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I Want to View It My Way! How Viewer Engagement Shapes the Value Co-Creation on Sports Live Streaming Platform

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Abstract

This study focuses on sports live streaming platforms (SLSPs) that allow sports viewers to actively engage with various actors while watching sports live streams. By considering the influence of multiple actors, the study explores how different types of viewers perceive the value of their viewing experience. A structural model is developed and tested among four viewer groups who utilise SLSPs for sports event consumption. The findings demonstrate that the value propositions of all four actors significantly contribute to viewers' experiences, and each group of viewers can acquire unique perceived value from the viewing experience. The research highlights the substantial impact of viewer engagement behaviour on the value co-creation process. It emphasises the importance for SLSPs' operations managers to recognise the value propositions of diverse actors and the engagement behaviour of viewers, as this is crucial for tailoring viewing experiences and providing personalised services.

Key words: Value co-creation, Engagement behaviour, Platform economy, Sports live streaming platforms.

1. Introduction

In the emerging digital platform economy, IT-enabled online platforms have been built to enable a wide range of value co-creation activities in both business and social interactions (Martin and John, 2016). Platform-based business models have become ubiquitous across various domains, including sectors like online e-commerce services, video streaming services and ride-sharing platforms. These digital platforms have significantly simplified the lives of millions of individuals to such an extent. It is difficult to imagine modern life without them.

Sports live streaming platforms (SLSPs), as a new platform format, have fostered stronger connections between sports fans and their favourite teams and players. This was particularly evident during the COVID-19 pandemic, which led to the suspension of sports competitions starting in 2020. In the absence of in-person attendance, sports organisations collaborated with SLSPs to live stream matches and keep fans engaged. The advent of high-speed internet and digital technologies, such as VR and 360-degree views further enhanced the spectator experience beyond passive TV broadcasting. SLSPs, therefore, offered a digital, immersive, and interactive viewing environment (Kim & Kim, 2020; Liu et al., 2022b; Qian, 2021).

Unlike general social live streaming platforms, where streamers create video content to enhance the viewer experience based on their own performance, SLSPs primarily broadcast sports competitions that cannot be produced by individual streamers. However, there are multiple actors that contribute to the value co-creation network on SLSPs. Players generate sports event content, platforms deliver content and provide IT services, streamers enhance the content by providing game commentary and addressing viewer queries, and viewers contribute

1 by creating a vibrant atmosphere through real-time messages and virtual gifts (Liu et al.,
2 2022a). For SLSPs, co-creating personalised viewing experiences with multiple actors has
3 become an essential mission to engage sports viewers.

4 In traditional Goods-Dominant Logic, customers are passive end-users. The value of a
5 product is created by the business and distributed in the market through the exchange of goods
6 and money (Vargo, Maglio, & Akaka, 2008). However, Service-Dominant Logic (SDL) has
7 redefined how value is created in service-based businesses. Customers evaluate and determine
8 the value of propositions based on the specific ways they use services, known as ‘value-in-use’
9 (Vargo et al., 2008). In alignment with SDL, Sandström et al., (2008) introduce a framework
10 called ‘value-in-use through service experience’ to clarify the process of value creation within
11 technology-based services. They emphasise that customers’ individual and situational
12 judgments of services affect the service experience and influence the evaluation of value.
13 However, Sandström et al., (2008)’s framework focuses only on a dyadic relationship between
14 a service provider and customers, thus limiting its applicability for explaining value co-creation
15 in a platform context. According to SDL, value is co-created when customers integrate the
16 value propositions of multiple service providers with their own resources—such as
17 competencies, knowledge, abilities, and skills—in a service ecosystem (Akaka et al., 2013;
18 Lusch & Nambisan, 2015). Clearly, multiple actors are involved in the ecosystem of SLSPs to
19 enhance viewers’ experiences. Meanwhile, viewers engage with SLSPs through activities such
20 as gifting and real-time messaging or simply observing the performance of players. These
21 interactions allow them to connect with fellow viewers, streamers, and players, thereby

1 personalising their viewing experience. Hence, viewers can integrate various resources, such
2 as attention, knowledge, and time, with the value propositions of other actors through
3 engagement behaviour, ultimately co-creating a unique perceived value for themselves.

4 Past research indicates that customer engagement behaviour plays a vital role in value co-
5 creation. Customers may contribute resources to extensive networks in varied ways and acquire
6 a unique value from their service experience through engagement behaviours (Jaakkola &
7 Alexander, 2014; Liu et al., 2022b; Liu et al., 2022). For example, Jaakkola and Alexander
8 (2014) identified four types of engagement behaviours for value co-creation: augmenting,
9 codeveloping, influencing, and mobilizing. Liu et al. (2022) investigated how viewers'
10 engagement behaviour contributes to the co-creation of value between customers and streamers
11 on sports live streaming platforms, using a microfoundations approach. They identified five
12 types of value co-creation activities: 1) commentating on matches; 2) building friendships; 3)
13 addressing questions; 4) reprocessing content; 5) maintaining the environment. Through these
14 activities, viewers and streamers acquired unique perceived values (Liu et al., 2022). Utilising
15 behavioural big data, Liu (2022b) classified SLSPs viewers into four types: content consumers,
16 super co-creators, co-creators, and tourists. They attempted to illustrate value co-creation
17 process through user typologies using a qualitative approach. However, further quantitative
18 analysis is needed to determine the extent to which these multiple actors impact the perceived
19 value of viewing experiences for each viewer type. Consequently, this study aims to explore
20 the value co-creation process for SLSPs viewers, enabling firms to offer tailored and
21 personalised services. To accomplish this goal, the study incorporates both Sandström et al.

(2008)'s framework and the viewer typology suggested by Liu et al. (2022b). This approach aims to examine how various types of viewers perceive the value of their experience, taking into account the impact of multiple actors.

This study addresses the following research questions (RQs):

RQ1: How do different actors influence the experience of each SLSP viewer group during live-streamed sports events?

RQ2: What is the perceived value derived from the viewing experience for each viewer group?

The remaining sections will first review the relevant literature and an outline of proposed research model. Next, the analysis and results will be presented. Finally, a conclusion and discussion of this study will be provided, suggesting avenues for future research.

