and results in final responses. This understanding will then guide the identification of gaps and future research directions. Accordingly, Chapter 2 involves a systematic literature review that consolidates the current body of scholarly knowledge on:

1. The motivation behind live streaming including social (Hilvert-Bruce et al., 2018), affective, and cognitive drivers (Sjöblom & Hamari, 2017).
2. Live streaming factors (e.g., real-time social interaction, source characteristics) that influence streamer content creation (Törhönen et al., 2020), viewer engagement (Hu et al., 2017) and gifting behaviour (Li & Peng, 2021).
3. The existing motivations and behavioural responses within live streaming commerce, which serves as a foundation to further research in this area (Wongkitrungrueng & Assarut, 2020).

The systematic literature review (Chapter 2) also highlights the fragmented nature of the field. Platforms, streamers, and scholars lack a coherent structure to build a holistic understanding and strategy around live streaming interactions. Consequently, the first aim of my PhD study is to synthesise and organise these disparate findings in the rapidly evolving arena of live streaming. The systematic literature review provided many avenues for future research, leading me to focus on one particularly intriguing area, the relationship among authenticity, influencer types, and community interaction in driving user acceptance and stickiness (Chapter 3).

Building on the insights from Chapter 2, which systematically mapped the commercial impact of live streaming and highlighted the dual Stimulus-Organism-Response (SOR) framework of streamer-viewer interactions, Chapter 3 delves deeper into how authenticity and the activation of community interaction (danmaku) influence streamer effectiveness in live streaming e-commerce. It also examines why rapid-paced barrages of community interaction in the form of rapidly streaming comments, gifts, and questions, can detract from the effectiveness of macro-streamers (>100,000 followers), who are typically well-known celebrities or online influencers. From a service-dominant logic (S-D logic) perspective, consumers are no longer passive recipients but active contributors to value creation (Vargo & Lusch, 2004). In live streaming commerce, this co-creation unfolds through real-time interaction, where viewers influence content, brand meaning, and purchase decisions (Prahalad & Ramaswamy, 2004; Wang et al., 2024). Yet, these same dynamics can also lead to value co-destruction when engagement produces cognitive fatigue, information overload, impulsive consumption, or negative exchanges among participants (Zhang et al., 2024a; Pang & Ruan, 2023).

In live streaming commerce, streamers build unique bonds with their audiences by establishing trust, which makes their recommendations highly valued for updates, insights, and product recommendations (Gao et al., 2021). The effectiveness of streamer endorsements is increasingly studied within online commerce, highlighting the impact of varying streamer approaches (Leung et al., 2022; Teresa Borges-Tiago et al., 2023). However, conditions that optimise outcomes in shopping live streaming remain underexplored in marketing research. Therefore, my second paper (Chapter 3) investigates the role of authenticity and trust across different types of streamers, exploring how these factors contribute to success. Additionally, research has primarily focused on the positive effects of community interaction (Zhang et al., 2022), with limited attention to its potential drawbacks (Zhang et al., 2024a). I extend the analysis by examining how community interaction and information sensitivity affect consumer trust and responses, such as endorsement acceptance, stickiness, and purchase intention.

Together, my two manuscripts provide a comprehensive analysis of social interaction in live streaming commerce: who the participants are (streamers and viewers), how they communicate (authenticity and danmaku), and why the interaction is effective or ineffective (information overload and sensitivity). Based on the findings from these chapters, I also present clear and essential future research directions in Chapter 5, exploring how influencer marketing and community interaction can contribute to emerging research areas such as co-creation and brand activism through live streaming strategies.

1.3 Research Questions Development

The purpose of my PhD research is to examine the interaction between streamers and viewers in live streaming commerce and explore how live streaming can be leveraged as an effective marketing tool in online retailing, with a focus on influencer marketing and community interaction. To achieve these, five research questions are presented, as follows:

- **RQ1:** What do we know about the state of current knowledge of commercial impacts led by user motivations and interactions in the context of live streaming? This question is addressed through characteristics analysis in a systematic literature review (Chapter 2).
- **RQ2:** What are the theories, contexts, and methodologies used to examine the commercial impacts of livestreaming? This is addressed through a systematic literature review (Chapter 2).

Building on the insights from the systematic literature review, three research questions shape the second manuscript by exploring the impact of authenticity and community interaction (danmaku) on streamer effectiveness and why community interaction can harm that effectiveness of streamers.

- **RQ3:** How do streamers employ authenticity to influence trust and consumer responses, such as acceptance of endorsement, continuance and purchase intention? This question is featured through Study 1 and Study 2 in Chapter 3.
- **RQ4:** How does activating community interaction impact streamer effectiveness in live streaming e-commerce? This question is answered by study 3 in Chapter 3.
- **RQ5:** What role does community interaction (i.e., rapid-pace barrage danmaku) play in streamer effectiveness? Study 4 in Chapter 3 helps to unpack this question.

1.4 Research Philosophy and Design

1.4.1 Scope of Study

A philosophical framework in social science typically includes five key steps: ontology, epistemology, research paradigm, methodology, and method (Crotty, 1998; Smith, 2006). These elements provide a foundation for guiding research directions and approaches to achieve the research aims. This research adopts a comprehensive and interdisciplinary approach to investigating live streaming commerce, integrating a systematic literature review (Chapter 2) with empirical research (Chapter 3). Grounded in clear philosophical assumptions, this approach ensures coherence and rigour.

To understand the dynamics of the live streaming context, it is important to examine relevant literature. This process helps to establish clearer future research directions. Accordingly, Chapter 3 explores live streaming shopping experiences by examining users' perspectives on streamer and community interaction. Given the exploratory nature of the study, a new methodology was employed in the live streaming context, involving the recording live streaming shopping scenarios as stimuli in an online experiment. This method offers a more realistic and dynamic simulation of live shopping environments, effectively capturing the fast-paced nature of danmaku. By vividly illustrating how community interaction impacts trust and consumer responses, this approach provides valuable insights into the mechanisms driving engagement in live streaming commerce.

Considering the nature of the current research and its aims, I will further discuss the five steps of research philosophy and explore how the philosophical paradigms of ontology and epistemology integrate with my study's research paradigm, methodology, and methods.

1.4.2 Ontology

Ontology refers to the nature of reality and what exists within the research domain. It focuses on how things really are and how things really work under the context of "real" existence (Guba & Lincoln, 1994). Ontology has two opposite poles, that is, objectivism and constructionism (Antwi & Hamza, 2015). Scholars, especially positivists, believe that true knowledge or social reality is objective and quantifiable (Antwi & Hamza, 2015). Walsham (1995) believed that reality is set apart from social construction, which means it works independent of individual perceptions and reactions. However, for most interpretivist researchers who represent constructionism (also known as idealism or relativism; Smith & Heshusius,1986), they recognise that no reality or knowledge can be independent of individual's thinking or reasoning and knowledge can obtain various correct and routes and methods (Gephart, 1999; Willis, 1995).

Except the dominant extremes, there are always some points in between. Guba (1990) raised that critical realism can be placed in between and explored the way humans conceive reality, or knowledge is imperfect. Critical realism is triggered by the fact that once individuals comprehend the structure or processes of social reality, they start seeking to reproduce and transform the status (Bhaskar,1975; Dieronitou, 2014). Critical realism is grounded in an explanatory framework that recognises and incorporates: (a) the existence of pre-established structures as generative mechanisms, (b) the interactions between these structures and other entities with their own causal powers and limitations within a stratified social world, and (c) the emergence of non-predictable yet explainable outcomes resulting from these interactions, all occurring within the open system of society (Wikgren, 2005; Archer, 1998).

The purpose of this study is to unpack the interaction mechanism between streamers and viewers by generating a conceptual framework in the live streaming context, followed by the understanding how different factors can influence the effectiveness of live streaming shopping on viewer's responses, and why community interaction might damage the effectiveness of macro-streamers in live streaming commerce. This study mainly uses quantitative methodology and combines different methods, such as systematic literature review and online experiments. By utilising quantification to enhance the accuracy of parameter

descriptions and their interrelationships (Antwi & Hamza, 2015), this thesis focuses on discovering truth and representing it through empirical evidence. Thus, objectivism as the ontology stance suits the best to the current research.

1.4.3 Epistemology

Epistemology means that the theory of knowledge is inherent in the theoretical perspective and, consequently, shapes the methodology (Crotty, 1998). Epistemology deals with the nature, acquisition, validation, and justification of knowledge (Burr & Hofer, 2002). Ontology and epistemology are not separate domains, but interconnected fields that enable a two-way exchange between them (Ejnavarzala, 2019). In today's world, one can embrace and integrate multiple ways of being and knowing by creatively crossing boundaries between ontology and epistemology (Ejnavarzala, 2019). For example, via bridging modern, non-modern, and postmodern ways of living, or connecting interdisciplines such as art, science, religion, and spirituality. Epistemology mainly includes positivism (and post-positivism), interpretivism, critical inquiry, feminism, and postmodernism (Crotty, 1998; Al-Ababneh, 2020). However, in social research, positivism and interpretivism (constructivism) are the most common extreme positions (Antwi & Hamza, 2015). Positivism views knowledge as objective and tangible in line with the ontological objectivism (Dieronitou, 2014). Interpretivism shows the knower has a close relationship with known things and internalises this knowledge via experiencing, which represents subjective constructionism (Dieronitou, 2014). However, Habermas (1972) argues that proper knowledge should consist of prediction and control, understanding and interpretation, emancipation and freedom. Positivism and interpretivism represent the first two components, while critical theory meets the third. The latter component goes beyond the previous two (Dieronitou, 2014).

My research, due to the innovative nature of live streaming, I will start from a systematic literature review to acquire the existing knowledge and then apply critical thinking to the existing gaps, which further serves as the foundation for exploring effectiveness. Only when I understand what is happening in this field through the objective methods, then I can validate and justify the knowledge in this area. There is limited critical control and subjective construction in my research, thus, positivism is the most the suitable epistemology for the current thesis work.

1.4.4 Research paradigm and Methodology

Saunders et al. (2012) describe the research process like an onion including many essential layers. Each layer leads to another until the centre, which directs data collection and analysis. Research paradigm is the most outside layer that influences the final choice of methodology and methods. Paradigm refers to how individual beliefs will influence research design and the procedures (Collis & Hussey, 2003; Al-Ababneh, 2020). There are two types of research paradigms: the positivistic paradigm and the interpretivist (or phenomenological) paradigm (Collis & Hussey, 2003).

Methodology refers to the practical approach a researcher uses to explore and uncover what they believe can be known. It serves as a research strategy that bridges ontological and epistemological principles, translating them into actionable guidelines for conducting research (Sarantakos, 2005). Additionally, methodology encompasses the principles, procedures, and practices that guide and govern the research process (Marczyk et al., 2005; Antwi & Hamza, 2015). A positivistic paradigm normally underpins quantitative methodology aimed to determine general causal explanations and interpretivist paradigm functions best with qualitative research methodology to attain an insider's view of the group under study (Antwi & Hamza, 2015). Thus, the aim of this thesis is to explore how streamers and viewers interact with each other and the causal relationship among the streamer, authenticity, community interaction, trust and consumer responses to generate maximum effectiveness of streamers. Thus, the positivistic paradigm provides the guideline for this thesis.

Saunders et al. (2003) further classified two research approaches, namely, a deductive approach used for developing and testing hypothesis and an inductive approach applied when collecting data and formulating a theory as a result of data analysis. Therefore, this PhD research follows a deductive approach and applies quantitative methodology for hypothesis development and analysis.

1.4.5 Method

Research method is a comprehensive plan for addressing the research question(s), which involves defining research objectives, identifying data collection sources, and accounting for research constraints, such as experiment, survey, case study, grounded theory, ethnography and action research (Saunders et al., 2003). However, no specific method is better

than others because the method should be bases on the research questions and objectives, research philosophy and the existing knowledge (Saunders et al., 2009).

Chapter 2 adopts a systematic literature review approach (Vrontis et al., 2021; Paul & Criado, 2020), chosen for its ability to enhance process and result quality, reduce bias, and increase transparency and reliability. By applying replicable steps, this approach provides a rich framework of extant research (Paul et al., 2021). Utilising the TCCM framework (Theory-Context-Characteristic-Methodology; Paul & Criado, 2020), Chapter 2 offers an in-depth and comprehensive analysis of the commercial impact of live streaming. It concludes with a proposed future research agenda to advance scholarly work in the area of computer-human interaction (Sjöblom & Hamari, 2017; Hilvert-Bruce et al., 2021), information system and management (Kang et al., 2021; Lu & Chen, 2021), business and retailing research (Park & Lin, 2020; Wongkitrungrueng & Assarut, 2020) and influencer marketing (Guo et al., 2022).

Chapter 3 follows positivism epistemology. Quantitative research is the most suitable methodology to build the hypotheses and analyse the data. The aim of Chapter 3 is to probe the causal relationships among streamer, authenticity, community interaction, trust, and consumer responses. Thus, experiments can help with testing different stimuli, such as streamer types (macro vs. micro) and community interaction (high vs. low), to answer the research questions proposed in this work. Chapter 3 tests a conceptual framework of live streaming shopping effectiveness (see Figure 1.1) via a pre-test and four online experiments. Below I outline further details for each study.

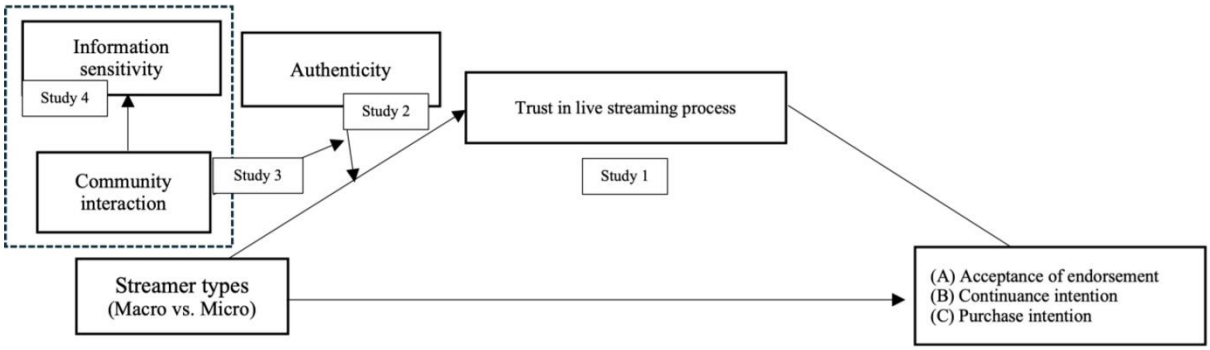

Figure 1.1.1 Conceptual framework for manuscript 2

Study 1. The goal of study 1 is to determine which streamers are most effective at driving consumer responses, such as acceptance of endorsement, stickiness measured as intention to continue using and engaging with the service, and intention to buy products shown in live streaming shopping. 150 respondents were randomly assigned to one of two streamer

conditions (macro- streamer: Chen He vs. micro-streamer: Taobao seller), recruited from the Chinese survey platform Wenjuanxing.

Study 2 replicates and extends results in Study 1 by using different streamers (macro-streamer: Austin Li vs. micro-streamer: Taozi sister) and discovering the moderating role of streamer authenticity. 153 participants were randomly assigned to one of two streamer conditions (macro-streamer: Austin Li and micro-streamer: Taozi sister). The same procedure and measures from study 1 were followed.

Study 3. The objective of study 3 is to discover the role of community interaction in streamer effectiveness. 335 participants were randomly assigned to a 2 (streamer type: macro-streamer vs. micro-streamer) x 2 (community interaction: absent vs. present) between-subjects design.

Study 4 is designed to probe why danmaku (fast-paced community interaction) lowers effectiveness for macro-streamers. 310 were randomly assigned to one of two conditions (danmaku interaction level: high vs. low).

1.5 Contributions and Significance of Research

1.5.1 Theoretical Implications

This PhD thesis presents the first systematic literature review on user motivations and interactions in the context of live streaming. It explores the roles of both streamers and viewers in fostering the growth of live streaming. By analysing existing theories, such as self-determination theory, uses and gratifications theory, and characteristics, I identify critical gaps and emerging challenges in scholarship on live streaming processes. Utilising the Theory-Context-Characteristics-Methodology (TCCM) framework (Paul et al., 2021) and Stimulus-Organism-Response (SOR) model (Mehrabian & Russell, 1974), Chapter 2 introduces an original, integrated dual SOR model that reveals how key factors interact in live streaming to drive its evolution. Building on parasocial interaction (Chen, 2021; Leith, 2021), this chapter emphasises the important role of interaction mechanisms between streamers and viewers. The proposed dual SOR model represents the first attempt to establish a comprehensive feedback loop among users, offering novel insights into the dynamic interplay within the live streaming ecosystem. This contribution provides both theoretical and practical implications for understanding streamer-viewer interactions as a distinct entity emerging from the live streaming phenomenon.

Secondly, I classify the key factors that influence user behaviour in live streaming through marketing and platform stimuli, cognitive and affective states (e.g., trust, attachment, perceived value), and resultant responses such as virtual gift purchasing, tipping, and product purchasing intention. Focusing primarily on the commercial and computer-mediated human-to-human interactions within live streaming, Chapter 2 summarises essential factors that drive engagement and consumption intentions. A notable observation from the systematic review is that existing studies heavily emphasise platform stimuli—such as live streaming benefits, affordances, and features—while disproportionally focusing on the viewer or consumer role. These insights motivate further investigation into the effects of streamers and the broader community in live streaming ecosystem.

Chapter 3 contributes to the emerging scholarship (Zhang et al., 2024a; Zhao et al., 2024; Liu & Sun, 2024) on live streaming commerce effects in two key ways. First, it empirically examines how streamer characteristics, particularly authenticity, influence consumer trust in the live streaming process (e.g., trust in the product, streamer, and platform). This extends the understanding of how to maximise streamer effectiveness in influencing consumer responses through authenticity. Previous research on asynchronous media has presented differing perspectives on the authenticity of less popular micro-influencers. Some studies suggest that smaller influencers exhibit lower authenticity (Marwick & Boyd, 2010), while others argue that they possess higher authenticity (Rao Hill & Qesja, 2023; Campbell & Farrell, 2020). Thus, Chapter 3 contributes to the development of authenticity as a theory base by uncovering how authenticity functions best in synchronous live streaming. The results reveal that less known micro-streamers (<100,000 followers) with lower perceived authenticity in a real-time context tend to generate higher trust. In contrast, the effectiveness of macro-streamers diminishes when community interaction becomes overloaded. Given the overwhelming volume of information present in live streaming shopping setting, authenticity—particularly when demonstrated by micro-streamers—acts as a crucial trust-building mechanism. This trust enhances user stickiness and the intention to continue engaging with the service. While prior research highlights the importance of synchronicity technology in live streaming (Sun et al., 2019), my findings emphasise that the authenticity of streamers is also important in shaping user engagement. Authenticity drives user stickiness and motivations to connect with and respond to streamers and platform services.

Furthermore, Chapter 3 identifies community interaction as a boundary condition, highlighting its negative effects for macro-streamers in live streaming commerce. This finding further develops social interaction theory by combining it with information overload in virtual

communities (Hilvert-Bruce et al., 2018; Jackson & Farzaneh, 2012; Farivar & Wang, 2022). Prior studies focus primarily on the positive or negative sales outcomes led by the appropriate interaction level and information overload. For example, providing excessive product details and extending viewer duration can lead to information overload, which may ultimately reduce sales (Zhang et al., 2024a). Zhao et al. (2024) suggest that barrage length and count present an inverted U-shaped effect on sales. However, my research uncovers the mechanisms of information overload, demonstrating how excessive community interaction (danmaku) reduces trust in the live streaming process, thereby impacting consumer responses. Specifically, it shows that less dynamic and continuous community interaction helps macro-streamers gain more trust and user responses from viewers. Without community interactions interrupting and distracting, these streamers can more easily meet user expectations, increasing their trust and positive responses towards recommendations, service stickiness, and purchase behaviour. This finding also enriches theories related to virtual community interaction (Farivar & Wang, 2022) through learning the boundary effects in the new live streaming context and provides insights into how community dynamics differ in commerce-focused contexts (e.g., shopping, Zhang et al., 2024c) compared to content-driven platforms (e.g., game, tourism; Hilvert-Bruce et al., 2018; Hu et al., 2017).

Lastly, Chapter 3 identifies community interaction as a boundary condition that moderates the effectiveness of streamer and live streaming commerce. My research advances co-creation theory by conceptualising the dual effects of community interaction in live streaming commerce and demonstrating that interaction requires careful calibration. Chapter 3 shows that interaction can simultaneously build trust and engagement while also creating risks of overload or distraction. By highlighting these opposing outcomes, my study underscores the importance of aligning interaction design with streamer performance, platform logic and brand objectives. In doing so, it extends co-creation theory into the context of live streaming, illustrating how value can be either enhanced or undermined depending on how interactions are structured and managed. Chapter 3 demonstrates that overloaded real-time danmaku diminishes the perceived authenticity of macro-level streamers, increasing information sensitivity and reducing trust in them. This, in turn, leads to lower endorsement acceptance, less continuance and purchase intention. Thus, both co-creation and co-destruction behaviours (e.g., indifferent interaction) emerge in live streaming contexts (Ogunbodede et al., 2022). Moreover, beyond the tangible commercial value that streamers or live streaming can bring, it is equally important to consider the non-commercial value of how live streaming and streamers can contribute to social advocacy and brand activism, a topic worthy of further exploration in

the future (Cheung et al., 2021; Cheung et al., 2020). Streamers, brands, and business can gain lasting reputation on their social responsibilities if they can start and keep focusing on these non-commercial aspects.

2.1.1 Practical Implications

The systematic literature review in Chapter 2 offers actionable insights for practitioners seeking to leverage live streaming for commercial impact. Live streaming represents a unique form of user-generated content characterised by real-time interaction (Giertz et al., 2022), which contrasts with the asynchronous nature of traditional social media. However, the dual SOR (Stimulus–Organism–Response) model in Chapter 2 highlights the key factors driving success in live streaming commerce and demonstrates how these factors can be effectively utilised. Practitioners can measure and directly manipulate these variables to optimise streamer selection and tailor characteristics to align with retail, communications, and branding objectives. For business, live streaming provides an opportunity to better understand customer preferences, influence purchase decisions, and deliver enhanced value through more seamless and interactive services. A primary objective for many businesses adopting live streaming channels is to drive sales while simultaneously fostering customer loyalty — an approach that facilitates the transition from multi-channel to omni-channel retail strategies (Gong et al., 2022).

A key insight is the importance of selecting the appropriate type of streamer based on marketing objectives. Comparisons between macro-streamers such as online celebrities and micro-streamers such as grassroots influencers reveal distinct advantages for specific goals. For instance, when promoting high-involvement or premium products, macro-streamers, like online celebrities, are better suited to address customer queries and avoid overwhelming audiences with excessive information. Conversely, micro-streamers, such as grassroots influencers, are more adept at fostering a sense of closeness and interaction with followers, making them ideal for driving impulsive purchases of low-involvement products.

Furthermore, the frequency and quality of the streamer interactions emerges as an important factor in establishing authenticity, which is important in building trust and cultivating long-term relationships. Platforms and marketers should guide streamers to maintain optimal frequency of interaction that maximises their perceived authenticity. Additionally, online retail platforms should invest in developing tools and features to enhance streamer-viewer interactions. For smaller streamers such tools can help build stickiness by empowering them to align with their unique style while enabling viewers to interact more effectively. This approach

minimises the likelihood of viewer disengagement and enhances the overall live streaming experience. By aligning strategies with these insights, business and platforms can unlock the full potential of live streaming commerce to drive both immediate and potential sustained success.

1.6 Thesis Flow Chart

Figure 1.2 demonstrates the roles of each chapter in this thesis. Chapters are well-organised to present the logical structure of my thesis, illustrating how each chapter contributes to the overall research questions and objectives as mentioned above. The flow chart also ensures that each chapter builds upon the previous and seamlessly transitions into the next. Chapter 1 (current chapter) as the introduction emphasis the research motivations, research questions, research philosophy, theoretical and practical contributions. Chapter 2 offers a systematic literature review to give a comprehensive overview regarding the interaction mechanism between streamers and viewers by exploring theories, contexts, key factors, and methodologies of current research, which further provide insightful future research directions. Thus, Chapter 3 followed previous meaningful directions to explore the factors that influence the effectiveness of live streaming and the role of community interaction in disturbing macro-streamers, which yields implications for marketers, retailers, and brands who consider when they want to use live streaming strategy. Chapter 4 summarises Chapters 2 and 3 and provides theoretical and practical contributions, limitations, followed by Chapter 5's development of a coherent and comprehensive future research directions that not only limit within the commercial impacts of live streaming, but also examines potential for social impacts related to influencer and brand activism.

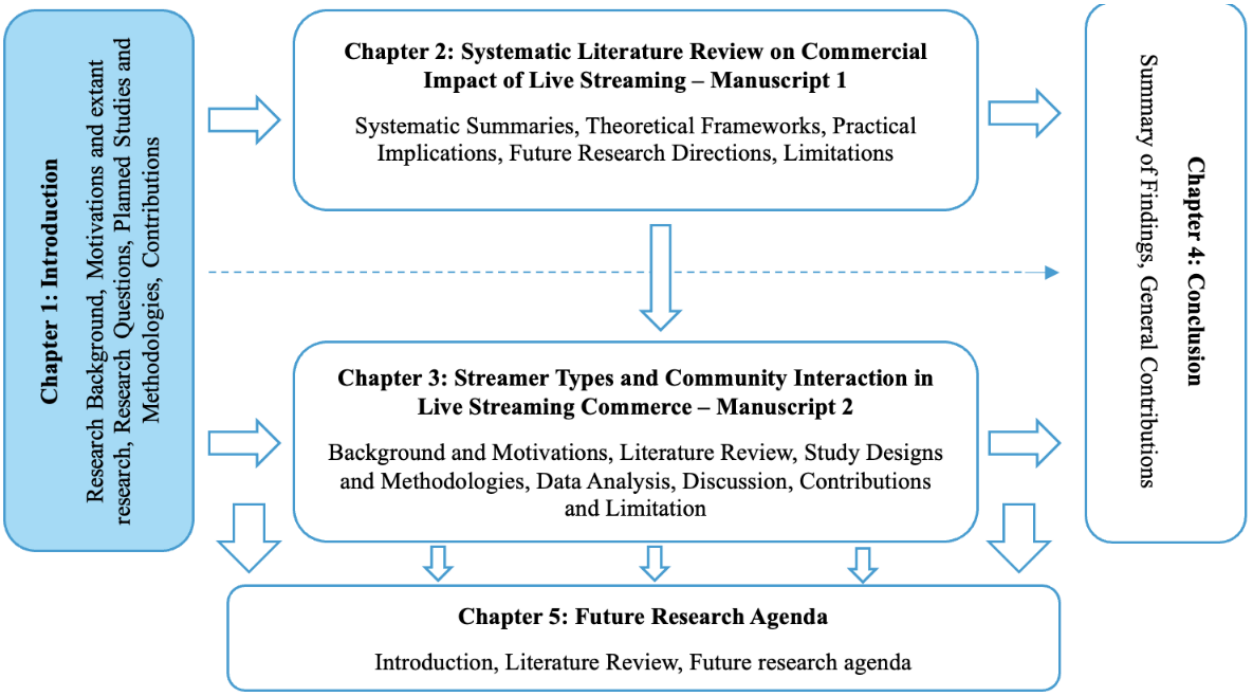

Figure 1.2 Thesis flow chart

Chapter 2 Manuscript 1: The Commercial Impact of Live Streaming: A Systematic Literature Review and Future Research Agenda

In Chapter 1, we framed live streaming commerce as a rapidly evolving intersection of real-time interaction, influencer marketing, and community dynamics, and we identified key gaps in understanding how these elements combine to drive consumer responses. Chapter 2 takes up this challenge by systematically examining the existing scholarship on live streaming and live streaming commerce. By organizing extant studies through the Theory–Context–Characteristics–Methodology (TCCM) framework and a dual Stimulus–Organism–Response (SOR) lens, this chapter not only maps what we know about streamers, viewers, platforms and interactions, but also pinpoints where the possible future directions are.

Chapter 2 lays the essential theoretical base work for our empirical research in Chapter 3. It synthesises 89 peer-reviewed articles to establish a unified model of how commercial impacts are created through streamer and viewer interactions. Current chapter justifies the need for targeted hypothesis testing in the Chapter 3 and highlights promising avenues for future research, ensuring that our experimental work builds directly on the most critical insights and unanswered questions identified in the literature.

Chapter 2 presents the first manuscript of my thesis. It has been published as: Xu, Y., Kapitan, S., & Phillips, M. (2023). The commercial impact of live streaming: A systematic literature review and future research agenda. *International Journal of Consumer Studies, 47*(6), 2495-2527.

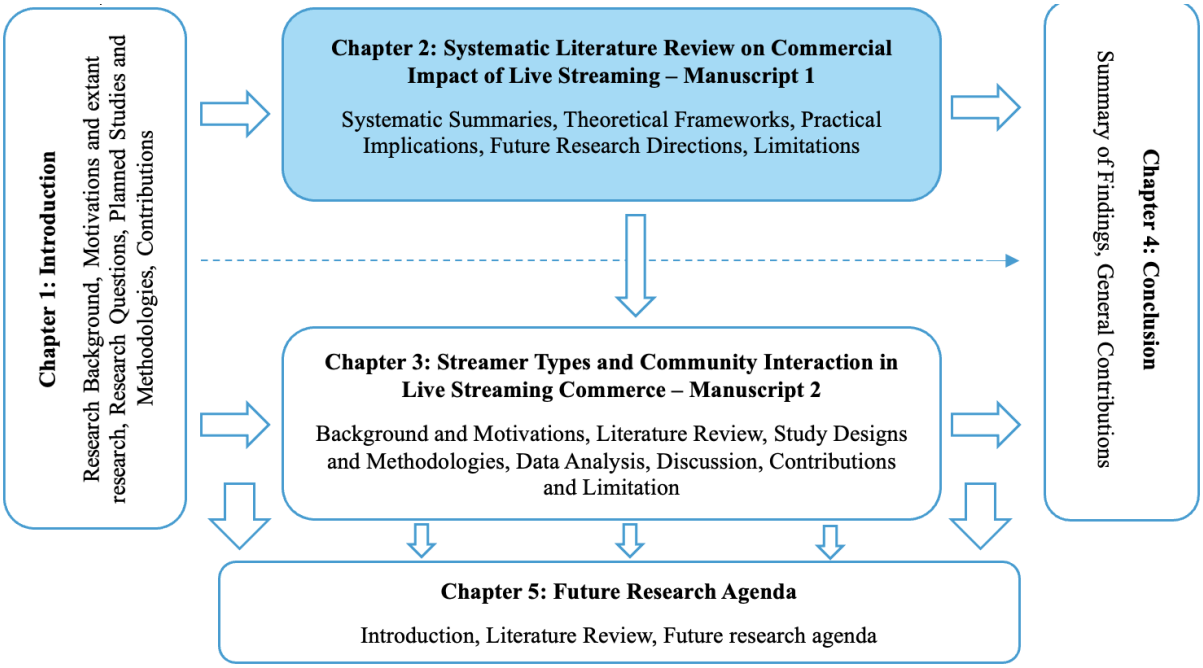

Figure 2.1 Thesis flow chart

The Commercial Impact of Live Streaming: A Systematic Literature Review and Future Research Agenda

Abstract

Live streaming allows streamers and viewers to watch, create, and share videos in real time on topics from gaming, shopping, and social channels to tourism and entertainment. It is distinct from earlier forms of social media in that it allows for real-time interaction and is extremely synchronous. That makes live streaming an important new area of enquiry. Yet live streaming platforms, streamers, and scholars lack an informed structure from which to build more holistic understanding and strategy. Following the Theory-Context-Characteristics-Methodology framework (Paul and Rosado-Serrano, 2019), we undertake a framework-based systematic literature review of 89 articles to source, review, and synthesise disparate findings in the arena of live streaming and live streaming commerce users' motivation and interactions. A dual Stimulus-Organism-Response (SOR) integrative framework is developed to further explore the characteristics of interaction and motivation factors. A future research agenda highlights area of research focus that are critical next steps for scholars.

Key words: Live streaming, Live streaming commerce, Real-time social interaction, Systematic literature review, TCCM framework, SOR model

2.1 Introduction

Live streaming provides real-time interaction between streamers and viewers, alongside fast-scrolling instant message viewer-to-viewer and viewer-to-streamer communication (Danmaku; Lin et al., 2021b; Ang et al., 2018). With the help of maturing mobile networks and the convenience of applications, live streaming has gained global popularity on platforms from gaming and shopping to entertainment and tourism (Lin & Lu, 2017). China-based Mogujie was the first to integrate live streaming on an e-commerce platform in 2016. This launched live streaming commerce that enables real-time interactions between a seller and shopper to assist with online shopping (Cai et al., 2018; Cai & Wohn, 2019). Live streaming revenue reached $70 billion in 2021, with game streaming service Twitch attracting 30 million daily users (Benitez, 2021). China's live streaming commerce market alone accounted for 20% of total online sales in 2022 (Guan et al., 2022; Ming et al., 2021). Despite the flourishing live streaming industry, the process of what motivates streamer-viewer interaction and ultimate consumer behaviours in live streaming remains uncharted. That means live streaming platforms, streamers, and scholars lack an informed structure from which to build a more holistic understanding and strategy. The goal of the present work is thus to provide a clear and unified account of the theories, contexts, characteristics, and methods in scholarship in live streaming commerce. Finally, the aim is to synthesise the work into an integrative framework and identify a future research agenda for the commercial impact of live streaming.

Live streaming is distinct from earlier forms of social media as it allows synchronous interaction (Payne et al., 2017; Sjöblom & Hamari, 2017; Zhou et al., 2019). In this format, streamers and viewers can watch, create, share videos, and comment or ask questions in real time. In other words, streamers do not know what questions, comments, or responses viewers may have, and they respond live, showcasing a finesse, humour or expertise that can impress viewers. Meanwhile, viewers receive information quickly and easily, creating a truly dynamic form of entertainment and information sharing. Figure 2.2 presents a captioned screenshot of gaming live streaming. The figure also illustrates the dynamic and continuous communications, alongside the economic practice of tipping, among viewers who interact with each other as a community along with the streamer. Live streaming commerce has also emerged rapidly alongside these formats (Zhang et al., 2022d). Figure 2.3 shows live streaming shopping, which affords synchronous communications from millions of viewers that overlaps with product presentation. In this mode of commerce, retailers, marketers, and business promote and sell products via an immersive and interactive live streaming experience.

This live streaming interactive experience occurs in real time through e-commerce platforms, social media, and platforms, and is assisted by the labour of these streamers (Cai et al., 2018; Cai & Wohn, 2019; Chen et al., 2022a; Lee & Chen, 2021; Wongkitrungrueng & Assarut, 2020; Guo et al., 2021). This offers meaningful commercial value to live streaming as a marketing communication tool (García Rivero et al., 2022; Wang et al., 2022c) and another channel for retailers, marketers, and businesses to sell goods. Whether revenue is generated from sales of virtual gifts, or product purchasing, or sharing tips with streamers, realizing commercial value requires the commitment and involvement of streamers and viewers.

