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# Online Users'

# Behaviours and Behavioural Intentions

# with Reference to Live Streaming

A thesis presented in partial fulfilment of the requirements

for the degree of

Doctor of Philosophy

at Massey University, Albany, New Zealand

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2021

# Abstract

Live streaming, as a new medium, allows users to participate in real-time interaction. It has attracted a large number of online users, and become a new social commerce venue and lucrative business, especially in China where the live streaming industry is growing explosively and is the largest in the world. This thesis aims to comprehensively investigate users' behaviours and behavioural intentions in live streaming through both qualitative and quantitative approaches using the Chinese live streaming as an example.

This thesis contains four studies to investigate from both streamers' and viewers' aspects. Firstly, we conducted two qualitative studies to investigate users' online behaviours in the social commerce practice in live streaming by exploring how streamers attract viewers (Chapter 2) and encourage gifting (Chapter 3). Novel multiple triangulation was used, including data source triangulation and methodological triangulation. Through multiple triangulation, three behaviours for viewer attraction and four behaviours for gifting encouragement were identified. These two chapters help to comprehensively understand streamers' online behaviours in this new form of social commerce.

Next, we conducted two quantitative studies to explore why viewers continue to watch streams (Chapters 4 and 5). Based on expectation-confirmation theory (ECT), in Chapter 4, we modified the *post-acceptance model of information system continuance* and re-defined the constructs in a structural equation model of predictors of continuance intention of watching live streams. Chapter 4 successfully connects intention and continuance intention of watching, and integrates disparate understandings of viewers' watching behaviours.

To solve the deficiencies identified in current ECT-based models and further increase the explanation of variance in continuance intention of watching, in Chapter 5, we proposed *a value-based continuance intention model* (V-ECM), which theoretically extends ECT-based studies by including a process of overall practical assessment between users' perceived benefits and perceived sacrifices. V-ECM appears to be a better model for

explaining users' continuance intention in the stream-watching context. Also, V-ECM could be used broadly in online and/or technology-related fields.

Overall, this thesis comprehensively investigates both streamers' and viewers' behaviours and behavioural intentions in live streaming. Insights from this thesis can improve the design, functions and marketing within live streaming platforms. Also, this thesis provides strong foundations for further online behaviour studies, for example, stream-watching addiction.

# Acknowledgements

I wish to take this opportunity to show my appreciation to all the people whose assistance was a milestone in the completion of my PhD study.

I would like to pay my special regards to my supervisors Professor Ruili Wang and Professor James Hou-fu Liu. Thank you for giving me a chance to taste PhD student life; Thank you for encouraging me to keep the faith to go on; Thank you for believing in me, giving me timely support, and leading me to a fantastic research world! It is whole-heartedly appreciated that your great advice for my research proved monumental towards the success of this study.

In addition, I would like to express my deepest appreciation to my parents, who are the best ones in the world! My PhD study would not have been possible without their support.

The completion of my PhD is not the end. It is only just the beginning. The road ahead will be long, and my climb will be steep!

路漫漫其修远兮，吾将上下而求索

Notes:

Approvals for the studies described in the thesis have been obtained from Massey University Ethics Committee.

Ethics application numbers:

# 4000020061 for Chapters 2 and 3

# 4000020568 for Chapters 4 and 5

References are listed at the end of each chapter in this thesis.

# Contents

# Chapter 1

# Introduction

This chapter provides an overview of this thesis. Section 1.1 presents the background of this thesis. Section 1.2 illustrates our motivation and research gaps, Section 1.3 briefly describes the theoretical approaches that we have used in the thesis, Section 1.4 summarizes the methodology, Section 1.5 describes the structure of this thesis, and Section 1.6 lists the related publications.

## 1.1 Live Streaming

Live streaming is a new medium. It allows viewers to watch a streamer broadcast an activity online and participate in it in real-time. During live streams, streamers broadcast different activities on live streaming platforms such as playing games, singing, and knowledge sharing. Viewers' activities on the platforms include watching streams, and interacting with streamers and/or other viewers by text or emoji. Crucially, viewers could voluntarily buy digital gifts (also known as virtual gifts) from the live streaming platforms using real currency, and send them to a streamer or streamers at any time during streams. A screenshot of a channel in live streaming is shown in Figure 1.1.

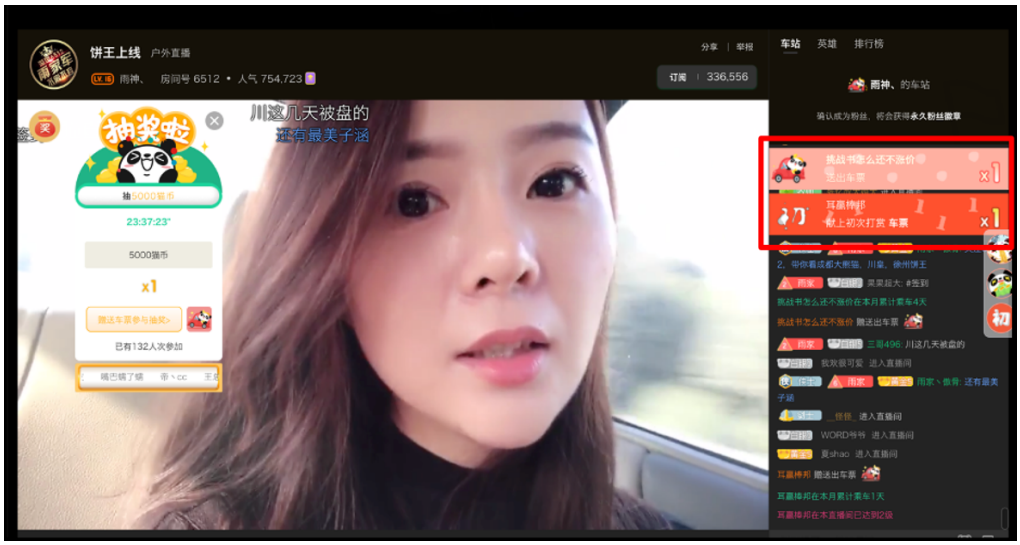


Figure 1.1. The screenshot shows a moment of a live stream from viewers' perspective. It shows a streamer is broadcasting on her way to a tourist attraction. On the left side, it shows viewers' texts and emojis. When viewers gift the streamer, the digital gifts are vividly shown on the screen as highlighted.

Live streaming has been growing explosively and becoming increasingly popular worldwide. It has attracted a large number of online users, and become a new social interaction venue and lucrative business. According to the data released, the value of the global live streaming market was US$42.6 billion in 2019 (Grand View Research, 2020). As of Oct 2020, the American leading live streaming platform, Twitch, has 140 million monthly users (Business of Apps, 2020).

In particular, the Chinese live streaming industry has been booming, and is the largest in the world in terms of the number of online users and profit made (Restream, 2020). As of March 2020, the Chinese live streaming users had reached 560 million (Xinhuanet, 2020). The Chinese live streaming market is expected to reach US$16.3 billion in 2020 in total (Statista, 2020).

## 1.2 Motivation and Research Gaps

With the development of the Internet, people are spending an increasing amount of time online. Human online activities are becoming important in everyday life, and human online behaviour has begun to receive attention in research.

Media have been evolving with the advancement of technology. Live streaming, as a new medium, has been widespread since its advent. In live streaming, users are able to conduct a wide range of activities, such as communicating with others, meeting new friends, entertaining themselves, conducting online trades, and sharing knowledge online etc.

As indicated in Section 1.1, compared with other media, live streaming is new since it allows instant interactions between streamers and viewers. However, there has been no research systematically investigating such interactions in live streaming so far. Also, most previous studies in live streaming are investigated mainly from the viewers' aspect (Hilvert-Bruce et al., 2018; Cai et al., 2018; Anjani et al., 2020), but there is a lack of behavioural studies from the streamers' aspect. Without studies on streamers' behaviours, it is impossible to get a full picture of live streaming. Understanding streamers' behaviours, especially how streamers interact with viewers, could provide useful information in platform design and marketing in live streaming. Hence, this is a research gap that needs to be filled in. We are therefore motivated to study how streamers interact with viewers in live streaming from the streamers' aspect.

On the other hand, for viewers, the basic behaviour in live streaming is watching streams. Most previous research only studied why viewers initially watch streams (Gros et al., 2017; Sjöblom & Hamari, 2017), and it is still not very clear why viewers continue to watch. Theoretically, initial stream-watching and continuance stream-watching are two different stages of the integral stream-watching behaviour (Bhattacherjee, 2001b). Without studying continuance stream-watching, it is impossible to fully understand the stream-watching behaviour. Also, investigating continuance stream-watching could provide valuable information in preventing watching addiction. Hence, it is important to fill in this research gap. We are therefore motivated to investigate viewers' continuance stream-watching intention behind their stream-watching behaviour.

Overall objectives of this research are as follows, which are corresponding to the research gaps identified above:

(i) To understand what behaviours streamers have in live streaming, and how streamers interact with viewers in live streaming.
(ii) To understand why viewers continue to watch live streams.

As the Chinese live streaming industry is the largest in terms of the number of online users and profit made (Restream, 2020), we intend to use the Chinese live streaming as an example in our investigations.

## 1.3 Theoretical Approaches

Theoretical approaches adopted in this thesis are based on theories in social commerce (Liang et al., 2011), social identity theory (Tajfel, 1974), uses and gratifications theory (Blumler & Katz, 1974) and expectation-confirmation theory (Oliver, 1980).