2. Literature review

2.1 *The sports in the platform economy*

The expansion of platform businesses has been driven by the development of internet, mobile technologies, artificial intelligence, Big Data analytics and so forth. These advancements, coupled with evolving consumer preferences and consumption behaviours, have played a crucial role in fuelling platform businesses growth (Wirtz, et al., 2019; Ghouri et al., 2022). Platform business models encompass a diverse range of types, including search, communication, social media, matching, content, review, booking aggregation, retail, payment, crowdsourcing, crowdfunding, and development platforms (Wirtz et al., 2019). It is worth

1 noting that these ‘pure’ platform types can be combined, allowing for the integration of
2 multiple functionalities within a single platform (Wirtz et al., 2019). For instance, a social
3 media platform may incorporate features like communication, content sharing, retail, and
4 payment.

5 In recent years, the widespread adoption of smartphones, 5G, and Wi-Fi has led to a surge
6 in the number of social live streaming services (SLSSs) all over the world. These services are
7 notable for their ability to enable viewers to engage remotely and participate in shared live
8 experiences (Hamilton et al., 2016). Hou et al. (2019) highlight two features of live streaming.
9 The first is social real-time interaction among viewers and streamers. The second feature
10 centres on a new monetisation model involving the consumption of virtual gifts. Streamers
11 attract viewers and earn money by receiving virtual gifts, which are then converted into cash
12 and contribute to the revenue shared between the streamers and the platform (Guan, Hou, Li,
13 Phang, & Chong, 2021). According to the content provision, SLSSs can be categorised as topic-
14 specific (e.g., Twitch for gaming) and general (without any thematic limitation) (Friedländer,
15 2017). SLSPs fall under the category of topic-specific SLSSs, focusing on providing viewers
16 with live-streamed sporting events and other sports-related content.

17 SLSPs allow viewers to transition from traditional means of watching sports content (via
18 dedicated sports channels on television) to digital methods involving internet streaming via
19 mobile phones, tablets, and other internet-connected devices. SLSPs also feature social
20 communication elements, allowing viewers to join their favourite streamer’s room and engage
21 with both the streamer and other viewers by sending real-time messages and virtual gifts (Liu

et al 2022a).

SLSPs operate as multi-sided markets, connecting multiple user groups, which reflect the network effects of the platform business (Van Alstyne, Parker, & Paul Choudary, 2016). They bring together sports viewers on one side and sports content providers (e.g., sports leagues) or reproducers (e.g., individual streamers) on the other side. SLSPs enable and facilitate the co-creation of value among viewers, content providers, and content reproducers. Viewers contribute their attention, engagement, and financial support; content providers supply live sports events content; content producers enrich the content with their professional commentary; and the platform companies provide the technologies (e.g., the 360-degree view, the multi-screen display, and virtual reality environment). The collaborative process enhances the overall experience: viewers gain access to a wide range of sports events, while other parties benefit from exposure and monetisation opportunities. Sports viewers are provided with a real-time, engaging, and interactive spectatorship experience. Unlike traditional TV broadcasts, where viewers passively receive the event interpretation from anchors, SLSP viewers can actively participate. Not only can they watch the sports event, but they can also express support for their favourite teams or offer constructive criticism of opponents (Liu et al., 2022a). Through real-time messaging, SLSP viewers can engage positively with streamers and fellow viewers, fostering a sense of community and shared enthusiasm for the sport. SLSPs can analyse viewer preferences and behaviour to personalise the viewing experience, recommend relevant sports content, tailor advertisements, and provide targeted promotions to enhance the viewers' viewing experience. They can employ various revenue streams to sustain their operations,

including advertising, sponsorship deals, subscription fees, or partnerships with sports organizations (Wohn & Freeman, 2020; Liu et al., 2022a).

2.2 The process of viewers value co-creation

A fundamental premise of SDL value co-creations in service systems are service interactions (Vargo & Lusch, 2004; Vargo & Lusch, 2008). Service providers cannot deliver value unilaterally; they can only offer value propositions. The actual value (value-in-use) is always evaluated and determined by the beneficiary based on how they integrate the value proposition of the service providers with their own resources (competencies, knowledge, abilities, and skills) based on usage (Vargo & Lusch, 2010; Vargo, 2009). Value co-creation, therefore, is a process in which consumers play an active role and co-create value with the firm (Prahalad and Ramaswamy 2004). The customer is no longer seen as the end of the value chain but as a value co-creator, signaling a shift from product-dominant logic to SDL (Vargo & Lusch, 2004; Vargo & Lusch, 2008).

In line with SDL, Sandström et al. (2008) developed a ‘value-in-use through service experience’ framework and attempted to explain value creation through service experience in technology-based services. Originally, Sandström et al. (2008) framed value-in-use as a process where customers experientially evaluate a firm’s value proposition (the functional and emotional attributes) in accordance with their individual motivation (i.e., competencies, actions, processes, and performances). In the ‘value in use through service experience’ framework, Sandström et al. (2008) presented that physical and technical enablers, such as technology and physical products, form the foundation of tangible value propositions, which

are the service functions available to customers. The emotional value proposition is considered intangible and provides non-physical features, such as mental images, brand reputation, and themes. During the value co-creation process, customers play both individual and situational roles. The individual and situational filter encompasses all factors related to the individual user and the specific situation they are in, influencing the service experience. These factors can range from demographic dimensions to the user's competencies, skills, and surrounding environment. As a result, the individual and situational filter has the potential to affect the evaluation of the service experience and the perceived value derived from it.

Although Sandström et al. (2008)'s framework initially conceptualises a dyadic relationship in which the customer co-creates value with technology-based services, this framework fails to explain the value co-creation process in service networks (Woratschek et al., 2014; Vargo & Lusch, 2016). Consistent with the SDL approach, SLSPs enable interactions and value co-creation to be two-way or multi-way, not solely initiated by platform businesses. In the study of SLSPs, researchers have revealed complex operational mechanisms involving multiple actors (e.g., players, platforms, streamers, and other spectators) and various activities (e.g., gifting and real-time messaging) (Liu et al., 2022a; Liu & Tan, 2023). Meanwhile, Liu et al., (2022a) identified 10 value propositions, including streamer endorsements, information quality, and player performance, among others, provided by multiple actors through topic modelling analysis based on SLSP viewers' behavioural data. In addition, value-in-use depends not only on personal states of mind or demographic characteristics but is also impacted by viewers' engagement in a service (Ranjan & Read, 2016; Merz et al., 2018). As defined by

Ranjan and Read, (2016), value-in-use is the “customers’ experiential evaluation of service proposition in accordance with their individual motivation, specialised competencies, actions, processes, and performances” (pp, 293). It is worth highlighting that engagement behaviours also play an important role in value co-creation.