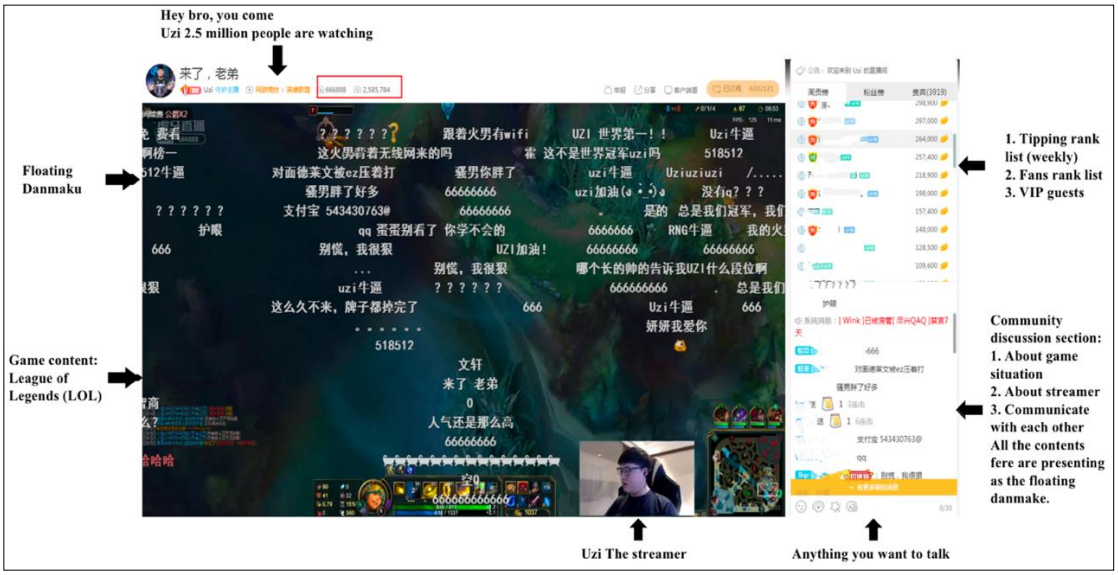

Figure 2.2 Example of game live streaming from Huya Live

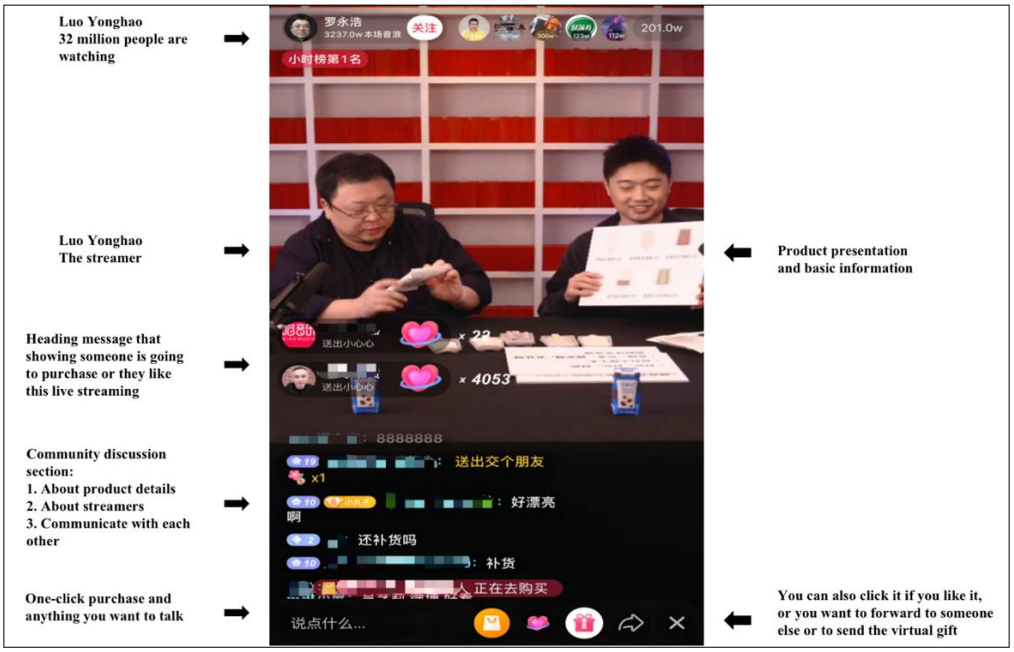

Figure 2.3 Example of shopping live streaming from Tiktok (Douyin in China)

2.1.2 Motivations for Conducting an SLR

Vigorous scholarly interest has emerged in the domain of live streaming with commercial intent (Guo et al., 2021; Wongkitrungrueng and Assarut, 2020; Sun et al., 2019). When a substantial body of work exists in a domain (more than 40 papers) and no review has been undertaken in the past five years, the domain is ripe for a systematic literature review (Paul et al., 2021a). A systematic literature review helps to accumulate current knowledge and reveals omitted fields. However, no such comprehensive review yet exists (Lin et al., 2022; Li et al., 2020), and that's the goal of the present work. Prior reviews show the relation and social actions in game streaming from streamer and viewer's aspects separately. However, such work fails to demonstrate the entire process of live streaming in a holistic manner to reveal detailed interactions and underpinning drivers of the live streaming marketplace (Scheibe et al., 2022). This review considers the interaction between streamer, viewer, and platform as key level of analysis to determine broader generalizations across commercial impacts of live streaming.

This review will uncover similarities across domains, such as how viewers' motivations to watch game streaming also inform motivations for watching shopping live streaming. However, inconsistencies exist, especially for community-related factors. For example, sense of community plays an important role in game live streaming engagement (Hilvert-Bruce et al., 2018; Oh et al., 2020), but that does not yet extend to live streaming commerce (Cai & Wohn, 2019). Current research also focuses on individual types of live streaming service (e.g., shopping, game, tourism) in turn, and limited research summarises and synthesises across all these types (Fu, 2021; Li et al., 2020; Lin et al., 2022). Current findings are as a result fragmented, mixed and sometimes contradictory across domains, marking a clear need for an integrated and organised review of such research (Lin et al., 2022).

We draw from the information management and systems, marketing, and business literatures to identify key factors and outcomes of the commercial impacts of live streaming. Based on the theory, context, characteristics, and methods framework (TCCM; Paul et al., 2017; Paul & Rosado-Serrano, 2019), the present work will source, review, and synthesise findings in the interactions of streamers and viewers in live streaming. Further encouraged by the characteristics analysis, this review draws on the process of stimulus-organism-response (Mehrabian & Russell, 1974) to revisualise the resulting environmental, internal, and response factors involved in live streaming contexts. We generate an integrative dual framework using stimulus and responses to better understand how motivation to interact among users can trigger commercial impacts that sustain the development and growth of live streaming.

2.2 Methodology

To be truly systematic, a well-thought-out literature review depends on a transparent, reliable, and replicable way to recognise knowledge gaps among extant literature that allows room for critical evaluation (Paul & Criado, 2020; Paul et al., 2021b). Paul and Criado (2020) suggest the main contribution of a systematic literature review is to provide state-of-the-art findings on a specific field and present insightful future directions by analysing the theories, contexts, and methods of existing studies (Lim et al., 2021; Paul et al., 2021b; Hao et al., 2021; Paul et al., 2023). Based on Paul et al. (2021b, P337), framework-based reviews are more "informative, insightful and impactful" because they provide the greatest coverage of the review topic. There are some common frameworks in extant systematic literature, for example, antecedents, decisions, and outcomes (ADO) framework (Paul and Benito,2018; Södergren, 2021), theory-context-methodology (TCM) or TCCM framework (Paul et al., 2017; Paul & Rosado-Serrano, 2019), and ADO-TCM combination framework (Lim et al., 2021).

The TCCM framework is the most applicable for our goals as, firstly, it helps synthesise important theories, contexts, and methods key to scholarship on the commercial aspects of live streaming from multi-disciplinary aspects (Paul et al., 2023). TCCM also serves as an efficient tool of the review process that yields an integrative study of characteristics analysis of independent variables, mediators, and dependent variables (D'Alessandro et al., 2022). It helps to make comprehensive theoretical and practical contributions to the research field (Paul and Rosado-Serrano, 2019; Hassan et al., 2022; Roy Bhattacharjee et al., 2022; Paul & Shrivatava, 2016; Paul & Singh, 2017). Many scholars use TCCM to provide the greatest breadth and depth to organise a literature's theories, contexts, characteristics, and methods, which can further help with progress in advancing the area (Paul et al., 2021a; Mandler et al., 2021; Billore & Anisimova., 2021; Yadav & Chakrabarti, 2022; Paul & Rosado-Serrano, 2019; Paul & Criado, 2020).

This review begins with the description of our framework-based review methodology and then presents (1) general research foci in live streaming, (2) dominant theories, (3) contexts, (4) characteristics, and (5) methodologies. Finally, a characteristics analysis enables us to classify the antecedents, cognitive and affective status, and outcomes under live streaming contexts. Thus, we present these factors via a dual model framework of the motivation for interaction among live streaming users to generate a future research agenda.

2.1.3 Initial Selection

A systematic literature review begins with searching databases using clear and specific search terms. We then screen titles, key words, and abstracts to choose articles that meet our search criteria before reviewing each article's full text for final sample selection.

In order to access the greatest coverage of content, we searched EBSCOhost Business Source Ultimate, Scopus, and Web of Science. These databases cover fields from business and marketing to information science and management. Given the focus on a topic emerging in several subfields at once, scattered research widely dispersed across many journals was expected. Thus, we cast a net wide to capture all relevant findings. Scopus covers diversified subjects and includes peer-reviewed articles published by Springer, Elsevier, Taylor & Francis, and Wiley (Gupta et al., 2021; Roy Bhattacharjee et al., 2022; Halder et al., 2021). Web of Science helps to source information science and computer technology related articles (Hu et al., 2017; Hilvert-Bruce et al., 2018; Guo et al., 2021). Importantly, prior work often relies on a combination of different databases to ensure comprehensive selection of a developing domain (Billore & Anisimova, 2021; Yadav & Chakrabarti, 2022).

We follow the SPAR-4-SLR protocol (Paul et al., 2021a) to leave the start date open for searching articles and set the end date as December 2022. To align with the broader research question more comprehensively, "live stream*", "streamer", "consum*" and "viewer" were selected as final keywords. These keywords were searched for research articles using the following combination ("live stream* AND consum*" OR "live stream* AND streamer" OR "live stream* AND viewer" OR "streamer AND viewer" OR "streamer AND consum*"). The term "viewer" represents individuals who participate or engage in live streaming, while "consum*" represents the individuals who engage in consumption of and purchasing on these platforms via such areas as virtual gift purchasing, tipping, or product purchasing. As a result, 6,786 papers emerged in the first step of this review's search (see Figure 2.4).

Still in the selection phase, only peer-reviewed journal articles written in English were taken into consideration, excluding conference papers, book chapters, and editorials (Ordanini et al., 2008; Lim et al., 2021; Vallaster et al., 2019). We selected academic journals ranked A* A and B on the Australian Business Deans Council (ABDC) to help guarantee the quality, impact and rigor of the sample (Furrer et al., 2008; Gupta et al., 2020; Lim et al., 2021). After using these filters as guides and removing 158 duplicated/triplicated articles, 306 initial articles remained in the initial selection phase, as shown in Figure 3.

Then, two authors worked together to screen and exclude unrelated articles based on the title, key words, and abstracts. The following inclusion criteria were used: (1) Articles that focus on commercial aspects of live streaming using platforms such as Twitch, Taobao live, YY live because they are popular platforms that focus on live streaming gaming, entertainment, or shopping (Giertz et al., 2022; Li et al., 2021b; Clement Addo et al., 2021); and (2) articles that focus on the social aspects of live streaming (e.g., real-time social interaction, streamer-viewer interaction, viewer-viewer interaction) as their study topics. Key exclusion criteria were developed to narrow the focus on live streaming interactions. The exclusion criteria are thus: (1) Exclude articles that focus on how specific technology or web development functions in live streaming, and (2) Exclude focus on "live sports," and "live music" categories, often pre-planned events broadcast on other channels as well that do not contain user-generated content or are not conducted by a live streamer (Liu et al., 2022). Unlike game live streaming and talent shows, live sports and live music are not always popular or mainstream in live streaming (Hu et al., 2017; Fan & Zhang, 2018). Following the application of these inclusion and exclusion criteria, 133 articles remained for full-text screening.

These inclusion and exclusion criteria were further applied by two authors in the next, full-text reading stage. In this stage, 47 articles were excluded that upon further reading did not meet the key inclusion and exclusion criteria listed above. A resulting sample of 86 articles remained in the dataset after the full text screening stage.

Authors next reviewed references in the 86 articles to ensure a comprehensive process of selection (Rana & Paul, 2017; Vrontis et al., 2021) and found 3 more related articles that suited the context and had not yet been unearthed in the prior search. As Figure 3 shows, 89 articles form the final sample for this systematic literature review. To ensure external validity, the first and second authors reviewed all excluded and included papers at each stage. Disagreements about exclusions and inclusions were then resolved via discussion with the third author (Gupta et al., 2020). Figure 3 shows the entire search strategy and procedural steps.

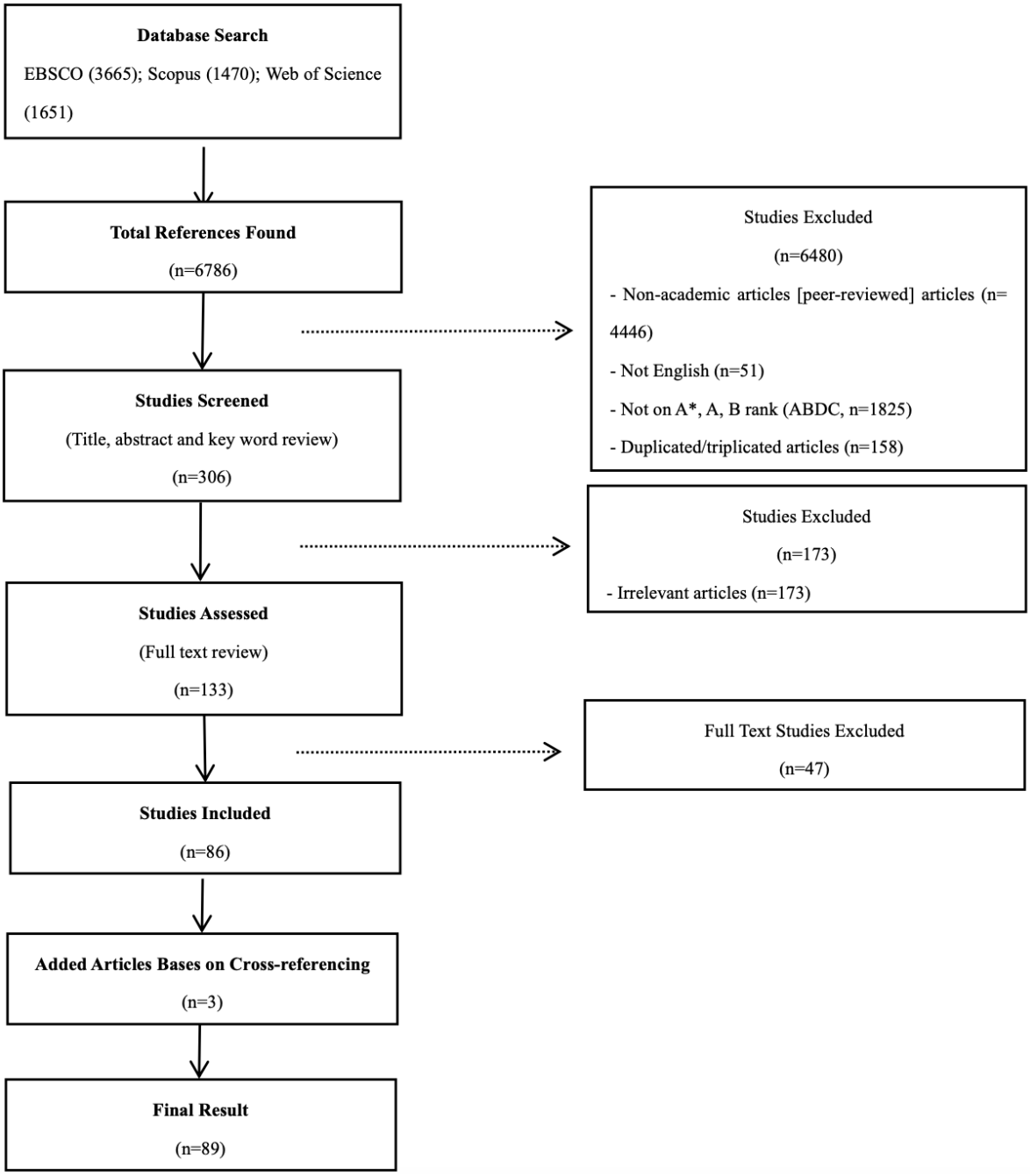

Figure 2.4 Search strategy

2.1.4 Data Extraction and Coding

A data extraction form was created to summarise and synthesise all papers' information. This also effectively reduces human error and presents the process in a replicable manner (Tranfield et al., 2003; Nguyen et al., 2018; Leonidou et al., 2020). To ensure the replicability of the coding process, we followed SPAR-4-SLR (Paul et al., 2021). Each paper was coded based on the following categories: (1) authors, (2) year of publication, (3) journal name, (4) article title, (5) theme (article types and research focus), (6) theory, (7) methodology and data

(qualitative, quantitative, conceptual and primary/secondary data types), (8) variable characteristics (independent variables, mediators, dependent variables, and moderators if mentioned), (9) findings, and (10) future research. A bibliometric analysis was conducted to give a general overview of authorship, year of publication (citations), and publication outlet (journal name).

To ensure agreement and reliability, the fifth theme category was open-coded and discussed by the author team (Paul et al., 2021a; Paul and Criado, 2020). In particular, reliability emerged in a coding process in which the first- and second- author both coded the papers. Disagreements were discussed over several meetings that were then resolved via conversations with the third author, in an iterative process. We used the key research focus of reviewed articles to categorise them based on (1) deductive themes and (2) inductive themes for those papers that did not fit into such a-priori codes. Thematic descriptive statements were then assigned to each article in the review, and initial themes were drawn from these (Gupta et al., 2020). The first and second authors discussed coding for both theme types, and any disagreements were again resolved via discussion with the third author (as in Gupta et al., 2020). In addition, theory, theme, methodology, and variables characteristics are in line with the TCCM framework, which provides in-depth analysis for this review (Lim et al., 2021; Paul et al., 2021a; Roy Bhattacharjee et al., 2022).

2.3 General Overview

2.3.1 Descriptive Analysis

The descriptive analysis charts the trajectory and timeline of live streaming scholarship. This is a fast-growing field of study, burgeoning alongside the development of live streaming technology. The first article was published in 2017. Although live streaming first appeared in 2011, the release of the first live streaming app "Meerkat" (in 2015) and the emergence of shopping live streaming (e.g., Mogujie, Taobao, and JD) in 2016 helped it become more attractive to viewers and businesses alike. With the appearance of “Lipstick King” Austin Li and “Queen of Live streaming” Viya Huang, live streaming commerce developed explosively in 2019 and into the isolation of the pandemic years (Chen et al., 2020a).

As shown in Figure 2.5, during the first three years of this scholarship from our sample of reviewed papers (2017-2019), there was a limited number of live streaming studies and only one solely focused on live streaming commerce (n=11; 12.4%). However, from 2020 to 2022,

the total number in the review's sample increased by 78, constituting 87.6% of the sample. Of the total 89 articles, 50 articles (56.2%) focus on live streaming while 39 articles (43.8%) emphasise live streaming commerce. Research into the commercial impact of live streaming is thus emerging rapidly in line with the development of related industries (game, online shopping, tourism).

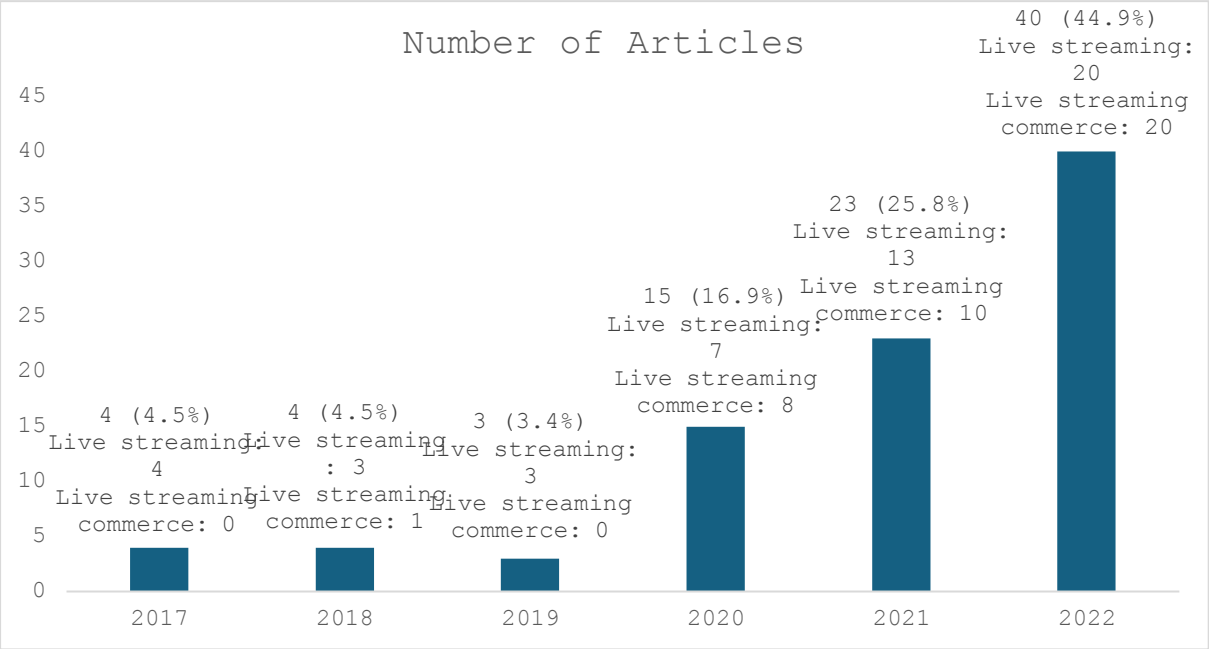

Figure 2.5 Year of publication

Scholarship on the commercial impacts of live streaming has also grown across a wide number of fields in information management, business and marketing. Based on the field of research as defined by the ABDC journal list, more than half of selected articles belong to the fields of information systems (n=45; 50.6%), followed by marketing (n=27; 30.3%), tourism (n=14; 15.7%) and management (n=3; 3.4%). Table 2.1 presents details about the research fields and journals in the review sample. It shows that these journals are early pioneers in commercial live streaming research and studies are relatively interdisciplinary, with more focus on information-related and human-computer studies. Of note, the marketing research field accounts for only 27 (30.3%) articles in total on commercial live streaming. Thus, this table also reveals a dire need for focused work on the psychology of live streaming consumers. Another key need is to understand how to utilise live streaming as a marketing and business strategy.

Research Field	Journal	No. of Article	Studies
Information Systems	Computers in Human Behavior	8	Sjöblom and Hamari (2017) [citation 620]; Hilvert-Bruce et al. (2018) [citation 518]; Hu et al. (2017) [citation 371]; Sjöblom et al. (2017) [citation 184]; Diwanji et al. (2020); Lim et al. (2020) [citation 148]; Sjöblom et al. (2019) [citation 160]; Zhang et al. (2022a)
Marketing	Journal of Retailing and Consumer Services	8	Guo et al. (2022); Kim and Kim (2022); Li et al. (2021b); Meng et al. (2021); Park and Lin (2020) [citation 228]; Tong et al. (2022); Wang et al. (2022a); Zheng et al. (2022)
Information Systems	Internet Research	7	Chen et al. (2022b); Chen et al. (2020b); Guo et al. (2021); Hou et al. (2020) [citation 136]; Hu and Chaudhry (2020) [citation 170]; Törhönen et al. (2020); Wang (2019);
Information Systems	International Journal of Human-Computer Interaction	5	Li and Peng (2021); Long and Tefertiller (2020); Meng-Lewis et al. (2022); Xu et al. (2021c); Zhang et al. (2022d)
Information Systems	Electronic Commerce Research	4	Church (2022); Fletcher and Gbadamosi (2022); He and Jin (2022); Lyu et al. (2022)
Information Systems	Information and Management	4	Li et al. (2021a); Lu and Chen (2021); Wan et al. (2017) [citation 154] ; Xue et al. (2020);
Marketing	Journal of Business Research	3	Lo et al. (2022); Ma et al. (2022); Wongkitrungrueng and Assarut (2020) [citation 415]
Marketing	Service Industries Journal	3	Clement Addo et al. (2021); Zhang et al. (2020a) [citation 140]; Zhang et al. (2022b)
Tourism	Information Technology & Tourism	3	Deng et al. (2021); Huertas (2018); Zhang et al. (2022c)
Information Systems	Behaviour and Information Technology	2	Chen et al. (2022a); He et al. (2022)

Information Systems	Decision Support Systems	2	Fei et al. (2021); Wang et al. (2022b)
Information Systems	International Journal of Information Management	2	Kang et al. (2021) [citation 158]; Xu et al. (2021b)
Information Systems	Journal of Electronic Commerce Research	2	Lo and Tseng (2021); Xu et al. (2020) [citation 143]
Marketing	European Journal of Marketing	2	Ang et al. (2018); Zhou et al. (2022)
Tourism	Asia Pacific Journal of Marketing and Logistics	2	Wang et al. (2022d); Yu and Zheng (2022)
Tourism	Asia Pacific Journal of Tourism Research	2	Lin et al. (2022); Ye et al. (2022)
Tourism	Tourism Management	2	Deng et al. (2022); Xie et al. (2022)
Tourism	Tourism Management Perspectives	2	Liu et al. (2022c); Xu et al. (2021a)
Information Systems	Computer Supported Cooperative Work	1	Freeman and Wohn (2020)
Information Systems	Electronic Markets	1	Church and Thambusamy (2022)
Information Systems	European Journal of Information Systems	1	Bründl et al. (2022)
Information Systems	Industrial Management & Data Systems	1	Geng et al. (2020)
Information Systems	Information Systems Journal	1	Guan et al. (2022)
Information Systems	Journal of the Association for Information Systems	1	Zhao et al. (2021)
Information Systems	Journal of Computer Information Systems	1	Hu et al. (2022)
Information Systems	Online Information Review	1	Lin et al. (2021a)
Information Systems	Information Communication and Society	1	Jodén and Strandell (2021)
Management	Communication Monographs	1	Leith (2021)
Management	Journal of Service Management	1	Giertz et al. (2022)

Management	Technological Forecasting and Social Change	1	Chang and Lee (2022)
Marketing	Communication & Sport	1	Xu et al. (2022)
Marketing	International Journal of Strategic Communication	1	Woodcock and Johnson (2019b)
Marketing	Journal of Consumer Behaviour	1	Wu et al. (2022)
Marketing	Journal of Marketing Communications	1	Chen (2021)
Marketing	Journal of Marketing Management	1	Wongkitrungrueng et al. (2020) [citation 136]
Marketing	Journal of Marketing Research	1	Lin et al. (2021b)
Marketing	Journal of Research in Interactive Marketing	1	Todd and Melancon (2018) [citation 104]
Marketing	Journal of Services Marketing	1	Zhang et al. (2021)
Marketing	Marketing Science	1	Lu et al. (2021)
Marketing	Psychology and Marketing	1	Yoganathan et al. (2021)
Marketing	Young Consumers	1	Zhong et al. (2022)
Tourism	International Journal of Hospitality Management	1	Shen et al. (2022)
Tourism	Journal of Travel & Tourism Marketing	1	Lv et al. (2022)
Tourism	Tourism Review	1	Li et al. (2022)
Note: Only citation counts above 100 are noted in the table.			

Table 2.1 Research fields and journal titles

Citation count is also an important metric because it shows the influence of previous studies and recent research orientations (Lu et al., 2016; Hao et al, 2021). Table 1 shows all articles with citations above 100 in Google Scholar. Importantly, the seminal works emerge as articles that have citations of more than 100, which include Sjöblom and Hamari (2017), Sjöblom et al. (2017), Hu et al. (2017), Wan et al. (2017), Hilvert-Bruce et al. (2018), Todd and Melancon (2018); Sjöblom et al. (2019); Hou et al. (2020); Wongkitrungrueng and Assarut

(2020), Wongkitrungrueng et al. (2020); Park and Lin (2020), Hu and Chaudhry (2020), Lim et al. (2020), Kang et al. (2021); Zhang et al. (2020) and Xu et al. (2020). Considering these papers are all published within the past 5 years, these citation numbers show the dual tendency of both the recent nature of and broader attention in live streaming studies. Since much of this review shows research comes from different research fields, live streaming motivations and interactions are generalizable and interdisciplinary.

2.3.2 Overview of Research Focus

Table 2.2 presents the general overview of live streaming and live streaming commerce research. The table explores research trends and important theories in the literature. We use the research focus of reviewed articles to categorise them based on deductive themes drawn from a-priori schemes (Blumenthal-Barby & Burroughs, 2012; Cadario & Chandon, 2019).

First, research about streamers' motivations is limited and mainly focused on live streaming. There are few insights into why streamers broadcast and create content, for instance. This is especially of interest given the different situations in live streaming commerce, from fixed brand and multi-brand shopping live streaming (Zhang et al., 2022a). Existing research tends to focus on uncovering viewer motivations (Hilvert-Bruce et al., 2018; Sjöblom & Hamari, 2017), customer engagement (Wongkitrungrueng & Assarut, 2020, Guo et al., 2021), and consumption intentions (Chen et al., 2022a; Chen et al., 2022b; Guan et al., 2022).

Some scholars also make use of live streaming strategy as a focus. This can help when examining different sales approaches used in live streaming commerce and exploring the commercial value of live streaming (Geng et al., 2020; Wongkitrungrueng et al., 2020). Live streaming literature tends to utilise self-determination theory (SDT) to explain streamer motivations and uses and gratification theory (UGT) to understand viewer motivations. The stimulus-organism-response (SOR) model is relatively prevalent in live streaming studies that focus on commerce, compared with its usage in more general live streaming scholarship. Trust transfer theory is also used in live streaming commerce to learn about the connection between trust in streamer, community, and products. These theories have been empirically tested in live streaming research and serve as theoretical foundations, which are discussed in the following sections as part of the TCCM framework.

	2017 - Now Live streaming	**2020 - Now** **Live streaming commerce**

	Research Focus	**Studies**	**Research Focus**	**Studies**
Streamer	1. Streamers' motivations on broadcast/keep broadcasting intention in live streaming.	Total: 5 e.g., Li et al. (2022); Lin et al. (2021a); Wang (2019)	N/A	N/A
	2. Streamers' contents creation intention in live streaming.	Total: 2 e.g., Törhönen et al. (2020); Deng et al. (2021)		
Viewer	**Research Focus**	**Studies**	**Research Focus**	**Studies**
	1. Viewers' motivations on live streaming usage intention (e.g., watch/search intention)	Total: 10 e.g., Hou et al. (2020); Hu et al. (2017); Sjöblom and Hamari (2017); Meng-Lewis et al. (2022)	1. Viewer's motivations on live streaming commerce usage intention (e.g., watch/search intention)	Total: 5 e.g., Ang et al. (2018); Guo et al. (2022); Zhang et al. (2022a)
	2. Viewers' live streaming engagement	Total: 15 e.g., Lin et al. (2021b); Xu et al. (2021b); Lim et al. (2020); Bründl, et al. (2022)	2. Viewer's live streaming commerce engagement	Total: 10 e.g., Guo et al. (2021); Hu and Chaudhry (2020); Wongkitrungrueng, and Assarut (2020)
	3. Viewers' gifting/tipping/donation/virtual gift purchasing behaviour (to streamer)	Total: 15 e.g., Chen (2021); Guan et al. (2022); Lin et al. (2021b); Hu et al. (2022); He et al. (2022)	3. Viewer's purchase intention (impulsively)	Total: 26 e.g., Chen et al. (2022a); Chen et al. (2022b); Fei et al. (2021); Tong et al. (2022); Shen et al. (2022); Lv et al. (2022)
	4. Gender differences in using live streaming	Total: 3 e.g., Freeman and Wohn Donghe (2020);	4. Using live streaming/streamer as	Total: 6 e.g., Geng et al. (2020); Wang et al.

		Long and Tefertiller (2020); Todd and Melancon (2018)	a marketing strategy/tool	(2022d); Wongkitrungrueng et al. (2020); Zhang et al. (2022b)
Types	Game live streaming; Talent show live streaming; Tourism live streaming, etc.		Shopping live streaming (shopping with real-time communication)	
Main theories	Self-determination theory (SDT) Uses and gratification (UGT)		Trust transfer theory	
	Stimulus-organism-response model (SOR)			
Note: The numbers of this table refer to 89 articles that we selected for systematic literature review, and some articles may contain more than once.				

Table 2.2 Research focus of live streaming and live streaming commerce

2.4 TCCM Framework Analysis

2.4.1 Theories

Several main theories are used in live streaming and live streaming commerce to study different motivation and interaction factors. These theories have framed research investigations and led to divergent variables and foci for the set of 89 papers in the review sample. Table 2.3 presents the overview of theories that have been used as the theoretical framework in the existing literature.

Theory	**Studies (%)**	**Examples**
Stimulus-Organism-Response (SOR) model	15 (16.9%)	Chen et al. (2022b); Hu and Chaudhry (2020); Kang et al. (2021); Xu et al. (2020); Xu et al. (2021b); Lo et al. (2022); Tong et al. (2022)
Uses and gratification theory (UGT)	11 (12.4%)	Guan et al. (2022); Hilvert-Bruce et al. (2018); Hou et al. (2020); Sjöblom and Hamari (2017); Sjöblom et al. (2017); Zheng et al. (2022)
Affordance theory	5 (5.6%)	Church and Thambusamy. (2022); Deng et al. (2021); Wang et al. (2022b)
Parasocial interaction theory	5 (5.6%)	Chen (2021); Leith (2021); Shen et al. (2022)

Self-determination theory (SDT)	4 (4.5%)	Giertz et al. (2022); Törhönen et al. (2020)
Trust transfer theory	4 (4.5%)	Guo et al. (2021); Wongkitrungrueng and Assarut (2020)
Attachment theory	3 (3.4%)	Li and Peng (2021); Li et al. (2021b)
Social-technical approach	3 (3.4%)	Li et al. (2021b); Wan et al. (2017); Zhang et al. (2022a)
Flow theory	2 (2.2%)	Guan et al. (2022); Li and Peng (2021)
Other theories (e.g., Media richness theory, Source credibility theory, Self-congruence theory, Social identity theory, Social presence theory, Affordance theory; Elaboration likelihood model etc.)	47 (52.8%)	Chen et al. (2022a); Deng et al. (2022); Hu et al. (2017); Park and Lin (2020); Sjöblom et al. (2019); Wan et al. (2017); Xu et al. (2022); Zhang et al. (2022d)
No specific theory	10 (7.5%)	Clement Addo et al. (2021); Wang (2010)
Note: Total number is over 89 because some articles use multiple theories, for example, Chang and Lee (2022), Guan et al. (2022), Li and Peng (2021), Wongkitrungrueng and Assarut (2020), Deng et al. (2022), Zheng et al. (2022) etc.		

Table 2.3 Summary of theoretical foundations

2.4.1.1 Self-determination Theory (SDT)

Self-determination theory (SDT) helps frame an understanding of streamers' intrinsic and extrinsic motivations that influence broadcasting intentions (Zhao et al., 2018; Törhönen et al., 2020; Lin et al., 2021a). The theory suggests that intrinsic motivations stem from fulfilling basic psychological needs, such as competence, autonomy, and connectiveness (Deci and Ryan, 2000). These motivations can be further characterised as a mix of cognitive seeking, affective enjoyment, desire for self-expression, and relaxation (Amabile et al., 1994; Törhönen et al., 2020; Zhao et al., 2018). More specifically, Lin et al. (2021a) empirically showed that streamers are motivated by these internal preferences and desires, which positively influence their broadcasting intentions.

Extrinsic motivation is usually accompanied with intrinsic motivation to encourage behaviours (Deci & Ryan, 1985; Lin et al., 2021a). Extrinsic motivation relates to the benefits brought by live streaming, for instance, pursuing increased income and reputation, extra social benefits, and more feedback (Lin et al., 2021a; Törhönen et al., 2020; Zhao et al., 2018). In particular, a streamer who is highly successful is likely to have an extensive following and increased income. This occurs as retailers and marketers seek to engage more with streamers to get their products into market (Zhang et al., 2022a). Importantly, whether such benefits as income and fame are achieved as expected or not, yield a clear source of extrinsic motivation that encourages streamer content creation.

2.4.1.2 Uses and Gratification Theory (UGT)

As one of the foundational theories in media and communication, uses and gratifications explains how people choose different media to meet their psychological needs (Hilvert-Bruce et al., 2018; Rubin, 2009; Sjöblom & Hamari, 2017). Scholars ground into this theory to explore viewers' motivations in using live streaming (e.g., entertainment, social bonding and connection) and in live streaming commerce (shopping). Sjöblom and Hamari (2017) examined five gratifications in using gaming platform Twitch. These include affective, cognitive, social/personal integrative, and tension release. Cognitive gratifications are related to information and knowledge acquisition, and affective and tension releases are associated with Twitch's use as an entertainment platform (Sjöblom & Hamari, 2017; Hou et al., 2020; West & Turner, 2010). Entertainment and information quality are normally the clearest motivations for using media (Choi et al., 2013; Kim et al., 2011; Chang & Lee, 2022).