### 1.3.1 Social commerce

Social commerce is defined as "taking advantage of relationships in a social network to gain commercial benefits" (Liang et. al, 2011, p. 73). As a relatively new e-commerce paradigm (Kim & Park, 2013), it is rooted in the development of technology and social media (Lin et al., 2017). Compared with ordinary e-commerce, social commerce combines product-selling with more social elements (Liang et al., 2011; Linda, 2010), such as communication and interaction

opportunities. For example, Aliexpress is a social commerce website since consumers can communicate and interact with others there. Consumers can ask other consumers questions such as "how is the product/service?" and "Do you recommend this product/service?" Consumers can even add others to be online "friends". Ordinary shopping websites do not provide this "social" function, but only list products/services and prices (e.g., the recycle boutique website https://recycleboutique.co.nz/).

Social commerce venues and social commerce practices have been evolving over time (Curty & Zhang, 2011), from blogs, social networking sites (SNSs) and social shopping websites (Jia et al., 2020), to live streaming. Compared with previous social commerce venues, social commerce in live streaming is special, since most of the live streams do not focus on product-selling, but provide interactive performances/shows (Jia et al., 2020) and rely on voluntary gifting from viewers to make profits. We explored this new social commerce practice in live streaming in this thesis, especially in Chapter 2 and Chapter 3.

### 1.3.2 Social identity theory

Social identity theory was firstly developed and defined by Tajfel (1974) as "part of an individual's self-concept which derives from his knowledge of his membership of a social group (or groups) together with the emotional significance attached to that membership" (p. 69). Members perceive a shared identity that prescribes who they are and how they behave from social groups (Hogg, 2016). This theory has been widely adopted to explain people's attitudes and behaviours by the influences of in-group and out-group (Hogg, 2016).

Social identity theory initially concentrated on intergroup relations, and is usually referred to as social identity theory of intergroup relations (Tajfel & Turner, 1979). It indicates that, when comparing with an out-group, people tend to make sure their own group is more positive, and would like to remain in their group and show group loyalty (Hogg, 2016). Social identity theory has been used in this thesis to explain viewers gifting behaviours in the individual competition and group competition in live streaming. Details are in Chapter 3.

### 1.3.3 Uses and gratifications theory

Uses and gratifications theory was originally used to explain users' selection and adoption of media (Blumler & Katz, 1974). It assumes that users are purposive and motivated to adopt and use media (Blumler & Katz, 1974) to satisfy their needs and gain gratifications (Luo & Remus,

2014). It stresses the active role of users and is a user-centered and goal-directed approach (Katz et al., 1973; Blumler, 2019).

Uses and gratifications theory has been extensively adopted in a large number of contexts of media use, such as the use of television (Rubin, 1983), the world wide web (Kaye, 1998), the Internet (Stafford et al., 2004; Chigona et al., 2008), social TV (Habes, 2019), social media (Raacke & Bonds-Raacke, 2008; Quan-Haase & Young, 2010; Whiting & Williams, 2013; Pang, 2016; Gan & Li, 2018; Pelletier et al., 2020; Kircaburun et al., 2020). Over time, besides in the context of media use, the adoption of uses and gratifications theory has been expanded to an even wider context, such as reality game-playing (Wu et al., 2010; Hamari et al., 2019), E-shopping (Lim & Ting, 2012), and application uses (Krause et al., 2014).

Uses and gratifications theory has been adopted to explain why viewers choose to watch live streams (Gros et al., 2017; Sjöblom & Hamari, 2017). Motivators of stream-watching include entertainment, cognitive stimulation, social interaction, affective value, tension release, etc. (Gros et al., 2017; Hamilton et al., 2014; Sjöblom & Hamari, 2017).

However, why viewers continue to watch live streams has not been investigated much so far. Initial stream-watching and continuance stream-watching, as two stages of the integral stream-watching behaviour, they are not supposed to be isolated from each other in analysis. Hence, in Chapter 4, we studied viewers' continuance stream-watching intention and made a connection with initial stream-watching intention based on uses and gratifications theory.

### 1.3.4 Expectation-confirmation theory

Expectation-confirmation theory (ECT) (Oliver, 1980) has been employed to explain viewers' post-adoption behaviour. It suggests that consumers' continuance intention is mainly influenced by their satisfaction with previous use experiences (Bhattacherjee, 2001b; Oliver, 1980). It originated from consumer behaviour research but has later been applied in multiple disciplinary domains (Bhattacherjee, 2001b). It has been used to explain and predict continuance use in different contexts, such as online banking, electronic commerce, mobile data services, the web portal context, blogs, Internet protocol television, paid mobile apps, and mobile instant messaging (Bhattacherjee, 2001a; Bhattacherjee, 2001b; Hsu, & Lin, 2015; Kim, 2010; Lin et al., 2005; Lin et al., 2012; Oghuma et al., 2016; Shiau et al., 2011).

According to ECT, the continuance adoption processes are as follows: initially, before adopting a product or service, consumers produce an expectation of a product or service. Then, consumers adopt the product or service, and they perceive its performance after use. Next, consumers compare their original expectation and perceived performance, and estimate whether their expectation is confirmed. A high level of confirmation leads to satisfaction, which has a positive influence on consumers' continuance intention (Olive, 1980; Bhattacherjee, 2001b). Continuance stream-watching is also a post-adoption behaviour. Hence, it is feasible to adopt ECT to explain and predict viewers' continuance stream-watching behaviour. ETC has been adopted in Chapter 4 and Chapter 5.

## 1.4 Methodology

This thesis adopts mixed research methods to achieve its research objectives, including both qualitative and quantitative studies. Using mixed methods can provide comprehensive understandings of a research question than single approach alone (Creswell et al., 2007; Molina-Azorin, 2016).

A qualitative approach is used to "answer questions about experience, meaning and perspective" (Hammarberg et al., 2016, p. 499), mainly from the views of a small number of participants (Gelo et al., 2008). Data collected by a qualitative study are normally non-numerical, such as texts and videos (Gelo et al., 2008). The qualitative approach is helpful to explain a phenomenon or behaviour thoroughly with rich and in-depth descriptions and interpretation (Sofaer, 1999).

Our first two studies (Chapter 2 and Chapter 3) are exploratory in nature. Hence, the qualitative approach was adopted to understand how streamers interact with viewers in live streaming. In particular, multiple triangulation (Thurmond, 2001) was used, including data source triangulation and methodological triangulation. We systematically collected data from both streamers' and viewers' perspectives through interviews and focus groups, as well as from the investigators' perspective through online observations. Details are presented in Chapter 2 and Chapter 3.

A quantitative approach is used to test the hypotheses and confirm the cause-and-effect relationships, and attempts to find out the generalized pattern in a large population (Gelo et al.,

2008). It "requires the reduction of phenomena to numerical values in order to carry out statistical analysis"（Gelo et al., 2008, p. 268).

Our last two studies (Chapter 4 and Chapter 5) attempted to find out factors influencing viewers continuance stream-watching based on our hypotheses. Hence, the quantitative approach was used to examine the relationships between these hypothesised factors. Data were collected through online survey as shown in Chapter 4 and Chapter 5.

## 1.5 The Structure of This Thesis

This is a thesis by publications. It contains four individual studies (Chapter 2 to Chapter 5), either published by a journal/conference or submitted to a journal/conference. This thesis comprehensively investigates live streaming users' behaviours and behavioural intentions. Users in live streaming can be categorised into streamers and viewers. This thesis aims to explore from both sides: the streamers' side and the viewers' side. In particular, the first two studies (Chapter 2 and Chapter 3) focus on investigating streamers' behaviours regarding how they interact with viewers in live streaming, and the last two studies (Chapter 4 and Chapter 5) concentrate on exploring viewers' behavioural intention behind their continuance stream-watching behaviour.

This thesis is organised as follows. Studies on streamers' behaviours (Chapter 2 and Chapter 3) are briefly described in Section 1.5.1. Studies on viewers' behavioural intentions (Chapter 4 and Chapter 5) are introduced in Section 1.5.2.

### 1.5.1 Studies on streamers' behaviours

Compared with traditional media such as newspapers, TV and blogs, live streaming allows instant interactions and has an innovative gifting function. Viewers can use real currency to buy digital gifts from the live streaming platforms, and gift streamers during the streams. The digital gifts received during the streams are shared by streamers and their host live streaming platforms, becoming one of most important and common commercial benefits. Lured by profits, streamers strive to attract more viewers to their channels and encourage more gifting. Streamers' commercial behaviours appear a novel form of social commerce practice which is characterized by "taking advantage of relationships in a social network to gain commercial benefits" (Liang et al., 2011, p. 73), which has not received much attention in previous research.

We therefore conducted two qualitative studies to explore how streamers interact with viewers in this new social commerce practice from the aspects of viewers' attraction and gifting encouragement. In detail, we investigated how streamers attract more viewers from the streamers' perspective, and how viewers choose streams to watch from the viewers' perspective, as well as the observed actual online behaviours of streamers and their viewers from the investigators' perspective in Chapter 2. In Chapter 3, we focused on investigating how streamers encourage online gifting, and the reasons viewers gift streamers from the viewers' perspective, as well as the observed actual gifting-related behaviours of streamers and their viewers from the investigators' perspective.

Our investigations are conducted using multiple triangulation (Thurmond, 2001), including data source triangulation (three data sources) and methodological triangulation (three methods): (i) interviews with ten popular streamers describing how they attract viewers and encourage online gifting; (ii) three focus groups of viewers describing their experiences of and motivations for choosing a streamer to watch, and to gift; and (iii) 305 hours of behavioural observation of actual live streams, involving the popular streamers interviewed. Through multiple triangulation, we ensure that the "social" side of e-commerce is examined from both creator and audience perspectives, and that verbal claims about gifting practices are backed up with observations of practice.

These two chapters help to integrally understand how streamers and viewers interact in live streaming. Moreover, these two chapters provide an innovative method in behaviour studies: exploring and evaluating a phenomenon from different standpoints using different and the most appropriate methods to balance out the advantages and disadvantages of each method.