Kumar et al. (2010) state that customer engagement behaviour is a mechanism that allows customers to add value to organisations through both transactional and non-transactional behaviours via interaction and participation. Engagement behaviours on SLSPs can refer to the actions and interactions of viewers while watching sports events on online streaming platforms, such as viewing, gifting, voting, and sending real-time messages, among others (Liu & Tan, 2023). Using the behavioural big data, Liu et al., (2022b) classified SLSPs viewers into four groups based on their engagement behaviours:

(1) Content consumers — longest viewing duration without real-time messaging and gifting;

(2) Super co-creators — relatively long viewing duration with real-time messaging and gifting;

(3) co-creators—relatively long viewing duration with only real-time messaging;

(4) Tourists — shortest viewing duration time and without messaging or gifting.

Liu et al., (2022b) also identified the different perceived values that each type of viewer acquired, based on qualitative data obtained from semi-structured interviews. Although the qualitative data provided insights into how each type of viewer co-creates value with multiple actors in the community, a quantitative study (e.g., survey) is required to offer a more

comprehensive understanding (Liu et al., 2022b). This study responds to the research call to examine the value co-creation process through quantitative means.

2.3 Conceptual model

2.3.1 Actors' value propositions and viewing experience.

The first research question aims to explore the main actors' contributions to viewers' experiences on SLSPs. According to Gupta and Vajic (1999), a service experience can be described as the sensations and knowledge that occur through interactions with various aspects of a context established by a service provider. In existing literature, researchers have found that many actors are involved in creating value propositions for sports viewers: players competing in the matches, on-site spectators contributing to the atmosphere, organizations planning sports events, IT companies offering technical support, and so forth (Kim & Kim, 2020; Liu et al., 2022a; Wohn & Freeman, 2020). Consistent with SDL, the current study argues that value in SLSPs is contributed by multiple actors with whom viewers interact, both directly and indirectly, and who facilitate the creation of meaningful experiences (Vargo & Lusch, 2016). However, one study cannot encompass all the actors who may contribute to viewers' experiences. Four types of actors (two for direct interactions and two for indirect interactions) considered important for value co-creation are chosen for this study (Liu & Tan, 2023).

In SLSPs, the direct interaction of value co-creation encompasses both streamer-to-viewer and viewer-to-viewer value co-creation. Streamers, as a new type of internet celebrities, have gained popularity on live streaming platforms (Geng, Wang, Chen, Song, & Yu, 2020). Streamers' endorsements can influence fans' value formation and purchasing decisions. For

example, research on social commerce and live streaming has studied the role of streamers' attractiveness and expertise in driving consumer intentions (Chen & Lin, 2018; Interfaces, 2021; Wang et al., 2021; Guan et al., 2021). Streamers are known to enhance positive impressions of a product or service in customers' minds (Hassan et al., 2016; Guo et al., 2022). In the SLSP community, streamers establish unique commentating styles, such as exhibiting humour through facial expressions and vocal tone (Liu et al., 2022). They also conduct quizzes and cheer along with viewers to intensify the viewing experience (Kim & Kim, 2020). These activities help viewers recover from daily stresses and enrich their leisure time.

Apart from interactions with streamers, viewers also directly interact with fellow viewers. They enthusiastically answer questions, post new information, send virtual gifts, and cheer for players in conjunction with the online fan community (Pongsakornrungrungsilp & Schroeder, 2011; Liu et al., 2022; Li et al., 2020). In this context, viewers act as experience providers through their enthusiastic behaviour (Kim et al., 2019; Qian et al., 2020; Zagnoli & Radicchi, 2010; Qian et al., 2020). Kim et al., (2019) describe passion as "other customers' emotionally expressive behaviours caused by a state of strong positive arousal during spectator sport consumption" (p.3). In SLSPs, even viewers who do not interact with streamers and other viewers may still be impacted by reading and watching the messages, comments, and virtual gifts sent by other viewers. Therefore, we propose that:

Hypothesis 1a: streamer endorsement is significantly correlated with all types of viewers' experience of watching sports events on SLSPs.

Hypothesis 1b: viewer passion is significantly correlated with all types of viewers'

1 experience of watching sports events on SLSPs.

2 Regarding indirect interactions, players are not on the platform and cannot interact directly
3 with viewers. However, viewers discuss and comment on players' performance by sending
4 real-time messages while watching their matches on live streams. Therefore, player
5 performance is an indispensable factor that shapes viewers' experiences (Liu & Tan, 2023).
6 The players' performance refers not only to the win or loss of a game but also to the enthusiasm
7 the player devotes to the game (Kolyperas, Maglaras, & Sparks, 2018). The viewing experience
8 of viewers, whether they interact or not, can be impacted by the players' performance (Liu et
9 al., 2022a).

10 The platform company may not interact with viewers through direct dialogue, but it does
11 provide information services that affect the viewing experience. SLSPs offer various
12 technology-based services, including a mobile app, 360° view, angle-switching capabilities,
13 and a simple, concise interface that allows viewers to access a wide range of sports content.
14 The 'information quality' of SLSPs pertains to the timeliness, accuracy, comprehensiveness,
15 conciseness, and relevance of the information provided, aligned with viewer expectations.
16 High-quality information enhances the customer's live streaming experience (Xu, Wu, & Li,
17 2020). We propose that:

18 Hypothesis 1c: player performance is significantly correlated with all types of viewers'
19 experience of watching sports events on SLSP.

20 Hypothesis 1d: Platform information quality is significantly correlated with all types of
21 viewers' experience of watching sports events on SLSPs.