But live streaming is vastly different from previous media and communication types because of its real-time, highly synchronous interaction. In this way, Hilvert-Bruce et al. (2018) reveal that motivations for users of live streaming services are driven by social and community needs. This includes social interaction, sense of community, and social support (Guan et al., 2022), which is represented by the social integrative perspective (Hou et al., 2020).

2.4.1.3 Stimulus-Organism-Response (SOR) Model

Mehrabian and Russell (1974) introduced the stimulus-organism-response, or SOR, model to provide a comprehensive overview of the cognitive and affective states (O) that follow exposure to environmental stimuli (S) and occur before individuals respond (R) (Zhang & Benyoucef, 2016). As one of the most influential frameworks in environmental psychology

(Yadav & Chakrabarti, 2022), the SOR model remains popular in consumer behaviour studies (Xu et al., 2020; Chan et al., 2017; Eroglu., 2003).

Table 2.3 shows that the SOR model is the most used framework in this review's sample of papers. This is because the SOR model drives consideration of details about antecedents, internal processes, and commercial results. That also makes it a key theoretical framework for the study of live streaming interactions, stimuli, and responses. SOR provides an overarching framework that allows multiple theories to be applied simultaneously. For example, Li and Peng (2021) examined the mediating roles of flow and attachment as two internal status changes under the SOR model. Wongkitrungrueng and Assarut (2020) further demonstrate trust transfer under the SOR framework to unpack the antecedents and responses of consumer's trust in live streaming commerce. In this way, the SOR model's explanatory power suits many contexts in which scholars seek to analyse the relationship among environmental originating factors, internal cognitive and affective states, and final outcomes.

2.4.1.4 Parasocial Interaction Theory

Parasocial interaction and relationships are the mostly one-sided feelings of friendship and intimacy with a media persona experienced by a frequent media user. They serve as a bridge to connect streamers and viewers (Horton & Wohl, 1956; Dibble et al., 2016; Xu et al., 2020). Based on long-term parasocial interaction, parasocial relationships are built between streamers and viewers (Horton & Wohl, 1956; Leith, 2021; Quan et al., 2020). In parasocial interactions, media users typically experience a one-sided sense of kinship and intimacy with a media persona (Horton & Wohl, 1956; Turner, 1993). Yet this can evolve into a deeper relationship when a media persona responds to user comments, feedback and ideas (Leith, 2021; Klimmt et al., 2006). For example, sending a virtual gift or tip to a streamer during broadcasting feeds into the parasocial interaction and relationship (Chen, 2021) that serves as a stimulus and encouragement for the streamer themselves.

The creation of new content by a streamer feed into the parasocial relationship with the viewer, and the cycle repeats in feedback loops. Streamers will know their audience better and be more informed about what to reveal and broadcast because of this, while viewers will have more opportunities to build and promote their connections with the streamer (Lueck, 2015; Lee and Jang, 2013; Leith, 2021). That forms a key feature of the SOR framework of live streaming users' (streamer and viewer) motivations and interactions, as a reciprocal determinism and dependency forms via the parasocial relationship established by the feedback loop of live streaming.

2.4.1.5 Trust Transfer Theory

In live streaming commerce, trust transfer theory is used as researchers seek to unravel the antecedents and consequences of trust and the relationship between cognitive trust (e.g., trust in platform, trust in products) and affective trust (e.g., trust in streamer, trust in community members; Zhang & Benyoucef, 2016; Wongkitrungrueng & Assarut, 2020; Guo et al., 2021). Cognitive trust is driven by knowledge, and affective trust is based on a sense of security and perceived closeness of relationships (Johnson & Grayson, 2005). In general, cognitive trust can work as a base and positively influence affective trust (Lewis & Weigert, 1985; Johnson & Grayson, 2005). Trust in a product is normally affected by the product quality and hedonic value, while trust in a streamer depends on the social bond or affiliation among the community (Chen et al., 2022a; Wongkitrungrueng & Assarut, 2020). Previous research reveals a two-way interaction between trust in product and trust in streamer (Chen et al., 2022a; Wongkitrungrueng & Assarut, 2020; Guo et al., 2021). The effects of trust in streamer on trust in products can also be explained by trust transfer theory.

2.4.1.6 Other Theories

It is worth noting that many studies pulled insights from concepts other than the prevalent theories discussed above (see Table 2.3). Social-based theory, for instance, social presence (Chen et al., 2020a; Geng et al., 2020; Zhang et al. 2022d) and social identity (Diwanji et al., 2020; Hu et al., 2017) theories are often used to examine how an individual's identification and social interaction operate in online community (Hu et al., 2017; Geng et al., 2020). In addition, technology-focused theories, such as affordance theory and media richness, are applied when the research involves technical environments and how they impact users' interactions and motivations (Deng et al., 2022; Chang & Lee, 2022; Sjöblom et al., 2019; Sun et al., 2019). However, social and technical factors are normally overlapped with each other tightly to provide real-time interaction.

In the socio-technical system, cooperation between social and technical enablers is essential to positive outcomes (Appelbaum, 1997). The social-technical approach in online virtual communities can help diagnose the social and technical enablers. These enabling forces can trigger different psychological processes, and lead to engagement and purchase intention (Zhang et al., 2022a; Wan et al., 2017; Li et al., 2021b; Kapoor et al., 2021). Theories that focus on cognitive and affective processes, such as flow theory, have likewise been used to understand flow experiences that can connect streamers and viewers, enabled via IT-related

factors, and viewer's gifting/tipping/purchase intentions (Guan et al., 2022; Li & Peng, 2021). This is often accompanied by attachment theory to further test the structure of viewers' stickiness and loyalty responses in live streaming and live streaming commerce (Kim & Kim, 2022; Li and Peng, 2021; Li et al., 2021b). The use of these smaller theories in the reviewed papers shows the tip of the iceberg for other frameworks and perspectives to yield more insight into the processes that create commercial impact in live streaming. Yet at the present stage, table 2.3 shows the theory bases doing the heaviest lifting in live streaming research.

2.4.2 Context

Figure 2.6 shows shopping (n=36; 40.4%) and gaming (n=24; 27%) are the primary categories for current studies, which represent the online retail and game industries respectively. Twitch (n=18; 20.2%) and Taobao (n=13; 14.6%) emerge as the most-studied platforms. Twitch was the first platform to launch video game streaming in 2011 and now is widely popular, with an average 2.84 million concurrent viewers worth more than $2.3 billion market value in 2020 (Diwanji et al., 2020; Iqbal, 2021). In online retail, the Taobao shopping platform in China shares the biggest portion because Taobao live has become an essential tool rather than an option or preference for online retailers (Chou, 2019; Clement Addo et al., 2021). Figure 5 also shows 15% of studies were conducted with multiple types of live streaming categories that mix topics such as gaming and personal sharing, many with no indication of a given platform under study. The rest (18%) in this review sample stemmed from popular live streaming categories, for example, social (e.g., daily life sharing, chatting, etc.), entertainment, travel and talent show (Hu et al., 2017; Deng et al., 2021; Deng et al., 2022; Ma et al., 2022). To draw a comprehensive picture in live streaming, more scholarship must focus on these inconspicuous but equally important categories and platforms.

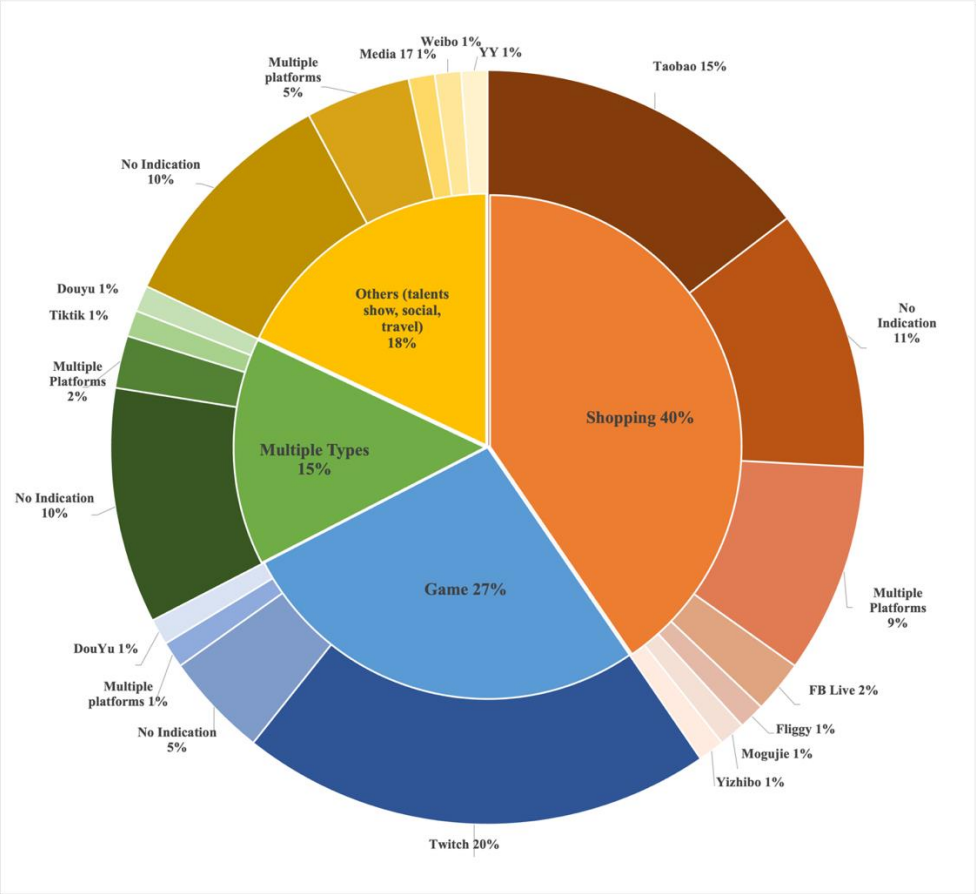

Figure 2.6 Live streaming categories and platforms

Results of the systematic review also show a wide disparity in geographic focus for live streaming research. This leaves findings fragmented by geographic regions. This is especially the case as authors in Asia explore live streaming commerce more deeply, but it remains underexplored in Western contexts. As Figure 2.7 illustrates, the vast majority of research is centred in Asia, with studies focused on mainland China (n=53; 59.6%) taking the most share. However, most research with "no indication" countries focus on Twitch and use the data from Twitch itself (e.g., Sjöblom et al., 2019; Woodcock and Johnson, 2019b; Diwanji et al., 2020), thus it is hard to determine the country context under study. Twitch is at present banned in mainland China, so studies that use Twitch as their target platform could have a Western background. Extant research focuses overwhelmingly on live streaming in Asia, as contexts including mainland China (n=53; 59.6%), Taiwan (n=4; 4.5%), Thailand (n=2; 2.2%), South Korea (n=2; 2.2%) and Malaysia (n=1; 1.1%), show far more representation in our review sample than Western countries (e.g., 21 no indication countries; U.S.A: n=2; 2.2%, U.K.: n=1; 1.1%,), which uncovers a clear gap in terms of geographic coverage. Both Figure 2.6 and Figure 2.7 reveal that more research is needed on viewer-streamer interaction in live streaming

commerce in Western backgrounds because Western live streaming commerce platform, such as Amazon live and Youtube live, are currently underexplored.

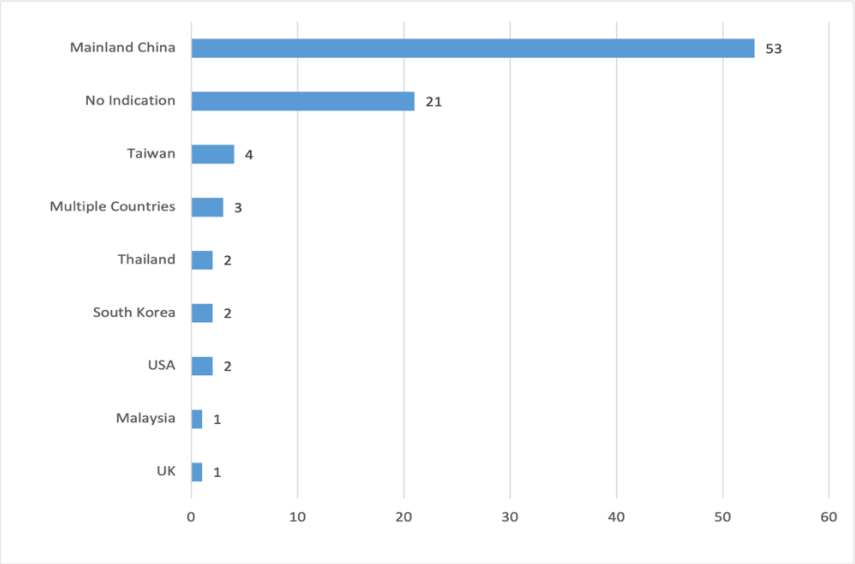

Figure 2.7 Sample countries/areas

2.4.3 Characteristics

This section next discusses the key independent, mediating and dependent variables studied in live streaming and live streaming commerce research and the relationships that were tested to explain phenomenon among these variables.

Previous research shows the SOR framework is a comprehensive model of how external factors can influence individual's internal states and then lead to final responses (Yadav & Chakrabarti, 2022; Buxbaum, 2016; Vieira, 2013). In general, this emerges with stimulus as the independent variable, organism as the mediator, and response as the dependent variable to constitute a basic consumer behaviour model (Mehrabian & Russell, 1974; Yadav & Chakrabarti, 2022; Billore & Anisimova, 2021; Goi et al., 2018; Spies et al., 1997; Turley & Milliman, 2000).

2.4.3.1 Independent Variables

Independent variables are the stimuli or environmental cues that trigger individuals into action (Mehrabian & Russell, 1974) and can be categorised as marketing and platform stimuli (Chan et al., 2017). In total 71.9% of the papers sampled included marketing and platform stimuli as independent variables, as shown in Table 2.4. Importantly, the variables listed are not exhaustive but rather are representative of the most common variables to appear in the sampled 89 papers. Note the addition of "C" to variables that have been studied in live

streaming commerce, which shows divergence in scholarly approaches and room for live streaming scholars to adopt key variables from work on live streaming commerce. Environmental factors that operate as independent variables are the external stimuli within the live streaming platform which can impact streamer and viewer interactions. These include ambient, design, and social elements, such as the instant feedback feature (to allow for synchronicity), sounds, and entertainment aspects. In terms of design (both functional and aesthetic) this includes organisation of the platform, the speed of the interactions, the signs used in the background, the information richness of the platform (media richness), and merchandise presentation.

From the streamer's perspective, marketing stimuli focus on external individual benefits such as monetary rewards, career goals, and skill development. These are likewise independent variables used most often to study streamers' motivations in live streaming (Chen, 2021; Törhönen et al., 2020; Bründl & Hess, 2016). As for viewers, 23 (25.8%) articles examine marketing stimuli related variables. Marketing stimuli include the cues that marketers use to enhance consumers' attention, engagement, and purchase intention (Chopdar & Balakrishnan, 2020), such as source characteristics (e.g., expertise, trustworthiness, attractiveness, professionalism, and authenticity), content appeal (e.g., human appeal, sex appeal) and financial attributes. Several papers in the review examined the influence of such variables on responses directly or indirectly in live streaming (Xu et al., 2021b; Li & Peng, 2021; Hu & Chaudhry, 2020). However, scholarship on live streaming commerce is limited as it relates to source characteristic variables and fails to examine the impact of other marketing stimuli related variables, for example, content appeal and content presentation style (Giertz et al., 2022; Hou et al., 2020). Live streaming combines various activities and content generation with real-time interaction via virtual face-to-face technology, which can also promote interaction among the online community and meet consumers' needs in live streaming commerce (Wang, 2019; Zhang et al., 2022a; Xu et al., 2020).

Compared with marketing stimuli, platform stimuli variables attract more scholarly attention. Platform stimuli represent the cues of online environment that individuals will experience during usage (Eroglu et al., 2001; Peng & Kim, 2014), which emerge in the form of live streaming benefits, features and affordance. Live streaming benefits are the advantages that live streaming can bring to users. Live streaming affordance refers to the technologies that live streaming use to lead individuals have certain behaviours, while features show the unique attributes that live streaming highlights (Deng et al., 2021; Sun et al., 2019; Volkoff & Strong, 2013). Social interaction (viewer-viewer, streamer-viewer) is the most used independent

variable. It can equally influence streamers' content creation behaviours and can fulfil their intrinsic needs (Törhönen et al., 2020) alongside viewer engagement and purchase intention. That's because social interaction influences the flow experience, perceived value, and attachment in both live streaming and live streaming commerce (Kim & Kim, 2022; Li et al., 2021b; Xue et al., 2020; Chen & Lin, 2018). This trait of live interaction among participants is a dividing line that renders live streaming different from more asynchronous social media. Live streaming commerce research examines the impacts of important platform stimuli variables, such as interactivity, synchronicity, information quality, and entertainment.

Several papers in the review show stimuli can have direct influence on responses (Hu & Chaudhry, 2020; Park & Lin, 2020). For example, Hou et al. (2020) showed that humour and sex appeal (IV) can trigger watching and consumption intention (DV) separately in live streaming, most likely because humour appeal can meet one's desire for enjoyment and relaxation (Spielmann, 2014) and sex appeal can trigger viewers' positive attitudes towards live streaming (Reichert et al., 2001). In this way, positive attitudes can serve as mediators in future studies to test. What's more, social bonds and structural bonds as platform stimuli related independent variables are tested to have both direct and indirect effects on consumer engagement (Hu & Chaudhry, 2020). However, most platform variables stem from technology or online environment-based benefits and features. That means their influence on responses is likely to be mediated via the psychological processes, such as whether these benefits can meet viewers' needs, and what kind of experience viewers will have by using these technology tools (Hilvert-Bruce et al., 2018; Li & Peng, 2021; Sun et al., 2019; Deng et al., 2022).

Summary of independent variables			**Total: 64**
Categories (streamer)	**Factors**	**Variables**	**Studies (%)**
Marketing Stimuli	Personal benefits	Monetary rewards/Income; Reputation; Career development; Skill development	2 (2.2%)
Platform stimuli	Live streaming benefits	Entertainment	1 (1.1%)
	Live streaming affordance	IT affordance	1 (1.1%)
	Live streaming features	Social interaction	2 (2.2%)

Others	Cognitive or Affective status work as independent variables	Altruism; Big five personality traits; Enjoyment; Information sharing; Locus of control; Perceived behavioural control; Perceived Facial attractiveness; Relaxation; Self-expression	3 (4.9%)
Categories (viewer)	**Factors**	**Variables**	**Studies (%)**
Marketing Stimuli	Source/Content features	Broadcaster appeal; Broadcaster emotion; Broadcaster performance; Cultural characteristics; Community-focused communication; Content-focused communication; Humour appeal; Live streaming strategy (C); Sex appeal; Source characteristics (C); Streamer skills; Vicarious expression (C); Wanghong/ live content-product congruence (C)	23 (25.8%)
	Financial attributes	Financial bonds (C); Price discount (C)	2 (2.2%)
Platform stimuli	Live streaming benefits	Entertainment (C); External support; Meeting new people; Psychical presence (C); Social bonds (C); Social presence (C); Social support; Sociability; Structural bonds (C); Tension release	13 (14.6%)
	Live streaming affordance	Active control; Media richness; Medium appeal; Interactivity (C); IT affordance (Media, Spatial, Temporal, Meta-voicing, Access); Synchronicity (C); Telepresence; Visual complexity (C)	18 (20.2%)
	Live streaming features	Co-experience; Competitiveness; Gamification; Information quality (C); Mutuality (C); Personalization (C); Social cues (C); Social interaction (C); Social status display	23 (25.8%)

Others	Cognitive or Affective status work as independent variables	Brand commitment (C); Class identity; Emotional engagement; Expectation; Information seeking; Materialism; Perceived control (C); Perceived product knowledge of streamers (C); Perceived product quality (C); Perceived usefulness (C); Perceived value (C); Price perception (C); Relational identity; Sense of community; Self-congruence (C); Value congruence; Trust in products/ community members/ streamers (C); Social Contagion (C); Value similarity (C)	18 (20.2%)
Note: "(C)" means that these variables have also been studied in live streaming commerce. Some articles may apply multiple variables in their studies.			

Table 2.4 Summary of independent variables

2.4.3.2 Mediators

Almost half the reviewed articles (n=44; 49.4%) used mediators in their research (see Table 2.5). Table 2.5 is representative, though not exhaustive, and shows the most common mediators. Self-determination theory, to a great extent, also explains how intrinsic and extrinsic motivations as mediators operate between independent variables and dependent variables (Zhao et al., 2018; Törhönen et al., 2020; Lin et al., 2021a). That is also why studies focused on streamers tend to only involve the path from independent to dependent variable, because they put the streamers' influences, such as information sharing, self-expression, and perceived behavioural control as antecedents or elements of intrinsic and extrinsic motivations (e.g., Törhönen et al., 2020; Lin et al., 2021a). Thus, the review mainly focuses on viewer's cognitive and affective status as mediators here. Our review reveals that existing studies use more affective status-related mediators than using cognition-related mediators. Community affect-based mediators (n= 20; 22.5%) and self-oriented cognition-based mediators (n=11; 12.4%) are the most popular categories.

Cognitive reactions include the mental processes concerned with acquiring, processing, maintaining, and retrieving information (Eroglu et al., 2001; Li & Peng, 2021). Social cognition involves different internal processes that can help individuals take advantage of being a social group member (Frith, 2008), which can lead to final responses, such as engagement and consumption behaviours (Diwanji et al., 2020; Xu et al., 2020). However, little research (n=4;

4.5%) focuses on applying community-based cognition as a mediator in live streaming commerce. Social cognition exists alongside individual cognition. Individual-level change in cognitions can reflect individual evaluative perceptions, self-oriented cognition, and cognitive trust (De Jaegher et al., 2010), which are closely connected with social interaction, source characteristics and information quality (Chen & Lin, 2018; Guan et al., 2022; Kim & Kim, 2022; Xu et al., 2020). Previous studies that applied evaluation perceptions as mediators (e.g., perceived value, perceived risk, and perceived uncertainty) tended to orient their effects on engagement and purchase intention in the context of live streaming commerce (Lu & Chen, 2021; Xue et al., 2020; Zhang et al., 2020a). Compared with social cognition-based mediators, individual cognition-based mediators (n=24; 27%) are adopted as a basis by more researchers, showing a clear need for further research on social cognition as a mediator that underlies viewer actions in live streaming.

Affective reactions-based mediators refer to emotional responses, such as attachment, trust, and arousal (Chen et al., 2022a; Xu et al., 2021b). Emotions based on relationships among streamers, viewers, and the community are tightly connected with real-time social interaction and source characteristics, which then influence stickiness or endurance of a given exchange and, ultimately, consumption intention (Hu et al., 2017; Li & Peng, 2021). What's more, community-triggered emotions (e.g., attachment, identification, and trust) have been studied and applied in live streaming commerce more than personal emotions (e.g., arousal, pleasantness).

Chan et al. (2017) found a close relationship between cognitive and affective reactions of viewers. For example, Li and Peng (2021) analysed autonomy-relatedness-competence needs in live streaming and found that flow experience has a positive effect on attachment. In addition, the two-way interaction between cognitive trust (trust in products) and affective trust (trust in streamers, trust in community members) can be explained by trust transfer theory (Chen et al., 2022a; Wongkitrungrueng & Assarut, 2020; Guo et al., 2021). These internal experiences that result from a viewer's exposure to live streaming stimuli are a vital link to responses that are key for marketing outcomes, such as social media engagement and purchase decisions.

Internal experiences can serve as independent variables, especially when researchers apply uses and gratification theory (Hilvert-Bruce et al., 2018; Chen et al., 2020a), as shown in Table 2.4. Although UGT and the SOR models start from different points, they both uncover key antecedents of behavioural responses. This review documents key variables that can be treated in studies as independent variables or mediators, depending on the research question

and manipulations employed in future research. For example, different streamer types might yield differential trust via diverging source characteristics and then lead to purchase.

Summary of mediators			**Total: 44**
Categories (viewer)	**Factors**	**Variables**	**Studies (%)**
Social cognition	Community cognition	Cognitive assimilation (C); Copresence; Sense of belongingness; Sense of community	4 (4.5%)
Individual cognition	Evaluative perceptions	Attitude (C); Perceived risk (C); Perceived uncertainty (C); Perceived usefulness (C); Perceived value (C)	8 (9%)
	Self-oriented cognition	Brand identification (C); Flow experience; Impulsive buying urge (C), Cognitive involvement; Self-enhancement; Status-seeking; Visual attention (C)	11 (12.4%)
	Cognitive trust	Trust in channels; Trust in products (C)	5 (5.6%)
Social affect	Community	Admiration; Affective commitment to broadcaster(C); Affective commitment to platform/channel (C); Attachment to the platform (C); Attachment to the streamer (C); Followership (C); Identification with broadcaster (C); Identification with group (C); Proximity to the streamer; Psychological distance (C); Swift guanxi (C); Tie strength (C)	20 (22.5%)
	Affective trust	Trust in streamers (C)	6 (6.7%)
Individual affect	Personal emotions	Arousal (C); Positive affections (enjoyment, pleasant, satisfaction) (C); Immersion	11 (12.4%)
Others	External stimuli work as mediators	Source characteristics (C)	1 (1.1%)
Note: "(C)" means that these variables have also been studied in live streaming commerce. Some articles may apply multiple variables in their studies.			

Table 2.5 Summary of mediators

2.4.3.3 Dependent Variables

After experiencing and meeting internal and external motivations, streamers tend to generate the final responses as shown in Table 2.6, which emerge as dependent variables in previous studies (Deng et al., 2021; Lin et al., 2021b; Törhönen et al., 2020). These responses, at the same time, will be the carriers or mediums that subsequently create environment stimuli and influence viewers' behaviours. To be specific, a streamer's engagement is more focused on broadcasting intention to perform real-time interaction with viewers, which raises streamer involvement in the live streaming community. Meanwhile, content creation requires producing attractive and highly related content as the priority. Content created in live streaming is prominent because it provides a new collaborative co-creation environment that is based on real-time interaction between streamers and viewers (Giertz et al., 2022; Hollebeek et al., 2019), as well as viewers and viewers.

In other words, streamers provide the content framework, while the interactions between streamer-viewer and viewer-viewer help to complete and enrichen the content in live streaming. Streamers connect with viewers directly and make sales in live streaming commerce. This means understanding who these streamers are, and their motivations, are critical for marketers and businesses to properly employ live streaming strategies.

Responses such as usage intention (n=14, 15.7%), customer engagement (n=13; 14.6%), consumption intention (n=27; 30.3%), and gifting or tipping behaviours (n=10; 11.2%) are commonly used as the dependent variables from the viewers' side (Giertz et al., 2022; Hou et al., 2021; Hu et al., 2017; Zhang et al., 2022a; Chen et al., 2022b; Fei et al., 2021; Wongkitrungrueng & Assarut, 2020; Lo & Tseng, 2021; Zhang et al., 2021). Engagement occurs when individuals invest enough physical and mental energy to meet their needs of seeking information, socialization, and entertainment (Ruggiero, 2000; Yu et al., 2018). Consumption behaviour is represented by gifting and tipping behaviour and purchase intention in live streaming. Prior work has discovered a link between engagement and gifting/tipping behaviour (Yu et al., 2018), as well as a favourable relationship between engagement and purchase (Sun et al., 2019; Clement Addo et al., 2021). Psychological states (mediators) such as attachment and trust are more likely to emerge as a result of high-level real-time contact (independent variables, such synchronicity and social interaction), which will lead to engagement and stickiness (Guo et al., 2021; Li et al., 2021b). These mental experiences can mediate and promote engagement, which leads to consumption intention (Chen & Xu, 2019; Blasco-Arcas et al., 2014; Clement Addo et al., 2021).

These responses from a viewer are not the endpoint and sole outcome of live streaming interaction. Instead, they loop back into stimuli (IV) that motivate streamers' content creation and engagement. For example, subscriptions, gifting, tipping and virtual gifts purchased with real money by viewers constitute revenue for streamers (Wang, 2019; Lin et al., 2021a). This revenue then becomes stimuli (e.g., monetary rewards as IV) for streamers to further encourage them to broadcast and create content (Chen, 2021; Törhönen et al., 2020). Streamers need to keep broadcasting and creating attractive content to ensure their influence on viewers (Lin et al., 2021a; Woodcock & Johnson, 2019a, b), and viewer-streamer-viewer parasocial interactions and relationships are strengthened during this repeated cycle of broadcasting, tipping and gifting (Chen, 2021).

Summary of dependent variables			**Total:64**
Categories (streamer)	**Factors**	**Variables**	**Studies (%)**
Usage behaviours	Engagement	Broadcasting intention; Performativity	3 (3.4%)
	Content creation	Average time invested weekly on content creation; Intention to continue video content creation; Storytelling	2 (2.2%)
Categories (viewer)	**Factors**	**Variables**	**Studies (%)**
Usage behaviours	Usage intentions	Search intention; Subscribe intention; Continuous (watching/use) intention (C)	14 (15.7%)
	Engagement	Customer engagement (C); Customer acquisition (C)	13 (14.6%)
	Loyalty	Loyalty; Stickiness (C); Commitment (C)	6 (6.7%)
	Sharing	Social Sharing (C)	1 (1.1%)
Consumption behaviours	Consumption intention	Hedonic consumption (C); Impulsive consumption (C); Purchase intention (C); Willingness to pay more (C)	27 (30.3%)
	Gifting/tipping behaviour	Donation/Gifting intention; Gifting; Tipping; One-off contributions	10 (11.2%)
Note: "(C)" means that these variables have also been studied in live streaming commerce. Some articles may apply multiple variables in their studies			

Table 2.6 Summary of dependent variables

2.4.4 Methodology

Table 2.7 presents the data collection approaches and analysis tools in the review's sample. First, empirical studies (n=85; 95.5%) comprise a larger research focus than theoretical articles (n=4; 4.5%). This shows one clear gap in scholarship around the impact of live streaming on consumers and streamers, as there is a lack of conceptual work that is essential to the development of the field, such as literature review and new theory development (MacInnis, 2011; Vrontis et al., 2021; Woodcock & Johnson, 2019b).

Among the empirical studies, most of the published work focuses on quantitative research methods (n=63; 70.8%) and uses online survey techniques (n=47; 52.8%) to collect data, compared with only 9 articles (10.1%) that use experiments and 7 articles (7.9%) that rely on other methods (e.g., cross-section study, text mining, and online observation). Qualitative methods, such as in-depth interviews, netnography, and focus groups, are applied in 13 studies (14.7%), while 9 articles (10.1%) use mixed-methods that involve both qualitative and quantitative research methods. More longitudinal studies will be warranted to validate and extend the proposed models in current research (Xu et al., 2021b; Hilvert-Bruce et al., 2018; Lim et al., 2020).

In terms of data analysis approaches, structural equation model is the most prevalent analysis tools under online survey methods, whether it is covariance/variance-based (n=9; 10.1%) or partial least squares structural equation modelling (PLS-SEM) (n=18; 20.2%). The other common tools are confirmatory factor analysis (n=12; 13.5%) and regression analysis (n=9; 10.1%). It is worth mentioning that netnography as a new qualitative method can suit online communities and social media when applied in a rigorous manner (Kozinets, 2002; Roy Bhattacharjee et al., 2022). Many researchers also used multiple analysis tools to help render their analysis more generalizable and reduce unnecessary common method biases (Podsakoff et al., 2003; Chen et al., 2021).

Approaches & Analysis methods	**Studies (%)**	**Study examples**
Quantitative research	**63 (70.8%)**	
Online survey	**47 (52.8%)**	
Partial least squares structural equation modelling (PLS-SEM)	18	Guo et al. (2021); Sjöblom et al. (2017); Törhönen et al. (2020); Wongkitrungrueng and Assarut (2020); Lo and Tseng (2021); Lo et al. (2022)
Confirmatory factor analysis	12	Kim and Kim (2022); Li and Peng (2021); Meng et al. (2021); Lim et al. (2020)

Regression analysis	9	Hilvert-Bruce et al. (2018); Xu et al. (2021b)
Structural model analysis (variance based)	9	Hu et al. (2017); Kim and Kim (2022); Li et al. (2021b); Lim et al. (2020)
Principal components factor analysis	2	Long and Tefertiller (2020); Wan et al. (2017)
Exploratory factor analysis	1	Zhang et al. (2021)
T-test	1	Todd and Melancon (2018)
Experiment	**9 (10.1%)**	Ang et al. (2018); Fei et al. (2021)
Others (cross-sectional study, text mining, online observation, LIWC)	**7 (7.9%)**	Geng et al. (2020); Clement Addo et al. (2021); Lin et al. (2021b); Zhao et al. (2021)
Qualitative research	**13 (14.7%)**	
Netnography	6	Jodén and Strandell (2021); Sjöblom et al. (2019); Wang (2019); Woodcock and Johnson (2019b)
In-depth interview	3	Li et al. (2022); Woodcock and Johnson (2019b); Freeman and Wohn (2020)
Semi-structure interview	2	Hu et al. (2022); Zhang et al. (2022b)
Focus group	2	Huertas (2018); Yoganathan et al. (2021)
Chatlogs with Linguistic Query and Word Count (LIWC)	1	Leith (2021)
Mixed methods	**9 (10.1%)**	
Grounded research + online survey	2	Wang et al. (2022b); Wang et al. (2022d)
In-depth interview + online survey	2	Hou et al. (2021); Xu et al. (2021b)
In-depth interview + participatory observations	1	Chen (2021)
Chatlogs with Linguistic Query and Word Countsecondary (LIWC) + secondary qualitative analysis	1	Diwanji et al. (2020)
Case study + online survey	1	Meng-Lewis et al. (2022)

Principal component analysis + multi-grounded theory approach	1	Wongkitrungrueng et al. (2020)
Video data analysis + survey	1	Xie et al. (2022)
Scale development	**2 (2.2%)**	Chen et al. (2020a); Liu et al. (2022c)
Literature review	**2 (2.2%)**	Deng et al. (2021); Lin et al. (2022)
Note: Some articles use multiple analysis methods, for example, Kim and Kim (2022), Lim et al. (2020), Xu et al. (2020), etc.		

Table 2.7 Research approaches and analysis methods

2.5 Conceptual Framework

We draw from our characteristic and theory analysis to synthesise an integrative framework of the state of streamer-viewer interactions. The goal of our model is to integrate key scholarly perspectives from the review to describe the structure of findings and to highlight important factors that retailers, marketers and businesses might consider from both the streamers and viewers' perspective. Figure 2.8 shows the model, which integrates perspectives to show how environmental factors (e.g., live streaming affordances, source characteristics) within the live streaming platform, internal experience of viewers and streamers (e.g., flow experience, attachment, trust), and commercial responses (e.g., engagement, tipping, purchasing) operate as an outcome of live streaming interaction. As an original conceptual framework, the dual SOR model combines streamer and viewer insights together and shows the complete interaction and motivation loop. We categorise these factors into different groups based on their features, such as marketing or platform stimuli and cognition and affect status with both social and individual aspects. This figure serves as a summary of the theory and characteristics analysis above, as well as the launchpad for discussion of a future research agenda that emerges from the systematic literature review.

The figure walks through the process starting with streamers in the upper-left corner. Streamers are first exposed to marketing and platform stimuli such as career opportunities and viewers' virtual gifts or tips that stimulate further live streaming performances (S), alter individual cognitions about streaming (O), and ultimately lead streamers to responses (R) such as continued engagement or creation of streaming content. Then, viewers likewise face various stimuli (S) brought by streamer and platform, before experiencing changes on an internal level (O) that lead to responses (R) from usage behaviours like greater engagement to consumption

behaviours. Meanwhile, this loop is strengthened and maintained by the parasocial interaction and long-term parasocial relationship that can be formed.