### 1.5.2 Studies on viewers' behavioural intentions

In live streaming, viewers' most basic behaviour is watching streams. Since live streaming has become popular, viewers are found to spend an increasing amount of time watching live streams. So far, not much is known about why viewers continue watching streams. In addition, the eventual success of the industry mainly relies on users' continuance use (Bhattacherjee, 2001b). Hence, it appears important to investigate the factors influencing viewers' continuance watching.

We therefore conducted two quantitative studies to explore viewers' continuance watching intention behind their continuance watching behaviour (Chapter 4 and Chapter 5). In Chapter 4, based on expectation-confirmation theory (ECT), we modified the *post-acceptance model of information system continuance* (Bhattacherjee, 2001b), and re-defined the constructs in the model to associate it with variables understood to be important to watching intentions. Our study in Chapter 4, for the first time, demonstrates the theoretically consistent association between initial intention of watching and continuance intention of watching. This connection, to a large extent, integrates our understanding of viewers' watching behaviour.

Later, we found that current ECT-based models were theoretically incomplete since they seem to lack sufficient consideration of users' costs of use. Hence, in Chapter 5, we proposed *a value-based continuance intention model* (named V-ECM) which includes perceived value, a process of overall practical assessment between users' perceived benefits and perceived sacrifices. Our theoretical model increases the explanation of the variance in continuance intention of watching, and works as a better model for explaining this. This model could also be used to explain other online and/or technology-related continuance intentions, and provide valuable information in preventing watching addiction.

In conclusion, this thesis mixes qualitative and quantitative studies and investigates users' behaviours and behavioural intentions from both streamers' and viewers' aspects. Overall, it fills in research gaps in behaviour studies in live streaming, improves our understandings of streamer-viewer interactions, provides generalized conceptual models of users' continuance intention of watching which helps us to understand viewers' continuance behaviour. Also, these models could be applied in broad online and/or technology-related fields, and is helpful for improving the design, functions and marketing within live streaming platforms. In addition, this thesis may serve as a solid foundation for further online behaviour studies, for example, stream-watching addiction.

## 1.6 Publications

This is a thesis by publications. Current publication statuses of these four studies are as follows:

- **Jia, X**., Wang, R., Liu, J. H., & Xie, T. (2020). How to attract more viewers in live streams? A functional evaluation of streamers' strategies for attraction of viewers. In Nah FH., Siau K. (Eds.), *HCI in Business, Government and Organizations* (pp. 369-383), Springer. https://doi.org/10.1007/978-3-030-50341-3_29 (Refer to Chapter 2)

- **Jia, X.**, Wang, R., & Liu, J. H. Understanding the social commerce practice in live streaming using novel multiple triangulation. *Electronic Commerce Research*. (Submitted) (Refer to Chapter 3).

- **Jia, X.**, Wang, R., Liu, J. H. & Hou, F. Why do viewers continue to watch live streams? An empirical study connects intention and continuance intention of watching. *Asian Journal of Communication*. (Submitted) (Refer to Chapter 4)

- **Jia, X**., Wang, R., Lu, Y., Liu, J. H., & Pan, Z. Investigating factors that influence continuance intention: A value-based continuance intention model. *Information Technology and People*. (Submitted) (Refer to Chapter 5)

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# Chapter 2

# How to Attract More Viewers in Live Streams?

## A Functional Evaluation of Streamers' Behaviours to Attract Viewers

Live streaming is becoming popular and has attracted large numbers of online viewers. It becomes a social commerce venue where streamers can gain commercial benefits from their relationships with viewers. Attracting more viewers is the essential foundation to build relationships and networks in the live streaming industry. This chapter explores and evaluates how streamers behave to attract more viewers through multiple triangulation, including data source triangulation and methodological triangulation. In detail, data were collected from streamers' self-reports, viewers' self-reports and observed online actual behaviour; interviews, focus groups and observations were applied, based on the characteristics of data. Through multiple triangulation, we identified three behaviours for attracting viewers: (i) to increase streamer-viewer interactions, (ii) to create synergy with other streamers, and (iii) to conduct self-promotion. Findings were indicated by the popular streamers and verified by both focus groups and online observations. This chapter contributes to increasing our understanding of streamer-viewer interactions in live streaming. Live streaming platforms also benefit from this study in terms of platform design and marketing.

This chapter is organized as follows. Section 2.1 provides an introduction of this chapter. Section 2.2 presents the related background, Section 2.3 details methods, Section 2.4 presents results, Section 2.5 provides discussion of the results, and Section 2.6 discusses the implications and analyses the limitations of this study.

## 2.1 Introduction

Social commerce as a relatively new version of e-commerce which makes use of relationships in social networks for business benefits (Liang, Ho, Li, & Turban, 2011), has evolved quickly and become popular since its emergence (Curty & Zhang, 2011). With the advancement of technology, the social commerce venues evolve from blogs, social networking sites and social shopping websites, to live streaming which has been widely accepted as a new place for social

interactions (Hamilton, Garretson, & Kerne, 2014). Live stream-watching has become increasingly popular globally. As a new medium, live streaming allows instant communication during the live streams. In a live stream, the streamer not only gives performances but also interacts with viewers. This makes their shows different from the traditional ones. We define such performances with live interactions as the "*interactive performances*".

Platforms such as Twitch, Facebook Live, YouTube Live and Periscope have attracted large audiences online. For example, Twitch, as the leading live streaming platform in the US, has over 15 million viewers each day (Twitch, 2019). However, the largest live streaming market is in China. The Chinese live streaming industry has been booming since 2016. There were 398 million live streaming users in 2017 (iiMedia, 2018), and the expected scale of users was projected to reach 507 million in 2019 (iiMedia, 2018).

Practically, attracting more viewers is the first step to be a success in the live streaming industry. With more viewers, streamers can become popular and their channels can become hot. Also, streamers are more likely to receive more income with more viewers in their channels (Zhu, Yang, & Dai, 2017). As a result, streamers strive to attract viewers. Theoretically, attracting more viewers to build relationships for commercial benefits is a new form of social commerce practice, which has not been investigated before.

To fill in this research gap, we used novel multiple triangulation (Mitchell, 1986) to investigate our research question: How do streamers behave or interact with viewers to attract them in the live streaming?

We firstly investigated it from the streamer's perspective to identify their behaviours to attract viewers. We interviewed 10 popular streamers who had more than 100,000 followers in each of their own channels at the time of their interviews. Also, we conducted 3 focus group interviews to verify these identified behaviours from viewers' perspectives. In addition, 305 hours of online observations were conducted to validate whether these viewer attraction behaviours are actually used.

Overall, this chapter investigates how streamers behave in live streaming to attract viewers. This chapter is related to and fits in one of our overall objectives regarding understanding streamers' behaviours and their interactions with viewers. Through multiple triangulation, we could identify how streamers attract viewers in the live streaming.

## 2.2 Background

Limited research has been conducted on how to attract more viewers in live streaming so far. However, we identified some characteristics of viewers' attraction in live streaming from previous research. Game-play tournaments were found to attract more users (both streamers and viewers) than no tournaments in Twitch (Kaytoue, Silva, Cerf, Meira, & Raïssi, 2012). Also, celebrities were thought to attract more viewers than non-celebrities (Tang, Venolia, & Inkpen, 2016).

We also reviewed the viewer attraction in the related fields. To attract viewers through web sites, it was necessary to value interactivity, immersion and connectivity and make a balance of them (Bhatt, 2004). As to the design of the web pages, the pages with a main large picture, pictures of celebrities, few words, and a search bar could more easily attract young viewers (Djamasbi, Siegel, & Tullis, 2010). In blogs, bloggers attracted more viewers by linking others' blogs to their pages since this improved the quality of their blogs and made their blogs become destination sites (Mayzlin & Yoganarasimhan, 2012). Technically, a mobile content recommender system (M-CRS) was also thought to help attract viewers. In this system, personalized content recommendations would be generated after recording and analysing readers' browsing habits and histories (Chiu, Kao, & Lo, 2010).

## 2.3 Research Methods

### 2.3.1 Triangulation and triangulation model

Previous qualitative studies on behaviour studies which only involve a single data source or method have been criticised for its low reliability and validity (Decrop, 1999). To address this issue, we use multiple triangulation (Mitchell, 1986), including data source triangulation and methodological triangulation in this study.

Triangulation is a method used to investigate a phenomenon by combining at least two theories, methods, data sources or investigators in one single study (Kimchi et al., 1991; Thurmond, 2001). Using more than one triangulation in a single study is multiple triangulation. In detail, we investigate streamers' viewer attraction behaviours from three perspectives. Firstly, we investigate from the streamers' perspective to investigate how they attract viewers; Secondly, we explore from the viewers' perspective to verify streamers' behaviour and probe why

viewers gift; We also observe the actual online behaviours from the investigators' perspective to validate streamers' behaviour in practice. Triangulating different perspectives can supplement information and provide a comprehensive understanding of the phenomenon, increase the validity of the study, and make the results more convincing (Carter, Bryant-Lukosius, Dicenso, Blythe, & Neville, 2014).

Methods are applied according to the characteristics of each data source. Streamers' behaviours can be obtained through one-on-one interviews since one-on-one interviews are flexible, and help collect detailed and in-depth information (Kazmer & Xie, 2008; Rubin & Rubin, 2011). Viewers' opinions on streamers' behaviour and their motivations for watching can be gathered through focus group interviews which involve "target persons whose points of view are requested to address a selected topic" (Vaughn et al., 1996, p.5) since focus group interviews allow discussion, and suit for relatively larger participants (Flick, Kardorff, & Steinke, 2004). The actual behaviour information can be collected through online observations. Triangulating these three methods helps to take advantage of the pros of each method. Our multiple triangulation model is shown in Figure 2.1.