2.3.2 Experience and perceived value in engagement

Perceived value refers to customers' holistic and subjective assessment of the overall worth and benefits they believe they derive from a service experience (Li & Shang, 2020). A plethora of studies have investigated consumer-perceived value, identifying various dimensions depending on the focus of each study. For instance, the theory of consumption values proposed by Sheth, Newman and Gross (1991), outlined five multi-dimensional consumer's perceived value concepts, which are functional value, social value, emotional value, epistemic value, and conditional value. Kunkel et al. (2017) introduced a conceptual framework for consumers' perceived value in sport team games, featuring five dimensions: functional, emotional, economic, social, and epistemic value. Furthermore, Horbel et al. (2018) argue that value co-creation in sports service management has evolved to focus on more than just consumers' purchasing power and the functional aspects of products. It also delves into the symbolic meaning of the consumption experience. This study narrows its focus to three types of perceived value—social value, emotional value, and epistemic value—to explore viewers' value-in-engagement in SLSPs, drawing on prior research in sports management and live streaming services.

Social value in the sports is identified as '*the utility derived from the ability of sport team game consumption to enhance social self-capital*' (Kunkel et al., 2017). According to social identity theory, social identity comprises two levels (Turner & Oakes, 1986). The first level pertains to an individual's sense of self, while the second relates to the social identity linked to groups with which an individual associates or forms bonds (White, Argo, & Sengupta, 2012).

Huang and Benyoucef (2013) argue that users' self-identity can be strengthened through interactions in online communities, as sharing knowledge and feeling recognised within the community can be enjoyable. This self-identity is shaped through self-expression and self-presentation, which, in turn, leads to peer recognition and group acceptance (Schau & Gilly, 2003; Kunkel et al., 2017).

In live streaming, sports viewers can easily share their opinions and express support to players and streamers through real-time messages in chat rooms (Qian et al., 2020). As a result, viewers' self-presentation might make them noticeable to streamers and fellow viewers (Guan et al., 2021). The second level of social value arises from social interactions and involves the need to connect with people who share common interests. This interaction between viewers and streamers fosters a sense of proximity, i.e. viewers' perceived closeness to the streamer (Guan et al., 2021). Meanwhile, the interaction between like-minded individuals leads to a sense of community (Vale & Fernandes, 2018; Guan et al., 2021; Hilvert-Bruce et al., 2018; Hamilton et al., 2016). In addition, in a live streaming social commerce study, Wongkitrungrueng and Assarut (2020) suggest that shoppers may identify with sellers based on shared preferences and tastes, including appearance, attitude, charisma, and talents. In the sports context, team or player identification reflects a sense of team attachment (Muniz & O'Guinn, 2001; Zagnoli & Radicchi, 2010). Paper and Turun (2015) contend that team or player identification can be interpreted as an expression of either togetherness or distinctiveness among sports customers.

Emotional value represents the utility derived from the feelings or affective states that are

1 elicited by consuming sports games (Sweeney & Soutarh, 2001). Sports customers can obtain
2 emotional value (e.g., enjoyment and flow) from meaningful experiences. Viewers usually
3 choose the streaming channels featuring their preferred streamers, which may enhance their
4 enjoyment (Wan & Wu, 2020). In the context of social live streaming, virtual gift-giving
5 heightens viewers' enjoyment, as streamers go to great lengths to entertain their fans to earn
6 rewards (Wan & Wu, 2020). Previous studies have shown that viewers can achieve a flow
7 experience when they send gifts, post real-time messages, and watch live streams on these
8 platforms (Zhou 2013; Chen & Lin 2018 ; Guan et al. 2021).

9 The concept of flow has its roots in psychology and refers to a holistic sensation
10 experienced by individuals when they are fully engaged in an activity (Csikszentmihalyi M,
11 Csikszentmihalyi IS, 1988). Chen and Lin (2018) define flow as the state in which people are
12 so absorbed in the content of a live stream that they are not easily distracted by external factors.
13 In the realm of sport media, Kim and Ko (2019) suggest that sports viewers can experience
14 flow through various media outlets, including computer screens, radios, smartphones, TVs, and
15 virtual reality devices. SLSPs have incorporated technologies like 360-degree views, multi-
16 screen displays, and virtual reality to enhance viewers' flow experiences.

17 Epistemic value is frequently emphasised in studies of online sports communities.
18 Epistemic value is defined as “the utility derived from the capacity of a sport team's game to
19 arouse curiosity, provide novelty, and satisfy a desire for knowledge” (Kunkel et al., 2017,
20 p.9). Knowledge acquisition refers to the extent to which sports consumers gain knowledge
21 from media consumption. They learn skills and techniques from players and teams and collect

1 information about competitions through conversations with or among other spectators (Hamari
2 & Sjöblom, 2017). Sports fans also seek information about their favourite player' rankings,
3 performance statistics, and current news in the sport (Kim and Kim, 2020). In a manner similar
4 to traditional sports settings, viewers in the context of SLSPs are able to acquire sports-related
5 knowledge in real-time through dynamic conversations with both streamers and other viewers
6 (Qian et al., 2022; Kim & Kim, 2020; Qian et al., 2019).

7 The types of perceived value selected for viewers in this study are explained above. While
8 we recognise that other forms of perceived value have been discussed in previous research, our
9 selection includes the most relevant measurements specifically related to viewers in the context
10 of SLSPs (Liu et al, 2022a).

11 Value-in-use is the "evaluation of the service experience" (Sandström et al. 2008, p.115).
12 The 'engagement behaviour' in SLSPs is the 'usage' of the SLSPs services. The researcher,
13 therefore, conceptualise that the value-in-engagement on SLSPs is viewers' evaluation of the
14 viewing experience based on how they are engaging with the value propositions of multiple
15 service providers through a direct and indirect interaction process in the SLSPs, thus, it is
16 proposed that:

17 Viewing experience on SLSPs is significantly correlated with the perceived value
18 measurements including H2a 'sense of community', H2b 'self-identity', H2c 'Flow', H2d
19 'enjoyment', H2e 'player identification', H2f 'streamers proximity', and H2g 'knowledge
20 acquisition'.

21 Furthermore, we assume that the engagement behaviour of viewers can serve as a filter

that impacts their perceived value of the viewing experience. More specifically, the four types of viewers engage differently in SLSPs, particularly in terms of gifting and real-time messaging. Therefore, individual and situational engagement behaviour can influence their evaluation of the service experience and their perceived value (Sandström et al., 2008). However, this is quite obviously not the case for the content consumers and tourists searching for self-identity as they do not send virtual gifts and real-time messages to express themselves (Liu et al., 2022b). Drawing on the existing literature discussed above, we summarised our hypotheses into a conceptual model shown in Figure 1.