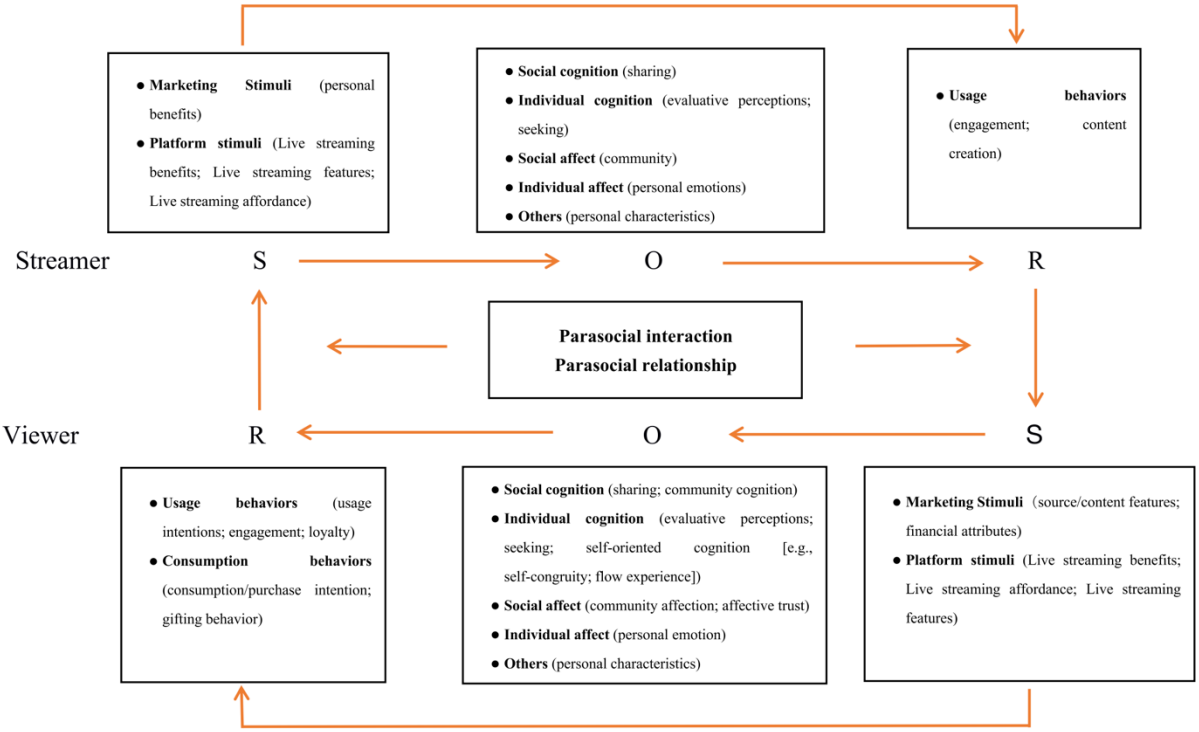

Figure 2.8 Integrated dual SOR model of streamer-viewer interactions and motivations

As a pioneer streamer, “Lao Luo” Luo Yonghao was first stimulated by the career development and monetary rewards in shopping live streaming on TikTok (S). Then he experienced internal processes that helped him meet his needs (e.g., self-expression, sharing information, enjoyment) (O). This drives his ultimate broadcast intention as he responds (R) by seeking to sell more technology-related products and plans for future content creation. Viewers then watch the streamer by the affordances of platform (S), such as synchronous communication. This form of communication allows viewers to become involved via real-time interaction as “Lao Luo” responds live to questions and ideas from viewers. This platform stimulus influences the viewer’s individual cognition (O), as the evaluative perceptions of a certain product presented during the live streaming are triggered, which encourages the viewer to purchase (R). The more viewers purchase the goods “Lao Luo” shows as he streams, the more the streamer himself is stimulated, which forms a reciprocal feedback loop. Participating in that loop allows the community among “Lao Luo” and his viewers to become strengthened after time.

Compared with UGT that mainly focuses on motivations for media usage, this SOR model describes a more complete process of what live streaming provides how people are

involved (internal processes), and the results (responses). This dual SOR model also explores how streamers and viewers interact and their internal experiences based on computer technologies (e.g., Meta-voicing; Synchronicity), that is, computer mediated human-human interaction (Chen et al., 2020c; Fei et al., 2021; Li and Peng, 2021; Xue et al., 2020; Zhang et al., 2022a). We present this model as both integrative summary and driver of future work. In the following section, we use this dual SOR model to analyse gaps in key characteristics in extant literature and outline a set of research plans for the field.

2.6 Future Research Agenda

This systematic literature review summarises the ongoing, dynamic interactions among streamer-to-viewer, viewer-to-streamer, and viewer-to-viewer in live streaming. As a result, the review highlights factors that increase streamers and viewers' motivations to engage in live streaming and live streaming commerce. Yet further research is needed in key areas as existing studies are relatively limited. For example, research about live streaming commerce is confined mostly to Asian settings that adopted technology first, but cultural differences in live streaming adoption and behaviour make Western settings an important context for testing generalization of extant results. This section unpacks and charts directions for future live streaming studies from three aspects: theory, context, and methodology (Paul et al., 2017; Lim et al., 2021; Vrontis et al., 2021). Table 2.8 presents a summary of possible future directions for live streaming and live streaming commerce studies.

Future research agenda		
Theory	Theory extension	• Find the missing parts in existing theories, such as uses and gratification theory (UGT), parasocial interaction, self-determination theory (SDT) and trust transfer theory to further update them into the new real-time era. • Use more social cognitive theory, social contagion theory and information processing theories to explain streamer and viewer's emotions and responses.
	Influencer types	• Compare the differences between streamers who endorse their own products and those who endorse other brands. • Investigate different streamer types (e.g., by size: nano-streamer, micro-streamer, macro-streamer, mega-streamer; by types: key opinion leader (KOL), grassroots/small seller, celebrity, online celebrity) and examine whether they trigger different responses and the underlying mechanisms.

		• Investigate the virtual streamer and animal streamer, and their probable boundary conditions for success.
	New relationship and factors	• Examine possible new connections among existing factors. • Explore additional antecedents (e.g., need of uniqueness, streamer communication skills, personality), moderators (interaction level among the community, live streaming experience), and responses (e.g., impulsive purchase).
	Live streaming strategy	• Explore the usage of live streaming in helping the development of the multi-channel and omni-channel, as well as the revolution from multi- to omni-channel.
Context	Cultural comparison	• Use Hofstede's cultural dimensions and high/low context cultures to understand the diversity and inclusion of live streaming commerce in different culture backgrounds. • Expand geographical coverage among the world, especially in Western context, with more studies on live streaming commerce.
	LVS categories focus	• Comparison studies among different live streaming categories to demonstrate the influence of different streaming contents. • Comparing the function of online community in live streaming and live streaming commerce. • Give more focus on live streaming types (e.g., unboxing, eating streaming) other than shopping and game.
	Platform focus	• Compare (1) using live streaming in e-commerce platforms (e.g., Taobao, Amazon), (2) using live streaming in social media platforms (e.g., Facebook, Youtube), and (3) live streaming platforms (e.g., Twitch, Tiktok) to demonstrate whether there are existing differences in consumers' watching and purchasing intention, if so, why these happen. • Pay attention to TikTok as it's a growing platforms for live streaming • Test findings of research on more live streaming platforms other than Taobao and Twitch (e.g., Facebook live, Huya live, and Youtube live) • Investigate whether different live streaming platform experiences result in different preferences of products/service choices. • Study the differences between static platforms (picture), dynamic platforms (short videos), and real-time interaction platform (live streaming) on consumers' responses towards the contents and influencers.

Methodology	• Conduct more qualitative studies • Conduct more mixed-method research • Adopt longitudinal research designs • Conduct experiments to control live stream content and test viewer reactions • Use more network data mining and LIWC • Sample consumers from multiple sources, beyond panel databases from one specific platform and/or university students.
Post-Covid Study	• Study the development of live streaming after Covid-19, and compare the usage/consumption behaviours pre, during and post Covid-19.

Table 2.8 Summary of possible future research directions

2.6.1 Theory Extension

Existing live streaming research, as evidenced in the sample, primarily focuses on the perspective of viewers. More studies are needed from the streamers' perspective (Li et al., 2021a). The differences between streamers who endorse their own products and those who endorse other brands might also yield a clearer line for factors that yield retail disruption via live streaming commerce (e.g., Chen et al., 2022a). Celebrity endorsement literature has long shown different effects for endorsement of own-brands or for sponsorship of other brands in traditional social media (Jin, 2018; Jin & Ryu, 2019). Whether those findings still apply in live streaming needs further exploration.

Previous research also differentiates influencers via types (nano-, micro-, macro-, and mega-streamers) based on viewer sizes (Hudders et al., 2020; Diwanji et al., 2020; Campbell and Farrell, 2020). Streamers have also been categorised as key opinion leader (KOL) and online celebrities based on their levels of expertise and/or connection to a specific audience (Guo et al., 2021). Streamers who evolve different format types should influence viewers' trust and behaviours differently (Guo et al., 2021; Diwanji et al., 2020). For example, online celebrities who make a living off their image are not as efficient as KOLs at effecting immediate purchase, though online celebrities impact engagement (Geng et al., 2019; Park & Lin, 2020). Future research could examine how channel sizes or streamer types can affect consumer behaviour. Understanding streamer appeal and possible boundary effects are vital for both researchers and marketers to better understand and use live streaming (Appel et al., 2020; Vrontis et al., 2021).

This review provides a wide range of interaction and motivation factors from the TCCM analysis. However, variables are often just tested once and lack generalization. This includes content appeal (Hou et al., 2020), telepresence (Lim et al., 2020), and trust in channels/platforms (Chen et al., 2020b), which reflects the disjointedness of extant studies (Zhang & Benyoucef, 2016). Our review is the first attempt to summarise and classify the most meaningful factors in live streaming. Our goal is to guide future directions in two ways: scholars should (1) probe for interaction effects and (2) explore other factors beyond those shown in Figure 7. Source characteristics might, for instance, act as a new factor that influences perceived enjoyment in live streaming commerce and thus greater impulse buying (Lee & Chen, 2021). Following the arrow indicated by these directions can offer marketers suggestions for how to run a live streaming campaign or event, and which factors to focus on, when.

Chiefly, the authors propose a theoretical extension for live streaming interactions in Figure 2.8 that links stimulus-organism-response theory (SOR) to parasocial interaction. We describe this interpretation of the review's data sample and findings, yet at present this theoretical extension lacks empirical support. Does parasocial interaction connect responses to stimuli for streamers? Does parasocial interaction connect responses to stimuli for viewers? What factors are missing that drive outcomes for each set of streamers and/or viewers? Future empirical work is needed to verify the pathways that link SOR elements and that link streamers and viewers via parasocial motivations and processes.

A key oversight in application of self-determination theory (SDT) is scholarship focused on studying consumers' intrinsic and extrinsic motivations, rather than just focusing on the streamer. Use of SDT as a theory base in live streaming is relatively new due to the synchronous and extremely high interaction among users (Qian et al., 2022). Yet future work must explore whether there is any difference between live streaming and asynchronous social media in fulfilling consumers' intrinsic and extrinsic needs and how meeting such needs in this way might strengthen or weaken ultimate behaviour. This is an important avenue for future work as findings can help marketers and brands adopt the best way to get in touch with their users.

In addition, uses and gratifications (UGT) is a common theory base, but it is not yet applied in live streaming commerce directly. Cai and Wohn (2019) rely on UGT to understand viewers' motivations but do not address why need for community fails to drive results in live streaming commerce. Is a theory centred on uses and gratifications only relevant to media choice and not important for final tipping and purchase behaviour? Scholars may want to extend a consideration of how users gain functionality and benefits from live streaming

platforms to understand commercial impact as well. Future research could combine self-determination and uses and gratification to better explore the possible antecedents, viewer's actual intrinsic and extrinsic motivations, and their responses in live streaming commerce. Moreover, as one of the most common theories, we suggest scholars can also apply the trust transfer relationship among brand, platform, channel, and scene setting with the existing streamer, community members, and product.

In a similar vein, information processing theories such as Elaboration Likelihood (i.e., Chen et al., 2022a) have been underutilised in examining responses to streamers and how streamers build engagement with viewers. Superficial responses may suit and be a good fit for hedonic or low-involvement products as presented by streamers, but deep processing of the message and arguments by the streamer and viewer promotes greater uptake of streamer recommendations. This is especially true for higher-cost, higher-involvement products and services such as holidays and luxury purchases. These tantalizing prospects have not been well verified or tested among streamers and their viewers, or between viewers via community factors (Gao et al., 2021) with the possible exception of Chen et al. (2022a).

Finally, future research cannot ignore the use of live streaming and its commercial impact. Multi-channel efforts can help reach consumers in different channels while omni-channel processes can provide seamless experiences for consumers in pre-, during, and post-purchase process (Zhang et al., 2010; Verhoef et al., 2015). Live streaming, as a necessary online marketing tool, can be an effective part of multi-channel outreach (Xue & Liu, 2022; Gong et al., 2022). Many e-commerce platforms that provide live streaming functions, such as Taobao, JD, and Amazon, also provides tools such as one-click purchase. Tools such as these integrate omni-channel efforts into the commercial effects of live streaming. Future studies should examine what role is played by live streaming in omni-channel and how it can progress retail from multi-channel to omni-channel.

2.6.2 Context

In this systematic review, shopping and gaming emerge as two main live streaming types. Since motivation for engaging with and watching different types of live streaming may differ, this can lead to differing behaviour. In live streaming commerce, viewers with shopping goals tend to be more easily stimulated by source characteristics and real-time interaction. That then influences consumer trust for products, platforms, or even streamers (Chen et al., 2022a; Guo et al., 2021), which for many influences purchase rates. In gaming live streaming, the

motivation to watch tends more often to stem from personal entertainment and eventually yield behavioural loyalty, through the flow experience (Li & Peng, 2021; Chen and Lin, 2018). Though some psychological differences exist, some motivations (e.g., arousal, affective commitment, attachment) emerge in all types of live streaming, and behaviour can emerge around consumption outcomes as well as continuing to watch live streaming. In this way, comparison studies among different live streaming categories are necessary to demonstrate the influence of different streaming content (Hu et al., 2017; Jodén & Strandell, 2021). For example, the effects of community are anticipated to differ in shopping, game, and other live streaming categories. Prior research found that sense of community is vital in live streaming while less important in live streaming commerce (Cai & Wohn, 2019; Bründl & Hess, 2016), but trust in community members does have positive effects on live streaming commerce engagement (Guo et al, 2021). Unpacking the power of community in live streaming and live streaming commerce can reveal more of the impact of viewer-viewer interaction among the online community, not only limited to interactions with streamers.

Current studies are overly dependent on China. There is serious polarization between Asian and Western countries as Asian countries focus more on live streaming commerce as opposed to live streaming gaming. Live streaming developed much faster and gained more popularity in China (Lu et al., 2018), which rendered China a suitable background for scholarship on live streaming and live streaming commerce. Well-developed e-commerce and s-commerce in China aided the adoption of live streaming commerce in the consumer market as online shopping formed a natural habit for many Chinese shoppers (Zhou et al., 2021). Yet this also leaves open the need for cultural comparison because of cultural differences in live streaming engagement and consumption (Hilvert-Bruce et al., 2018; Li & Peng, 2021; Lin et al., 2021b; Oh et al., 2020). Comparing culture differences using Hofstede's five cultural dimensions (Hofstede, 1997; Hofstede, 2001), high/low context cultures (Guan et al., 2022; Kim et al., 1998; Richardson and Smith, 2007), and individualism/collectivism dimensions (Singelis et al., 1995; Triandis and Gelfand, 1998), can be some ways to test the generalization of extant studies and find how different interaction and motivation factors work under the influence of different cultural backgrounds. Oh et al. (2020), for instance, found cultural differences related to use of personal pronouns and affective words between Korean and English live streaming users. Interestingly, Korean viewers who share collectivistic cultures preferred to use "I" and more affective words, while English users higher in individualism were more likely to rely on the collective "we" in live streaming. This runs counter to and challenges

longstanding prior findings (DeAndrea et al., 2010). Research such as this could help platforms, businesses and streamers design content and lead appropriate community discussion.

In addition, the gap existing in live streaming platforms makes it hard to conduct cross-cultural studies because such platforms as Twitch, Youtube live, and Facebook live are banned in mainland China, while Amazon is not yet as developed and convenient as Taobao's one-click service. TikTok, known as Douyin in China, can be used as future research target as TikTok attracts more than 1 billion active users across the globe (Anderson, 2021). Importantly, TikTok provides shopping, gaming, and social live streaming at the same time, which makes it possible for researchers to carry out cross-cultural studies, from emerging countries to developed countries, by using one app available worldwide.

2.6.3 Methodology Expansion

Most extant studies on live streaming interactions rely on quantitative research methods, such as survey, descriptive data and experiment. However, the lack of qualitative research may hinder the appearance and development of new theories. Live streaming especially with commerce applications has become appointment viewing with receptive interaction partners who meet together at the same time and same virtual "place." In this way, live streaming differs from earlier forms of social media via static photo posting and pre-recorded short videos (Ang et al., 2018). Mixed-method research is needed to reduce general method bias and provide an in-depth understanding from both subjective and objective perspectives (Zhang and Benyoucef, 2016). Due to the convenience of collecting descriptive information from different live streaming platforms, predictive analytics are recommended to originate new theories, analyse existing data, and perhaps yield predictive assessments (Zhang & Benyoucef, 2016; Shmueli and Koppius, 2011).

There are currently no longitudinal studies on live streaming, mainly because the appearance and development of live streaming is relatively recent. Longitudinal studies can help to identify similarities or differences among live stream users at different time points to further explore key factors identified here, such as how streamer-viewer interaction evolves alongside the development of online community (Jodén & Strandell, 2021), and whether and how motivation factors change over long time (Hilvert et al., 2018). That can help validate and extend extant theoretical models in live streaming studies (Xu et al., 2021b). Moreover, controlled, laboratory-based experiments as the first step to control live streaming content presentation and examine viewer reactions will be key. This is especially important for testing

individual differences in viewer responses, such as culture and cognitive preferences. It is much easier for research to restrict and control the environment to probe for interactions and motivation mechanisms with viewers from different culture backgrounds and with differing cultural self-construal (Zhou et al., 2019; Li et al., 2021a). More use of network data mining and LIWC are also encouraged because these data can reveal objective aspects of live streaming (Li et al., 2021a) and can be used for predictive analysis to support the generation of new theory (Zhang & Benyoucef, 2016; Shmueli & Koppius, 2011).

2.7 Conclusion

Given the vigorous development of live streaming as a commercial minefield, this systematic review tries to tie the existing theories, charts divergences, and scopes potential environmental, internal, and response factors in live streaming. An integrative framework shows how relationships between viewers and streamers stimulates the development of a marketplace exchange and charts clear response patterns.

The work then offers clear sets of implications for marketers and businesses interested in using live streaming as a strategy to target and attract viewers. If a business wants to introduce and promote a new product via live streaming, they should focus on emphasizing factors (e.g., created content, content appeal, and streamer appeal) that trigger interaction among the community led by each streamer. This is because real-time social interaction in live streaming commerce is a key driver, as shown in the sampled papers, which then can influence affective trust to reduce product uncertainty and then lead to viewer's final purchase decision (Lu & Chen, 2021; Zhang et al., 2022a). As live streaming commerce is different from traditional e-commerce and s-commerce, this review reveals which factors are key to conducting live streaming commerce.

2.7.1 Theoretical Implications

This work presents the first systematic literature review on user motivations and interactions in the live streaming social era, documenting the roles of both streamers and viewers in encouraging the growth of live streaming and live streaming commerce. We analyse the theory and characteristics of a sample of extant work to show gaps, room for future research, and rising challenges in scholarship on live streaming processes. We also use the sample of reviewed papers to demonstrate the commercial impact of live streaming from multiple live streaming contexts, including viewer outcomes (engagement and purchase), viewer behaviours

(participation, community and gifting/tipping), and what streamers are motivated to provide (broadcast intention and content creation).

Second, by using the TCCM framework (Paul et al., 2017) and SOR model (Mehrabian & Russell, 1974), we present an original, integrated dual SOR model revealing how factors cohere in live streaming and live streaming commerce to drive the development forward. Drawing on parasocial interaction (Chen, 2021; Leith, 2021), we demonstrate the important role of interaction mechanisms between streamers and viewers. The dual SOR model we develop here is the first attempt to present a comprehensive feedback loop among users (streamers and viewers alike). This provides both theoretical and practical implications to better understand streamer-viewer interactions as a new entity that live streaming is nurturing.

Third, we classify extant factors that influence all users via marketing and platform stimuli, cognitive and affective status, and final responses (virtual gift purchasing or tipping, product purchasing intention). By mainly focusing on the commercial and computer-mediated human-to-human interaction aspects of live streaming, we summarise essential factors that can lead to final engagement and consumption intention. We find studies rely heavily on investigating platform stimuli (live streaming benefits, affordances, and features). There is a lack of virtual community cognitions and personal, emotional mediators in current studies. Existing research is likewise overwhelmingly focused on the viewer and consumer in this work, which means more research is needed to examine the role of streamer engagement in the process.

2.7.2 Practical Implications

This systematic literature review also provides practical suggestions. First, live streaming for commercial impact introduces a different style of user-generated content produced and consumed using real-time interaction (Pires & Simon, 2015; Bründl & Hess, 2016; Giertz et al., 2022). This means previous asynchronous social media experience may not form an effective guidance for businesses and marketers. However, our dual SOR framework (Figure 2.8) demonstrates clearly which factors are vital and how they best function in live streaming and live streaming commerce. These factors can be measured and manipulated directly by practitioners to select streamers and characteristics for their retail, communications and branding efforts. For example, streamer characteristics such as credibility, authenticity, and attractiveness play a vital role in encouraging viewer participation and consumption intention (Woodcock & Johnson, 2019b; Li & Peng, 2021; Chen et al., 2022b). Thus,

businesses can carefully select different streamers to present various characteristics that attract the right kind of viewer's attention, to sell products and increase loyalty as trust in products and trust in streamer is transferred (Guo et al., 2021; Wongkitrungrueng & Assarut, 2020).

Comparisons among different streamer types, such as key opinion leaders (KOLs), online celebrities, and business owners would also help marketers to choose the correct streamer to present their products and deliver their brand image for more effective customer trust building (Guo et al., 2021; Diwanji et al., 2020). KOLs can explain products professionally with their expertise and knowledge in shopping live streaming (Casaló et al.,2020; Leal, 2014), while online celebrities prefer to build close relationships with fans by sharing daily life and interacting with their followers (Liu et al., 2020). In live streaming commerce, if marketers want to promote higher involvement and more high-end products, they should seek a KOL to help answer questions from consumers and seek an online celebrity to trigger impulsive purchasing of lower-involvement products via closeness with followers.

Importantly, not all businesses and business types have yet engaged with live streaming to reach their customers. This review outlines the role and possibilities of live streaming as a commercial medium that connects professional streamers to viewers in an iterative, dynamic and engaging format. From this, we propose that many businesses that fulfil orders via an e-commerce site should consider live streaming as a sales strategy to reach viewers as customers, whether individual consumers or broader clientele in the business-to-business marketplace. Online retailers and businesses can make use of live streaming content and motivations to understand their customers' preferences, influence their decisions, and provide better value via more seamless service. The goal for many businesses that sell via live streaming channels is to make sales and boost customer loyalty, which can help them transfer from multi-channel to omni-channel sales (Ji et al., 2022; Xue & Liu, 2022; Gong et al., 2022).

Yet there are some limitations that should be taken into consideration. Firstly, as in other systematic literature reviews, this review selects peer-reviewed English journal articles. Thus, some important Chinese journal articles and conference papers were excluded but can have meaningful and relevant findings for live streaming studies. Second, we only select for our sample articles that rank highly in ABDC journal lists, which excludes some emergent journals. Third, this review mainly focuses on the common live streaming categories. Future research should examine other types, such as unboxing, education, and sports as well to achieve a more holistic understanding of the impact of all types of live streaming.

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Appendix A (89 selected articles)

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Chapter 3 Manuscript 2: Drowning in Danmaku: The Dual Effects Community Interaction in Live Streaming Commerce

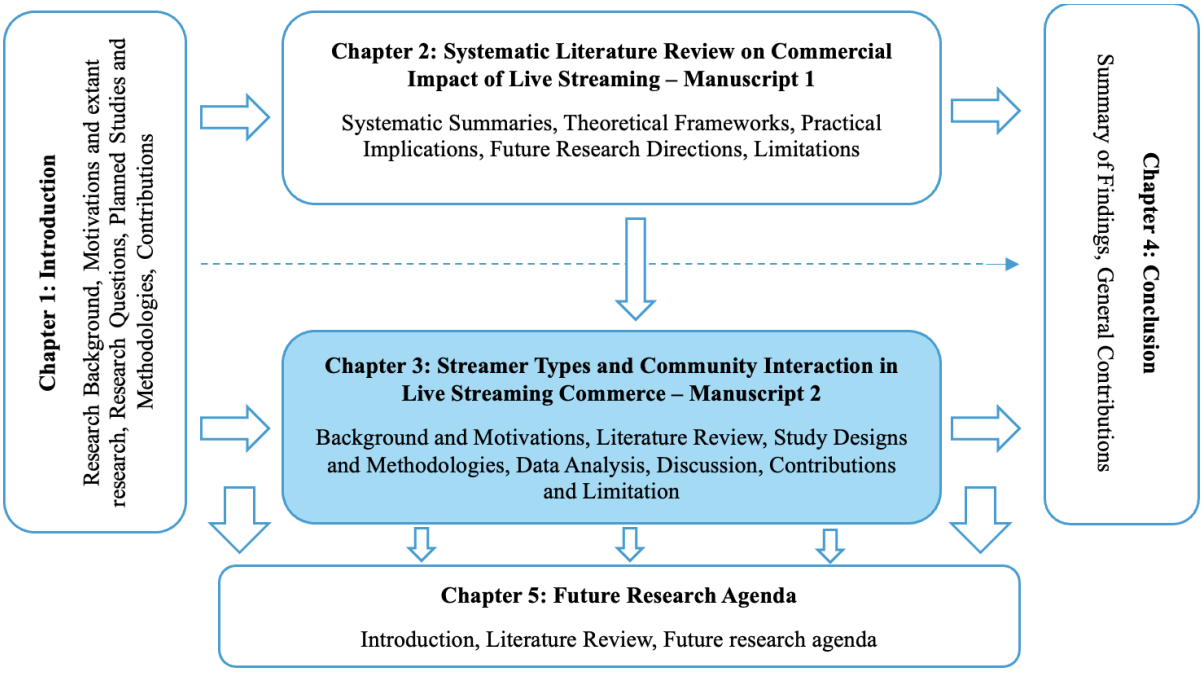

Figure 3.1 Thesis flow chart

The chapters in this thesis collectively explore the evolving horizon of live streaming, with particular emphasis on commercial values and practical use. Chapter 2, as a systematic literature review, reveals the commercial significance of real-time interaction in live streaming by identifying stimuli, internal process, and responses from both streamer and viewer perspectives. This review forms a foundation for understanding the vital role of different antecedents, such as socio-technical features and streamer characteristics, in establishing streamer-viewer connections, enhancing viewer engagement, and leading to final commercial impacts.

Danmaku, or real-time scrolling comments, represents a distinctive form of community interaction in live streaming shopping. Beyond facilitating social presence and immediacy, danmaku actively shapes consumer experiences by amplifying value co-creation through engagement, trust-building, and parasocial relationship (Xu et al., 2023; Qian & Seifried, 2023). At the same time, its rapid pace and high volume can generate cognitive

fatigue, information overload, distraction, and scepticism, leading to value co-destruction (Agnihotri et al., 2024; Zhang et al., 2024a). Despite its central role in shaping live streaming dynamics, danmaku has received limited direct attention in academic research. By focusing specifically on this interactive feature, Chapter 3 next turns to the task and digs into the detailed and diversified roles of streamer types, authenticity, trust and community interaction. Specifically, it explores how to maximise the effectiveness of different streamers by their perceived authenticity. Findings reveal that while community interaction generally strengthens trust, endorsement acceptance, continuance and purchase intention, it can also trigger information sensitivity, especially with macro-streamers. For macro-streamers with a large audience base, this overloaded information sensitivity can reduce the effectiveness of their endorsements and potentially alienate consumers. This finding emphasises a critical balancing act in live streaming. While interactivity is key to foster trust, its unchecked growth may hurt macro-streamers' commercial impact. Together, these papers provide a comprehensive exploration of how real-time interaction functions and influences the efficacy of live-streaming commerce.

Chapter 3 is the second manuscript of this thesis, currently under review in the *Australasian Marketing Journal*. It should be published as: Xu, Y., Kapitan, S., & Phillips, M. (2025). Drowning in danmaku: The double-edged sword of community interaction in live streaming commerce. *Australasian Marketing Journal*, forthcoming.

Drowning in Danmaku: The Dual Effects Community Interaction in Live Streaming Commerce

Abstract:

This study examines the dual effects of co-creation in live streaming commerce by investigating how synchronous community interaction (danmaku), in the form of scrolling comments, questions, gift-sharing, testimonials, and interactions, shape consumer responses. Integrating theories of co-creation, source effects, and information overload, we propose and test a model of how community interaction in streaming can (1) co-create social impact such as trust and (2) build commercial impact such as engagement and purchase intention, but can also lead to co-destruction with excessive danmaku content with (3) social impacts that overwhelm viewers' information sensitivity to lower their trust and (4) distract from the streamers' commercial message to reduce conversion. Findings reveal that macro-streamers (>100,000 followers) directly enhance consumer outcomes. Yet when community chat danmaku becomes excessive, positive effects are attenuated due to information overload and

disrupted viewer immersion, demonstrating a co-destructive effect. In contrast, micro-streamers build consumer trust gradually, and danmaku does not alter their impact. Their influence operates indirectly via trust-based parasocial bonds, reinforcing co-creative engagement. This research offers actionable implications for brands, platforms, and influencers aiming to balance community engagement with message clarity to optimise consumer impact.

Keywords: Live streaming commerce; Co-creation; Co-destruction; Community interaction; Information overload; Online marketing strategy.

3.1 Introduction

Live streaming commerce, characterised by real-time, curated product presentations from streamers, represents a significant advancement in online marketing (Grewal et al., 2022; Chong et al., 2023). A prominent example is China's largest platform, Taobao Live, which has amassed more than 50 billion views. The commercial impact of this format is exemplified by streamer "Lipstick King" Austin Li, who generated 33.62 billion CYN in pre-sale revenue during the 2022 "11.11" festival alone (Xu et al., 2023). Enabled by dynamic, two-way interaction, live streaming commerce emerged as a powerful tool for global marketing communication and sales (Zhao et al., 2024). These platforms facilitate consumer co-creation through real-time chat, digital gifting, commenting, and fan-group activities. A distinctive feature is the use of danmaku, or streaming text overlays ("bullet curtains"), which enhance both social and commercial outcomes.

Research shows that danmaku interactions can build trust, strengthen community ties, and even foster parasocial relationships (Hu et al., 2017; Chen, 2021). Users are willing to send paid gifts and purchase, contributing to a reported $5 billion USD livestreaming commerce industry, while live chat interactions curate relationship building key to optimal sales performance (Lu et al., 2018). However, some studies caution that an exclusive focus on community engagement can reduce financial returns (Giertz et al., 2020; Zhang et al., 2024a). This research aims to investigate when danmaku creates value and when it may disrupt it.

Despite its potential, live streaming commerce is not without challenges. Highly popular streamers can struggle to engage meaningfully with their audience, leading to reduced effectiveness. Consumer decision quality can also be undermined by information churn. Excessive product detail and prolonged viewing durations can result in information overload, ultimately decreasing sales (Zhang et al., 2024a). By 2022, 751 million people in China—

representing 70.3% of online users— had participated in live streaming commerce (CNNIC, 2023). In the U.S., 46% of shoppers attending live selling events made purchases, often influenced by customer testimonials and reviews (McKinsey, 2023; Ratchford et al., 2022). While communal engagement transforms shopping into a vibrant social experience, it also introduces rapid and overwhelming layers of information via danmaku, which may saturate viewers if not effectively managed.

Extant literature has examined how external stimuli (e.g., live streaming features and streamer characteristics) influence consumer responses (Guo et al., 2022), as well as the cognitive and affective processes triggered in viewers (Wongkitrungrueng & Assarut, 2020). Live streaming has developed alongside continuous community interaction (danmaku), where streamers rely on audience responses, comments, questions, gift-sharing, and testimonials, as essential elements of content creation (Xu et al., 2023). Community interaction significantly influences engagement and purchase intentions in both gaming and shopping contexts (Hilvert-Bruce et al., 2018; Fei et al., 2021) and perceived crowdedness in a session can raise perceptions of value (Chong et al., 2023). Yet in commerce-focused live streams, the length and count of interaction texts exhibit an inverted U-shaped relationship with sales outcomes (Zhao et al., 2024; Zhang et al., 2024a). This indicates that the wider implications of dynamic community interaction, particularly its influence on endorsement acceptance, continuance, and purchase intention, remain insufficiently examined, with limited attention given to its relationship with streamer effectiveness and the potential for information overload. This study addresses these gaps by examining whether cumulative danmaku in live streaming commerce contributes to information overload that undermines streamer effectiveness. We explore both social and commercial outcomes, investigating how rapid, large-scale, and poorly managed community interactions affect the efficacy of live streaming commerce. While group engagement can enhance brand perceptions and streamer credibility (He et al., 2023), this research evaluates the threshold at which such interactions become counterproductive.

Drawing on four experiments, this paper examines how streamers navigate pathways to influence consumer responses. Specifically, we investigate the roles of streamer authenticity, community interaction and information sensitivity, with trust as a mediating variable influencing key outcomes such as endorsement acceptance, purchase intention, and continued usage intention. Our findings show that:

1. Popular streamers with large follower count achieve higher levels of trust and consumer outcomes but are adversely affected by excessive community interaction.

2. Smaller streamers can enhance trust and consumer responses despite lower perceived authenticity, while community interaction does not impact their effectiveness.
3. Intensive danmaku activity on macro-streamer channels increases information sensitivity, triggering backlash against popular streamers.

Framing these findings through the lens of value co-creation and co-destruction (Vargo & Lusch, 2008; Echeverri & Skålén, 2011), we reveal how community interaction via danmaku operates via a dual effects model in live streaming commerce. When appropriately moderated, such interactions can foster co-created value by enhancing social outcomes (increased trust) and commercial outcomes (higher endorsement acceptance and purchase intention). These effects are particularly salient for macro-streamers, where authenticity and high follower counts facilitate trust, which in turn mediates positive commercial responses. However, when danmaku becomes excessive or poorly managed, it increases information sensitivity (Zhang et al., 2024a), a form of cognitive overload that undermines trust. This reflects a process of co-destruction, whereby excessive participation and unregulated community input reduce the efficacy of streamers in live streaming commerce. Here, the social outcomes of co-destruction include reduced trust and perceived authenticity, while commercial outcomes of co-destruction include lower endorsement acceptance and weakened purchase intention among viewers.

In contrast, micro-streamers benefit from a different dynamic. Even with relatively lower perceived authenticity, they can co-create trust and commercial outcomes in the absence of disruptive community interaction. For them, community input appears neutral rather than co-destructive, suggesting a threshold effect tied to streamer scale and audience expectation.

Overall, this research identifies boundary conditions for value co-creation and co-destruction in live streaming commerce. By mapping the roles of streamer type, authenticity, trust, and information sensitivity, we demonstrate how these mechanisms jointly produce or erode value for viewers and platforms. This study contributes to the literature on online influencer and marketing in live streaming commerce by demonstrating how practitioners can strategically calibrate community engagement to sustain value co-creation and avoid value co-destruction. The following sections review the relevant literature and present our hypotheses, followed by four experimental studies, their results, and interpretations. We conclude with a general discussion and outline the theoretical and managerial implications of our findings.

3.2 Literature Review and Hypothesis Development

3.2.1 Co-creation and Co-destruction

Under service-dominant logic (S-D logic), consumers are no longer passive recipients but active collaborators in shaping products and brand experiences (Vargo & Lusch, 2004; Tajvidi et al., 2020). This collaborative process, known as value co-creation, empowers consumers to influence both product development and brand identity through shared engagement and mutual benefit (Prahalad & Ramaswamy, 2004). Live streaming commerce amplifies this dynamic by enabling real-time content creation and interaction, reinforcing key co-creation elements such as collaborative decision-making and reciprocal value exchange (Wang et al., 2024a). Co-creation outcomes are driven by active participation and the strategic use of resources to foster beneficial interactions among stakeholders (Jain et al., 2024; Cheung et al., 2020). In contrast, value co-destruction arises when resources are misused either intentionally or unintentionally, or when interactions are poorly coordinated, resulting in diminished value for one or more parties (Wang et al., 2024a). Value is thus contingent on the alignment of participants, content, and context (Plé, 2016).