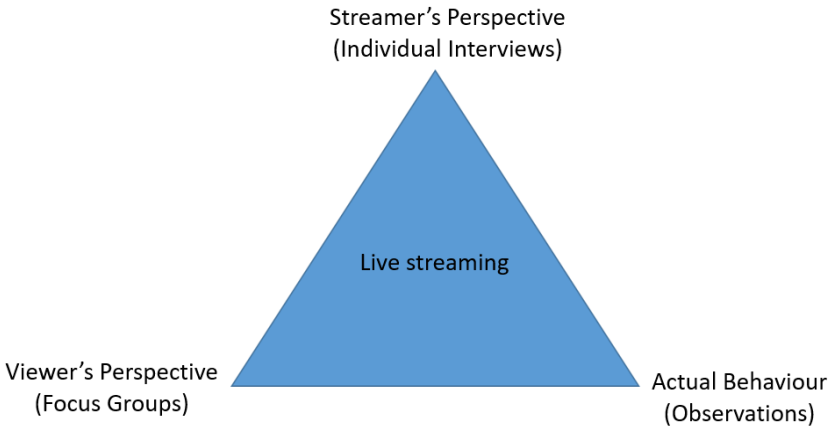


Figure 2.1. The multiple triangulation model

## 2.3.2 Sampling, procedures and data analysis

2.3.2.1 Individual interviews

*Sampling*

10 popular streamers with enormous followers (all over 130,000) at the time of interviews were chosen as participants, 5 males and 5 females. They were from six live streaming platforms which provide comprehensive contents and categories of streams, including Kuai (https://www.kuaishou.com/), Inke (https://h5.inke.cn/app/home/hotlive), Xiongmao (https://panda.tv/), Douyu (https://www.douyu.com/), Xigua (https://www.ixigua.com/) and Huya (https://www.huya.com/). (All confirmed that each of their streams had over 5,000 viewers in the last 3 months, which far reaches the massive standard for streams in live streaming (Hamilton et al., 2014). The average age of the participants was 27.6. The details of the interviewed streamers are shown in Table 2.1.

Table 2.1. Details of streamers

| Coded No. | Gender | Contents | Age | No. of followers | Platforms |
|---|---|---|---|---|---|
| S1 | M | Talk show | 20 | 651,904 | Kuai |
| S2 | F | Instrument playing | 27 | 503,682 | Inke |
| S3 | M | Singing | 49 | 517,056 | Kuai |
| S4 | F | Dancing | 22 | 524,387 | Xiongmao |
| S5 | M | Game-play | 28 | 253,799 | Douyu |
| S6 | M | Appearance/physical attractiveness | 27 | 188,215 | Douyu |
| S7 | F | Instrument playing and instrument selling | 22 | 134,671 | Xigua |
| S8 | F | Eating | 25 | 241,020 | Huya |
| S9 | F | Anime culture | 21 | 276,572 | Xiongmao |
| S10 | M | Outdoor activities | 32 | 323,453 | Xiongmao |

*Procedures*

Criterion-based and purposive sampling strategies (Mason, 2018) were used when selecting and recruiting participants. Streamers were recruited in four ways, including online forums (BBS), social networking apps (e.g., Wechat and QQ), and network sampling. Network sampling, also called snowball sampling, is a sampling technique generally adopted to estimate population (Lee, 2008). In addition to content-based criterion such as the nature of their shows and the numbers of followers, we also took into consideration their ages to reflect the general population of streamers. About 70% of streamers were found born in or after 1990 (Xinhuanet, 2019). Thus, more streamers born in or after 1990 were selected.

To conduct our interviews, firstly, we asked all participants to complete a brief demographic questionnaire as a pre-interview procedure. All participants agreed to the terms of consents, privacy and confidentiality that were fully explained to them before the interviews started. The interviews took place online from 28th Oct, 2018 to 21st Jan, 2019, when the participants answered questions related to how they attract viewers (e.g., "how do you attract more viewers?"). All the interviews were later transcribed into text. Information that could be identifiable of the individuals was removed from the text. The interviews and original transcripts were in Chinese. We employed the Brislin model (Brislin, 1970; Lee, li, Arai, & Puntillo, 2009), a classic translation model which can ensure the accuracy of the translation. In detail, the first bilingual translator independently translated the Chinese transcripts into an English version. Then the second bilingual translator independently back-translated the English version into a Chinese version, which was used to compare with the original Chinese transcripts. When errors found, our third bilingual translator back-translated the materials again until the content were equivalent in meaning.

2.3.2.2 Focus group interviews

*Participants*

23 people who, in the last 6 months, had watched a wide range of streams with gifting experiences were selected to be the participants. There was a gender imbalance in focus groups. The reasons might be as follows. Firstly, the members in two focus groups were students from Qingdao Agriculture School where there are more male students than female students. Secondly, men and women are found with different money spending habits (Hayhoe et al.,

2000). Males tend to spend electronic goods and entertainment, while females would more likely to spend on clothes (Hayhoe et al., 2000).

Normally, two to three focus groups were enough to obtain over 80% of themes, while three to six focus groups could capture 90% of the themes (Guest et al., 2017). Hence, 23 viewers were put into 3 separate focus groups with 7, 8 and 8 participants in each group, respectively. Demographic breakdowns were as follows: ages were from 18 to 32 with the average age of 21.2 years old. All participants self-identified as Chinese. Focus groups members include students and workers/professionals. Details of three groups are shown in Table 2.2.

Table 2.2. Details of focus groups

| Group No. | No. of participants | Coded No. | Average age | Gender |
|---|---|---|---|---|
| G1 | 8 | A1-A8 | 21.4 | 2 female, 6 male |
| G2 | 8 | A9-A16 | 18.5 | 1 female, 7 male |
| G3 | 7 | A17-A23 | 18.9 | 2 female, 5 male |

*Procedures*

The recruitment was done via advertisements posted on university internal bulletin boards, online forums (BBS) and social networking sites at three universities (i.e. Qingdao University, Qingdao University of Technology and Qingdao Agriculture University). All participants confirmed that they participated in the study voluntarily. Two face-to-face focus groups took place on 14 Oct 2018 at Qingdao Agricultural University, and one online focus group took place on 3 Nov 2018. Similar to procedures described in Section 2.3.2.1, we asked them to complete a brief demographic questionnaire first. Then they were asked to discuss and answer the key question “how do you choose a streamer/channel?” These interviews were audio-recorded and lasted on average 1 hour. Terms of consent, privacy and confidentiality were fully explained in the pre-interview instructions. Information pertaining to individual’s identity was then removed from the study. The transcripts were acquired and translated in the same procedure as explained in Section 2.3.2.1.

2.3.2.3 Observations

*Participants*

167 channels/streamers (89 female, 78 male) from 6 live streaming platforms (i.e., Xiongmao https://panda.tv/, Kuai https://www.kuaishou.com/, Douyu https://www.douyu.com/, Huya https://www.huya.com/, Yizhibo https://www.yizhibo.com/, and YY https://www.yy.com/) were selected randomly as participants, including 113 talent-show streamers (65 female, 48 male) and 54 game-play streamers (24 female, 30 male). The streaming activities of the selected streamers spanned from game-play, singing, dancing, instrument playing, food eating to talk shows, outdoor activities, anime culture, etc.

*Procedures*

Our observations were conducted with different durations ranging from10 minutes to 3 hours according to the length of each stream. The total observation time was 305 hours from 15 Nov 2018 to 15 Mar 2019. Notes were descriptive, and were taken during online observations to compare with data from the interviews and focus groups.

### 2.3.3 Data analysis

After immersing in the data and fully understanding the information, investigators analysed and captured the essence of the information from both individual interviews and focus group interviews, then clustered the transcripts according to different themes (such as “to increase streamer-viewer interactions” and “to conduct self-promotion”) using thematic analysis (Braun & Clarke, 2006), which is used to generate, analyse and interpret “patterns of meaning (themes) within qualitative data” (Clarke & Braun, 2017, p. 297).

We then compared the themes obtained from individual interviews and focus group interviews, as well as our descriptive notes written during our online observations.

## 2.4 Results

Based on our multiple triangulation, we induced three convergent behaviours for viewers’ attraction and one divergent behaviour. Three convergent behaviours are (i) to increase streamer-viewer interactions; (ii) to create synergy with other streamers; and (iii) to conduct self-promotion. The divergent behaviour is to work closely with the guilds and platforms.

### 2.4.1 Three convergent behaviours

Behaviour 1: To increase streamer-viewer interactions

*Results from the streamers' perspective (individual interviews)*

Streamers reported they attracted viewers by promoting interactions between them and their viewers. Streamers noticed several advantages in promoting streamer-viewer interactions: (i) active interactions between the viewers and the streamer "*made the content of the shows more exciting and attractive since the shows also added elements of the viewers' ideas*" (S4). (ii) Interactions with streamers also increased viewers' sense of participation. (iii) More interactions, more online text communication from the viewer's side. This helped to make the channel appear "hot" on the live streaming platform. (The hotness of the channel was articulated as being associated with the size of the audience, the texts from the viewers, and digital gifts being sent to the streamer.) Normally, the hotter the channel, the more likely the channel would be highly ranked and given a prominent place in the front page of the entire platform, which in turn, attracted even more viewers to visit the channel, since channels on the front page were easier for prospective viewers to see and visit. Also, as a streamer mentioned, "*the more online texts in the channel, the better the atmosphere in the channel, the more alive the stream was, and it is more likely that a new viewer was to stay in the channel*" (S2).

The basic practice for maintaining streamer-viewer interactions was to "*have a fixed streaming schedule so that viewers would turn up when his/her favoured streamer was on*" (S7).

According to streamers, "*the streamer-viewer interactions should not only be promoted during the real-time streams, but also outside streaming hours*" (S7). Streamers noticed the importance of "*turning up often to show their viewers that they were still there*" (S7). For example, posting some statuses, photos, captions, information either in their streaming page or other social media websites where they had connections with their fans and viewers.