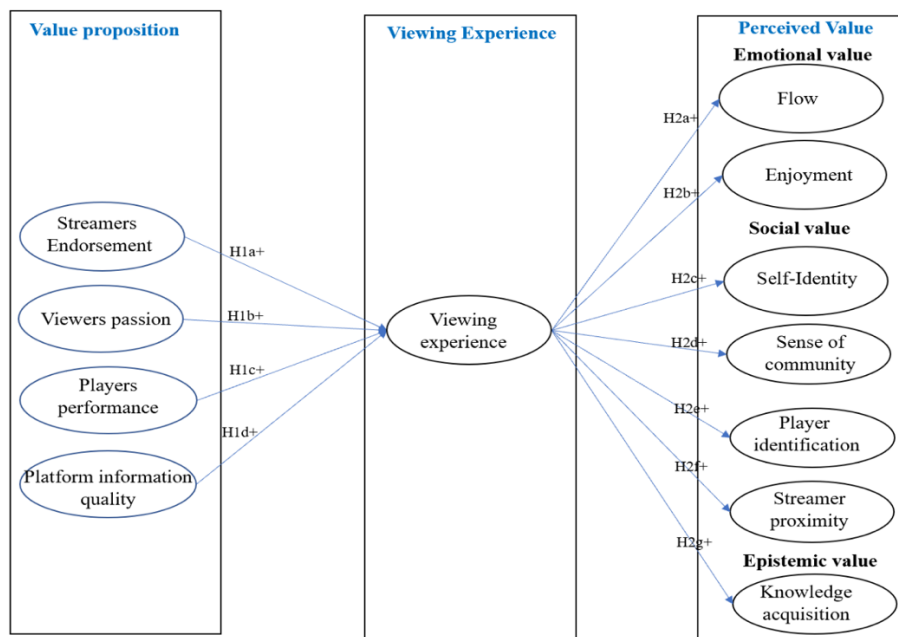


Figure 1 Map of hypotheses of the value-in-engagement through experience.

3. Methods

3.1 Measures

The measurements used in this study are adapted from previous literature (see Appendix 1).

Five items were chosen to measure ‘streamer endorsements’ (Chen & Lin, 2018; Qian et al.,

2020; Qian et al., 2022). Five items assessing ‘information quality’ were adapted from studies on e-sports (Qian, et al., 2020) and S-commerce (Kim & Park, 2013). ‘Viewer’s passion’ and ‘player performance’ were each measured by three items, adapted from Kim et al. (2019) and Horbel et al. (2016). The dimensions of ‘perceived value’ were measured as the value outcome of the viewing experience (Sandström et al., 2008). Four-item scales established in previous research were used to measure ‘sense of community’ (Mendelson et al., 2010) and another four-item scales was adapted from Chen and Lin (2018) to assess ‘Flow’. A three-item measurement for ‘enjoyment’ was used to reflect entertainment (Vale & Fernandes, 2018), excitement (Kunkel et al., 2017), and drama (Kim & Kim, 2020) as a way to assess the intrinsic feelings of sports viewers. Well-established three-item scales were employed to measure ‘self-identity’ (Vale & Fernandes, 2018), ‘player identification’ (Robinson & Trail, 2005), ‘streamers proximity’ (Guan et al., 2021) and ‘knowledge acquisition’ (Kunkel et al., 2017; Vale & Fernandes, 2018). ‘Experience’ was measured by a single item adapted from Horbel et al. (2018).

3.2 Survey design

In terms of survey design, the questionnaire is divided into three main sections. The first section includes questions about the participant’s demographic information. A filter question is included to ensure that respondents have the requisite experience of watching sporting events through SLSPs within the past 12 months. Given that the research aims to test value co-creation across different viewer segments, the second section of the questionnaire is designed to

categorise viewers through a single self-evaluation question. This question consists of four items, set in accordance with the typology empirically identified by Liu et al, (2022). The third section comprises the research items. Matell and Jacoby (1972) have suggested that a 6- or 7-point scale is ideal; therefore, all measures were converted to 7-point Likert scales for this study.

Since the initial questionnaire items were developed in English, it was necessary to translate them into simplified Chinese to align with the study's purpose. This translation was accomplished through a three-stage process (Kim et al., 2020). First, two bilingual individuals translated the survey into simplified Chinese. Then, another bilingual individual retranslated it back into English. To ensure the clarity and accuracy of the translated scales, three bilingual students compared the original and translated versions to assess any discrepancies.

3.3 Data collection

Hinkin (1995) points out that the sample size for factor analysis can be determined by an item-to-response ratio, which typically ranges from 1:4 to 1:10. A 1:4 ratio means that there are four subjects per item, and this is the minimum required for factor analysis. Hinkin (1995) approach was adopted for data collection in order to conduct the factor analysis. An online questionnaire was created and distributed to 10 WeChat groups of sports fans. As a result, seven completed questionnaires were rejected because all answers were ticked in the same column, yielding a final usable response rate of 98.8% (n = 605). Four structural equation models were analysed separately, with four distinct analyses conducted, corresponding to different types of viewers. For viewers categorised as 'content consumers' and 'tourists', the construct of 'self-identity' was deemed irrelevant and thus excluded from the analyses pertaining to these viewer types.

4. Data analysis and results

Among the 605 respondents who participated in the survey, 398 are male and 207 are female. More than 68% of the subjects are under 35 years old, and less than 40% are above 36 years old. Half of the respondents reported a household income between 4,000 and 16,000 RMB. With respect to the usage frequency of SLSPs, 323 respondents (53.5%) use SLSPs once a month, while only 95 respondents (15.7%) use SLSPs more than five times a month. The respondents were also asked to identify how they interact with other viewers and streamers when they watch sports events on SLSPs. Among the respondents, 23.3% were super co-creators, 19.5% were co-creators, 26.5% were content consumers, and 30.8% were tourists.