The dual effects of co-creation in live streaming commerce, where co-creation can both enhance and undermine consumer experiences, are increasingly becoming recognised in emerging empirical work across marketing, services, and digital commerce literature. These dual effects yield both social (relational, community, trust) and commercial (purchase, endorsement, continuance on the stream or platform) outcomes. Co-creation fosters trust and enhances purchase intentions, with macro-streamers gaining more from these interactions due to their professional delivery (Li & Peng, 2021b; Zhang et al., 2024b). However, it can also lead to overconsumption or impulsive buying driven by flow states (Lee & Wan, 2023). To retain followers, some micro-streamers may compromise content quality and adopt people-pleasing behaviours (Tan et al., 2020; Song et al., 2025).

On the other hand, co-destruction often results in cognitive overload and decision fatigue, prompting viewers to disengage (Zhang et al., 2024a; Zhao et al., 2024). Toxic comments can harm streamers' mental health but may also generate viral attention. For example, in 2018, Twitch famous macro-streamer Pokimane faced a surge of harassment after a clip of her without makeup went viral, unintentionally sparking a movement of solidarity among female streamers (Partis, 2018).

Table 3.1 charts the damaku’s dual effects of co-creation and co-destruction in live streaming commerce. It outlines how real-time chat, feedback, and interactions can yield

positive social outcomes, such as trust and a sense of community belonging, or commercial outcomes, such as increased purchase intention and enhanced endorsement effectiveness. Conversely, excessive or irrelevant messages can lead to information overload, weakened parasocial bonds, reduced sales and diminished streamer credibility. This study focuses on processes that foster co-creation, while probing the boundary conditions under which co-destruction occurs, particularly from information overload (Zhang et al., 2024a) due to excessive and poorly managed community interaction (danmaku).

Real-time interaction (Danmaku)	**Co-creation**	**Co-destruction**
Social outcome	**Build parasocial relationships and trust** Streamers cultivate meaningful parasocial ties that effect emotion and decision-making directly, such as trust, attachment, and purchase intention (Chen et al., 2022; Li & Peng, 2021b; Xu et al., 2023). **Enhance community belonging** Live streaming empowers viewers to become active participants by enabling real-time content generation and exchange with streamers. This interactivity fosters collaborative engagement that further strengthens community building, active decision-making, and mutual benefits (Qian & Seifried, 2023).	**Information overload** High chat volume can cognitively overwhelm viewers, reducing their ability to process trust or authenticity signals (Agnihotri et al., 2024). Overloaded information and excessive or poorly managed interactions might help viewers assess when a product or pitch feels off, increasing consumer scepticism (Chen et al., 2009). **Weakened parasocial bonds** Over-stimulation may reduce the immersive quality of the interactions, diminishing emotional connection (Pang & Ruan, 2023).
Commercial outcome	**Boost purchase intentions** Perceived interactivity enhances engagement, leading to increased willingness to purchase (Zheng et al., 2023). Macro-influencers with higher expertise benefit more from community interaction, such as positive responses toward their recommendations (Zhang et al., 2024b). **Increase endorsement effectiveness** Consumers are more likely to accept product recommendations when they feel involved (Wongkitrungrueng & Assarut, 2020).	**Lower purchase intentions** If users feel overloaded or distracted, they may disengage from the content and product messaging (Zhang et al., 2024a; Zhao et al., 2024). **Reduced credibility** Too many irrelevant comments or too much commentary can create noise in the interaction. This can undermine the perceived authenticity or trustworthiness of the streamer. Viewers can experience cognitive overload, decision fatigue and feel overwhelmed (Zhang et al., 2024a; Zhao et al., 2024).

Table 3.1: Danmaku's dual effects in live streaming commerce

3.2.2 Streamer Use of Social Signals

Signalling theory is particularly relevant in online environments characterised by information asymmetry, where consumers face limited or overwhelming information and can make more biased decisions (Biswas & Biswas, 2004). Marketers and influencers use signals to enhance consumer decision-making confidence and reduce uncertainty, positioning themselves as personal brands through consistent and distinctive content creation (Kozinets et al., 2023; Li & Peng, 2021a). Compared to written reviews, peer-action based signals, such as following and interacting with influencers— are more effective in shaping group preferences (Rao Hill & Qesja, 2023).

In live streaming commerce, streamers play a central role in shaping consumer behaviour. Influential streamers who promote a variety of products tend to outperform store-affiliated streamers, especially when brand awareness is high (Liu & Yu, 2024). Streamer type also moderates the impact of trust: trust in the streamer benefits third-party streamers, while trust in the product supports streamers in retaining viewers (Zhang et al., 2022b). Differences in perceived authenticity and purchase intention have also been observed between AI and human streamers n (Li et al., 2023b). Despite these insights, the effectiveness of different streamer types in influencing consumer responses, beyond their impact on sales performance, remains underexplored (Zhang et al., 2022b).

In this study, streamer type is defined by identification, familiarity and follower count. Due to limited public information of many streamers, we adopt a simplified classification: macro-streamers are influential figures or celebrities with over 100,000 followers, while micro-streamers have fewer than 100,000 followers and are typically grassroots creators or online store owners (Liu & Yu, 2024; Conde & Casais, 2023). Macro-streamers are often perceived as authoritative due to their expertise, familiarity, and popularity, which enhance their persuasive power and increases purchase intention (Conde & Casais, 2023; Campbell & Farrell, 2020). Their professional performances, high familiarity and large follower bases make their endorsements more impactful, even though they often engage in short-term brand collaborations (Conde & Casais, 2023; Liu & Yu, 2024).

Micro-streamers, while less familiar to viewers, tend to foster closer emotional connections and build parasocial relationships that support word-of-mouth effects (Conde & Casais, 2023; Zhang et al., 2022b). They frequently promote their own products through frequent and attention-grabbing broadcasts designed to create a sense of affinity (Tan et al., 2020; Liu & Yu, 2024). Although micro-streamers excel in relational engagement, macro-streamers are more likely to generate positive consumer responses such as endorsement

acceptance, continued use of live streaming, and purchase intention, due to their broader influence and credibility. Accordingly, we hypothesise:

H1: Macro-streamers drive more positive consumer responses, including (a) acceptance of endorsement, (b) continuance usage intention, and (c) purchase intention, compared to micro-streamers.

3.2.3 Trust in Live Streaming

Trust serves as a critical mediating mechanism linking influencer characteristics and consumer responses in digital commerce (Lou & Yuan, 2019). Trust refers to the belief that the other party in a social exchange will behave ethically and refrain from engaging in opportunistic behaviour (Gefen & Straub, 2003; Guo et al., 2021). In live stream commerce, where consumers cannot physically evaluate products, streamers function as surrogate decision aids. Through real-time demonstrations and interactive dialogue, they help reduce information asymmetry and perceived uncertainty (Park & Lin, 2020), thereby enhancing viewer confidence (Guo et al., 2021).

Trust in live streaming commerce includes both cognitive trust (trust in the streamer's knowledge or platform's functionality) and affective trust (emotional connections with the streamer or community; Wongkitrungrueng & Assarut, 2020). While cognitive trust is based on rational evaluation, affective trust arises from emotional closeness, perceived relational warmth and a sense of security (Johnson & Grayson, 2005). Cognitive trust often serves as a precursor to affective trust (Lewis & Weigert, 1985), especially in digital contexts where relational cues and signals are mediated by technology (Ozdemir et al., 2020). Trust in products, trust in streamers, and trust in platforms together form an interconnected and transferable system that shapes consumer responses. Trust measured via these three key targets of trust form an essential mechanism in the context of live streaming commerce (Wongkitrungrueng & Assarut, 2020; Guo et al., 2021; Xu et al., 2023). Thus, this research mainly focuses on integrated trust across product, streamer and platform to probe how streamer type drives overall trust to influence consumer responses in live streaming.

Importantly, trust in live streaming is not formed in isolation but is co-created through interaction between streamers and audiences. Audience members evaluate trustworthiness based on how a streamer responds to live chat, incorporates viewer feedback, and tailors content in real time, creating a participatory environment that fosters perceived closeness and authenticity (Lee & Eastin, 2021). Macro-streamers, with larger followings and greater

visibility, often demonstrate higher degrees of content co-creation and viewer familiarity. Their frequent engagement, professional presentation, and reputation enhance trust by allowing viewers to feel that their presence shapes the streaming experience (Xu et al., 2023). While micro-influencers on static platforms often create trust through niche intimacy (Conde & Casais, 2023), macro-streamers in live commerce contexts instead build trust through performance scale, responsiveness, and information richness (Li et al., 2023a). Based on this, we propose the following hypothesis:

H2: Macro-streamers drive more positive consumer responses, including (a) acceptance of endorsement, (b) continuance usage intention, and (c) purchase intention via trust in live streaming.

3.2.4 Authenticity

Authenticity reflects the degree to which an influencer or streamer is perceived as sincere, genuine, and true to themselves in their promotional activities (Boerman et al., 2017; Evans, 2017). While often viewed as a personal trait, authenticity is also a socially co-constructed and relational phenomenon, shaped through community interaction and the performative context in which it unfolds (Cheng, 2004; Marwick & Boyd, 2010). In live streaming commerce, authenticity is not static but emerges in real time, through the streamer's responsiveness, emotional expressions, and engagement with audience input (Liu & Sun, 2024).

The co-created nature of authenticity is particularly important in live settings. In static social media, viewers actively interpret the sincerity of an influencer's self-presentation based on how spontaneous, consistent, and responsive they appear (Audrezet et al., 2020). Live contexts are anticipated to magnify those effects. Trust and authenticity are mutually reinforcing. Co-created trust can lead to heightened perceptions of authenticity, especially when the viewers see their content and participation reflected in live streaming content (Lee & Eastin, 2021). Macro-streamers, despite their commercial motivations, may appear more authentic due to their professional competence, consistent persona, and visible engagement with community interaction danmaku. In contrast, micro-streamers in live streaming settings may undermine authenticity through exaggerated, overperformed enthusiasm intended to please viewers (Tan et al., 2020; Xu et al., 2023).

Although prior research suggests that micro-influencers are generally seen as more authentic in static social media contexts (Rao Hill & Qesja, 2023), live streaming commerce

disrupts this pattern. Here, authenticity is not solely a function of streamer type; it is mediated by viewer experience of co-creation, trust, and engagement. Accordingly, we hypothesise:

H3: Authenticity moderates the relationship between streamer types and trust, such that the positive effect of macro-streamers (vs. micro-streamers) on trust is stronger when perceived authenticity is high.

Moreover, the social construction of authenticity in live streaming commerce is shaped by the fast-paced, synchronous exchange of ideas, questions, and comments within the viewer community, which further influences streamer effectiveness.

3.2.5 Community Interaction

The role of community in live streaming commerce remains contested (Farivar & Wang, 2022). As illustrated in Table 1's dual effects framework, co-creation through danmaku's real-time chat, digital gifting, commenting, and fan-group activities has the potential to both enhance and undermine consumer experiences. On one hand, interactions among viewers foster trust, engagement, and continuance intention, with social presence and identification driving these effects (De Cicco et al., 2020; Hu et al., 2017; Chong et al., 2023). Community interaction and a sense of community has been shown to increase engagement in gaming and mukbang streams (Hilvert-Bruce et al., 2018; Lee & Wan, 2023; Giertz et al., 2021), as well as boost sales in commerce streams via online comments and interactions (Kashyap et al., 2023).

On the other hand, excessive interaction, such as rapid-fire danmaku scrolling comments, can overwhelm viewers, introducing information overload that diminishes trust while increasing scepticism and information asymmetry (Biswas & Biswas, 2004). In this research, danmaku is operationalised as the large volume of real-time comments, gifts, and emojis sent by viewers during live streaming. Information overload occurs when viewers are bombarded with a barrage of content that distracts from product presentations and disrupts cognitive processing (Zhao et al., 2024). If streamers fail to maintain active parasocial engagement, the relationship can become negative, fostering divergence (Duffy et al. 2022). This overload not only undermines trust in streamers and platforms but also negatively affects purchase intentions, which are key commercial outcomes. (Furner & Zinko, 2017).

The inverted-U relationship between product information and sales in live streaming underscores the need for balance (Zhao et al., 2024; Zhang et al., 2024a). Excessive product detail or prolonged exposure can reduce sales performance (Zhang et al., 2024a). In a highly interactive environment, such as those with a large volume of danmaku community chat,

viewers with varying levels of information sensitivity may react differently. While moderate community interaction enhances trust and viewer involvement, excessive danmaku can disrupt this equilibrium. Consistent with signalling and uncertainty reduction theory, viewers seek information from streamers to reduce perceived risk, which increases trust (Lu & Chen, 2021). When information is overwhelmed by excessive content, viewers are more likely to perceive lower authenticity, as streamers are less capable of responding promptly and professionally. This can lead consumers to question whether the streamer genuinely understands the product. This issue is more common among macro-streamers, who tend to have larger audiences and receive a higher volume of danmaku than micro-streamers. Building on this perspective, we hypothesise:

H4: The effect of streamer authenticity on trust in the live streaming process is moderated by the large volume of community interaction (danmaku), such that excessive interaction weakens the positive relationship between authenticity and trust.

The overlap between community interaction danmaku and live broadcast content can hinder viewers' ability to fully comprehend the streams' content and increase cognitive load (Zhang & Ruan, 2024). In live streaming commerce, this challenge is intensified by excessive or poorly managed high-volume danmaku messages, which contributes to information overload and makes it harder for viewers to process and evaluate product-related information. As a result, viewers may experience information avoidance or develop information sensitivity, choosing to rely mainly on streamers who are easy to access or emotionally reassuring (Cao et al., 2024). When streamers are overwhelmed by excessive danmaku and unable to respond promptly, the perceived quality of interaction can also decline. This we predict is more likely to lead to value co-destruction, reflected in lower trust, reduced engagement and continuance intention, and decreased purchase intention (Lv et al., 2021). Thus, we formally hypothesise:

H5: As community interaction danmaku increases, information sensitivity rises, which negatively influences trust in live streaming and related consumer responses, including (a) acceptance of endorsement, (b) continuance usage intention, and (c) purchase intention.

3.3 Empirical Overview

This paper tests a dual effects model to examine how co-created community interaction (danmaku) influences the effectiveness of live streaming commerce. Four experiments are conducted to determine how streamers impact both social outcomes (e.g., trust) and commercial outcomes (e.g., endorsement acceptance, continuance intention, and purchase

intention) under varying levels of community interaction including chats, messages, feedback, gifts, and emojis.

Figure 3.2 presents the empirical framework. A pre-test first identifies streamers and their perceived authenticity. Study 1 next tests whether macro-streamers elicit more positive consumer responses (H1). Study 2 then examines trust as a mediating mechanism (H2) and streamer authenticity as a moderating factor (H3). Study 3 further introduces the moderating role of community interaction in streamer effectiveness (H4), providing the first test of the dual effects model. Study 4 investigates how excessive levels of community interaction (danmaku) can lead to information overload, reducing consumer responses that include both social and commercial effects (H5).

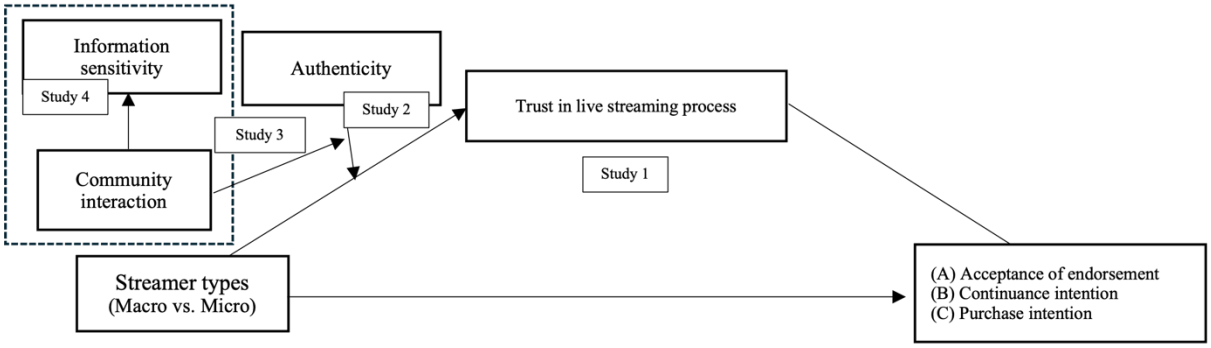

Figure 3.2 Conceptual framework

Pre-test

To identify suitable streamers, a pre-test was conducted with 479 live streaming commerce users (60.3% female, $M_{age} = 34.9$) recruited from the Chinese online survey platform Wenjuanxing. Participants evaluated the authenticity of 15 streamers using a 7-point Likert scale (1 = "strongly disagree," 7 = "strongly agree"). Questions were translated into Chinese for the convenience of Chinese respondents, and a backward translation were also be used to ensure consistency between English and Chinese questionnaires (Lu & Chen, 2021). To minimise potential bias, participants were randomly exposed to different streamers.

The objective was to ensure parity in perceived authenticity between macro- and micro-streamers, reducing potential confounds in subsequent experiments. Four streamers were selected based on comparable authenticity scores: The macro-streamer category comprised Austin Li and Chen He, each with over 100,000 followers. The micro-streamer category included Taozi sister and a Taobao seller, each with 10,000-100,000 followers.

Pairwise comparisons revealed no significant differences in authenticity between Austin Li (M_{Austin_Li}=5.26) and Taozi sister (M_{Taozi_sister}=5.51, p>0.05; Cohen's d = 0.66) or between Chen He (M_{Chen_He}=5.00) and the Taobao seller (M_{Taobao_seller}=5.15, p>0.05; Cohen's d=0.76). As suggested by previous research (Conde & Casais, 2023; Campbell & Farrell, 2020; Liu & Yu, 2024), there are significant differences in familiarity between Austin Li (M_{Austin_Li}=5.82) and Taozi sister (M_{Taozi_sister}=3.97, p>0.05; Cohen's d=1.46) and between Chen He (M_{Chen_He}=5.45) and the Taobao seller (M_{Taobao_seller}=3.12, p>0.05; Cohen's d = 1.41). These results validate the selection of these streamers as representative macro- and micro-streamer exemplars with differing levels of familiarity for the studies that follow. Accordingly, Chen He was paired with the Taobao seller, and Austin Li was paired with Taozi sister for subsequent experiments. Table 3.2 outlines the experiment designs and research purposes for all four studies.

	Study Design	**Purpose**	**Context**	**Sample size**	**Independent variable**	**Dependent variables**	**Mediators**	**Moderators**
Study 1	2 streamer conditions (macro-streamer: Chen He vs. micro-streamer: Taobao seller) in a between-subjects experimental design.	The effectiveness of macro- and micro-streamers in driving key consumer outcomes	Snack food	150	Macro and Micro-streamer	a. Acceptance of streamer endorsement b. Continuance intention c. Purchase intention	Trust in live streaming process	N/A
Study 2	2 streamer conditions (macro-streamer: Austin Li vs. micro-streamer: Taozi sister) in a between-subjects experimental design.	Replicate Study 1 by comparing two different streamers and examining the moderating role of the authenticity	Snack food	153	Macro and Micro-streamer	a. Acceptance of streamer endorsement b. Continuance intention c. Purchase intention	Trust in live streaming process	Authenticity
Study 3	2 streamer types (macro-streamer vs. micro-streamer) x 2 community interaction (absent vs. present) between-subjects experimental design.	Explore the impact of community interaction on the effectiveness of different streamers and the boundary effects of streamer authenticity	Snack food	335	Macro and Micro-streamer	a. Acceptance of streamer endorsement b. Continuance intention c. Purchase intention	Trust in live streaming process	Authenticity; Community interaction (danmaku)

Study 4	2 community interaction conditions (high vs. low) in a between-subjects experimental design.	Investigates how high-volume community interaction (danmaku) affects information sensitivity and trust, especially for marco-streamers.	Snack food	310	Danmaku interaction levels	a. Acceptance of streamer endorsement b. Continuance intention c. Purchase intention	Information sensitivity; Trust in live streaming process	N/A

Table 3.2: Study design overview

Study 1 overview

Study 1 investigates the effectiveness of macro- and micro- streamers in driving key consumer outcomes, including acceptance of recommendations, continuance intention toward the streaming platform, and purchase intention. Additionally, the study tests whether perceived trust mediates these effects, thereby evaluating H1 and H2.

Study 1 method

A total of 150 participants (59.3% female, M_{age}=33.3) were recruited via Wenjuanxing, one of China's largest online survey platforms. The platform supports more than 2,000 empirical studies and covers all regions of China, with balanced gender representation and a wide range of occupational backgrounds (Zheng & Zheng, 2014). Eligibility was restricted to users who engage with live streaming commerce at least weekly.

Participants were randomly assigned to one of two streamer conditions (macro-streamer: Chen He or micro-streamer: Taobao seller) in a between-subjects experimental design. Each participant viewed a 1-minute video clip of the assigned streamer selling snack food, a product category commonly featured in live streaming commerce (Seçer et al., 2023). Brand names and danmaku were deliberately excluded to control for extraneous influences and isolate the effects of streamer type. After viewing the clip, participants completed scale measures assessing trust in product, streamer, and platform (α=0.93; Guo et al., 2021; Chen et al., 2009), acceptance of streamer endorsement (α=0.88; Li et al., 2023b), continuance intention (α=0.93; Zhang et al., 2022a) and purchase intention (α=0.88; Guo et al., 2022). In all four studies, participants who exited the video early were excluded from the final sample. In general, The KMO value was 0.95, indicating marvellous sampling adequacy, and Bartlett's test of sphericity was significant ($\chi^2 = 9000.48$, $p < .001$), supporting the suitability of the data for factor analysis. The results of all factor analyses are presented in the appendix at the end of this chapter.

Study 1 results

Main effects. An independent t-test revealed that streamer type significantly influences consumer responses across key measures. Participants exposed to the macro-streamer condition reported significantly higher endorsement acceptance (M_{macro}=5.44 vs. M_{micro}=4.43; F(1, 148)=36.20, p<.05; Cohen's d=1.03), continuance intent (M_{macro}=5.39 vs. M_{micro}=4.26; F(1, 148)=29.61, p<.05; Cohen's d=1.25), and purchase intent (M_{macro}=5.03 vs. M_{micro}=4.14; F(1, 148)=18.67, p<.05; Cohen's d=1.25) compared to those in the micro-streamer condition. These results support the hypothesis that macro-streamers elicit stronger consumer responses than micro-streamers.

Mediation effects. To test whether trust in live streaming mediates the relationship between streamer type (macro-streamer vs. micro-streamer) and key consumer responses, three separate mediation models (A, B, C) were run in PROCESS (Model 4; 5,000 bootstrapped samples; Hayes, 2022). Streamer type (macro vs. micro) was the independent variable, trust in live streaming was the mediator, and the dependent variables were: (A) acceptance of streamer endorsement, (B) continuance intention and (C) purchase intention.

The direct effect of streamer type was statistically significant across all models via acceptance of streamer endorsement (β=0.72, p=0.00; R^2=0.45), continuance intention (β=0.71, p=0.00; R^2=0.45) and purchase intention (β=0.68, p=0.00; R^2=0.41). These standardised coefficients (β value) indicate large effects, suggesting that switching from a micro- to a macro-streamer result in a 0.72 standard deviation increase in endorsement acceptance, a 0.71 increase in continuance intention, and a 0.68 increase in purchase intention. Trust in live streaming mediated these relationships, with higher trust predicted stronger consumer responses such as acceptance (β=0.51, p=0.00, CI=[0.10, 0.49]), continuance (β=0.51, p=0.00, CI=[0.13, 0.62]), and purchase intention (β=0.51, p=0.00, CI=[0.13, 0.61]). These results reflect medium-to-large mediation effects, indicating that trust plays a substantial role in translating streamer type into consumer outcomes. As illustrated in Figure 3.3, macro-streamers enhanced trust in live streaming, which in turn drove more favourable consumer responses, including acceptance of endorsement, continuance intention, and purchase.

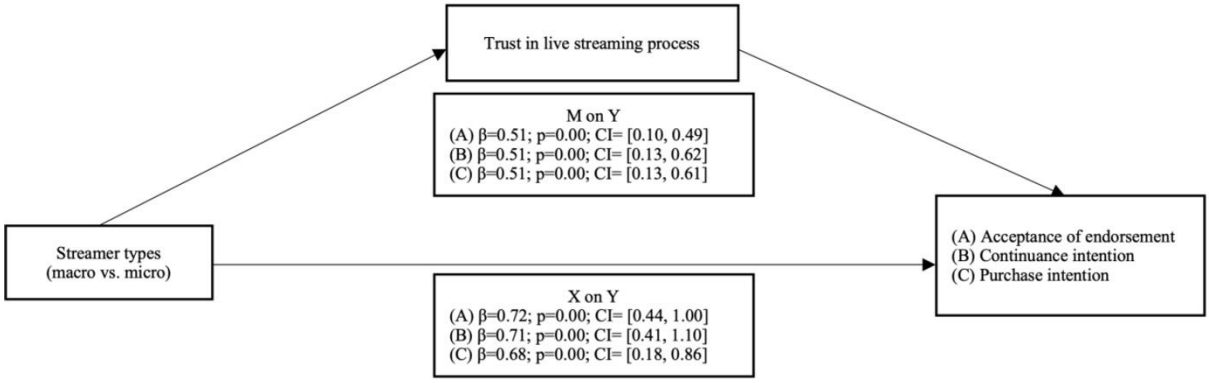

Figure 3.3 Main effects and mediating role of trust in live streaming (Study 1)

Study 1 discussion

Study 1 highlights the significant impact of streamer type on both social and commercial outcomes in live streaming commerce. Macro-streamers outperform micro-streamers across all measured variables, including acceptance of endorsement, continuance intention, and purchase intention. Consistent with H1 and H2, the findings demonstrate that macro-streamers foster higher levels of trust as a critical social mechanism linking streamer type to consumer commercial responses. These results offer valuable insights for marketers leveraging live streaming commerce, suggesting that macro-streamers can effectively enhance consumer trust and engagement, ultimately driving platform and purchase-related outcomes.

Study 2 overview

Study 2 aims to replicate and extend the findings from Study 1 by: (1) comparing two different types of streamers withmacro-streamer Austin Li and micro-streamer Taozi sister, and (2) examining the moderating role of the streamer's perceived authenticity. Specifically, this study tests a moderated mediation effect, by incorporating perceived authenticity as a moderating factor in the relationship between streamer types and trust in live streaming. This approach extends the dual effects model of co-created danmaku by establishing a foundational understanding of how streamer types and characteristics form a base model from which to compare the role community interaction plays in determining social and commercial outcomes (tested in studies 3 and 4).

Study 2 method

Study 2 utilises a between-subjects experimental design with 153 respondents (68% female, M_{age} =32) all of whom engage with live streaming commerce at least once per week.

Participants were recruited via the Chinese survey platform Wenjuanxing and randomly assigned to one of two streamer conditions: macro-streamer (Austin Li) or micro-streamer (Taozi sister). The procedure mirrored that of Study 1. Participants viewed a 1-minute video clip of the assigned streamer promoting snack food (with brand names and danmaku excluded to control for extraneous influences). After viewing, participants rated the perceived authenticity of the streamer (α=0.86; Lee & Eastin, 2021) and filled in the same measurements as in Study 1.

Study 2 results

Main effects. An independent t-test revealed significant differences between the two streamer types. Macro-streamers were found to drive greater consumer acceptance of endorsement (M_{macro}=5.61 vs. M_{micro}=4.18; F(1, 151)=14.38, p<.05; Cohen's d=1.12), higher continuance intention (M_{macro}=5.64 vs. M_{micro}=3.92; F(1, 151)=28.22, p<.05; Cohen's d=1.37), and greater purchase intent (M_{macro}=5.23 vs. M_{micro}=3.87; F(1, 151)=24.28, p<.05; Cohen's d=1.36) compared to micro-streamers.

Mediation effect. Trust in live streaming mediated the effect of streamer type on key outcomes. Specifically, trust mediated the relationship between streamer type and endorsement acceptance (β=0.75, p=0.00, CI=[0.22, 0.61]; R^2=0.48), continuance intention (β=0.75, p= 0.00, CI=[0.21, 0.73]; R^2=0.43), and purchase intention (β=0.51, p= 0.00, CI=[0.27, 0.81]; R^2=0.43). These results confirm the extension of the mediation observed in Study 1. The size of these mediation effects ranges from moderate to large based on standardised coefficients. This suggests that building trust is a key mechanism through which streamer type influences consumer responses.

Moderated-mediation effects. Using Hayes' PROCESS (Model 7; 5,000 bootstrapped samples; Hayes, 2022), moderated mediation analyses revealed a significant effect of authenticity on trust, which in turn impacted the dependent variables of (A) acceptance of streamer endorsement (β=-0.53, p=0.00, CI=[-0.47, -0.11]), (B) continuance intention (β=-0.53, p=0.00, CI=[-0.54, -0.11]), and (C) purchase intention (β=-0.53, p=0.00, CI=[-0.63, -0.12]). Path weights are shown in Figure 3.4 below. Specifically, macro-streamers directly and positively influenced consumer responses, driving the main effects of acceptance of endorsement (β=1.02, p=0.00, CI=[.69, 1.34]), continuance intent (β=1.27, p=0.00, CI=[0.86, 1.69), and purchase intent (β=0.85, p=0.00, CI=[0.46, 1.24]). Also, macro-streamers indirectly influence acceptance of endorsement (β=0.55, p=0.00, CI=[0.39, 0.69]), continuance (β=0.59,

p=0.00, CI= [0.41, 0.78]), and purchase intention (β=0.68, *p*=0.00, CI=[0.51, 0.86]) by affecting viewer's trust.

Interestingly, the indirect paths revealed a novel effect for micro-streamers. Despite being rated as relatively lower on authenticity (M=3.95 and 4.97), micro-streamers generated higher trust, which led to stronger consumer responses across all outcome variables (endorsement acceptance, continuance and purchase intention).

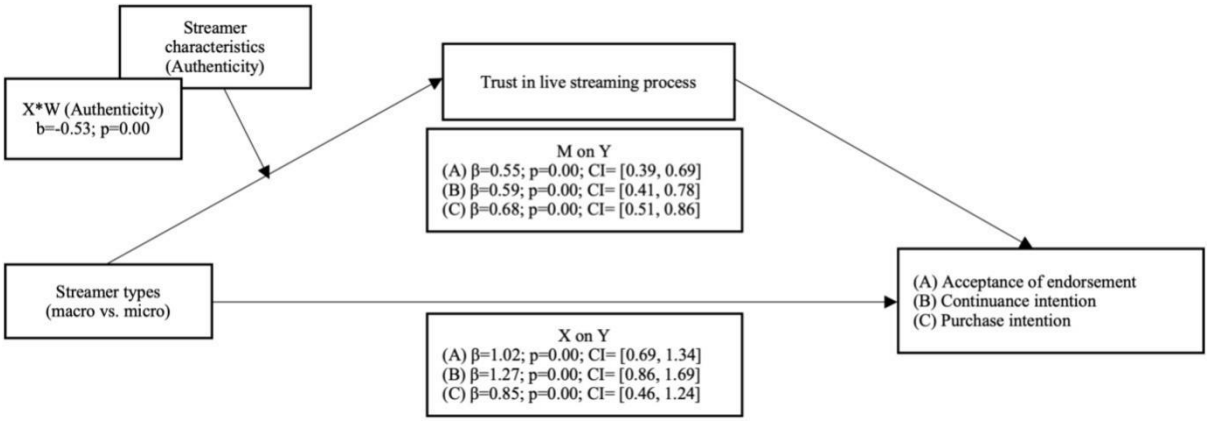

Figure 3.2 Moderated mediation effects of authenticity (Study 2)

Study 2 discussion

Study 2 replicates and extends the mediation effect identified in Study 1 (H1, H2), confirming that macro-streamers with higher popularity and visibility trigger more favourable consumer responses in live streaming commerce through enhanced trust in the product, the streamer, and the platform. Thes findings reinforce the social impact of macro-streamers, even in controlled environments without community interaction (danmaku), demonstrating their consistent influence on trust and engagement. Importantly, Study 2 also identifies a novel pathway for micro-streamers. When perceived authenticity is relatively lower, micro-streamers paradoxically generate higher trust, leading to more positive consumer responses (H3). This suggests that authenticity does not operate uniformly across streamer types and may interact with viewer expectations and relational dynamics in complex ways.

While the use of 1-minute video clips without brand names or community interactions allowed for controlled testing of specific variables, the design may not fully capture the complexity of real-world live streaming environments, where community interactions are integral components of the consumer experience. To enhance the ecological validity of the findings and further test the dual effects model of danmaku, the next studies (3 and 4) investigate the role of community interaction in shaping both social and commercial outcomes.

Study 3 overview

The objective of Study 3 is to test H4, exploring the impact of community interaction on the effectiveness of different streamers. This study also investigates the boundary effects of streamer authenticity, a variable that yielded mixed results in Study 2 and remains contested in the literature (Marwick & Boyd, 2010; Rao Hill & Qesja, 2023; Campbell & Farrell, 2020).

Study 3 method

Study 3 employed a between-subjects experimental design with 335 participants (60.3% female, M_{age}=34.7) recruited via the Chinese survey platform Wenjuanxing. Participants, all of whom engaged in live streaming commerce at least weekly, were randomly assigned to one of four conditions in a 2 (streamer type: macro-streamer vs. micro-streamer) x 2 (community interaction: absent vs. present) design. Participants watched a 1-minute video clip either of macro streamer Austin Li or micro-streamer Taozi sister selling snack foods. Each clip was edited to include either (1) no community interaction (community interaction danmaku absent) or (2) floating danmaku text overlaying the video (community interaction danmaku present). Figure 4 below shows examples of streamer Taozi sister with (present) and without (absent) community interaction.

This design mimics the real-world features of platforms such as Taobao Live and TikTok (Douyin), where users can toggle community interaction on or off. Community interaction, such as floating text, stars, and comments as danmaku, often overlays up to 50% of the screen and is widely used (see Figure 3.5 for an example), with 84% of young views expressing preference for the feature (Sina Technology, 2020). However, industry trends suggest that increasing amounts of danmaku may influence user experience (Sina Economy, 2021).

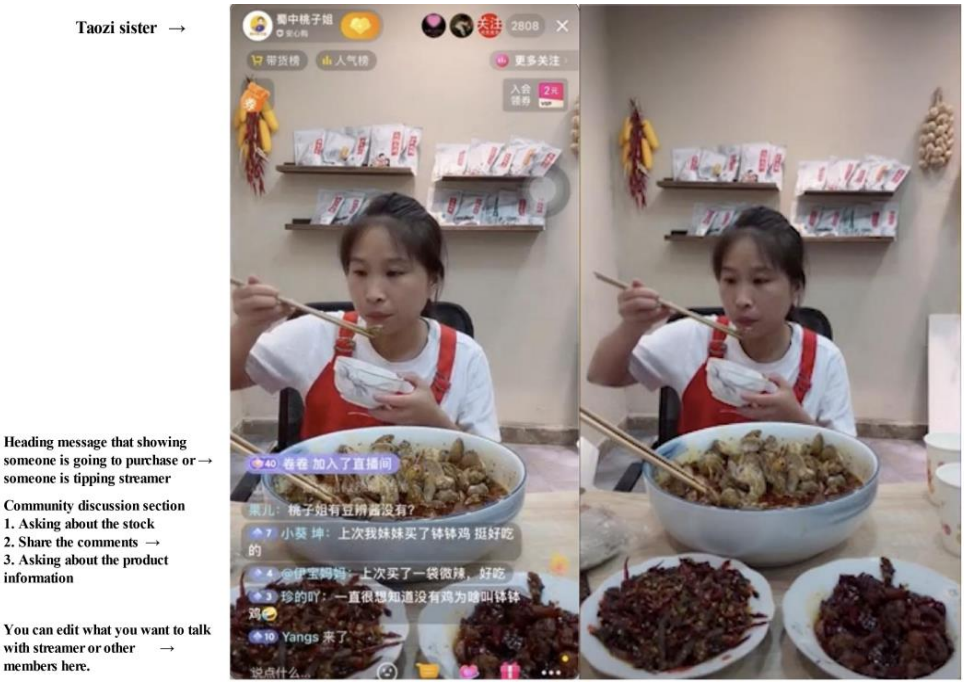

Figure 3.3 Streamer Taozi sister shown in panel A with community interaction in floating text and danmku, and in panel B without community interaction.