*Results from the viewers' perspective (focus groups)*

According to eight focus group members, effective interactions between streamers and their viewers were an essential reason for them to watch a stream and follow a streamer. They admitted that "*more good interactions and attention from streamers attracted them to attach more to the streamers*" (A22). Besides, apart from the interactions between streamers and

viewers, focus group members expressed that they also expected good interactions between themselves and other viewers.

Focus group members perceived that more streamer-viewer interactions would promote more engagement. They felt that "*watching streams was a kind of companion*" (A21). Besides, they "*preferred streamers who can stream on a fixed schedule*" (A14) so that they knew when to expect the streams. They also mentioned that they "*enjoyed the interactions with the streamers they like outside streaming hours*" (A1).

*Results from the actual online behaviours (observations)*

In our observation, all the streamers we observed were seen to give feedback or responses to viewers during their streams. Most of them were also observed to initiate a topic and encourage their viewers to text, reply, and interact. Online interactions were not limited to online verbal and written communications; other interactions included creating online activities such as raffles or quizzes with prizes.

Streamer-viewer interactions were found to account for a large proportion of time in a stream. According to our observation, the average interaction and communication time between the talent show streamers and their viewers was well over 50% of the whole streaming time. For the game-play streamers, the situation was a little different. Among all the 54 game-play streamers, the average interaction and communication time was all less than 30%.

138 out of 167 streamers mentioned in their channels/pages or declared during the streams that they had a fixed streaming schedule. All of the streamers except the ones from the YY platform were found to post photos, captions, information, or statuses in the streamer pages (YY does not support this function at the time of observation) to maintain interactions and communications with their viewers outside streaming hours as well.

Behaviour 2: To create synergy with other streamers

*Results from the streamers' perspective (individual interviews)*

Most streamers reported that they attracted more viewers by creating synergy with other streamers through two practices: recommending other streamers and PK (player kill)/VS (versus) with other streamers.

Recommendation: One streamer recommended their "friends" or team members (other streamers) to their viewers. Streamers said they often helped each other through this way.
PK (player kill)/VS (versus): PK or VS is a form of cooperation or competition with other streamers. Streamer A could video call Streamer B who was also streaming online; B could decide whether to answer the call or not. If B responded it, then A and B would connect with each other and both of them would show on the viewers' screens side by side. After seeing both streamers and their performances, the viewers in Streamer A's channel were likely to visit Streamer B's channel and vice versa. In this way, streamers could "channel" viewers from each other's channels. Figure 2.2 shows that two streamers are in the PK mode. Viewers could easily visit the other streamer in the PK/VS mode by just clicking a button as highlighted.

*Results from the viewers' perspective (focus groups)*

Focus group members acknowledged that they "*would go to visit or even follow other streamers if these streamers were recommended by the streamer they like*" (A18). In addition, they admitted that in the PK/VS mode they "*would visit and also follow the other streamers if they found the other streamer was attractive*" (A3).

*Results from the actual online behaviour (observations)*

According to our observations, 128 out of 167 streamers were observed to have this behaviour. Besides oral recommendation in the streams, some streamers were also found to recommend their friends or team members by listing them at the bottom of their channels. The viewers could easily enter other streamers channels by clicking their icons as shown in Figure 2.3. However, not all the platforms had this function. Figure 2.4 shows that some streamers were working as a team. It seemed streamers who were familiar with each other tended to cooperate often in the PK/VS modes. According to our observation, PK/VS was widely used in talent show streamers, while game-play streamers did not use it as much as talent show streamers.


Figure 2.2. It shows that it is easy for the viewers to visit the other streamer's channel by clicking the button as highlighted.


Figure 2.3. One streamer listed his "friends" at the bottom of his page as highlighted.

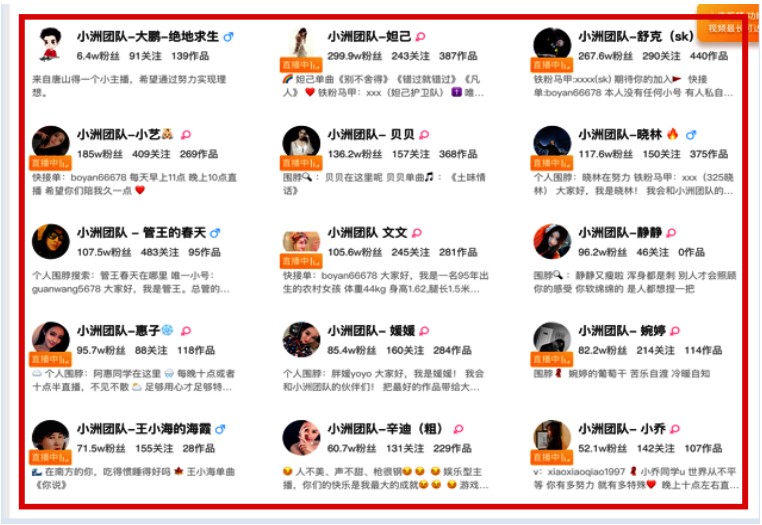


Figure 2.4. Some streamers were from the same team (Xiaozhou Team) as highlighted. All the streamers except the first one had over 500,000 followers.

Behaviour 3: To conduct self-promotion

*Results from the streamers' perspective (individual interviews)*

From the interviews, streamers reported they attracted viewers by self-promotion. Streamers believed that, with fame and popularity, they could easily attract more viewers. Therefore, streamers tried many ways to create their fame and awareness. Streamers mentioned two practices for self-promotion categorized by content.

Performance-related self-promotion: Streamers posted their video clips of their best performances to their personal pages on the platforms and/or on third-party platforms (i.e., Weibo, Wechat, Tik Tok and Bilibili) as a kind of advertisement. For example, "*the video clips with the streamers' names or streaming IDs were posted to popular third-party platforms or social media such as Weibo and Tik Tok*" (S4 & S5). When viewers were interested in the streamers' performances, they may go to the streamers' channels to watch more live performances/streams.

Performance-unrelated self-promotion: Some streamers also promoted themselves by creating news or developing content or skills in other fields unrelated to their live streaming performances. Streamers held the view that when a person was famous or popular in one area, he/she would easily create fame in other areas as well. For example, a talk show presenter "*released a single as a singer in KuGou*" (S1) to help him attract more fans/viewers who liked his singing to his talk show channel.

Streamers also reported some other self-promotion practices:

Snowball technique practice: Streamers "*encouraged viewers to recommend them to other viewers*" (S8), for example, by sharing their channels or performances to viewers' family, friends, or networks. According to streamers' self-reports, when someone liked a streamer, it was likely that their friends and family would like the streamer as well. Some platforms had the functions of recording any performances as a short video and sharing it through social media. This made sharing more efficiently and easily.

Proper self-presentation approach practice: streamers disclosed the importance of "*choosing the proper and attractive hashtags, captions, profile pictures, etc.*" (S4 & S7) for their streams. Unique, vivid, and novel self-presentation was deemed to attract more viewers.

*Results from the viewers' perspective (focus groups)*

Focus group members confirmed that they would like to "*search for a particular streamer if they heard the streamer was famous or they read some news about the streamer*" (A17). They also admitted that they tended to "*choose to watch the shows which are "HOT" (or recommended) in the live streaming platforms*" (A6 & A11). Also, focus group members said they "*would like to watch a stream and follow a streamer recommended by other people, especially their family or friends*" (A2).

Focus group members also disclosed that they "*would like to choose the streamers with attractive hashtags, captions, profile pictures, or self-presentation*" (A16 & A20) when they wanted to search a new streamer/channel.

*Results from the actual online behaviour (observations)*

Self-promotion conducted through performance-related and performance-unrelated practices for self-promotion were observed. In all the 167 streamers observed, 144 of them were found to have this behaviour. Figure 2.5 and Figure 2.6 are the screenshots of performance-related and performance-unrelated self-promotion, respectively. It seemed that streamers from different platforms behave differently for self-promotion, which were determined by the functions of different platforms. For example, streamers from Douyu and Xiongmao tended to post their videos with good performances in their personal pages or at the bottom of their channels. However, streamers from Kwai liked posting other unrelated short videos, normally comedy videos. Also, some streamers were found to link their IDs of other media (e.g., Weibo) to their live streaming channels.

The snowball technique practice was also observed by investigators. Streamers were observed to encourage viewers to share their channel links in viewers' social media. With regards to the proper self-presentation, streamers were seen to post hashtags, profile pictures, captions, etc. However, investigators could not define, to what extent, they were proper and attractive.

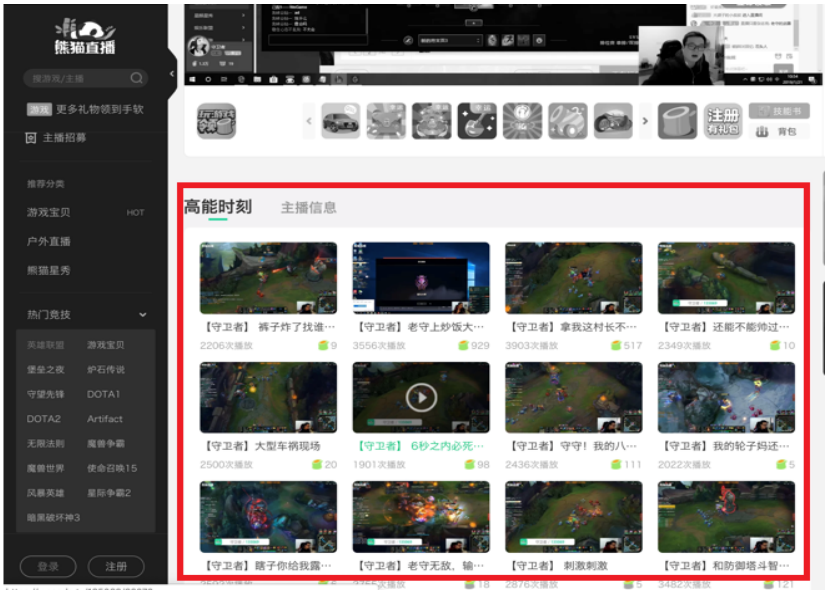


Figure 2.5. Performance-related self-promotion. The game-play streamer posted some of his game-playing clips with good performance at the bottom of his channel as highlighted.