Before conducting structural equation model (SEM) analysis, the measurement model was assessed for validity and reliability using confirmatory factor analysis (CFA) through AMOS. The scale statistics, including factor loadings, composite reliability (CR), and average variance extracted (AVE), were tested across four different groups of viewers. The CR values for all factors were greater than the recommended cut-off point of 0.60 indicating that the proposed constructs were internally consistent (Matell & Jacoby, 1972). The result also shows that all items were loaded onto their respective factors with factor loadings ranged from 0.55 to 0.91. This result provides evidence that the items accurately captured their respective factors (Anderson & Gerbing, 1988; Hair et al., 2005). A further assessment of convergent validity was conducted through an examination of AVE. The AVE values for the ten constructs ranged from 0.58 to 0.81, providing evidence of convergent validity (Fornell & Larcker, 1981). The root-mean-square values of the AVE for all latent variables in this study were larger than their

correlation coefficients with other latent variables, indicating good discriminant validity for each construct (Fornell & Larcker, 1981) (refer to Table 1).

Table 1 Measurement model

Latent	No. of item	item-to-total range ^a				Across all contexts ^a	CR Across all contexts ^a	AVE Across all contexts ^a
		Super co-creation	co-creator	Content consumers	tourists			
SE	5	.69→.78	.75→.83	.66→.81	.74→.81	.69→.83	.88→.92	.58→.71
PIQ	5	.67→.80	.66→.79	.65→.78	.63→.71	.63→.80	.86→.89	.56→.63
VP	3	.76→.78	.78→.80	.74→.85	.85→.89	.74→.89	.89→.93	.73→.83
PP	3	.66→.74	.80→.91	.69→.76	.73→.77	.66→.91	.85→.90	.65→.75
SC	4	.70→.79	.76→.84	.79→.91	.80→.91	.70→.91	.88→.94	.73→.80
FI	3	.64→.66	.79→.81	.74→.80	.72→.79	.64→.81	.80→.90	.64→.75
En	3	.64→.70	.76→.79	.56→.74	.68→.76	.56→.79	.80→.89	.59→.73
Si	3 ^b	.64→.69	.67→.75	n/a	n/a	.64→.75	.81→.85	.59→.66
PI	3	.55→.69	.86→.91	.8→.91	.89→.92	.55→.92	.78→.95	.86→.88
SP	3	.74→.70	.93→.94	.94→.95	.77→.87	.74→.95	.86→.97	.89→.93
KA	3	.65→.74	.84→.87	.80→.85	.81→.93	.65→.93	.79→.91	.66→.83
VE	1	1	1	1	1	1	1	1

SE=Streamers Endorsement; PIQ=Platform Information Quality; VP=Viewers Passion; PP=Player Performance; SC=Sense of Community ; FI=Flow ; En=Enjoyment ; Si=Self-identity ; PI=Player Identification ; SP=Streamer Proximity; KA=Knowledge Acquisition; VE=Viewing Experience;

^a Highest and lowest loading value within context;

^b Not applicable for all types of viewers.

The global fit indices were assessed in order to evaluate how well the proposed measurement models fit the data for the four groups (see Table 2). The chi-squared values across all four groups were significant. The ratios of the chi-squared values to degrees of freedom ranged from 1.268 to 1.597, all of which were smaller than the cut-off value of 3.0. The values of the root mean square error of approximation (RMSEA) for the four groups of data sets were smaller than the criterion of 0.08. The comparative fit index (CFI) was greater than the cut-off points of 0.90 (Hair et al., 2005). However, the Tucker Lewis Index (TLI) value for the super co-creators was 0.853, lower than the recommended level of 0.90. The values for the other groups were all above this level. Nevertheless, a TLI value ranging from 0.8 to 0.9

indicates a marginal fit (Hair et al., 2005). The results of this research showed that the TLI could be considered marginal, which is still acceptable. Based on the overall assessment of the fit indices, the measurement model can be identified as an acceptable fit for the data. Combined with the results of the evidence of convergent and discriminant validity, it is evidenced that this study had the necessary measures for further analysis of the proposed structural model.

Table 2 The results of Global fit indices

Global fit indices	Acceptable fit	Super co-creators	Co-creators	Content consumers	Tourists
CMIN/df	Equal or less than 3.0	1.268***	1.422***	1.442***	1.579***
CFI	Roughly .90 or larger	0.931	0.921	0.942	0.932
RMSEA	Equal or less than .08	0.044	0.06	0.053	0.056
TLI	Roughly .90 or larger	0.853	0.915	0.937	0.926

***p<.001

In order to identify how different types of viewers perceive the value of their viewing experience, SEM analyses were used in this step to test the proposed research hypotheses. The empirical findings of the structural model estimates, as well as the significance of the path coefficients using AMOS, confirmed most of the hypotheses for each group of viewers.

In terms of the super co-creators, the test of the structural model indicated that the coefficients of the four paths from the value proposition to the viewing experience were positive and significant. However, platform information quality was found to have a significant and positive influence on the viewers' viewing behaviours ($\beta = 0.193$, $P < 0.005$), with an effect size of 0.103; thus, H1c is weakly supported. The empirical findings show that the viewing experience significantly influenced all perceived values: sense of community ($\beta = 0.480$, $P < 0.01$); flow ($\beta = 0.395$, $P < 0.01$); enjoyment ($\beta = 0.388$, $P < 0.001$); self-identity ($\beta = 0.450$, $P < 0.001$); player identification ($\beta = 0.362$, $P < 0.001$); streamer proximity ($\beta = 0.410$, $P < 0.001$);

1 and knowledge acquisition ($\beta = 0.507$, $P < 0.001$). It was found that super co-creators tend to
2 acquire a satisfactory viewing experience through interactions with streamers and other viewers
3 by sending virtual gifts and real-time messages while watching the players perform. Their
4 perceived flow may not be highly relevant to the platform's technology functions but is related
5 to mutual interactions with streamers and other viewers.

6 For the co-creators, who engage on the SLSPs by sending real-time messages, the results
7 of the structural model testing indicate that the coefficients for the four paths from the value
8 proposition to the viewing experience, as well as the seven paths from the viewing experience
9 to perceived value, were positive and significant. Compared with the super co-creators, the
10 significant effect of streamer endorsement ($\beta = 0.410$, $P < 0.01$) on the viewing experience is
11 weaker for the co-creators.