Study 3 results

Main effects. Significant differences emerged across the four experimental conditions, replicating the findings of Studies 1 and 2. Macro-streamers were significantly more effective than micro-streamers across all key outcomes: acceptance of endorsement (M_{macro}=5.92 vs. M_{micro}=5.27; $F(1, 333)=30.62$, $p<0.05$; Cohen's d=0.93), platform continuance intention (M_{macro}=5.96 vs. M_{micro}=5.23; $F(1, 333)=32.31$, $p<0.05$; Cohen's d=1.08), and purchase intention (M_{macro}=5.64 vs. M_{micro}=5.02; $F(1, 333)=35.26$, $p<0.05$; Cohen's d=1.16). For micro-steamers, low-to-moderate levels of authenticity (M=4.45 and M=5.18) again yielded stronger consumer responses, triggered by increased trust (β=-0.33, $p<0.05$).

Moderated moderated-mediation effects. Using PROCESS (Model 11; 5,000 bootstrapped samples; Hayes, 2022), we tested the role of community interaction (danmaku) as a boundary condition (coded 1 = present; coded 0 = absent). Results revealed distinct pathways for macro-and micro-streamers (see Figure 3.6).

When danmaku was absent, the effect of streamer types and authenticity (α = 0.85) positively influenced trust in live streaming (α = 0.92, β = 0.38, $p < 0.05$). Trust increased only in conditions that community interaction was absent and authenticity was relatively low (M = 4.36, β = 0.38, $p < 0.05$, CI=[0.15, 0.62]) or moderate (M = 5.18, β = 0.17, $p < 0.05$, CI=[0.01, 0.34]). Macro-streamers yielded higher trust and acceptance of recommendation. Higher trust

also led to platform continuance (β=0.98, p<0.05, CI=[0.89, 1.08]) and purchase intention (β=1.06, p< 0.05, CI=[0.96, 1.17]). Moderated mediation indices were significant on both continuance (β=0.37, p<0.05, CI=[0.09, 0.68]) and purchase intention (β=0.40, CI=[0.09, 0.73]). These large effect sizes (e.g., β=0.98 and β=1.06) suggest that macro-streamers are most effective when danmaku is absent and authenticity is low to moderate. In contrast, micro-streamers maintained trust regardless of danmaku presence when authenticity was relatively low.

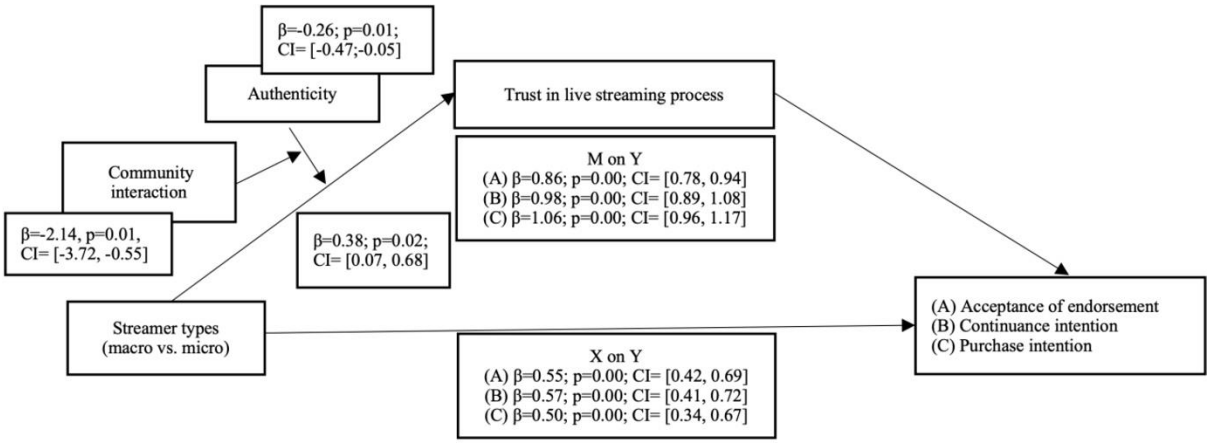

Figure 3.4 Moderated moderated-mediation effects of community interaction

Study 3 discussion

Study 3 shows the first empirical support for the dual effects model of community interaction (danmaku) in live streaming commerce. Two key insights emerge: 1) Macro-streamers outperform micro-streamers in driving consumer responses, consistent with Studies 1 and 2. However, their effectiveness diminishes when community interaction is present, suggesting that the visual and cognitive load imposed by danmaku text may undermine the persuasive impact (H4). This reflects potential co-destructive effects, including lowered trust, continuance intention, and purchase intention. In another key finding, 2) Micro-streamers with lower authenticity maintain effectiveness regardless of community interaction, indicating that trust in micro-streamers is less dependent on danmaku. This may be due to the perceived intimacy and relatability.

Overall, Study 3 highlights the dynamic role of community interaction in shaping consumer responses. The presence or absence of danmaku significantly alters outcomes depending on streamer type. Study 4 further investigates this by examining the threshold at which danmaku becomes excessive and begins to undermine streamer effectiveness.

Study 4 overview

Study 4 was designed to further examine whether excessive community interaction (danmaku) reduces the effectiveness of macro-streamers, thereby providing a comprehensive test of the dual effects model of community interaction on both social and commercial outcome in live streaming commerce. Macro-streamers, who typically attract larger audiences, often experience high volumes of danmaku as rapidly scrolling chat messages and testimonials, particularly during major sales events such as the "6.18 Shopping Festival" or "11.11 Singles' Day." This can lead to cognitive overload, which may reduce trust in the streamer and weaken consumer responses. As Study 3 suggested, co-created community interaction can yield co-destruction effects, but the threshold at which this occurs remains unclear.

While a moderate interaction can foster connection and engagement, Table 1 shows that excessive danmaku may trigger information overload and sensitivity (Hunter et al., 2023), overwhelming viewers and ultimately diminishing the overall shopping experience (Zhang et al., 2024a). Study 4 therefore investigates how high-volume danmaku affects information sensitivity and trust, shedding light into the mechanisms driving these effects.

Study 4 method

A total of 310 participants with prior live streaming commerce experience (54.5% female, M_{age}=36.7) were recruited via the Chinese survey platform Wenjuanxing. Using a between-subjects experimental design, participants were randomly assigned to one of two conditions: (1) The high danmaku interaction condition featuring 100 fast-moving messages, simulating the intensity of major sales (2) The low danmaku interaction condition featuring 40 pieces slower-moving messages, reflecting typical daily live streaming sessions (as used in Study 3). The operationalisation of danmaku interaction in Study 4, using 100 fast-moving comments versus 40 slower-moving comments, was informed by a simple pre-test with my colleagues and friends who have live streaming experience. We aimed to create two conditions that differed meaningfully in perceived community interaction and information load, without compromising ecological realism or message clarity.

All participants watched a 1-minute video clip of macro-streamer Austin Li selling snack products, edited to match their assigned danmaku interaction condition. Afterward, participants completed measures of information sensitivity ($\alpha = 0.91$; Hunter et al., 2024) and trust in live streaming (using the same measures as the prior two studies).

Study 4 results

Main effects. There was no significant direct effect of danmaku interaction level on trust or consumer outcomes such as acceptance of endorsement, continuance intention, and purchase intention. However, high danmaku interaction significantly increased information sensitivity ($M_{intensive}$ = 3.55 vs. M_{mild} = 3.09; $F(1, 308) = 21.4$, $p < 0.05$; Cohen's d=0.86).

Mediation effects. A mediation effect showed that danmaku interaction level indirectly influenced trust through information sensitivity (see Figure 3.7): danmaku interaction level (low vs. high) has a positive relationship with information sensitivity (β =0.45, p=0.00, CI=[0.26, 0.65]). That is, excessive danmaku interactions lead to higher information sensitivity. Higher information sensitivity led to lower trust in the live streaming process (β=-0.22, p=0.00, CI=[-0.31, -0.13]; R^2=0.14), which directly and negatively impacts consumer responses, lowering the level of acceptance of endorsement (β=0.95, p=0.00, CI=[0.88, 1.03]; R^2=0.68), continuance intention (β=1.08, p=0.00, CI=[0.99, 1.18]; R^2=0.65), and purchase intention (β=1.08, p=0.00, CI=[0.99, 1.17]; R^2=0.68). Importantly, trust fully mediated the relationship between information sensitivity and consumer outcomes. The direct path from information sensitivity to consumer responses is non-significant ($p > 0.05$), indicating that trust is the key explanatory mechanism in this model.

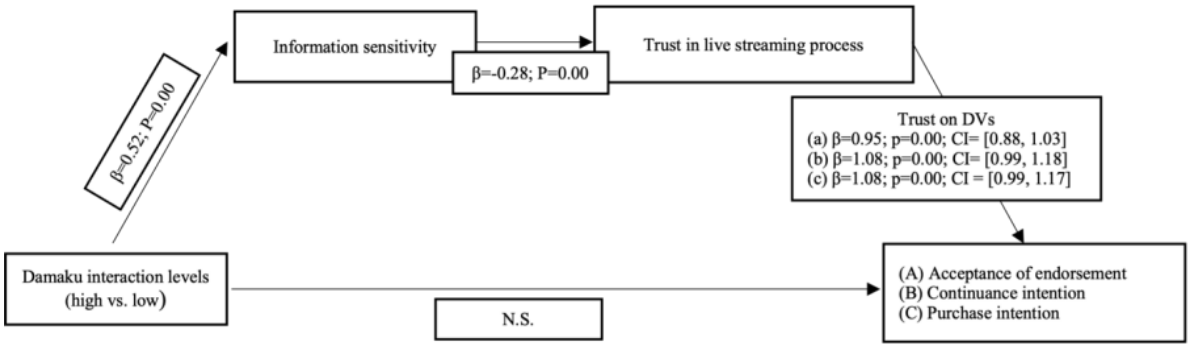

Figure 3.5 Danmaku interaction level on influencing information sensitivity

Study 4 discussion

Study 4 extends prior findings by demonstrating that excessive and poorly managed community interaction (danmaku) exacerbates information overload, leading to heightened information sensitivity and lower trust in live streaming. Unlike Study 3, which explored a binary on/off toggle for danmaku interaction, this study investigated the nuanced effect of mild versus excessive danmanku levels. The results show that excessive danmaku disproportionately harms macro-streamers, whose larger audience naturally generate higher interaction levels. During high-intensity events, such as sales holidays, the barrage of fast-

moving danmaku can overwhelm viewers, increasing cognitive load and reducing trust in the live streaming process. This erosion of trust has significant implications, as it diminishes endorsement acceptance, continuance intention, and purchase intention, key commercial outcomes for live streaming commerce. These findings reinforce the co-destructive potential of community interaction when not properly managed. For platforms and streamers, the implications are clear that strategic management of danmaku volume is essential. For macro-streamers in particular, moderating danmaku during high-stakes events may help mitigate information overload and preserve both trust and authenticity, ultimately sustaining consumer engagement and commercial success.

3.4 General Discussion

Across four studies, this research provides evidence for a dual-effects model of community interaction (danmaku) in live streaming commerce. Study 1 finds that macro-streamers generate stronger consumer responses both directly and indirectly by increasing trust in the live streaming commerce experience, thus, H1a, H1b, H1c and H2a, H2b, H2c are all supported. Study 2 builds on this by introducing authenticity as a moderating factor, showing that micro-streamers perceived as low to moderately authentic can foster higher trust, which in turn enhances consumer responses. H3 is partial supported. Study 3 shows that macro-streamers gain more trust with less community interaction danmaku, while micro-streamers build trust regardless of danmaku. In this way, H4 is partial supported. Finally, Study 4 reveals that a larger volume of danmaku, although a common feature of live streaming, can trigger information sensitivity when left unmanaged. So, H5a, H5b, H5c are all supported. This overwhelms viewers, distracts from the streamers' product messages, and lowers trust.

Together, these findings identify two distinct pathways to effective consumer engagement in live streaming commerce. First, we find clear evidence of value co-creation: macro-streamers build trust and commercial responses (endorsement acceptance, continuance, and purchase intention), especially when community interaction is moderate and the streamer is perceived as authentic. Micro-streamers also contribute to co-creation through trust-based parasocial bonds, even with limited interaction. Second, we identify a value co-destruction pathway: when danmaku becomes excessive, it introduces information overload, which diminishes trust and reduces viewer responsiveness— particularly in macro-streamer contexts.

Building on prior research (Zhao et al., 2024; Zhang et al., 2024a), our research examins how streamer type and community interaction (danmaku) jointly shape trust and downstream

outcomes. Excessive danmaku, characterised by fast-moving, colourful text and high message volume, contributes to cognitive fatigue and information sensitivity. This diminishes trust and relationship quality, key drivers of consumer response (Grewal et al., 2022). The unpredictability of user-generated danmaku messages can introduce scepticism or disengagement, especially when negative or irrelevant content dominates (Duffy et al., 2022). Such experiences reflect co-destruction, where the very mechanisms designed to engage instead lead to avoidance, distrust or disengagement (Ogunbodede et al., 2022; Wang et al., 2024a).

These findings highlight the contingent nature of damaku and its dual effects: it is both an asset and a liability depending on its intensity and the context in which it occurs. To apply these insights, brand managers should align macro-streamers with structured, product-focused campaigns that emphasise clarity in information sharing, minimising unnecessary interaction during key messaging moments. Streamers, especially macro-streamers, may benefit from moderated danmaku or scheduled Q&A sessions to preserve trust. For micro-streamers, a balance of parasocial relationships and professional presentation can strengthen trust. Platforms should enable these strategies by offering interface tools to manage danmaku. For example, Bilibili in China allows users to filter or customise comment flow. Tailoring engagement strategies to streamer types can help optimise both co-creative and commercial outcomes while avoiding co-destruction.

3.5 Conclusion and Implications

This study contributes to live streaming commerce research in two key ways. First, it empirically examines how streamer type influences consumer trust and related behaviours. By distinguishing between macro- and micro-streamers, we extend live streaming literature by showing how streamer authenticity and viewer size interact with consumer responses. Second, we identify a critical boundary condition for community interaction (danmaku). While prior research documents the benefits of crowd cues in gaming and shopping streams (Chong et al., 2023; He et al., 2023), our findings reveal that synchronous danmaku operates in dual ways: as a co-creative force when moderate, and as a co-destructive force when excessive.

Moderate community interaction (danmaku), which includes a balanced amount of scrolling comments, questions, gift-sharing, and testimonials, enhances both social outcomes, such as trust, and commercial outcomes, such as purchase intention and engagement. For macro-streamers, these benefits are amplified by high perceived reach and authenticity.

However, when danmaku becomes excessive, with large volumes of scrolling comments, questions, gift-sharing, and testimonials, it can increase information overload, disrupt viewer immersion (Mou et al., 2022), erode trust, and distract from the streamer's message (Zhang et al., 2023), ultimately lowering conversion (Zhang et al., 2024a). These negative effects are especially pronounced for macro-streamers. In contrast, micro-streamers build trust more gradually through parasocial bonds (Conde & Casais, 2023; Zhang et al., 2022b), and their influence remains stable regardless of danmaku volume. These insights extend literature on community interaction (Hilvert-Bruce et al., 2018; Farivar & Wang, 2022) and offer a clearer understanding of how synchronous interaction can both enable and erode value.

Our dual-effects model of co-creation in live streaming commerce highlights the need to calibrate community interaction. For practitioners, macro-streamers should limit or schedule danmaku to preserve message clarity and maintain trust. Platforms can support this by offering interaction management tools such as filters, overlays, and moderation features. Micro-streamers, in turn, may benefit from encouraging ongoing interaction to deepen engagement. Platform strategies should align interaction design with brand objectives. For example, product-focused platforms such as Taobao may prioritise clarity and conversion, while interaction-driven platforms such as TikTok may emphasise social engagement. Customisable danmaku settings could help tailor the experiences and improve both short-term and long-term consumer outcomes.

This study also has several limitations. Our sample comprised Chinese live streaming commerce users recruited through the Wenjuanxing platform, which may limit generalisability to other cultural or geographic settings. Cultural norms around trust, authenticity, and communication may moderate the observed effects. The use of a one-minute video standardised stimuli but may not fully capture the dynamic nature of real-time community interaction. Future research should explore this model in field settings and across a wider range of product categories. Our focus on snack foods may not represent the full range of consumer behaviour in product categories such as fashion or electronics (Zhang et al., 2020; Chen et al., 2022). While this work focused on the perceived trustworthiness across streamer types, future work could incorporate audience-level variables such as prior familiarity and personal identification with the streamer. Additionally, though this work in centred on shopping streams, the model could be tested in other live content domains such as gaming, entertainment, or mukbang (eating) streaming, where viewer engagement and trust dynamics may differ.

Finally, our findings point to new directions for inquiry. The rise of virtual and AI streamers (Li et al., 2023b) raises important questions about how authenticity and trust are

formed. Platform-specific design choices (Guo et al., 2021) may also shape the dual effects of danmaku, highlighting the value of comparative studies across platforms such as TikTok (interaction focused social-commerce) and Amazon Live (information focused e-commerce) Future research could also explore how real-time community interaction (danmaku) interacts with omni-channel marketing strategies (Thaichon et al., 2023; Pereira et al., 2019). For example, a retailer could integrate live streaming with coordinated offers across its e-commerce site, mobile app, email marketing, and in-store displays. Researchers could then examine whether viewers who engage with live streaming are more likely to make purchases through other channels, compared with those who do not engage with danmaku. Beyond commercial outcomes, this dual-effects model could be extended to assess social value creation, such as in corporate social responsibility (CSR) campaigns or advocacy streams. As ethical expectations rise (Cheung et al., 2022; Dang et al., 2020), understanding how platforms and streamers can balance social and commercial goals in real time remains a compelling challenge for future research.

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Appendix A: Measurement scales

Variables	Items	Literature
Acceptance of endorsement	1. This streamer's endorsement of the product is delightful 2. I like the fact that the streamer endorsed the product 3. I have a positive opinion of this streamer endorsement	Li et al., 2023c
Continuance intention	1. I will use this livestream shopping service again if I had a choice. 2. I will choose to this livestream shopping service next time I need to purchase. 3. I will use this livestream shopping service in the future.	Zhang et al., 2022a
Purchase intention	1. I would buy products this streamer promotes in his livestream shopping service 2. I intend to purchase the products that this streamer promotes in his livestream shopping service 3. I will consider this streamer's livestream shopping service as my first shopping choice	Guo et al., 2022
Trust in live streaming process (adjusted)	Trust in product 1. I think the products I order from live streaming will be as I imagined 2. I believe that I will be able to use products like those demonstrated on live streaming 3. I trust that the products I receive will be the same as those shown on live streaming	Guo et al., 2021; Chen et al., 2009
	Trust in streamer 1. I believe in the information that the streamers provide through live streaming 2. I can trust streamers that use live streaming 3. I believe that streamers who use live streaming are trustworthy 4. I do not think that streamers who use live streaming would take advantage of me	
	Trust in platform 1. I think the platform is honest 2. I think the platform cares about its customers 3. I think the platform knows its market	
Authenticity (adjusted)	Sincerity 1. This streamer seems kind and good hearted 2. This streamer comes off as very genuine 3. This streamer is down-to-earth Truthful endorsements 1. Although they post ads, this streamer gives meaningful insights into the products 2. This streamer gives very honest reviews on brands 3. The products and brands this streamer endorse vibe well with his/her personality 4. This streamer promotes products he/she would actually uses Visibility 1. This streamer not only presents about the good but also about hardships 2. This streamer talks about real-life issues going on in the life 3. This streamer talks about flaws and is not ashamed to show them in public 4. This streamer reveals a lot of personal life to the public Expertise 1. This streamer is expert. 2. This streamer has experience in live streaming commerce. 3. This streamer is knowledgeable in live streaming commerce. 4. This streamer is qualified to conduct live streaming commerce. 5. This streamer has the skills to conduct live streaming commerce. Uniqueness 1. This streamer is highly unique 2. This streamer is one of a kind 3. This streamer is really special and different to others	Lee & Eastin, 2021
Popularity	1. This streamer has big fan following 2. This streamer has good performance track record 3. This streamer is likeable 4. This streamer is non-controversial public image 5. This streamer is role model	Gupta et al., 2017

Perceived sensitivity towards information overload	Information Processing Ability 1. When I watched this live stream shopping, I was able to process large amounts of information. 2. When I watched this live stream shopping, I used a variety of methods to process information. 3. When I watched this live stream shopping, I was capable of processing complex information. 4. When I watched this live stream shopping, I had the ability to process large amounts of information prior to making purchase decision. Sensitivity to Amount of Information 1. When I watched this live stream shopping, there was too many options for me to make a purchase decision. 2. When I watched this live stream shopping, there was too many options to choose from. Sensitivity to Available Time 1. When I watched this live stream shopping, there is not enough time to process the given information. 2. When I watched this live stream shopping, I have to process information hastily. 3. When I watched this live stream shopping, the time period to handle all information is too short. 4. When I watched this live stream shopping, I don't have the time to consider all information. Anticipation of Negative Affect 1. I feel confused when I am exposed to too much product information. 2. When I buy products, a wide range of information confuses me. 3. When I watched this live stream shopping, the available amount of information makes me feel overloaded. 4. When I watched this live stream shopping, the large volume of information is confusing. Anticipation of Mistakes 1. The amount of product information causes me to make mistakes in my purchase decision. 2. Due to too much information, I often make the wrong purchase decision. 3. The amount of information that I must understand has caused me to make the wrong purchase decision. 4. When confronted with too much information, I often select the wrong product.	Hunter et al (2024)

Appendix A: Measurement scales

Appendix B: Experiment stimuli

Study 1 video screenshots

Macro-streamer: ⟶
Chen He
He is a famous actor in China.
This 1-minute video clip comes from TikTok China (Douyin).

⟵ Micro-streamer:
Taobao seller
She is a small seller from Taobao and has her own shop.
This 1-minute video clip comes from Taobao.

There is no community interaction (danmaku) in the 1-minute video clips. Although some videos feature assistants, they primarily pass products or cook them, rather than sharing information or engaging with viewers.

Study 2 video screenshots

Macro-streamer: ⟶
Austin Li
He is a famous online celebrity in China.
This 1-minute video clip comes from Taobao.

⟵ Micro-streamer:
Taozi sister
She is a grassroot who promotes her own brand of hometown snacks.
This 1-minute video clip comes from TikTok China (Douyin).

There is no community interaction (danmaku) in the 1-minute video clips. Although some videos feature assistants, they primarily pass products or cook them, rather than sharing information or engaging with viewers.

Study 3 video screenshots

There are four 1-minute video clips: two include community interaction (danmaku), and two do not. Each respondent will view only one of the four clips. Although some videos feature assistants, they primarily pass products or cook them, rather than sharing information or engaging with viewers.

Study 4 stimuli designs

We designed two danmaku volume conditions: one matching the amount used in Study 3 (around 40 pieces), and a more intensive version with approximately 100 danmaku in the same 1-minute video clip. The danmaku amounts were manually adjusted to ensure consistency across the clip.

Appendix C: Exploratory Factor Analysis

Variables	Items	Factor loadings
Acceptance of endorsement	AE1	0.70
	AE2	0.75
	AE3	0.53
Continuance intention	CI1.	0.83
	CI2	0.91
	CI3	0.84
Purchase intention	PI1	0.78
	PI2	0.78
	PI3	0.76
Trust in live streaming process (adjusted)	Trust in product	
	TIP1	0.77
	TIP2	0.68
	TIP3	0.83
	Trust in streamer	
	TIS1	0.80
	TIS2	0.69
	TIS3	0.77
	TIS4	0.58
	Trust in platform	
	TIP1	0.68
	TIP2	0.61
	TIP3	0.35
Authenticity	Sincerity	
	SIN1	0.51
	SIN2	0.57
	SIN3	0.64
	Truthful endorsements	
	TE1	0.50
	TE2	0.39
	TE3	0.41
	TE4	0.42
	Visibility	
	VI1	0.68
	VI2	0.49
	VI3	0.82
	VI4	0.68
	Expertise	
	EP1	0.55
	EP2	0.75
	EP3	0.83
	EP4	0.63
	EP5	0.75
	Uniqueness	
	UN1	0.71
	UN2	0.90
	UN3	0.84
Perceived sensitivity towards information overload	Information Processing Ability	
	IPA1	0.64
	IPA2	0.78
	IPA3	0.79
	IPA4	0.71
	Sensitivity to Amount of Information	absolute value
	SAI1	0.45
	SAI2	0.40
	Sensitivity to Available Time	absolute value

	SAT1	0.73
	SAT2	0.80
	SAT3	0.81
	SAT4	0.71
	Anticipation of Negative Affect	
	ANA1	0.65
	ANA2	0.64
	ANA3	0.73
	ANA4	0.67
	Anticipation of Mistakes	
	AM1	0.81
	AM2	0.82
	AM3	0.79
	AM4	0.75

Chapter 4 Discussion and Conclusion

To conduct my research in a progressive manner, I outline five research questions in the introduction section. This chapter will summarise and explore findings from Chapter 2 and 3 in relation to these five research questions. Specifically, this chapter will integrate the findings from both manuscripts, demonstrating how they address the research questions and reflecting on their theoretical and practical contributions. Through the systematic literature review and empirical studies, my PhD research primarily focuses on (1) understanding the state of current knowledge on the commercial impact of live streaming and (2) uncovering the underlying mechanisms of streamer-viewer interactions that influence the commercial impact of live streaming. Additionally, I investigate how streamers interact with rapid community interactions and authenticity to maximise the effectiveness of live streaming commerce by influencing trust in the live streaming process. This, in turn, leads to positive behavioural and attitudinal responses, such as endorsement acceptance, continuance, and purchase intention. This chapter presents a summary of the key findings and addresses the research questions outlined in Chapter 1, followed by a discussion of the study's contributions and limitations.

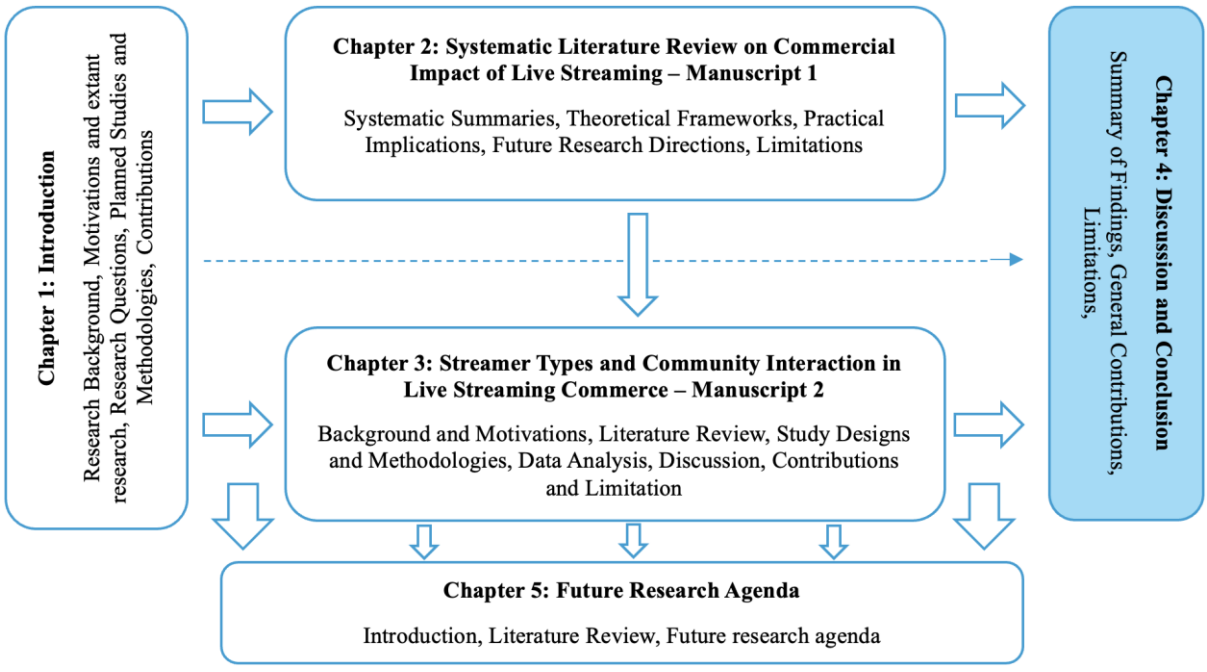

Figure 4.1 Thesis flow chart

4.1 Summary of Findings

Combining the systematic literature review in Chapter 2 with the four empirical studies in Chapter 3, the following is a summary of all the findings.

RQ1: What do we know about the state of current knowledge of commercial impacts led by user motivations and interactions in the context of live streaming?

RQ2: What theories, contexts and methodologies are used to examine the commercial impact of live streaming?

Live streaming, characterised by its real-time nature, facilitates dynamic interactions between streamers and viewers. Through the systematic literature review, I used the Theory-Context-Characteristic-Methodology (TCCM) framework (Paul & Criado, 2020) to integrate a dual Stimulus-Organism-Response (SOR) model of streamer-viewer interaction (Mehrabian & Russell, 1974). I reviewed 89 articles to examine their year of publication, research fields, journal titles, research foci, theoretical foundations, live streaming categories and platforms, and sample countries/regions. This comprehensive approach enables a thorough and insightful analysis of the existing body of knowledge. Chapter 2 provides an in-depth analysis of these interactions, categorising them into two primary dimensions: streamer-focused engagement and viewer-driven participatory behaviours, as shown in Figure 4.2.

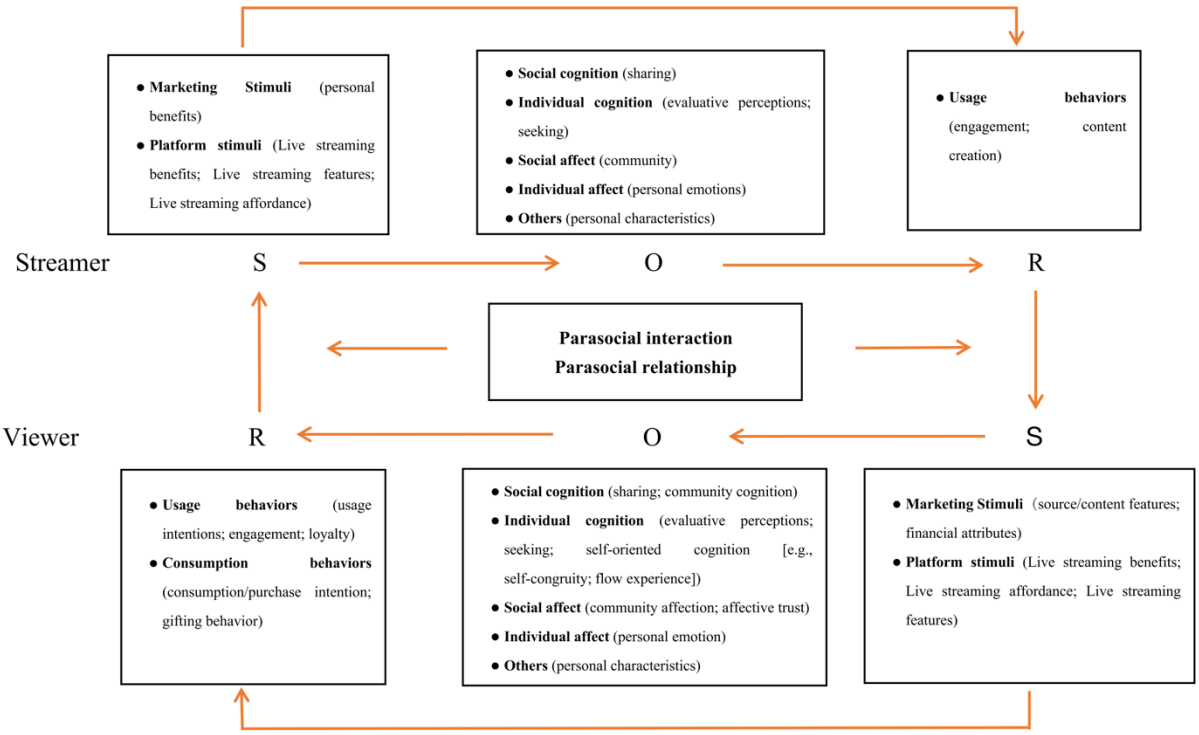

Figure 4.2 Integrated dual SOR model of streamer-viewer interactions and motivations

For the streamer-focused route, self-determination theory explains the intrinsic and extrinsic motivations that drive streamers to create content and broadcast (Törhönen et al., 2020). Intrinsic motivations arise from fulfilling basic psychological needs (Lin et al., 2021a; Törhönen et al., 2020), while extrinsic motivations are related to the benefits provided by live streaming, such as income and career development (Lin et al., 2021a; Törhönen et al., 2020). Extrinsic motivation is normally accompanied with intrinsic motivation to encourage behaviours (Deci and Ryan, 1985). In the dual SOR model, extrinsic motivation serves as the external marketing and platform stimuli, driving the streamer's internal cognitive and affective processes (e.g., sharing content and community-building), which ultimately leads to content creation and engagement. On the other hand, viewer-driven participatory behaviours include activities such as engagement, gifting virtual rewards, stickiness and purchase intention. These behaviours are motivated by a mix of external and psychological drivers, including entertainment, streamer characteristics, the desire for social connection and attachment, and the opportunity to gain recognition within the streamer's community. For example, virtual gifting is often linked to viewers' desire to stand out among the audience and capture the streamer's attention. Thus, when both streamers and viewers are exposed to environmental stimuli, they typically experience internal reactions (as organisms), ranging from co-presence to trust and attachment, which ultimately influence their final responses. Previous research has focused either on the streamer's pathway or the viewer's journey, rather than exploring the connection between them (Hilvert-Bruce et al., 2018; Törhönen et al., 2020).

Inspired by parasocial interaction, the dual SOR model shows the connection between these two routes and the commercial impact of live streaming. Parasocial interaction theory provides insights into the one-sided emotional bonds viewers develop with streamers, which further motivate participation (Xu et al., 2020). Over time, parasocial relationships are built between streamers and viewers (Quan et al., 2020). Specifically, streamers engage with viewers through verbal acknowledgments (e.g., addressing individual viewers by name), responding to real-time questions or comments, and creating content based on viewer feedback. These practices create a sense of immediacy and intimacy, enhancing viewers' perception of being seen and valued. Streamers may also use humour, storytelling, or shared activities (e.g., gaming or product demonstrations) to create a more personalised and entertaining environment. By employing these behaviours, streamers position themselves as accessible and relatable personas, fostering a sense of belonging among viewers. As a result, viewers encounter various stimuli from the streamer and platform, which lead to internal changes that ultimately influence

engagement and consumption behaviours. These behaviours, in turn, contribute to the streamer's income and career development motivations.

This systematic literature review sheds light on the interactions between streamers and viewers, driven by a combination of external stimuli and internal processes. By doing so, it lays a foundation for future research to explore the cultural, temporal, and contextual factors that shape these interactions, providing valuable academic and practical insights. While Chapter 2 offers a comprehensive framework of streamer-viewer interactions, it does not delve into specific topics, such as streamer types or the potential negative role of community interaction. For instance, while real-time engagement fosters intimacy, it can also create pressure on streamers to constantly perform and respond, potentially leading to burnout. On the viewers' side, high levels of interaction may result in information overload, where the rapid pace of comments and activities overwhelms their ability to process and engage meaningfully. Thus, Chapter 3 further explores these aspects while providing empirical data to address the following research questions 3 to 5.

RQ3: How do streamers employ authenticity to influence trust and consumer responses, such as acceptance of endorsement, continuance and purchase intention?

Authenticity is a key determinant of streamer success in live streaming commerce, as content that resonates with a streamer's genuine trust and drives consumer engagement (Liu et al., 2024; Kapitan et al., 2022). Chapter 3 explores this research question through two studies (Study 1 & 2), which examines the interplay between streamer types (macro vs. micro) as independent variables, trust in live streaming process (trust in product/streamer/platform) as mediator, and consumer responses as dependent variables (endorsement acceptance, continuance and purchase intention). The aim of Study 1 is to test the main effects and determine whether perceived trust acts as an underlying mechanism. Study 2 replicates and extends these results by using different streamers as stimuli and investigating the moderating role of streamer authenticity.

Study 1 tests the direct effect of streamer type on consumer responses and the mediating role of trust. The results reveal that macro-streamers generate stronger consumer responses, both directly and indirectly, by enhancing trust in the live streaming. Trust serves as an important mechanism through which streamer type influences endorsement acceptance, purchase intention, and continuance.