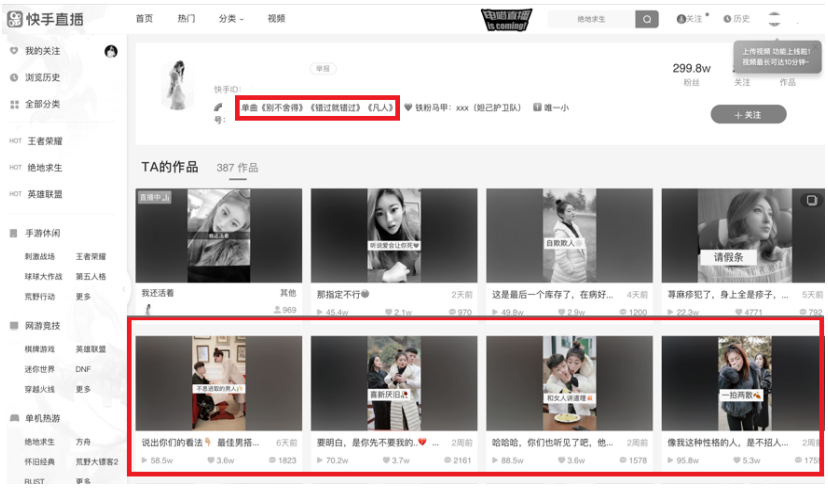


Figure 2.6. Performance-unrelated self-promotion. A talk show streamer mentioned her songs in her personal page and posted comedy episodes in her channel as highlighted.

### 2.4.2 One divergent behaviour

There was one more behaviour brought up by streamers, partially verified by viewers, but could not be validated by online observation.

Behaviour 4: To work closely with the guilds and platforms

*Results from the streamers' perspective (individual interviews)*

Most streamers disclosed that they joined the guilds, and their guilds could channel some viewers to them with the help of platforms. Therefore, it was essential to work closely with guilds and platforms. Streamers mentioned two ways that their guilds and platforms could help.

Initial entry: When a viewer entered a platform, he/she would be assigned to a channel automatically. Streamers or their guilds paid the platform to get more random viewers.

Recommendation system and hot streamer list: Viewers received recommendations continuously and automatically during their stream-watching. Also, there was a hot streamer list which kept updating on the platform. Some streamers would pay their platforms to get recommended or to be listed on the hot streamer list, so that more viewers may visit their channels.

*Results from the viewers' perspective (focus groups)*

Focus group members admitted that they might stay or even follow the streamers if they found streamers attractive after they were randomly assigned to a channel. Viewers also confirmed that they were likely to visit streamers recommended by the platforms, or check the hot streamer list and visit them.

*Results from the actual online behaviour (observations)*

Through our observation, we found we would be assigned to a channel by the platform. However, we could not know whether the platform assigned us to that channel randomly or deliberately. In addition, we observed the hot streamer list. However, we did not know whether the streamers paid for their recommendations.

## 2.5 Discussion

The key point of Behaviour 1 is to increase interactions and communications. Previous qualitative study shows that Twitch streamers noted the viewers' desire of being recognized and interacted with, therefore, they made efforts to recognize viewers and offered viewers opportunities to participate in and stand out in the streams (Hamilton et al., 2014). Our finding reflects that no matter the American viewers or the Chinese viewers, they all value the "social"

side of stream-watching. This reveals that pursuit of streamer-viewer interactions may be one of the main reasons for viewers to watch live streams.

Our finding that streamers spent time on communication and interactions are consistent with the previous study that chatting (streamer-viewer interactions) accounts for the largest proportion of streaming activities (Tang et al., 2016). We firstly note the differences in time spent on interactions between talent show streamers and game-play streamers. Game-play streamers need to concentrate to win the game, and that is probably why their interactions are less than talent show streamers'.

Behaviour 1 also indicates the importance of having a fixed streaming time, which is well consistent with previous study that keeping a consistent schedule is important in building community (Pellicone & Ahn, 2017).

In addition, our finding about turning up often, and keeping connected/communication with viewers support previous studies on online phatic culture which was popular in blogging and social networking like Facebook. As a new form of online communication, it aims to "maintain connections or audiences, to let one's network know that one is still 'there'", rather than to express information or focus on content (Miller, 2008). Our finding demonstrates the existence and the use of phatic communications in the live streaming realm.

In Behaviour 2, no previous research has specifically explored whether recommendations and PK (or versus) can attract more viewers. According to the literature, the reciprocal streamers who gifted each other were found to appear more often on the popular streamers list (Tu, Yan, Yan, Ding, & Sun, 2018), which in return, might make streamers more easily accessed by viewers on live streaming platforms. As observed in our study, streamers who are familiar with each other tend to compete in the PK/VS mode. Their relationships can be regarded reciprocal. Our study extends research on streamers' reciprocal behaviours. Differences in genres in using PK/VS are found as well. Reasons might be the same as we talked above that game-play streamers need to focus on their games.

In Behaviour 3, streamers are found to try different means to promote themselves, which is in agreement with the previous finding that streamers use other social media platforms for promotion (Kietzmann, Hermkens, McCarthy, & Silvestre, 2011). This behaviour reveals the importance of reaching and using a variety of means, and supports the previous research that

platforms should provide tools for streamers' self-promotion (Kietzmann et al., 2011; Tafesse & Wien, 2018).

Self-promotion is often concomitant with self-presentation or self-expression. Our finding that streamers make use of profile pictures, selfies and captions to attract more viewers, is consistent with previous studies that profile pictures, captions and selfies all serve as tools for self-presentation, strategic communication and performative utterances (Jerslev & Mortensen, 2016; Tifferet & Vilnai-Yavetz, 2018).

In addition, our findings show that some viewers are motivated to search for and choose some streamers to watch because of their curiosity. In the live streaming field, curiosity was only found to be influential on viewers' gifting behaviour (Li, Hou, Guan, & Chong, 2018). Our study extends previous research and finds out that curiosity may be one of the motivators of stream-watching.

In Behaviour 4, streamers cooperating with platforms and their guilds to make use of more resources, in fact, is a way of promotion as well. It is considered as less fundamental than the first three behaviours as Behaviour 4 could not be verified by all the three data sources.

## 2.6 Implications and Limitations

This chapter provides innovative methods in the behaviour study. Most previous research was found only using a single method in their investigation, such as interviews (Hamilton et al., 2014; Johnson, 2019; Tang et al., 2016), surveys (Cai et al., 2018; Gros et al., 2017; Hilvert-Bruce et al., 2018; Hu et al., 2017; Li, Hou et al., 2018; Sjöblom & Hamari, 2017; Sjöblom et al., 2017; Wan et al., 2017; Wohn et al., 2018; Zhu, Lu, & Gupta, 2017), or data crawling (Kaytoue et al., 2012; Pires & Simon, 2015; Tu et al., 2018; Zhu, Yang, & Dai, 2017). However, our study integrates multi-methods (including individual interviews, focus group and actual behaviour observation) in one study and explores a phenomenon from three different standpoints, which helps us comprehensively understand the phenomenon. In addition, our study expands the scope of the research objects. Multiple categories in live streaming are included rather than a single category. Our results provide a comprehensive description of viewer attraction in the live streaming realm.

Theoretically, social commerce practice in live streaming has been explored for the first time. By investigating how streamers attract viewers, we understand how streamers commercially interact with viewers, and ensure the social side of e-commerce in live streaming.

In terms of practical implications, both platforms and streamers benefit from our study. For platforms and the live streaming industry, our research is beneficial for knowledge of marketing and platform design. Platforms may add more functions which can promote streamer-viewer interactions, strengthen the cooperation among streamers, and provide more ways/means for streamers' self-promotion. Furthermore, other fields related to pervasion may also benefit from our study.

This study is not without limitations. Firstly, the psychological aspect of the attraction of viewers in relation to the effectiveness needs further investigation, e.g. why viewers watch streams? Why and under what circumstance a particular behaviour is more effective than the others? Secondly, it will be interesting to investigate whether cultural differences exist in the behaviours for viewers' attraction.

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# Chapter 3

## How to Be a Success in Live Streaming?

### Understanding the Social Commerce Practice in Live Streaming Using Novel Multiple Triangulation

Live streaming has become a massive, lucrative and competitive business, as well as a popular new social interaction venue. During a live stream, viewers can purchase digital gifts from a platform and send them to streamers. Streamers and their platforms share revenue from digital gifts received during live streams. Lured by profits, streamers strive to encourage viewers to send more gifts through interaction. This combination of business and social interactions makes live streaming a new form of social commerce. This article increases our understanding of this form of social commerce by investigating and evaluating how streamers encourage gifting using novel multiple triangulation, including data source triangulation and methodological triangulation. Data were systematically drawn from three sources, including self-report data from 10 popular streamers, 23 viewers, and observational online behaviour on 167 streamers and their viewers. Three methods were applied, including individual interviews, focus groups, and online observation. Through multiple triangulation, four convergent behaviours for gifting encouragement were identified: (i) to provide prices for extra services, (ii) to create prize-winning opportunities for viewers, (iii) to elicit competition between individuals; and (iv) to elicit competition between groups. This research pointing out new characteristics of social commerce in live streaming encompassing a wider range of selling subjects and selling objects with more interactions and communication opportunities in the selling process, helps to integrally understand social commerce practices. This research also increases our understanding of how streamers interact with viewers, and provides practical implications for platforms in marketing and platform design.