12 For the content consumers, the empirical findings showed that viewers' passion ($\beta =$
13 0.225 , $P < 0.01$), platform information quality ($\beta = 0.362$, $P < 0.001$), and performance ($\beta =$
14 0.239 , $P < 0.001$) had significant positive impacts on the viewing experience. The results
15 further show that streamer endorsement had no significant impact on content consumers'
16 experience ($\beta = 0.410$, $P = 0.789$). Additionally, the viewing experience has a significant and
17 positive influence on flow ($\beta = 0.523$, $P < 0.001$), enjoyment ($\beta = 0.385$, $P < 0.001$), player
18 identification ($\beta = 0.441$, $P < 0.001$), and knowledge acquisition ($\beta = 0.988$, $P < 0.001$). Based
19 on the empirical results, it can be interpreted that content consumers are more likely to acquire
20 perceived value in terms of flow, enjoyment, player identification, and knowledge acquisition
21 from a satisfactory viewing experience. This experience is impacted more by viewers' passion,

platform information quality, and players' performance rather than by the streamer. The reason for this is that content consumers typically concentrate on watching the game without interacting with other viewers and streamers.

This study also assessed the research hypothesis for the tourists' group. The coefficients for the four paths from the value proposition to the viewing experience were positive and significant; thus, H1a-H1d are supported. Unsurprisingly, regarding the relationship between experience and viewers' perceived values, the results revealed that the experience had no significant impact on either the sense of community ($\beta = 0.063$, $P = 0.403$) or flow ($\beta = 0.056$, $P = 0.474$). A detailed overview of the structural model estimates is provided in Appendix 2.

5. Discussion

5.1 Theoretical implications

The value co-creation among viewers and platforms, viewers and streamers, and viewers with other viewers is explored in the existing literature (Liu et al., 2022; Liu & Tan, 2023). However, these studies primarily employ a qualitative research approach and focus on the perspective of usage types. Therefore, by adapting the 'value-in-use through experience' framework and aligning with the SDL, this study proposes a 'value-in-engagement through experience' structural equation model. It illustrates that value processes involve multiple actors, and individual engagement behaviour can impact both the evaluation of the service experience and the perceived value.

In general, the impact of actors' value propositions is more significant for super co-creators and co-creators, who actively engage in the live-streaming room by sending real-time

1 messages and virtual gifts. These two groups of viewers can attain more perceived values
2 through their viewing experiences. However, the impact of actors' contributions on these
3 experiences varies slightly between the groups. For super co-creators, 'information quality' has
4 only a minor impact on their viewing experience, while 'streamer endorsement' and 'player
5 performance' are the primary contributors. This aligns with the super co-creators' engagement
6 behaviour, which involves interacting with streamers by sending both virtual gifts and
7 messages to fulfil their perceived values. In contrast, co-creators' viewing experiences are
8 primarily shaped by information quality.

9 In terms of content consumers, their viewing experience is mainly impacted by 'players'
10 performance' and 'information quality' and is only slightly influenced by 'viewers' passion'.
11 It's worth noting that 'streamer endorsement' does not significantly shape the content
12 consumers' viewing experience. They seek an immersive experience by focusing on players'
13 performance and using special features like 360-degree and multi-screen views. This aligns
14 with the finding that content consumers prioritise 'flow experience', 'enjoyment,' 'player
15 identification', and 'knowledge acquisition' over 'sense of community' and 'streamer
16 proximity'. This result can be attributed to content consumers' engagement behaviour, which
17 involves solely watching without interacting with other viewers or streamers. As for the
18 tourists, who neither send messages nor gifts and have the shortest viewing durations, actors
19 have a relatively lower impact on them compared to other viewer groups. However, tourists
20 still value 'enjoyment', 'player identification', 'streamer proximity', and 'knowledge
21 acquisition'. These findings suggest that tourists may be new to the platform and tend to switch

1 between rooms to find an enjoyable experience, particularly in streaming rooms with highly
2 rated streamers or a large number of viewers.

3 The results of this study clearly reveal that the value propositions of all four actors
4 contribute to the experiences of the four viewer groups, which in turn impact perceived value.
5 In line with the SDL, this study enriches our understanding of how value is co-created in SLSPs
6 by various types of viewers in the digital platform economy. It recognises that value is not
7 solely created by companies and delivered to passive consumers; instead, it emerges through
8 the active participation and contributions of multiple stakeholders, including both companies
9 and viewers. Our research findings indicate that the value co-creation process is strongly
10 influenced by the engagement behaviour of viewers. The distinct engagement behaviours of
11 various viewer groups lead to differing perceptions of experience and value among the
12 recipients, who are the viewers themselves.

13 *5.2 Managerial implications*

14 From a managerial perspective, the research findings highlight the importance of understanding
15 on how different types of viewers acquire a satisfactory experience and perceived value through
16 interactions with multiple actors. This research emphasises the role of viewers' engagement
17 behaviour in co-creating perceived value. The study has significant implications for operations
18 managers and streamers in SLSPs. Based on our findings, we recommend that operations
19 managers and streamers should carefully identify which value propositions are crucial for
20 shaping each viewer type's experience. This will facilitate value co-creation for viewers and
21 help achieve the strategic benefits for SLSPs. A collaborative approach to value creation has

the potential to foster stronger customer relationships, drive innovation, and create mutually beneficial outcomes for both businesses and customers in the digital marketplace.

For example, to benefit all four types of viewers, SLSPs should improve their competitive advantages to outbid major cable and broadcast network owners for sports event broadcasting rights, thereby giving viewers access to more sports games. Secondly, player-themed or streamer-themed text and virtual gift options (e.g., player emojis and equipment-themed virtual gifts) should be designed and offered to encourage super co-creators and value-co-creators to express their affinity for streamers and players in live streaming rooms. To enhance the experience for three viewer groups—super co-creators, co-creators, and content consumers—high-quality information services and new technologies like VR and AR should be developed to foster a flow experience. Meanwhile, streamers should improve their ability to utilise various functions of SLSPs (e.g., pop-up quizzes, screen highlighters, etc.) and incorporate additional entertainment activities (e.g., singing, telling jokes) to co-create emotional value and enjoyment. For tourists, SLSPs could develop an automatic chatting function to encourage conversation and knowledge sharing among viewers, further enhancing tourists' knowledge acquisition and enjoyment.