Study 2 extends and refines these findings by introducing authenticity as a moderating factor and testing its interaction with streamer type. The results indicate a nuanced effect:

- Micro-streamers (with smaller follower counts) who are perceived as low-to-moderate in authenticity generate more trust in the live streaming process, which in turn leads to stronger consumer responses.
- Macro-streamers, by contrast, drive positive consumer responses primarily by increasing trust in live streaming, rather than through perceptions of authenticity.

A critical insight from Study 2 is that authenticity functions as a moderator, while trust acts as an underlying mediator that translates perceived authenticity into consumer responses. This suggests that viewers are more likely to accept a streamer's product recommendations and engage in repeat purchases when they perceive the streamer as genuine and trustworthy. Interestingly, past research suggests that micro-streamers—despite often lacking the professionalism or expertise of macro-streamers —may cultivate trust by adopting exaggerated performance styles to capture audience attention (Tan et al., 2020). Although this study did not specifically measure this, the counterintuitive finding highlights that a lower level of perceived authenticity does not necessarily hinder trust; instead, it can enhance engagement in certain contexts.

Taken together, these studies reveal that while macro-streamers generally have greater trust and responses than micro-streamers, micro-streamers can work effectively on eliciting higher trust when they are perceived as having relatively lower authenticity.

RQ4: How does activating community interaction impact streamer effectiveness in live streaming e-commerce?

Community interaction is one of the defining features of live streaming platforms, fostering a dynamic and synchronous experience that distinguishes live streaming from traditional e-commerce or s-commerce (Hilvert-Bruce et al., 2018; Hu et al., 2017). Study 3 of Chapter 2 investigates the complex role of community interaction in shaping streamer effectiveness. The findings highlight both the opportunities and challenges associated with activating community interaction and provide insights into its nuanced impact on consumer responses. In live streaming commerce, community interaction often takes the form of barrage-style comments (danmaku), creating a sense of immediacy and engagement that allows viewers to actively participate in the stream, rather than passively consuming content (Zhao et al., 2024). For streamers, community interaction serves as a tool to foster relationships, enhance trust, and drive gifting, purchase, and engagement (Hilvert-Bruce et al., 2018). However, the

effectiveness of community interaction is not universal; its impact varies based on factors such as streamer type, interaction intensity, and audience composition.

Study 3 reveals that macro-streamers experience greater trust in live streaming, with endorsement acceptance, continuance, and purchase intent being driven by less community interaction. In contrast, micro-streamers gain trust regardless of whether community interaction is present. These findings contribute to the understanding of virtual community dynamics and consumer behaviour in digital environment. They highlight the importance of balancing interactivity and information clarity in live streaming commerce. While prior studies have primarily focused on the benefits of community interaction (Hilvert-Bruce et al., 2018; Zhou et al., 2019), this research provides a more nuanced understanding by identifying its boundary conditions and potential downsides.

RQ5: What role does community interaction (i.e., rapid-pace barrage danmaku) play in streamer effectiveness?

Study 4 of Chapter 3 explores the phenomenon of rapid-paced barrage danmaku that negatively impacts on streamer effectiveness in live streaming e-commerce. This study highlights the mechanisms through which excessive community interaction lowers trust and consumer responses. Study 4 identifies information overload as a critical factor that hinders the effectiveness of macro-streamers, who typically attract larger audiences and, consequently, more danmaku activity.

This study shows that rapid-paced danmaku induces information sensitivity, a condition where viewers struggle to process and prioritise the information presented during live streaming. This sensitivity creates a chaotic environment that can distract from the streamer's message and product presentation. The resulting information overload reduces viewers' ability to process relevant content, ultimately lowering their trust. Unlike a moderate level of community interaction, which fosters connection and engagement, excessive interaction overwhelms viewers and detracts from the overall shopping experience (Zhang et al., 2024; Zhao et al., 2024). Macro-streamers are particularly vulnerable to these effects due to their broader reach and higher visibility. With larger audiences, macro-streamers' live streaming often attracts an excessive amount of danmaku, creating an environment of visual and auditory clutter. This also diminishes a macro-streamer's ability to maintain authenticity, leading to reduced consumer trust and lower endorsement acceptance. When viewers join a stream hosted by a macro-streamer, they anticipate a professional and seamless shopping experience. Overloaded community interaction disrupts this expectation, resulting in frustration and

diminished trust. By contrast, viewers of micro-streamers often expect a more casual and interactive environment, making them less sensitive to danmaku intensity.

Study 4 reveals that rapid-paced danmaku, while a prominent feature of live streaming, can become a double-edged sword if left unmoderated. By uncovering the mechanisms through which overloaded interaction disrupts trust and consumer responses, this research offers valuable insights for streamers, platforms, and brands. It emphasises the importance of balancing interactivity to optimise the viewer experience, ultimately enhancing the effectiveness of live streaming commerce.

With Chapter 2 and Chapter 3, my PhD study provides an in-depth and comprehensive exploration of streamer-viewer interaction, including how it works, what are the key factors, what are the boundary conditions, and why some interactions may fail to be effective.

4.2 General Contributions

4.2.1 Theoretical Contribution

Stimulus-Organism-Response (SOR) model. Mehrabian and Russell (1974) introduced the Stimulus-Organism-Response (SOR) model to provide a comprehensive framework for understanding how environmental stimuli (S) influence individuals' cognitive and affective states (O) before shaping their behavioural responses (R). The SOR model is widely used in live streaming commerce (Chen et al., 2022b; Hu & Chaudhry, 2020; Kang et al., 2021; Li & Peng, 2021), compared to its relatively limited application in broader live streaming research. SOR as an overarching framework allows multiple theories to be applied simultaneously, such as flow, socio-technical system, and trust transfer theory (Li & Peng, 2021; Wongkitrungrueng & Assarut, 2020; Zhang et al., 2022). Building upon this foundation, Chapter 2 introduces a dual SOR model that incorporates both streamers and viewers, demonstrating a more comprehensive interaction and motivation loop. This model not only accounts for the distinct motivations of streamers and viewers but also illustrates how they connect through key mechanisms, specifically parasocial interaction (PSI) and parasocial relationship (PSR). By integrating PSI and PSR as central components, this extended SOR model in live streaming research, deepening the understanding of interactive dynamics in live streaming environments. It offers a valuable framework for future studies seeking to explore the reciprocal nature of streamer-viewer engagement and the underlying mechanisms driving their interactions.

Previous research on live streaming has predominantly focused on either streamer or viewer aspects in isolation (Hilvert-Bruce et al., 2018; Törhönen et al., 2020). For example, Hilvert-Bruce et al. (2018) investigated the motivations driving users to continue engaging with game live streaming, while Törhönen et al. (2020) explored why streamers persist in content creation. Existing studies typically treat streamers and viewers as separate pathways, failing to examine the interaction and motivation mechanisms that link them in the live streaming ecosystem (Chen, 2021; Guo et al., 2022; Jodén & Strandell, 2021). As shown in Figure 4.1, my original dual SOR model represents the first comprehensive framework to capture the interactive loop between streamer and viewer motivations and behaviours. Drawing on the Theory-Context-Characteristics-Methodology (TCCM) framework, my dual SOR model integrates environmental factors, internal experiences, and resulting commercial outcomes to illustrate the dynamic interactions in live streaming.

In detail, the process begins with streamers, shown in the upper-left corner of Figure 4.1. Streamers receive stimuli (S) such as career opportunities or virtual gifts and tips from viewers. These external stimuli influence their internal cognitive and emotional states (O), including perceptions of live streaming as a form of career development or personal expression. These internal shifts lead to responses (R), such as continued engagement with the viewers or the development of new content strategies. Similarly, viewers encounter platform- and streamer-driven stimuli (S), such as real-time interactions and streamer characteristics. These stimuli shape viewers' internal states (O), including cognition and affect at both social and individual levels. Ultimately, these internal shifts drive responses (R), such as increased engagement, tipping, or purchasing behaviours. Over time, parasocial interactions and relationships further reinforce this loop, creating a dynamic feedback system between streamers and viewers.

To illustrate the dual SOR model in action, consider live streaming pioneer “Lipstick King” (Austin Li) on Taobao. As a streamer, Austin Li initially had stimuli (S) such as career development potential and the financial incentives of live streaming. These external motivators led him to an internal realisation of personal satisfaction (O), including self-expression and viewer connection. His responses (R) involved creating engaging content and introducing cost-effective products. On the viewer side, platform affordances such as real-time communication and synchronous feedback (S) encouraged active participation during Austin Li’s live sessions. Viewers experienced cognitive changes (O), such as increased trust in the products showcased by him and stronger trust and attachment to his recommendations. These shifts translated into tangible responses (R), such as higher conversion rates and greater community involvement.

Over time, this mutual feedback strengthened the bond between Austin Li and his audience, solidifying the interactive ecosystem.

The dual SOR model extends beyond a traditional SOR framework by integrating Self-Determination Theory (SDT) and Uses and Gratifications Theory (UGT) to provide a more convincing explanation of dynamic interactions in live streaming. SDT addresses intrinsic and extrinsic motivations, and UGT examines media usage drivers. However, their application in live streaming contexts remains fragmented (Lin et al., 2021b; Sjöblom et al., 2017). The systematic review in Chapter 2 synthesises these theories to propose the integrated framework for understanding how live streaming meets users' intrinsic (e.g., enjoyment, self-expression) and extrinsic (e.g., monetary benefits, social recognition) needs. Although UGT primarily focuses on motivations for media usage, the dual SOR model provides a more comprehensive depiction of live streaming. It not only explains what live streaming offers but also explores how individuals engage through internal processes and the resulting behavioural responses. This model goes further to explore the bidirectional interaction between streamers and viewers, emphasising their internal experiences and motivations.

Influencer marketing. The insights derived from my PhD studies are vital in understanding the dynamics of influencer marketing, which are necessary components of live streaming strategies. Firstly, the systematic review (Chapter 2) provides a comprehensive analysis of the interaction mechanisms between streamers and viewers. The feedback loop in the dual SOR model offers a comprehensive framework for analysing the effectiveness of live streaming in influencer marketing from both streamer and viewer perspectives. This dual SOR model renders the influencer marketing process more complete because it also shows the motivation of streamers and the internal process of both parties, creating a more complete picture of live streaming interactions.

Second, Chapter 3 clarifies how different types of streamers – online and traditional celebrities as macro-streamers, and grassroots influencers or small sellers as micro-streamers—engage with their audiences. Understanding how community interaction functions with streamer types can further assist marketers in refining their strategies to enhance viewer stickiness and boost product sales. Specifically, the research highlights the critical role of community interaction in building authenticity and trust. Different from prior studies (Park et al., 2021; Rao Hill and Qesja, 2023), my research finds that relatively lower authenticity emerged for micro-streamers, which triggered better perceptions of trust in live streaming and drives more positive user responses, such as stickiness and acceptance. However, the role of fast-paced damaku can disrupt user stickiness and continuance intentions. This work extends

the understanding of influencer marketing by demonstrating that the presence of community interactions—such as information sharing, gifting notifications, and questions or comments via a barrage of floating danmaku—acts as a boundary condition that reduces the effectiveness of macro-streamers. This finding, which has not been previously identified, underscores the vulnerability of macro-streamers to information overload created by excessive community interaction. Such involvement does not significantly impact the effectiveness of micro-streamers. This research emphasises that the effectiveness of dynamic community interaction ultimately depends on the type of streamer, allowing them to strategically decide when to "switch on" or "switch off" community involvement to optimise outcomes.

Authenticity. Authenticity has emerged as a critical factor in influencer marketing, driving consumer trust and engagement (Kim & Kim, 2021). Chapter 3 highlights that perceived authenticity is influenced by both influencer type and the level of community interaction. Macro-streamers, with their larger followings, face unique challenges in maintaining the same level of personal interaction as smaller influencers. Previous studies suggest that micro-influencers are usually perceived as having higher authenticity (Park et al., 2021; Rao Hill & Qesja, 2023). I extend this idea about how both micro- and macro-streamers behave and the barriers to effectiveness they encounter. Authenticity is effective at yielding trust and user responses in live streaming context via two pathways: (1) micro-streamers who drive perceptions of relatively lower authenticity because of their exaggerated eye-catching performance and (2) macro-streamers without community interaction.

Interestingly, while increased interaction with a larger community might intuitively be expected to enhance authenticity, our findings reveal the opposite effect. Macro-streamers, due to the scale of their audience, may resort to more generalised and scripted interactions to manage the volume, which can be perceived as less authentic. This counterintuitive finding unveils a crucial aspect of authenticity: the quality of interaction outweighs the quantity. Authenticity must therefore account for the nature of community interactions in live streaming context due to real-time features. In fact, meaningful engagements, where streamers respond thoughtfully and personally, are more likely to foster authenticity than frequent but superficial interactions. This result challenges the traditional view by highlighting the need for a more nuanced understanding. Micro-streamers, with their smaller and more niche followings, often engage more deeply and personally with their audience (Lin & de Kloet, 2019; Marwick & Boyd, 2011). Their interactions tend to be more genuine, as they can afford to dedicate time and attention to individual followers. This deeper engagement builds stronger trust and a more

authentic connection. In contrast, macro-streamers must manage the complexities of maintaining authenticity while maintaining a larger audience.

Moreover, the findings suggest that authenticity is not solely the product of influencer performance but also of broader community dynamics. Influencers who foster a supportive and interactive community, where followers engage not just with the streamer but with each other, can be an effective way to enhance the overall perception of authenticity. This collective experience, rather than individual influence alone, should be integrated into authenticity theory to provide a more comprehensive understanding of how authenticity is constructed in live streaming contexts.

Information overload. Chapter 3 builds on the concept of information overload, which arises when individuals are exposed to excessive amounts of information that exceed their processing capacity (Furner & Zinko, 2017; Doucé & Adams, 2020). In the context of live streaming commerce, this manifests through intensive community interactions such as rapid danmaku (scrolling comments). Unlike asynchronous social media, live streaming commerce introduces real-time, high-volume interactions that exacerbate sensory and cognitive pressure. My research extends the theory of information overload by situating it within a synchronous interactive environment.

Different from previous research focused on the positive aspects of social interaction (Chen & Lin, 2018; Chen et al., 2022; Hilvert-Bruce et al., 2018; Hu et al., 2017), my findings highlight the nature of community interaction as a double-edged sword, where moderate levels of danmaku for macro-streamers (>100,000 followers) enhance trust and engagement but excessive levels create overload, leading to diminished trust and consumer responses. This finding verifies and expands prior research (Zhao et al., 2024; Zhang et al., 2024a), identifying similar dynamics in information overload and extending to more aspects, such as trust endorsement acceptance, continuance and purchase intent.

Chapter 3's results also contribute a nuanced understanding of information sensitivity, which captures the heightened perception of information as overwhelming. While information overload reflects an objective excess of information, sensitivity emphasises the subjective experience of being overwhelmed (Bansal et al., 2010). Through Study 4 in Chapter 3, I reveal that the pace and volume of danmaku as stimuli significantly heighten information sensitivity. Although live streaming fosters a stronger sense of community and engagement through continuous real-time interactions (Hilvert-Bruce et al., 2018; Giertz et al., 2021), a highly interactive environment with a large volume and fast pace of danmaku may lead to different reactions among viewers based on their level of information sensitivity. Previous studies only

used the count and length of these barrages to see their influences on sales. My study moves beyond previous research that primarily focused on objective results of overload, offering a more granular understanding of viewer experiences, such as endorsement acceptance and continuance intention. I also establish that increased information sensitivity harms consumer trust, which in turn mediates its negative impact on consumer responses. This connection between sensitivity and trust bridges cognitive and emotional dimensions, enriching theoretical frameworks, which also echoes the dual SOR model in Chapter 2 on how environmental stimuli affect internal process.

4.2.2 Methodological Contributions

As mentioned in Chapter 1, positivistic paradigm normally underpins quantitative methodology to find the general causal explanations. To answer my research questions properly, my PhD research applied a domain-based systematic literature review with Theory-Context-Characteristics-Methodology (TCCM) framework in Chapter 2 and quantitative research with four online experiments in Chapter 3.

Paul et al (2021)'s Scientific Procedures and Rationales for Systematic Literature Reviews (SPAR-4-SLR) focuses on *"what," "why," "when," "where," "who," and "how"* of systematic literature reviews. Systematic Literature Reviews are a state-of-the-art understanding of existing literature and a stimulating agenda to advance understanding in the future. *"What"* is about the nature of systematic literature review, consisting of domain- (e.g., structured theme-based reviews, framework-based reviews, bibliometric reviews, hybrid reviews, and conceptual reviews), theory-, and method-based reviews (Palmatier et al., 2018; Paul and Criado., 2020). "Why" is about the rationale of undertaking a systematic review because it can be either harmful or helpful to researchers depending on if the reason is suitable or not (Paul et al., 2021). A combination of different frameworks, such as Antecedents-Decisions-Outcomes (ADO), Theory-Context-Characteristics-Methodologies (TCCM), or ADO-TCM framework is recommended to gain a thought-out understanding of the breadth and depth of existing research. *"When," "Where," and "Who"* decides the quality and selection criteria of the systematic review. *"How"* is about the actual procedures to conduct the systematic review by using *"assembling," "arranging," and "assessing."*

In the Chapter 2, the TCCM framework systematically categorises studies based on theories, contexts, characteristics, and methodologies, allowing for a comprehensive evaluation of existing research and identification of gaps in live streaming research. Rather than limiting

within any specific field, this systematic literature review applies an interdisciplinary approach, including information management and systems, marketing, and business literatures to identify key factors and outcomes of the commercial impacts of live streaming. Thus, the contextual analysis within the TCCM framework highlights the generalisation of geographic, cultural, and technological settings of existing studies. For instance, the review identifies a predominance of studies conducted in Asian countries and calls for broader geographic representation. The systematic literature review also contributes to the integrated framework based on characteristics, rather than listing the related factors, which also brings contribution to the further development and the usage of domain-based review. Specifically, this review contributes to previous systematic literature review on live streaming (Li et al., 2020) via an interdisciplinary approach that generates the original and unique dual SOR model.

Moreover, unlike previous studies, Chapter 3 employed a robust methodology by adapting several live streaming shopping scenes as stimuli in experiments, offering a more vivid representation of the fast-paced nature of danmaku. I used experimental designs with live-streaming scenes, creating a highly realistic and dynamic simulation of live shopping environments inside the experimental setting. This approach also captures the fast-paced nature of danmaku, vividly illustrating how community interaction impacts trust and consumer responses.

4.2.3 Managerial Contributions

By strategically managing community interactions, brands can enhance the perceived authenticity of their influencers, thereby increasing viewer trust and loyalty. This is especially critical in an era where consumers are becoming increasingly discerning about the authenticity of influencer endorsements.

For influencers, brands, retailers and platforms, these insights offer practical guidelines for enhancing authenticity. Given the overwhelming flow of information from macro-streamers and their support teams, it is essential for both the streamer and the brand to prioritise high-quality interactions. Macro-influencers should focus on genuine engagement rather than attempting to respond to every comment. Platforms and tools that enable more personalised interactions—such as daily user sharing or structured Q&A sessions—can help bridge the authenticity gap. When partnering with streamers, brands need to carefully consider the type of influencer and their interaction style. Collaborations with micro-influencers might yield higher authenticity and trust among niche audiences (Rao Hill & Qesja, 2023), while macro-

influencers can be more effective for broad reach if they maintain strategic, authentic engagements. To maximise the effects of stickiness and diminish information overload, brands have to think about who can carry the role to best present authenticity and trigger trust.

This thesis provides two ways for marketers to approach influencer marketing. When using a micro-streamer, brands might gain more authenticity, but less reach and this kind of streamer is less likely to be disrupted by interaction frequency and amount. However, as micro-streamers gain exposure, they can quickly transition into macro-streamers. At this stage, businesses need to strategically determine the "medium" through which they want to build consumer attachment— be it the brand, the platform, or the streamer. On the other hand, macro-streamers offer broader reach but come with challenges, such as the potential information overload and more superficial interactions, which can lead to lower trust and reduced authenticity. Despite these challenges, the popularity of macro-streamers can deliver significant business returns, even in a single session. For example, Viya, a prominent macro-streamer in China, achieved 66 million CNY in selling New Zealand local products, such as Manuka honey and lozenges, within just one day in 2019 (NZ Herald, 2019). Also, the rapid development and growing popularity of live streaming accelerates the brand life cycle. The synchronous communication inherent in live streaming shortens the time it takes for consumers to progress from brand awareness to usage and loyalty— or to abandonment. These findings empower marketers to make more informed decisions when planning to incorporate influencer marketing into live streaming strategies.

What I present here is results from my PhD studies. Live streaming, influencer marketing, parasocial interaction, and information overload in social media deserve extensive attention in future research. The following section provides an analysis of existing limitations and possible future agenda.

4.3 Limitations and Future Research Directions

Despite the contributions of this research, limitations should be acknowledged to guide future research directions.

Firstly, as is typical in systematic literature reviews, this study only selected peer-reviewed English journal articles, which may exclude significant contributions from Chinese journals and conference proceedings. These sources might offer valuable and context-specific insights, particularly given the prominence of live streaming commerce in regions such as China. Moreover, the inclusion criteria prioritised articles published in highly ranked journals

on the ABDC list. While this ensures academic rigour, it may overlook journals that explore innovative or niche areas in live streaming commerce, such as Sun et al. (2019) and Zhao et al. (2018). Although the journals were not qualified for the inclusion criteria, these articles also brought meaningful insights into understanding developments within live streaming. Future systematic reviews could incorporate a broader range of sources to address these limitations and provide a more inclusive perspective on the field. Besides, the review primarily focused on common live streaming categories, such as shopping, game and entertainment, potentially overlooking other significant types such as educational, sports, and mukbang (eating) live streaming. These categories may have unique dynamics and implications for consumer behaviours and platform strategies as well. During the time of writing Chapter 2, these types of streaming were not as general as mainstream types. Future research could explore these types, especially mukbang live streaming, to achieve a more holistic understanding of live streaming's impact across varied contexts.

In Chapter 3, the empirical component of this research used a sample exclusively comprising Chinese live streaming commerce users recruited through the "Wenjuanxing" platform. While this approach ensured cultural relevance for the dominant live streaming commerce market based on the results from Chapter 2, it limited the generalisability of the findings to other cultural contexts and geographic regions. Consumer behaviours, perceptions of streamers, and platform engagement may differ in other regions, suggesting the need for cross-cultural studies. Cultural differences could act as moderators, offering opportunities to refine and expand the conceptual framework presented here.

Additionally, the experimental aspect of this research used one-minute video clips to maintain consistency across studies. While this approach controls for internal variability, it may not fully capture the complexity of live streaming commerce interactions, including real-time audience engagement, community-building activities, or long-term relationship development between streamers and viewers. Also, due to the experimental design, we were unable to precisely manipulate conditions to test for an inverted U-shaped effect. Future research could address this by treating interactivity as a continuous variable, enabling more accurate curve estimation. Using larger sample sizes and implementing field experiments that quantify the actual number of danmaku lines per minute would enhance statistical power in detecting second-order effects. Moreover, this thesis focuses on sole-streamer contexts and does not explicitly address co-streamer dynamics. Using co-streamers can enhance audience engagement by creating a more interactive and entertaining environment, while also helping to share the overloaded pressure of the streamer. However, having more than one streamer may

lead to extra information overload, as viewers may struggle to focus on who to follow or what message to prioritise. This duality reflects both value co-creation and value co-destruction potential in co-streaming formats. While this approach allowed for greater control over experimental design, it also limits the scope of analysis, as interactions between multiple streamers may create additional dynamics that shape authenticity, community engagement, and consumer decision-making. Future research should therefore investigate co-streamer settings to capture this added layer of complexity and provide a more comprehensive understanding of interactional processes in live streaming commerce.

Lastly, while this thesis made valuable contributions to understanding the commercial aspects of live streaming commerce, its scope was predominantly limited to consumer responses, streamer characteristics, and interaction dynamics within a commercial context. This focus overlooked the possible broader implications of live streaming strategy, particularly its potential to contribute to social impact. Live streaming commerce is not only a tool for transactions but also a platform that can foster meaningful social dialogues, raise awareness on critical issues, and promote sustainable or ethical consumer behaviours. For instance, streamers and platforms could play a key role in advancing corporate social responsibility (CSR) initiatives or encouraging community-driven actions, that is, value co-creation (Wang et al, 2024). However, these aspects remain underexplored in the present live streaming study and even underexplored in social media studies (Cammarota et al., 2023). Future research should investigate how streamers and live streaming can serve as a vehicle for social change, examining its role in supporting (co-creation) or disrupting (co-destruction) brand activism, driving inclusivity, and influencing societal perceptions of ethical consumption, such as the LGBTQ movements, feminism, and sustainability. Understanding these dynamics would provide a more comprehensive framework that integrates both commercial and social impacts, offering actionable insights for businesses and policymakers aiming to leverage live streaming for dual-purpose goals. Also, this extension could explore the interplay between commercial and social outcomes, such as how a brand's advocacy for social issues during live streaming influences consumer trust, engagement, and loyalty. Incorporating these dimensions would allow researchers to surpass the transactional focus and embrace a multidimensional view of live streaming as a powerful socio-commercial strategy.

Chapter 3, as my second manuscript, is currently under review. I have received much insightful feedback from previous rounds, such as incorporating the non-commercial impacts of live streaming and streamers, as well as conceptualising danmaku as a double-edged sword. These suggestions have encouraged me to think more deeply about possible solutions and

future research directions. Therefore, in the following chapter, I will probe how Chapter 2 and 3 in the commercial context open the door to clear need for future research in value co-creation, technology adoption, and social impacts that can further develop the extant theories, such as para-social relationship and SOR model within the novel context of live streaming and the usage of live streaming into a meaningful level.

Chapter 5 Future Research Agenda: Value Co-creation in Live Streaming Era

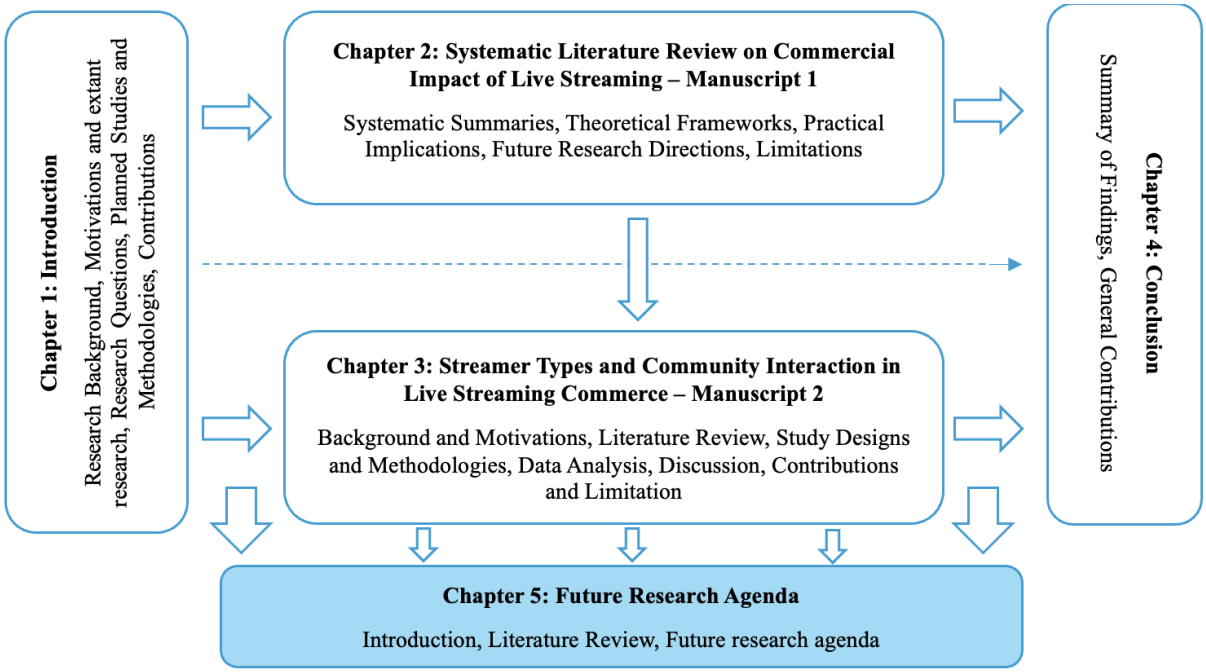

Figure 5.1 Thesis flow chart

5.1 Introduction of Future Research Agenda (Vo-creation and Live Streaming)

My PhD research primarily focuses on the commercial impact of live streaming rather than its non-commercial aspects. Chapters 2 and 3 highlight the fundamental role of streamer-viewer interaction in driving consumer responses to commercial goals. As discussed in the limitations and future research directions at the end of Chapter 4, future research must consider the role of streamer-viewer interactions in addressing responses in other settings, including social impact.

Scholars should embrace work on the 10 research directions outlined in Table 5.1 to probe for the future impact of streamer-viewer interactions and community effects in arenas beyond commercial implications. The trust viewers place in streamers indicates greater potential to curtate social impact, even via the e-commerce platforms many streamers currently operate within. The way live streamers and communities of viewers interact necessitates deeper examination of the creation of value that can be deployed beyond brand and product needs,

representing an important next step in studies of livestreaming contexts and results for consumer behaviour.

In the following pages, I provide an overview for the research directions listed in Table 5.1. The chapter examines (1) individual-level factors in live streaming co-creation, (2) live streaming strategy in value co-creation and social impact, and (3) ethical impacts of live streaming processes in co-creation.

Foci	Future research objectives
Individual level factors in live streaming co-creation	
Individual features	RO1: Individual-level factors should be explored to determine impact on value co-creation/co-destruction in the live streaming context.
	RO2: Researchers need to discover the role of streamers in co-creating social impact.
	RO3: Research needs to address the role of viewer's engagement in value co-creation within social movements through live streaming.
Live streaming strategy in value co-creation, social impact and brand activism	
Live streaming as an innovative tool	RO4: Scholars should build a model explaining how live streaming strategy shapes value co-creation.
Branding focused	RO5: Research to examine the role of brand in co-creation must explore how live streaming innovation alters the landscape.
	RO6: The role of live streaming should be examined in enhancing or hindering brand activism.
Ethical impacts of using live streaming in value co-creation	
Ethical concerns	RO7: Researchers should explore ethical impacts on streamer physical and mental wellbeing.
Technological concerns	RO8: Research should explore the role of virtual reality in live streaming to aid value co-creation.
	RO9: Scholars should discover how the use of AI yields value co-creation and/or value co-destruction in live streaming.
	RO10: Researchers should examine how the use of AI tools affects authenticity in live streaming.

Table 5.1 Future research objectives

Live streaming differs from traditional asynchronous media due to its real-time interactions, which strengthen parasocial relationships between users, including streamers, brands, and viewers (Xu et al., 2023a). Under service-dominant logic (SDL), consumers gain greater authority to shape and co-develop products, transforming them from passive recipients into active collaborators with brands and suppliers (Vargo & Lusch, 2004; Tajvidi et al., 2020). This process, known as value co-creation, allows consumers to influence product development and brand identity (Prahalad & Ramaswamy, 2004). Social media further amplifies this phenomenon by enabling consumers to generate and share content, reinforcing key aspects of co-creation: collaborative engagement, active participation in decision-making, mutual benefits, and the dual potential for both positive (co-creation) and negative (co-destruction) interactions. As discussed in Chapter 3, real-time danmaku (on-screen comments) can disrupt communication and authenticity for macro-level streamers, leading to cognitive overload and fatigue. This, in turn, fosters co-destruction behaviours, such as ignoring or withholding information, engaging in irresponsible behaviour (e.g., making negative comments about products or brand value), or demonstrating indifferent interactions (Ogunbodede et al., 2022). Both co-creation and co-destruction can occur in live streaming, making this an important area for advancing research on live streaming effects.

The outcomes of co-creation active participation and resource utilisation to achieve win-win results through interactions among participants (Jain et al., 2024; Laud & Karpen, 2017). In contrast, co-destruction arises when individuals misuse resources—either intentionally or unintentionally—or fail to coordinate their interactions, ultimately reducing the well-being of at least one party involved (Wang et al., 2024). Value is only created when participants, content, and context align effectively (Plé, 2016). Zadeh et al. (2019) categorise value co-creation behaviours into intra-role participation (e.g., information seeking and sharing, responsible behaviour, and personal interaction; Yi & Gong, 2013) and extra-role citizenship behaviour (e.g., feedback, advocacy, support, and tolerance; Gruen, 1995). Similarly, Silpakit and Fisk (1985) identify three forms of value co-creation: physical (e.g., watching or liking content), intellectual (e.g., direct communication), and emotional (e.g., actively building relationships). These levels of participation often follow a sequential pattern and are frequently observed in social media marketing, making them relevant for live-streaming studies (Wang et al., 2024; Pan & Lin, 2021).

Live streaming empowers viewers to become active participants by enabling real-time content generation and exchange with streamers. This interactivity fosters collaborative engagement, active decision-making, and mutual benefits. Both streamer characteristics and

consumer behaviours shape collaborative outcomes, either enhancing co-creation or triggering negative disruptions that lead to co-destruction. Investigating these dynamics provides deeper insights into the nature of real-time engagement. This leads to the first research objective from my thesis, as follows.

RO1: *Individual-level factors should be explored to determine impact on value co-creation and/or co-destruction in the live streaming context.*

Rather than merely serving as mass communication channels, streamers cultivate meaningful parasocial ties that influence consumer decision-making (Lou & Yuan, 2019; Bu et al., 2022; Jiménez-Castillo & Sánchez-Fernández, 2019). In this arena, influencers play a crucial role not only in driving commercial impact but also in shaping social activism, particularly in movements such as LGBTQ rights, gender equality, and Black Lives Matter (BLM). Despite its growing significance, the intersection of influencer marketing and social activism remains an emerging research area (Scharff, 2023). Co-creation between influencers, consumers, and social movements strengthens influencers' perceived authenticity and credibility while deepening their connection with followers (Thomas & Fowler, 2023; Wellman, 2022). During the 2020 U.S. elections, political campaigns leveraged live streaming to communicate directly with supporters, bypassing constraints imposed by COVID-19 lockdowns. Yu et al. (2023) confirmed that the synchronicity of live streaming, combined with a heightened sense of presence and co-presence between streamers and viewers, fosters political mindfulness and strengthens engagement.

Given limited research on streamers' roles in social impact, existing studies on influencer activism provide valuable insights. Lewis (2019) demonstrated that micro-influencers often exert a more substantial impact on social movements compared to mainstream media. Micro-influencers cultivate longer-term trust with their audiences through transparency and open dialogue, positioning them as authentic voices challenging mainstream narratives (Lewis, 2019). Similarly, Knupfer et al. (2023) found that young consumers with higher environmental awareness engage more deeply with "greenfluencers" on complex sustainability issues, whereas those with lower knowledge levels rely more on parasocial relationships with influencers to navigate environmental activism.

However, influencer activism also presents challenges that may lead to value co-destruction. The success of influencer-led social movements depends on interactivity, relatability, and authenticity— qualities that often require influencers to share personal vulnerabilities (Raun, 2018; Duffy et al., 2023). Streamers, unlike traditional influencers,

cannot easily control or filter audience feedback—especially when dealing with real-time comments such as danmaku. This challenge is particularly pronounced for female streamers, who often face disproportionate levels of online harassment. Sustained exposure to negative interactions can lead to psychological distress, demotivation, and decreased content production.

When streamers withdraw from engagement, their followers may also experience disengagement, reducing their ability to participate, share information, or offer mutual support. This disruption in communication and engagement can result in value co-destruction, as the co-creative process between influencers and followers breaks down. Importantly, while activism can enhance an influencer's credibility, a single post or campaign is insufficient for establishing long-term authenticity (Thomas & Fowler, 2023). Influencers must continuously demonstrate genuine commitment to the social causes they support rather than merely capitalising on trending issues. Building and maintaining this authenticity requires ongoing engagement, which places significant pressure on influencers to sustain their activist roles over time. If influencers fail to uphold consistent engagement, their activism risks being perceived as performative, potentially leading to audience skepticism and further instances of value co-destruction.

RO2: *Research is needed to examine the role of streamers in co-creating social impact.*

While consumers are undeniably key contributors to value co-creation, brands often struggle to identify and harness their influence. Effectively engaging consumers in co-creation requires brands to relinquish some control over their identity and narrative (Hatch & Schultz, 2010; Kennedy & Guzmán, 2016). Consumers are typically motivated to participate in brand co-creation by factors such as "social engagement, fun, brand identification, communication appeal, and brand commitment" (Kennedy & Guzmán, 2016, p. 320), particularly when commercial objectives take precedence. To my knowledge, no study has yet examined the consumer's role in social impacts within the live streaming context. Research can go further on learning this to help brand gaining non-commercial impacts as well.