This chapter is organized as follows. Section 3.1 provides an introduction of this chapter. Section 3.2 presents the related background, Section 3.3 details methods, Section 3.4 analyses the data and presents the results, Section 3.5 provides discussion of the results, and Section 3.6 discusses the implications.

## 3.1 Introduction

Live streaming, as a new medium, has become popular globally and attracted large numbers of viewers (Twitch, 2017). It allows viewers to watch a streamer broadcast an activity online and

participate in real-time. During a live stream, viewers can interact with the streamer or other viewers by text or emoji. The streamer can provide "interactive performances" (Jia et al., 2020), and give audio (*e.g.,* talking to viewers) or visual (*e.g.,* body movements) responses to viewers. It makes live streaming a new place for social interaction (Hamilton et al., 2014). Crucially, viewers can voluntarily send streamers digital gifts (also known as virtual gifts) at any time during a live stream. The digital gifts, as a kind of product of live streaming, are bought using real currency from live streaming platforms. Streamers and their streaming host platforms share the revenue from digital gifts received (Lee et al., 2018) as an important source of income (iResearch, 2018; Jiguang, 2018; Research, 2018). In effect, streamers strive to encourage viewers to gift more. This appears to be a novel form of social commerce characterized by "taking advantage of relationships in a social network to gain commercial benefits" (Liang et al., 2011, p. 73), which has not yet received much research attention.

To understand this new form of social commerce practice is theoretically essential. With advancing IT capabilities and platforms, social commerce (also called social business), as a form of E-commerce, has evolved quickly over the past decade, from blogs, to social networking sites (SNSs) and social shopping websites (Jia et al., 2020). Now social commerce seems entering a new era with the advent of live streaming. The study of social commerce practice in live streaming can theoretically extend social commerce literature, and is helpful to understand social commerce integrally.

It is also practically crucial to understand social commerce practice in live streaming. The value of global live streaming was US$42.6 billion in 2019 (Grand View Research, 2020). It is projected that live streaming will account for over 80% of all internet traffic in 2020 (Techjury, 2020). The number of American live streaming users reached 228.8 million in 2018, and is expected to amount to 248.9 million in 2022 (Statista, 2019). Live streaming is even more pervasive and competitive in China where its live streaming market is forecasted to reach US$16 billion in 2020 (Statista, 2020) with 560 million users as of March 2020 (Xinhuanet, 2020). The Chinese live streaming industry has been the largest in the world in terms of the number of online users and profit made (Restream, 2020). Hence, it is practically important to understand the social commerce practice in live streaming, specifically the Chinese live streaming.

To studying the Chinese live streaming can broaden our perspective to understand social commerce practice in a global context. As online gifting is the most important and common

commercial benefits gained by streamers, we focus on investigating how streamers encourage online gifting. Our research questions are as follows:

(i) How do streamers interact with viewers to encourage their gifting behaviour?
(ii) Are there anything different in this new form of social commerce?

As previous qualitative studies on behaviour investigation involving a single data source or method have been challenged, due to low reliability and validity (Decrop, 1999), we developed innovative multiple triangulation (Mitchell, 1986; Thurmond, 2001) including data source triangulation and methodological triangulation. To comprehensively understand this new form of social commerce, data are drawn from three sources, including verbal self-report from both streamers and viewers, and the observational online behaviours of streamers and viewers from the investigators. Data from different standpoints supplement each other to obtain convergent and divergent conclusions. This is helpful to gain comprehensive information, and hopefully add to the breadth of our understanding. Accordingly, based on the characteristics of each data source, three methods are applied, including interviews, focus groups and observations. Applying different methods in one study could balance out the cons and pros of each method, and improve the reliability and validity (Bekhet & Zauszniewski, 2012; Carter et al., 2014).

Through multiple triangulation, we ensure that the "social" side of e-commerce is examined from both creator and audience perspectives, and that verbal claims about gifting practices are backed up with observations of practice.

Overall, this chapter investigates how streamers behave in live streaming to encourage viewers to gift. This chapter is related to and fits in one of our overall objectives regarding "to understand how streamers interact with viewers". Through multiple triangulation, we could conclude and understand how streamers interact with viewers to encourage them to gift.

## 3.2 Background

In this section, we review the current social commerce practices and gifting-related studies of live streaming. We also review related studies with regards to triangulation.

### 3.2.1 Social commerce

Social commerce, which was first introduced in 2005 (Curty & Zhang, 2011), is a relatively new e-commerce paradigm (Kim & Park, 2013). It is rooted in the development of Web 2.0 technologies and social media (Lin, Li, & Wang, 2017) and has transformed e-commerce into a more socialised and interactive way of doing business (Curty & Zhang, 2013). The main difference between social commerce and ordinary e-commerce is that social commerce involves more social elements (Liang et al., 2011; Linda, 2010).

The practices of social commerce have been evolving over time (Curty & Zhang, 2011) with the advent and growth of new technology, platforms, and social media tools. The social commerce venues have evolved from blogs, originally text-oriented, social networking sites (SNSs) and social shopping websites (Jia et al., 2020), to today's most popular live streaming which combines text, image, audio, and video, and provides live interactions. The various social commerce practices have resulted in different understandings since researchers emphasize different aspects and characteristics of social commerce. Until now, there has not been a consistent definition of social commerce. However, its basic features that enterprises leverage social relationships to facilitate online product-selling or service-selling (Hajli, 2013; Liang et al., 2011; Liang & Turban, 2011; Linda, 2010), have been widely accepted.

Although live streaming has opened up a new era of social commerce, to date only limited studies on social commerce have been conducted in the context of live streaming. Like other traditional text-oriented and image-oriented shopping websites such as Amazon and Taobao, live streaming shopping is a form of social commerce focused on product-selling with more interactive opportunities. Live streaming shopping is a special category of the whole live streaming industry, while most of the live streams do not focus on product-selling, but provide interactive performance (Jia et al., 2020) and rely on voluntary gifting from viewers to make profits. This relationship-based social commerce is obviously different from the product-based social commerce explored before. Hence, there is a need to understand this practice.

### 3.2.2 Gifting behaviour in live streaming

Several gifting patterns and characteristics have been identified from previous research in live streaming. From a macro-perspective, viewers' gifting behaviour is found to be correlated with the number of viewers (Zhu, Yang, & Dai, 2017). The more viewers, the more gifts are likely

to be received (Zhu, Yang, & Dai, 2017). Also, most viewers tend to purchase cheap gifts, while a small number of viewers contribute the more valuable gifts, critical to overall revenue (Tu et al., 2018; Zhu, Yang, & Dai., 2017). Moreover, most viewers just gift to one or two streamers, and the most valuable gifts are normally given to the most popular streamers (Tu et al., 2018). Most gifting behaviours were found to be synchronous with a barrage of comments or text communication (Tu et al., 2018).

From the micro-perspective, viewers' engagement positively affects their gifting behaviour (Yu et al., 2018). Engagement includes but is not limited to the amount of stream watching time, closeness to the streamers and viewers' dependence on live streaming. Stream-watching time is also found to positively influence gifting behaviour (Zhu, Yang, & Dai, 2017). Moreover, viewers' gifting behaviour is stimulated by other viewers on the same channel (Tu et al., 2018; Zhu, Yang, & Dai, 2017). In other words, viewers are more likely to gift when they see others gift.

Viewers with gifting behaviour are found to be regular users (Gros et al., 2017). Some viewers are even found to fight to be the top gift-senders (Sjöblom et al., 2017). Viewers with such behaviours are found to easily develop a deeper relationship with the streamers, and to affect the content of streams (Lu et al., 2018).

Gender differences in actual gifting behaviour have not been investigated. However, gender differences are found in viewers' decision to gift. Females' decisions on gifting are more likely based on their financial situations, while males are more likely to make their gifting decisions based on their interactions with streamers (Lee et al. , 2019).

Most studies on gifting are explored from the viewers' perspective, except one conducted from streamers' perspective with the investigation of gifting behaviour between streamers. Findings show that when a streamer gives gifts to other streamers, other streamers tend to gift the streamer back (Tu et al., 2018). This process forms a reciprocal gifting relationship between streamers. Nevertheless, there is a lack of investigation of general gifting study from the streamers' perspective, which motivates us to fill in this research gap.

## 3.3 Methods

### 3.3.1 Triangulation and triangulation model

Most qualitative approaches, especially those that investigate a phenomenon/behaviour only through a single data source, are often criticized for their biases and low reliability (Decrop, 1999). Here are two reasons. First, it is difficult to understand a complicated phenomenon only through one data source/standpoint. Second, it is hard to verify whether a behavioural pattern subjectively mentioned in interviews exists in a wider reality. It has been accepted that triangulation can serve as a strategy to mitigate these disadvantages through the convergence and agreement of information derived from different theories, investigators, sources and methods (Flick, 2004).

Triangulation is a novel method, which investigates a phenomenon by combining at least two theories, methods, data sources or investigators in one single study (Kimchi et al., 1991; Thurmond, 2001). A study adopting more than one type of triangulation is described as multiple triangulation. Although triangulation is an effective method, extant triangulation studies are few, and most of them are from nursing literature (Kimchi et al., 1991; Thurmond, 2001; Carter et al., 2014). Moreover, most current related studies focus on providing theoretical description of triangulation rather than applying it as a method in the research. Overall, it seems triangulation has not received much attention and has not been used much in the literature. This leads to a thought if we could apply triangulation as a method.