6. Limitations and future studies

Several avenues for future research could be explored. Firstly, while this study has examined the value co-creation process from the perspective of the customer (or viewer) within the networks of SLSPs, future research should consider including all actors involved in these value networks. This would deepen our understanding of how value is co-created among all

stakeholders. Secondly, although this study investigated the viewing experience and perceived value of each of the four viewer groups, it did not incorporate the distinct differences among these groups into the research questions and data analysis. As a result, the study did not explore variations in perceived value among these groups, nor did it measure the extent of these differences. Conducting a multi-group analysis could be a fruitful direction for future research. This would better understand how perceived value may differ among various viewer groups and identify the factors influencing perceived value, suggesting strategies for catering to diverse viewer needs.

7. Conclusion

This research responds to recent calls to apply a quantitative approach to explore the ‘value-in-engagement through experience’ of different user types within the context of SLSPs (Liu et al., 2022b). It identifies the value co-creation process for viewers in SLSPs and provides new insights into how four different types of viewers engage with multiple actors to shape their own unique viewing experiences and perceived values. This study sheds light on the intersection of engagement behaviour and value co-creation literature, helping to classify user groups in SLSP contexts. This understanding assists operators in making decisions to design and provide customised services more effectively. Future work is encouraged to define the mutual interaction and value co-creation of all actors involved in the SLSPs’ value networks.

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Appendix 1 Measurements.

Dimensions		Items	Adapted from
Value propositions			
1	Streamer endorsement	This streamer has the knowledge to stream the sports event. This streamer provides energetic and engaging commentary. The streamer is interactive who react to viewers. The streamer is attractive or charming. The streamer and the sports content fit together well.	Qian, 2022 Qian et al., 2020 Chen & Lin, 2018
2	Platform information quality	This sports live streaming platform provides useful information. This sports live streaming platform provides sufficient content. This sports live streaming platform provides good quality audio and sound. This sports live streaming platform provides different angles and aspects of the game. This sports live streaming platform provides High-resolution stream	Kim et al., 2013; Qian et al., 2020
3	Viewer passion	The viewers' support was intense in the sports live streaming room. The viewers' passion was intense in the sports live streaming room. The number of viewers was large in the sports live streaming room.	Kim et al., 2019
4	Player performance	The players performed very well in mental, technique and strategic aspects. The players showed great fighting spirit in the game. The game was extremely thrilling.	Horbel et al., 2018
Perceived value			
	Flow	When watching sport live streams, I often forget the work I must do;	Chen & Lin (2018)

	Watching sport live streams gives me a temporary escape from the real world;	
	When watching sport live streams, I am not distracted easily by other things.	
8 Enjoyment	I enjoy the sports live streams because it is entertaining;	Kunkel et al., 2017; Kim & Kim 2020; Vale & Fernandes, 2018
	I enjoy the drama when watching the sports live streams.	
	I enjoy the excitement associated with watching the sports live streams.	
9 Self-identity	Watching sport live streams let me to express what kind of person I am.	
	Watching sport live streams gives me self-confidence.	Vale & fernandes, 2018
	Watching sport live streams let me to impress others with what I know about the sport.	
5 Sense of community	I feel connected to the streamers' community.	
	I feel like a member of streamers' community.	Mendelson et al., 2010
	I feel like a member of player's community.	
	I feel connected to the player's community.	
1 Player identification	When watching sports live streams, I feeling to be part of the fans of the player X.	
	When watching sports live streams, I feel I am very committed to an individual player.	Robinson & trail, 2005
	When watching sports live streams, I consider myself to be a 'real' fan of an individual player.	
1 Streamer proximity	When watching sports live streams, I feel closer to the streamer.	
	When watching sports live streams, I feel the streamer knows I'm concerned about him or her.	Guan et al., 2021
	When watching sports live streams, I feel I had a warm feeling about the streamer.	

1	Knowledge acquisition	Watching via sports live streaming platform helps me to learn about the tactical aspects of the sports.	
		I can know what streamer and other viewers think about the sport player/team.	Kunkel et al., 2017; Vale & Fernandes, 2018
		I can get information about team/player performance, player profiles, events and games scheduled.	
1	Experience	I am satisfied with my experience in watching sports events on sports live streaming platforms.	Horbel et al. (2018)

Appendix 2 Hypotheses testing results.

Super co-creators				Co-creators			Content consumers			Tourists		
Path	Path coefficient	SE	p-value	Path coefficient	Standard Error	p-value	Path coefficient	SE	P-value	Path coefficient	SE	P-value
Value proposition → Viewing experiences												
SE-- > Ex	0.327	0.081	***	0.185	0.058	**	0.084	0.049	0.174	0.27	0.062	*
VP-- > Ex	0.225	0.08	**	0.216	0.083	**	0.255	0.091	**	0.254	0.07	**
PIQ-- > Ex	0.193	0.103	*	0.485	0.11	***	0.362	0.114	***	0.166	0.078	**
PP-- > Ex	0.29	0.097	***	0.442	0.083	***	0.239	0.099	***	0.302	0.093	*
Viewing experience → Perceived value												
VE-- > SC	0.48	0.074	***	0.625	0.065	***	-0.022	0.074	0.789	-0.063	0.065	0.403
VE-- > Fl	0.395	0.075	***	0.468	0.104	***	0.523	0.106	***	-0.056	0.095	0.474
VE-- > En	0.388	0.069	***	0.497	0.075	***	0.385	0.066	***	0.809	0.067	***
VE-- > Si	0.45	0.077	***	0.635	0.101	***	n/a	n/a	n/a	n/a	n/a	n/a
VE-- > PI	0.362	0.077	***	0.414	0.107	***	0.441	0.12	***	0.323	0.1	***
VE-- > SP	0.41	0.069	***	0.59	0.076	***	0.089	0.108	0.268	0.289	0.091	***
VE-- > KA	0.507	0.072	***	0.599	0.079	***	0.988	0.089	***	0.676	0.062	***

*p < .05, **p < .01, ***p < .001; SE=Streamer Endorsement; VP=Viewer Passion; PIQ=Platform Information Quality; PP=Players Performance; VE=Viewing Experience; SC=Sense of Community; Fl=Flow; En=Enjoyment; Si=Self-identity; PI=Player Identification; SP=Streamer Proximity; KA=Knowledge Acquisition