Consumer co-creation behaviours can be categorised into two types: participation behaviour and citizenship behaviour. Participation behaviour involves actions such as information seeking, sharing, assuming responsibility, and engaging in interactions, whereas citizenship behaviour includes feedback provision, advocacy, helping others, and demonstrating tolerance (Yi & Gong, 2013). While citizenship behaviour is not a prerequisite for successful value co-creation, it enhances the value for both brands and consumers (Groth, 2005). Conversely, value co-destruction occurs when resources are misused, misaligned, or

missing, leading to negative outcomes such as withholding information, irresponsible behaviour, and impersonal interactions (Grönroos & Voima, 2013; Wang et al., 2024). In certain complex contexts, co-destruction is more prevalent than co-creation (Wang et al., 2024). As shown in this thesis, excessive real-time comments (e.g., "danmaku" spam) in live streaming can reduce the functional quality of interactions, while information fatigue can diminish engagement and overall interaction quality.

Grönroos and Voima's (2013) value creation model provides a useful framework for understanding these dynamics that researchers can begin this work with. This model conceptualises value creation as a collaborative process involving providers (e.g., brands, influencers, retailers), who produce resources as potential value, and consumers, who hold the real value. In this framework, value is co-created through interaction in a joint sphere, where the provider acts as both a facilitator and co-creator, while the consumer becomes a co-creator when actively engaged with the provider. Live streaming amplifies this process, positioning consumers not only as value creators but also as co-providers, as their content contributions, feedback, and real-time interactions directly shape brand and influencer narratives (Liu & Tan, 2023). Consequently, co-creation and co-destruction can coexist, depending on how users engage with the process (Smith, 2013; Echeverri et al., 2012).

RO3: *Research should address the role of viewer engagement in live streaming to co-create social movements.*

5.2 Live Streaming Strategy in Value Co-creation for Social Impact

Although individual factors play a crucial role in value co-creation for both commercial and social impact within live streaming, the strategic application of live streaming as an innovative engagement tool remains underexplored. Future research should further investigate its implications for fostering social change and driving sustainable consumer-brand relationships.

Live streaming enables viewers to engage remotely and participate in shared live experiences in real time (Hamilton et al., 2016). This capability facilitates the co-creation process among viewers, streamers, and other content providers by offering features such as meta-voicing, high visibility, responsiveness, real-time interaction, multi-screen displays, and personalization (Sun et al., 2019; Liu et al., 2024). These IT affordances not only enhance

consumer engagement but also enrich the overall co-creation experience. The distinctive value of live streaming is not solely attributable to its technological features; it also derives from the synergy between these affordances and real-time social interaction, which fosters a strong sense of immersion and self-presence among viewers. This dynamic strengthens interpersonal relationships within the virtual community (Chen et al., 2022b). Research indicates that, unlike physical interactions, individuals can form meaningful online relationships through sustained interaction, as exemplified by the parasocial relationships discussed earlier in this chapter (Shen et al., 2010).

RO4: *Scholars should develop a comprehensive model to explain how live streaming strategies shape value co-creation.*

Live streaming fosters real-time interaction among consumers and brands, amplifying psychological needs and boosting engagement. Consequently, the processes of brand co-creation and co-destruction are accelerated, influencing the brand lifecycle from initial attention to repositioning. Research to examine the role of brand co-creation could explore how live streaming innovation alters the landscape.

Brand co-creation today refers to the explicit value generated through experiences and activities tied to a brand, driven by social commerce features (Tajvidi et al., 2020; Merz et al., 2009). It emphasises that (1) brand value is collaboratively generated within a network of stakeholders rather than solely through individual relationships, and (2) it is continuously shaped through social interactions (Swaminathan et al., 2007; Merz et al., 2009). Consumer engagement in co-creation can also influence individuals' brand perceptions (Payne et al., 2009; Kamboj et al., 2018). The brand relations engagement platform is designed for co-creating brand activities, such as stakeholder connection, new offer marketing, product innovation, and customer support, and requires a trusting environment where participants feel free to create and share value (Ramaswamy & Ozcan, 2016; Kozinets et al., 2008). In this sense, a brand connects not only with customers' online brand experiences but also with broader civic communities, offering an "open brand" platform that fosters a "rough democracy of buying" (Simon, 2011; Ramaswamy & Ozcan, 2016, p. 97).

Live streaming introduces greater transparency and authenticity. Its inherent synchronicity allows immediate feedback, through real-time appraisals, support, complaints, or criticisms, that can significantly influence brand strategies and decision-making. Consequently, further research on how live streaming accelerates co-creation throughout the

brand life cycle, considering both its positive and negative impacts, is critical for scholars and marketers alike.

Brand co-creation offers consumers diverse opportunities to shape their identities and enhance engagement through social interactions, communication, and daily usage in both real and virtual environments (Iglesias et al., 2017). The outcomes of co-creation can vary depending on the involved parties. For example, Sarasvuo et al. (2022) suggest that brand value, identity, and meaning emerge mutually from both marketer and stakeholder perspectives. Consumers tend to focus on co-creating brand experiences, such as image, content, intimacy, and community identity, whereas marketers emphasise brand expression, including nomenclature, narrative, promise, and culture (Sarasvuo et al., 2022).

Existing studies have shown that different levels of co-creation can affect various stages of the brand life cycle (Orcik et al., 2013). Breakthrough co-creation at the introduction stage leverages early adopters and influencers to generate buzz and credibility, while high levels of co-creation during the growth stage foster community ownership, driving loyalty, advocacy, and sustained growth. At the maturity stage, however, value co-creation can either rejuvenate the brand or lead to decline, depending on consumer involvement. If a brand becomes complacent and fails to engage in high-level co-creation, consumers may shift their attention to more innovative alternatives. Engaging loyal customers in breakthrough co-creation efforts can enable brands to pivot or revitalise. In this context, live streaming—with its real-time interaction and authenticity—offers unique opportunities to accelerate the co-creation process throughout the brand life cycle.

RO5: *Research to examine the role of brands in co-creation should explore how live streaming innovation alters the landscape.*

Co-creation and live streaming can contribute far beyond commercial outcomes. While influencers typically present themselves as individuals, brands possess a greater capacity to drive social movements. The core of brand activism, especially in relation to co-creation, is authenticity (Vredenburg et al., 2020; Mirzaei et al., 2022; Sibai et al., 2021). If the activism is perceived as authentic, consumers are more likely to co-create and share value with the brand (Tressoldi et al., 2024). Conversely, if the activism appears inauthentic, brands risk backlash, as consumers may perceive it as "woke-washing" and subsequently boycott the brand— a clear instance of co-destruction (Tressoldi et al., 2024). Live streaming is already effectively employed in political events, such as during the 2020 U.S. elections, demonstrating its utility as a tool for brand activism. Its real-time, transparent interactions set it apart from

asynchronous media, presenting new opportunities and challenges, for co-creation in brand activism. Researchers could examine how live streaming strategies can enhance or hinder the co-creation process in brand activism and explore whether they have potential to transform superficial "woke-washing" into genuine, impactful activism.

Co-creating with socially conscious consumers who expect brands to contribute positively to societal issues offers an opportunity for brands to initiate activism and deepen relationships with their audiences. This engagement enables brands to better understand consumer values and informs future decisions about involvement in social causes.

Live streaming may revolutionise co-creation in brand activism by introducing real-time, transparent interactions that reshape how brands engage with social causes. Its immediacy enhances the authenticity of activist messaging, enabling genuine, co-creative partnerships with consumers and other stakeholders. This transformative medium not only accelerates feedback loops, thus mitigating the risk of "woke-washing", but also empowers brands to dynamically align their activist initiatives with evolving consumer values. As live streaming becomes increasingly prevalent in both commercial and social contexts, it offers a unique opportunity for researchers to investigate how these real-time interactions can either enhance or undermine the co-creation process in brand activism, ultimately altering the landscape of corporate social engagement.

RO6: *The role of live streaming could be examined in enhancing or hindering brand activism.*

5.3 Ethical Impacts of Using Live Streaming in Value Co-creation

Future research must address the ethical challenges and operational strains inherent in live streaming, particularly regarding online abuse, fatigue, and the pressure to maintain continuous consumer interaction. In 2018, a popular gaming platform Twitch streamer named Pokimane experienced a wave of online harassment and toxic comments after a clip of her streaming without makeup went viral, sparking a movement where other women streamers supported her by also streaming without makeup (Partis, 2018). Additionally, streamers such as xQc have openly discussed the mental toll and fatigue associated with constant engagement and public scrutiny in Twitch streaming (Billings, 2023). More recently, a 36-year-old Chinese female streamer suddenly died in a washroom after broadcasting through the whole night (Epochtimes, 2025). These real-world cases underscore the urgent need for frameworks that safeguard the mental and physical well-being of live streamers and promote ethical standards in online interactions.

Future studies should explore protective mechanisms and regulatory policies to mitigate online abuse and burnout while ensuring that the continuous, real-time nature of live streaming supports sustainable value co-creation in both commercial and social contexts. Formally, this emerges in Table 5.1 as Research Objective 7.

RO7: *Researchers should explore ethical impacts on streamer physical and mental wellbeing.*

5.3.1 Technological factors and concerns

Virtual and Augmented Reality (VR/AR) create realistic digital environments that offer both physical and psychological immersion. The degree to which a user's senses are engaged by a virtual environment directly influences their overall engagement with the experience (Gutierrez et al., 2008). Marketers in online shopping, entertainment, and gaming are developing virtual environments designed to stimulate all five senses (Price et al., 2013).

Immersion positively impacts value co-creation by linking it to gamification and personalised experiences (Luan & Phan, 2023), and this effect is enhanced by high-involvement virtual reality experiences (Cowan & Ketron, 2019). However, Pala et al. (2022) caution that VR exposure can lead to both positive and negative satiation depending on the duration of exposure, which in turn influences consumer engagement, stickiness, and overall well-being. The recent introduction of Apple Vision Pro marks a significant step toward the maturation of VR and AR technologies, positioning them as essential, accessible tools for marketers aiming to enrich user experiences.

While live streaming offers significant immersion through its unique IT affordances, parasocial connections, and real-time interactions (Lv et al., 2022; Sun et al., 2019), VR and AR can further heighten immersion and flow. This enhanced immersion may make co-creation more engaging and personally involving. However, as this thesis demonstrates, excessive community interaction can lead to information fatigue and role disconfirmation. This indicates that prolonged VR exposure may result in negative satiation, potentially triggering co-destruction. Scholars and practitioners may carefully consider the combined effects of VR and live streaming on value co-creation to maximise both commercial and social impacts.

RO8: *Research should explore the role of virtual reality in live streaming to aid value co-creation.*

The convergence of AI technology with live streaming has opened new frontiers for value co-creation, particularly through the rise of virtual streamers. This fusion is transforming

traditional marketing and entertainment landscapes, fundamentally reshaping the ways in which brands and consumers collaborate and generating a rich tapestry of co-created value.

Virtual influencers and streamers, which attract massive followings, are increasingly driving an innovative revolution in influencer marketing (Miao et al., 2021; Zhang et al., 2024b; Xu et al., 2024). Extant studies indicate that though consumers are aware of the fictional nature of virtual influencers, they are willing to engage with them because these AI-generated figures can convey emotions (Yu et al., 2024). Moreover, high-social AI streamers with real-time interaction capabilities similar to human streamers can effectively foster parasocial interactions (Zhang et al., 2024b). Several live streaming platforms have already begun incorporating AI streamers; for example, Kizuna AI, an AI-generated animated character, held the successful live concert "Hello, World 2022," which garnered significant attention. Similarly, Lil Miquela—a prominent virtual influencer—has collaborated with numerous brands, engaging millions of followers through social media interactions that often include audience participation (Drenten & Brooks, 2020), such as voting on content or contributing to creative projects, thereby demonstrating the power of co-creation.

However, the uncanny valley theory posits that as non-human entities (such as avatars or robots) become increasingly human-like, they may eventually evoke negative reactions due to intellectual uncertainty or discomfort (Mori, 1970; Mori et al., 2012). When AI streamers or virtual influencers become too realistic, viewers may experience discomfort that leads to rejection (Ho & MacDorman, 2010; Mori et al., 2012). Research on the role of AI streamers and virtual influencers in the value co-creation process remains in its early stages, with studies gradually emerging (Manser Payne et al., 2021). Scholars urgently need to explore the usage of AI in value co-creation or co-destruction with the live streaming context.

RO9: *Scholars should discover how the use of AI yields value co-creation and/or value co-destruction in live streaming.*

Influencers with varying characteristics influence co-creation behaviours and co-destruction outcomes in different ways. As this thesis shows, authenticity is a crucial characteristic—their authenticity triggers higher engagement, increased user loyalty, and greater participation in co-creation (Lou & Yuan, 2019; Chapter 3). But scholars argue that consumers may not perceive AI-generated and virtual avatars as authentic sources of information due to concerns about credibility, homophily, accessibility, and relatability. Extending insights from existing AI influencer literature to livestreaming shows some possible effects that research must be poised to explore. First, we know that AI influencers can construct

idealised identities, which can reduce their perceived authenticity (Lou et al., 2022). Koles et al. (2024) propose three dimensions for assessing the authenticity of AI influencer: true-to-ideal (TTI), true-to-fact (TTF), and true-to-self (TTS). *TTI* refers how well an individual's characteristics align with social standards (Moulard et al., 2021).

Because AI influencers are human-made creations equipped with social constructs, they can be authentic if their characteristics meet the influencer idea. AI influencers work more effectively when they are beyond their human-like appearance and have further emotions and creative behaviour (Koles et al., 2024). In contrast, they do not necessarily have to perform like human beings and can stay within their character storyline (Koles et al., 2024). *TTF* represents the extent to which the information provided by an individual aligns with real-world facts (Moulard et al., 2021). Since AI influencers are artificial creations, their authenticity is contingent on whether the creators disclose their virtual nature. Koles et al. (2024) emphasise the importance of transparency, particularly for virtual influencers that more closely resemble humans. In short, failing to disclose artificial origins can undermine trust. TTS authenticity assesses how well an entity's performance aligns with its intrinsic motivations rather than extrinsic goals (Moulard et al., 2021). As fictional and human-created entities, AI influencers' authenticity is transferred to their creators. If the creators focus on developing technology and building the characteristics of the AI influencer, consumers are more likely to perceive the AI influencer as authentic. Conversely, if the creators' focus is solely on exploiting trends and maximizing profits, this can lead to a perceived loss of authenticity (Koles et al., 2024). The authentic character or storyline can influence how followers perceive the creator's passion, thus impacting authentic motivation. However, the involvement of multiple creators in designing an AI influencer may reduce autonomy, potentially backfiring and decreasing the perceived authenticity of the AI influencer (Koles et al., 2024).

Despite these insights, research on AI influencers and streamers remain in its infancy. Questions regarding how AI-enabled influencers can authentically engage in value co-creation are largely unexplored. While consumers may be willing to engage with AI live streamers and influencers, the fictional nature of these entities may also contribute to co-destruction, as they are not interacting with a real human, leading to a sense of illusory connection. This raises several critical ethical questions: What is the boundary for realism, as outlined by the uncanny valley theory? How can AI influencers maintain authenticity while engaging in real-time co-creation? These are pivotal questions that must be addressed before marketers can fully use AI influencers or streamers for effective value co-creation. These questions converge on a central research objective: authenticity issues by using AI in value co-creation in live streaming.

RO10: *Researchers should examine how the use of AI tools affects authenticity in live streaming.*

5.4 Summary

My PhD research advances our understanding of live streaming commerce by systematically synthesising the current literature and empirically examining the dynamics of streamer–viewer interactions. By integrating diverse theoretical frameworks, the work of this thesis unveils the dual role of community interaction in shaping consumer trust and behavioural responses. The findings underscore that while authenticity, particularly in micro-streamers, fosters a deeper trust and engagement, excessive real-time community interactions can paradoxically diminish the effectiveness of macro-streamers because of overloaded information.

My research advances current understanding of live streaming commerce by integrating a novel dual SOR framework (Chapter 2) with an in-depth exploration of community interaction (Chapter 3). Methodologically, the combination of a systematic literature review with multiple empirical experiments provides a robust blueprint for examining the dynamic interaction between streamers and viewers. The findings not only enrich theoretical frameworks in consumer behaviour, influencer marketing, and information sensitivity but also offer practical insights for optimizing live streaming strategies in commercial results. Moreover, the research sets a clear agenda for future studies by highlighting the individual role in value co-creation in the live streaming context, the potential for effects of live streaming strategies on social impact that goes beyond commercial focus, and the use of emerging technologies such as AI and VR in live streaming.

Overall, my research makes significant contributions by mapping the current landscape of live streaming commerce and offering a clear research agenda to drive future examinations of live streaming. The implications of this research extend beyond immediate commercial benefits, potentially having broader social impacts by enhancing our understanding of online engagement and community building in an increasingly interconnected marketplace of ideas. Can we have an impactful concluding line to leave the examiners with.

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Appendix A: Abbreviation List

Abbreviations	Full spellings
SOR model	Stimulus–Organism–Response
TCCM framework	Theory–Context–Characteristics–Methodology
S-D logic	Service Dominant Logic
SDT	Self-Determination Theory
UGT	Uses and Gratification Theory
KOL	Key Opinion Leader
PSI	Parasocial Interaction
PSR	Parasocial Relationship
ADO	Antecedents-Decisions-Outcomes
CSR	Corporate Social Responsibility
VR	Virtual Reality
AR	Augmented Reality
TTI	True-to-Ideal
TTF	True-to-Fact
TTS	True-to-Self

Appendix B: Ethics Approval

Auckland University of Technology Ethics Committee (AUTEC)

Auckland University of Technology
D-88, Private Bag 92006, Auckland 1142, NZ
T: +64 9 921 9999 ext. 8316
E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

11 July 2022

Sommer Kapitan
Faculty of Business Economics and Law

Dear Sommer

Re Ethics Application: **22/160 Live streaming commerce is coming: how do streamers disrupt retail and influence consumers"**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC).

Your ethics application has been approved for three years until 11 July 2025.

Non-Standard Conditions of Approval

1. Amendment of the Information Sheet as follows:
   a. In the section on 'How do I agree' in the Information Sheet remove the third sentence as this is not possible for an anonymous survey.
   b. In the section on discomforts, remove the last sentence and replace with 'you can stop doing the survey at any time by exiting the survey but once the survey has been submitted withdrawal will not be possible.
   c. In the feedback section revise to say ' if you wish to view a summary of the findings these will be available on the "wenjuanxing platform' by following the link (the add URL here)

Non-standard conditions must be completed before commencing your study. Non-standard conditions do not need to be submitted to or reviewed by AUTEC before commencing your study.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the Auckland University of Technology Code of Conduct for Research and as approved by AUTEC in this application.
2. A progress report is due annually on the anniversary of the approval date, using the EA2 form.
3. A final report is due at the expiration of the approval period, or, upon completion of project, using the EA3 form.
4. Any amendments to the project must be approved by AUTEC prior to being implemented. Amendments can be requested using the EA2 form.
5. Any serious or unexpected adverse events must be reported to AUTEC Secretariat as a matter of priority.
6. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEC Secretariat as a matter of priority.
7. It is your responsibility to ensure that the spelling and grammar of documents being provided to participants or external organisations is of a high standard and that all the dates on the documents are updated.
8. AUTEC grants ethical approval only. You are responsible for obtaining management approval for access for your research from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

Please quote the application number and title on all future correspondence related to this project.

For any enquiries please contact ethics@aut.ac.nz. The forms mentioned above are available online through http://www.aut.ac.nz/research/researchethics

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat
Auckland University of Technology Ethics Committee

Cc: jojo921218@gmail.com; megan.phillips@aut.ac.nz

Auckland University of Technology Ethics Committee (AUTEC)

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2 November 2022

Sommer Kapitan
Faculty of Business Economics and Law

Dear Sommer

Re Ethics Application: **22/160 Live streaming commerce is coming: how do streamers disrupt retail and influence consumers"**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC).

Stage Two of your ethics application has been approved for three years until 11 July 2025.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the Auckland University of Technology Code of Conduct for Research and as approved by AUTEC in this application.
2. A progress report is due annually on the anniversary of the approval date, using the EA2 form.
3. A final report is due at the expiration of the approval period, or, upon completion of project, using the EA3 form.
4. Any amendments to the project must be approved by AUTEC prior to being implemented. Amendments can be requested using the EA2 form.
5. Any serious or unexpected adverse events must be reported to AUTEC Secretariat as a matter of priority.
6. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEC Secretariat as a matter of priority.
7. It is your responsibility to ensure that the spelling and grammar of documents being provided to participants or external organisations is of a high standard and that all the dates on the documents are updated.
8. AUTEC grants ethical approval only. You are responsible for obtaining management approval for access for your research from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

Please quote the application number and title on all future correspondence related to this project.

For any enquiries please contact ethics@aut.ac.nz. The forms mentioned above are available online through http://www.aut.ac.nz/research/researchethics

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat
Auckland University of Technology Ethics Committee

Cc: jojo921218@gmail.com; megan.phillips@aut.ac.nz

Auckland University of Technology Ethics Committee
(AUTEC)

19 April 2023

Sommer Kapitan
Faculty of Business Economics and Law

Dear Sommer

Re: Ethics Application: **22/160 Live streaming commerce is coming: how do streamers disrupt retail and influence consumers"**

Thank you for your responses to the conditions for the amendment to your ethics application.

The amendment to the data collection protocol (additional surveys) is approved.

Non-Standard Conditions of Approval

1. Remove the following sentence in the "How do I agree' section of the Information Sheet(s): If you choose to withdraw all your identifiable data will be remove directly',aAs there is no identifiable data in an anonymous survey

Non-standard conditions do not need to be submitted to or reviewed by AUTEC unless requested but must be completed before commencing your study.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the Auckland University of Technology Code of Conduct for Research and as approved by AUTEC.
2. All public facing documents must have the AUTEC approval number and be of a high standard of spelling and grammar. Dates on the Information Sheet(s) and Consent Form(s) must be consistent.
3. Any amendments to the project must be approved by AUTEC prior to being implemented.
4. A progress report is due annually on the anniversary of the approval date.
5. A final report is due at the expiration of the approval period, or, upon completion of project.
6. Any serious or adverse events must be reported to AUTEC, this includes unforeseen issues that might affect continued ethical acceptability of the project.
7. AUTEC grants ethical approval only. You are responsible for obtaining management permission for access from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

The application number and title need to be referenced on all correspondence related to this project.

All forms are available online http://www.aut.ac.nz/research/researchethics

For any enquiries, please contact ethics@aut.ac.nz

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat
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Auckland University of Technology Ethics Committee (AUTEC)

26 August 2024

Sommer Kapitan
Faculty of Business Economics and Law

Dear Sommer

Re: Ethics Application: **22/160 Live streaming commerce is coming: how do streamers disrupt retail and influence consumers"**

Thank you for your responses to the conditions for the amendment to your ethics application.

The amendment to include Study 3 (replication of study 2, with additional scales) is approved.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the Auckland University of Technology Code of Conduct for Research and as approved by AUTEC.
2. All public facing documents must have the AUTEC approval number and be of a high standard of spelling and grammar. Dates on the Information Sheet(s) and Consent Form(s) must be consistent.
3. Any amendments to the project must be approved by AUTEC prior to being implemented.
4. A progress report is due annually on the anniversary of the approval date.
5. A final report is due at the expiration of the approval period, or, upon completion of project.
6. Any serious or adverse events must be reported to AUTEC, this includes unforeseen issues that might affect continued ethical acceptability of the project.
7. AUTEC grants ethical approval only. You are responsible for obtaining management permission for access from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

The application number and title need to be referenced on all correspondence related to this project.

All forms are available online http://www.aut.ac.nz/research/researchethics

For any enquiries, please contact ethics@aut.ac.nz

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The AUTEC Secretariat
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Appendix C: Participant Information Sheet

Pre-test in Chapter 3 (Manuscript 2)

Participant Information Sheet

Date Information Sheet Produced:

7th June, 2022

Project Title

Live streaming commerce is coming: how do streamers disrupt retail and influence consumers?

An Invitation

I am Yujun(Jojo) Xu, a PhD candidate in Auckland University of Technology and the designer of this questionnaire. This research would be an important part for me to acquire my PhD degree. I would really appreciate your participation.

What is the purpose of this research?

The aim of this research is a pre-test, which will help the researcher to choose the suitable streamer images for following study about how streamer types and characteristics influence consumer engagement and purchase intention in live streaming commerce. The findings of this research will be used for my PhD thesis, academic publications, and presentations.

How was I identified and why am I being invited to participate in this research?

We are seeking Chinese participants who are older than 18 and have live streaming commerce experiences.

How do I agree to participate in this research?

Your participation in this research is voluntary (it is your choice) and whether you choose to participate will neither advantage nor disadvantage you. You can withdraw from the study at any time. If you choose to withdraw, you all identifiable data will be removed directly.

At the beginning of the questionnaire, we will present one question: "Thank you very much for your time and support, please indicate below if you agree to participate" with options "Agree and Disagree" to make sure that all respondents are happy and volunteer to participate.

What will happen in this research?

Following questions will include your live streaming commerce experience, your opinions about the match-up between streamer and product types, your perceptions of each streamer's characteristics, and demographic information.

What are the discomforts and risks?

This research would try to eliminate any discomfort and risk. However, there are some potential discomforts when it involves some basic personal information, such as income level and education level. Importantly, you will not be identifiable in the outcome of the research because it's totally anonymous and our questions will not target any personal or sensitive topics. In addition, you have the right to withdraw from the questionnaire at any time you want, and your data won't be collected.

What are the benefits?

This research may assist me in publishing journal articles and obtaining my PhD degree. And for research community, this research would help scholars to further develop the theoretical foundation of live streaming and live streaming commerce. And for marketers, it can help them to better understand and use live streaming strategy. As for live streaming commerce users, we can help them to have more fun and meet their needs, such as providing enough shopping guidance, streamer-viewer interaction and product introduction by choosing the correct streamer.

How will my privacy be protected?

In this "Wenjuanxing" platform, the responses of the survey will remain entirely anonymous. The data collected will be securely stored in such a way that only the researchers of the study will be able to gain access to it.

What are the costs of participating in this research?

Completing the questionnaire usually takes about 10-15 minutes.

What opportunity do I have to consider this invitation?

Until the pre-test is closed or meeting the expected respondent sample size.

Will I receive feedback on the results of this research?

You can contact the "Wenjuanxing" platform, and the platform will get in touch with the researchers, which ensure the privacy and anonymous for the respondents.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr. Sommer Kapitan, sommer.kapitan@aut.ac.nz, (+649) 921 9999 ext 5131

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, *ethics@aut.ac.nz* , (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet for your future reference. You are also able to contact the research team as follows:

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Dr. Megan Phillips, megan.phillips@aut.ac.nz

Yujun Xu, qqy8366@autuni.ac.nz.

Researcher Contact Details:

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Project Supervisor Contact Details:

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Approved by the Auckland University of Technology Ethics Committee on *type the date final ethics approval was granted*, AUTEC Reference number *type the reference number*.

Study 1 and 2 in Chapter 3 (Manuscript 2)

Participant Information Sheet

Date Information Sheet Produced:

17th Sep, 2022

Project Title

Live streaming commerce is coming: how do streamers disrupt retail and influence consumers?

An Invitation

I am Yujun(Jojo) Xu, a PhD candidate in Auckland University of Technology and the designer of this questionnaire. This research would be an important part for me to acquire my PhD degree. I would really appreciate your participation.

What is the purpose of this research?

The aim of current research is about how streamer types and characteristics influence consumer's acceptance of streamer's endorsement, continuance intention, and purchase intention in live streaming commerce. The findings of this research may be used for my PhD thesis, academic publications, and presentations.

How was I identified and why am I being invited to participate in this research?

We are seeking Chinese participants who are older than 18 and have live streaming commerce experiences.

How do I agree to participate in this research?

Your participation in this research is voluntary (it is your choice) and whether you choose to participate will neither advantage nor disadvantage you. You can withdraw from the study at any time. If you choose to withdraw, you all identifiable data will be removed directly. You can stop doing the survey at any time by exiting the survey but once the survey has been submitted withdrawal will not be possible

At the beginning of the questionnaire, we will present one question: "Thank you very much for your time and support, please indicate below if you agree to participate" with options "Agree and Disagree" to make sure that all respondents are happy and volunteer to participate.

What will happen in this research?

You need to watch a 1 minute pre-recorded live streaming video with the link provided. Following questions will include your acceptance of streamer's endorsement, continuance intention and purchase intention, your perceptions of each streamer's characteristics, and demographic information.

What are the discomforts and risks?

This research would try to eliminate any discomfort and risk. However, there are some potential discomforts when it involves some basic personal information, such as income level and education level. Importantly, you will not be identifiable in the outcome of the research because it's totally anonymous and our questions will not target any personal or sensitive topics. In addition, you have the right to withdraw from the questionnaire at any time you want, and your data won't be collected.

What are the benefits?

This research may assist me in publishing journal articles and obtaining my PhD degree. And for research community, this research would help scholars to further develop the theoretical foundation of live streaming and live streaming commerce. And for marketers, it can help them to better understand and use live streaming strategy. As for live streaming commerce users, we can help them to have more fun and meet their needs, such as providing enough shopping guidance, streamer-viewer interaction and product introduction by choosing the correct streamer.

How will my privacy be protected?

In this "Wenjuanxing" platform, the responses of the survey will remain entirely anonymous. The data collected will be securely stored in such a way that only the researchers of the study will be able to gain access to it.

What are the costs of participating in this research?

Completing the questionnaire usually takes about 8-12 minutes.

What opportunity do I have to consider this invitation?

Until the online questionnaire is closed or meeting the expected respondent sample size.

Will I receive feedback on the results of this research?

You can contact the "Wenjuanxing" platform, and the platform will get in touch with the researchers, which ensure the privacy and anonymous for the respondents. You can also book mark the following URL link for the final results: https://www.wjx.cn/vm/eGY4URt.aspx

What do I do if I have concerns about this research?

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Study 3 in Chapter 3 (Manuscript 2)

Participant Information Sheet

Date Information Sheet Produced:

13th March, 2023

Project Title

Live streaming commerce is coming: how do streamers disrupt retail and influence consumers?

An Invitation

I am Yujun(Jojo) Xu, a PhD candidate in Auckland University of Technology and the designer of this questionnaire. This research would be an important part for me to acquire my PhD degree. I would really appreciate your participation.

What is the purpose of this research?

The aim of current research is about whether community interaction can further influence consumer's preception of streamer characteristics, acceptance of streamer's endorsement, continuance intention, and purchase intention in live streaming commerce. The findings of this research may be used for my PhD thesis, academic publications, and presentations.

How was I identified and why am I being invited to participate in this research?

We are seeking Chinese participants who are older than 18 and have live streaming commerce experiences.

How do I agree to participate in this research?

Your participation in this research is voluntary (it is your choice) and whether you choose to participate will neither advantage nor disadvantage you. You can withdraw from the study at any time. If you choose to withdraw, you all identifiable data will be removed directly. Once the survey is submitted the data cannot be withdrawn as it is anonymous.

At the beginning of the questionnaire, we will present one question: "Thank you very much for your time and support, please indicate below if you agree to participate" with options "Agree and Disagree" to make sure that all respondents are happy and volunteer to participate.

What will happen in this research?

You need to watch a 1 minute pre-recorded live streaming video with the link provided. Following questions will include your acceptance of streamer's endorsement, continuance intention and purchase intention, your perceptions of each streamer's characteristics, community interaction and demographic information.

What are the discomforts and risks?

This research would try to eliminate any discomfort and risk. However, there are some potential discomforts when it involves some basic personal information, such as income level and education level. Importantly, you will not be identifiable in the outcome of the research because it's totally anonymous and our questions will not target any personal or sensitive topics. In addition, you have the right to withdraw from the questionnaire at any time you want, and your data won't be collected.

What are the benefits?

This research may assist me in publishing journal articles and obtaining my PhD degree. And for research community, this research would help scholars to further develop the theoretical foundation of live streaming and live streaming commerce. And for marketers, it can help them to better understand and use live streaming strategy. As for live streaming commerce users, we can help them to have more fun and meet their needs, such as providing enough shopping guidance, streamer-viewer interaction and product introduction by choosing the correct streamer.

How will my privacy be protected?

In this "Wenjuanxing" platform, the responses of the survey will remain entirely anonymous. The data collected will be securely stored in such a way that only the researchers of the study will be able to gain access to it.

What are the costs of participating in this research?

Completing the questionnaire usually takes about 8-10 minutes.

What opportunity do I have to consider this invitation?

Until the online questionnaire is closed or meeting the expected respondent sample size.

Will I receive feedback on the results of this research?

You can contact the "Wenjuanxing" platform, and the platform will get in touch with the researchers, which ensure the privacy and anonymous for the respondents. You can also book mark the following URL link for the final results: https://www.wjx.cn/wjx/design/previewmobile.aspx?activity=211141823&s=1.

What do I do if I have concerns about this research?

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Study 4 in Chapter 3 (Manuscript 2)

Participant Information Sheet

Date Information Sheet Produced:

1st August, 2024

Project Title

Live streaming commerce is coming: how do streamers disrupt retail and influence consumers?

An Invitation

I am Yujun(Jojo) Xu, a PhD candidate in Auckland University of Technology and the designer of this questionnaire. This research would be an important part for me to acquire my PhD degree. I would really appreciate your participation.

What is the purpose of this research?

The goal of this research is to explore why macro streamers (streamers with over 1 million followers, such as Austin Li) struggle to engage effectively with their community followers during live streaming. It also looks at why community interaction can influence information sensitivity (e.g., anticipation of negative affect that refers to the concerns that receiving a certain amount of information might lead to unpleasant feelings, such as confusion and overloaded), which further affect viewers' trust, how much they can accept streamer's recommendations, how often they return to the streaming services, and whether they decide to make a purchase. The results of this study might be used in my PhD thesis, academic papers, and presentations.

How was I identified and why am I being invited to participate in this research?

We are seeking Chinese participants who are older than 18 and have live streaming commerce experiences.

How do I agree to participate in this research?

Your participation in this research is voluntary (it is your choice) and whether you choose to participate will neither advantage nor disadvantage you. You can withdraw from the study at any time. If you choose to withdraw, you all identifiable data will be removed directly. Once the survey is submitted the data cannot be withdrawn as it is anonymous.

At the beginning of the questionnaire, we will present one question: "Thank you very much for your time and support, please indicate below if you agree to participate" with options "Agree and Disagree" to make sure that all respondents are happy and volunteer to participate.

What will happen in this research?

You need to watch a 1 minute pre-recorded live streaming video with the link provided. Following questions will include your perceived sensitivity towards information overload, acceptance of streamer's endorsement, stickiness on the live streaming service and purchase intention, your perceptions of each streamer's characteristics and demographic information.

What are the discomforts and risks?

This research would try to eliminate any discomfort and risk. However, there are some potential discomforts when it involves some basic personal information, such as income level and education level. Importantly, you will not be identifiable in the outcome of the research because it's totally anonymous and our questions will not target any personal or sensitive topics. In addition, you have the right to withdraw from the questionnaire at any time you want, and your data won't be collected.

What are the benefits?

This research may assist me in publishing journal articles and obtaining my PhD degree. And for research community, this research would help scholars to further develop the theoretical foundation of live streaming and live streaming commerce. And for marketers, it can help them to better understand and use live streaming strategy. As for live streaming commerce users, we can help them to have more fun and meet their needs, such as providing enough shopping guidance, streamer-viewer interaction and product introduction by choosing the correct streamer.

How will my privacy be protected?

In this "Wenjuanxing" platform, the responses of the survey will remain entirely anonymous. The data collected will be securely stored in such a way that only the researchers of the study will be able to gain access to it.

What are the costs of participating in this research?

Completing the questionnaire usually takes about 10-15 minutes.

What opportunity do I have to consider this invitation?

Until the online questionnaire is closed or meeting the expected respondent sample size.

Will I receive feedback on the results of this research?

You can contact the "Wenjuanxing" platform, and the platform will get in touch with the researchers, which ensure the privacy and anonymous for the respondents. You can also book mark the following URL link for the final results: https://www.wjx.cn/wjxdesignnew/designnew.aspx?version=7&openType=redesign&curid=276913118&nqt=&sguid=3b3054b8-5d5a-47ec-aff2-d8529480964e

What do I do if I have concerns about this research?

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