In our study, we use both data source triangulation and methodological triangulation to investigate how streamers encourage online gifting. Our data source triangulation not only draws information from the streamers' perspective, but also from two more independent data sources, including the viewers' perspective and observational actual online behaviours from the investigators' perspective. Triangulating these perspectives helps to supplement and verify streamers' accounts of their own strategies. Viewers, especially regular viewers, are a group who know the streamers and streamers' behaviours well. Viewers can also provide their motivations for their gifting behaviours, which can help us to better understand why streamers' behaviours work. Finally, online behaviour observations allow verification that these subjective accounts are actually practiced.

Methodologically, a between-method triangulation which involves contrasting research methods is designed, based on the characteristics of each data source, including individual interviews, focus group interviews, and online observations.

Interviewing is the most direct way to interact with participants (Kazmer & Xie, 2008; Rubin & Rubin, 2012), and it allows exploration of participants' attitudes, opinions, and perceptions based on over-arching research questions (Barriball & While, 1994). Using interviews helps to gather in-depth information, and allows clarification when necessary. Also, interviewing is flexible. However, the one-on-one interview is time-consuming, and often cannot allow for generalization.

Focus groups enable researchers to collect more information in a relatively shorter period than with one-on-one interviews (Lederman, 1990). They allow the dynamic exchange of attitudes and opinions between individuals (Bohnsack, 2004). This synergy of interactions enables participants to react to comments from others, and generate more ideas or controversy through discussion (Bohnsack, 2004). However, the time and venue of focus groups need to be coordinated, and sometimes it is hard to come to any agreement.

The verbal data collected from interviews and focus groups are through self-report, and therefore they are quite subjective. Systematic observation can balance out these subjective biases by triangulating their operation in real-time with more objectively coded observations of online behaviours. Triangulating these three methods can make use of strengths from each method, balance out their weaknesses, and increase reliability and validity (Bekhet & Zauszniewski, 2012; Carter et al., 2014). Our model of multiple triangulation is shown in Figure 3.1.

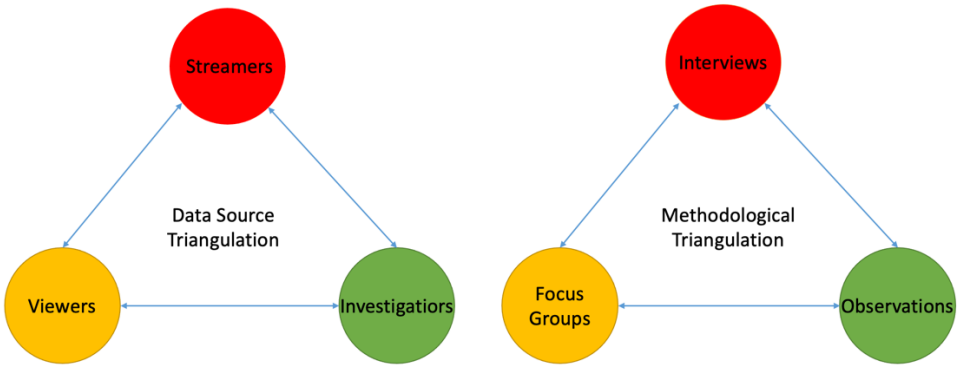


Figure 3.1. The model of multiple triangulation

## 3.3.2 Participants and procedures

3.3.2.1 Individual interviews

*Participants.*

Participants were 10 Chinese streamers (5male, 5 female) from six live streaming platforms which provide comprehensive contents and categories of streams, including Kuai (https://www.kuaishou.com/), Inke (https://h5.inke.cn/app/home/hotlive), Xiongmao (https://panda.tv/), Douyu (https://www.douyu.com/), Xigua (https://www.ixigua.com/) and Huya (https://www.huya.com/). They all had at least 130,000 online followers at the time of interviews. Ages were from 20 to 49 with an average of 27.6 years old. Streamers were from 6 popular Chinese live streaming platforms which provide comprehensive categories of streams, such as singing, dancing, game-play and talk show.

The participants were all popular streamers. According to iResearch (iResearch, 2018), only 1.4% of game streamers had over 20,000 followers as of December 2017. Also, a stream drawing over 1,000 viewers was considered to be massive (Hamilton et al., 2014). In our study, all the participants reported that each of their streams in the previous 3 months drew over 5,000 viewers. Hence, all the interviewed streamers were popular in terms of the number of total followers they had and the number of viewers drawn in each stream. The details of the interviewed streamers are shown in Table 3.1.

Table 3.1. Details of streamers.

| No. | Gender | Contents | Age | No. of followers | Platforms |
|---|---|---|---|---|---|
| S1 | Male | Talk show | 20 | 651,904 | Kuai |
| S2 | Female | Instrument playing | 27 | 503,682 | Inke |
| S3 | Male | Singing | 49 | 517,056 | Kuai |
| S4 | Female | Dancing | 22 | 524,387 | Xiongmao |
| S5 | Male | Game-play | 28 | 253,799 | Douyu |
| S6 | Male | Appearance/physical attractiveness | 27 | 188,215 | Douyu |
| S7 | Female | Instrument playing, teaching and instruments selling | 22 | 134,671 | Xigua |

| | | | | | |
|---|---|---|---|---|---|
| S8 | Female | Eating | 25 | 241,020 | Huya |
| S9 | Female | Anime culture | 21 | 276,572 | Xiongmao |
| S10 | Male | Outdoor activities | 32 | 323,453 | Xiongmao |

*Procedures*

Participants were recruited through the Bulletin Board System (BBS), SNSs, and snowball sampling. They were selected according to criterion-based and purposive sampling strategies (Ritchie, Lewis, & Elam, 2003). According to data released, about 70% of the streamers were born in or after the Year 1990 (Xinhuanet, 2018), and streamers of talent shows (singing, dancing, cooking, talk shows, etc.) were found to attract more gifts than game-play streamers (Jinriwanghong, 2017). Hence, more streamers born in or after the Year 1990 were chosen, and more talent shows streamers were involved in our study.

The interviews took place online from 28 Oct 2018 to 21 Jan 2019 with a 40-min average duration. Streamers participated voluntarily. Semi-structured interviews were carried out following the basic research question "without considering the content and genre of your streams, how do you encourage viewers to gift more in streams?"

All interviews were transcribed. Any identifying information of the streamers was deleted. The transcripts were coded and clustered according to themes using thematic analysis (Braun & Clarke, 2006). To make sure the transcripts were translated equivalently, the Brislin back-translation model (Brislin, 1970) was used. Specifically, the first bilingual translator independently translated the Chinese transcripts into English. Then the second bilingual translator independently back-translated the English version into Chinese. Then, the two Chinese versions of transcripts were compared with each other. If inconsistency found, the third bilingual translator back-translated the inconsistent parts again until the two versions were equivalent in meaning.

3.3.2.2 Focus group interviews

*Participants*

Participants were 23 regular viewers (5 female, 18 male) who spent more than CNY6/USD0.89 in gifting in the previous 3 months before participating in the focus group interviews, with at least 10 gifting experiences. There was a gender imbalance in focus groups. The reasons might

be as follows. Firstly, the members in two focus groups were students from Qingdao Agriculture School where there are more male students than female students. Secondly, males and females are found with different money spending habits (Hayhoe et al., 2000). Males tend to spend electronic goods and entertainment, while females would more likely to spend on clothes (Hayhoe et al., 2000).

In general, two to three focus groups are thought to be enough to capture over 80% of themes, and three to six focus groups could obtain 90% of the themes (Guest et al., 2017). Hence, participants were allocated to 3 focus groups with 7, 8, 8 participants respectively. Ages ranged from 18 to 32, with an average age of 21.2. Participants were viewers from different places in China, and included students and workers/professionals. All reported they watched popular live streams, across a wide range of genres. Details of the focus groups are shown in Table 3.2.

Table 3.2. Details of focus groups.

| Group No. | No. of participants | Coded No. | Average age | Gender |
|---|---|---|---|---|
| G1 | 8 | A1-A8 | 21.4 | 2 female, 6 male |
| G2 | 8 | A9-A16 | 18.5 | 1 female, 7 male |
| G3 | 7 | A17-A23 | 18.9 | 2 female, 5 male |

*Procedures*

Participants were recruited through BBS sites, and SNSs. More young viewers were chosen to reflect that nearly 70% of online viewers were under 30 years old (iResearch, 2018; Jiguang, 2018).

The average duration of each group discussion was 60 minutes. The first focus group interview took place online, and the other two focus groups were conducted fact-to-face in Qingdao Agriculture University. All participants volunteered for the study. The focus groups were conducted based on the research question “under what circumstances, do you gift streamers and why?” The transcripts of group interviews were dealt with in the same way as stated in Section 3.3.2.1.

3.3.2.3 Observations

*Participants*

In the 305 hours of online observations, 167 streamers were observed from six popular live streaming platforms (i.e., Xiongmao https://panda.tv/, Kuai https://www.kuaishou.com/, Douyu https://www.douyu.com/, Huya https://www.huya.com/, Yizhibo https://www.yizhibo.com/, and YY https://www.yy.com/). All the six platforms provide comprehensive streams, with their content covering game-play, singing, dancing, talk shows, food eating, outdoor activities, appearance attraction, instrument-playing, anime culture, etc. Details of the observed streamers are shown in Table 3.3.

Table 3.3. Details of observed streamers.

| Item | Details |
|---|---|
| **Gender** | 89 female, 78 male |
| **Content** | 113 talent shows (65 female, 48 male), 54 game-play (24 female, 30 male) |

*Procedures*

The observed streamers were randomly chosen from the streamer hotlists from six live streaming platforms including the streamers interviewed. The duration of each observation varied from 10 minutes to up to 3 hours depending on the length of each stream. Data from observations are descriptive and used to compared with data from the interviews and focus groups.

## 3.4 Data Analysis and Results

After analysing the transcripts, initial common behaviours for gifting encouragement were extracted from streamers' interviews through identifying the patterns of meaning (themes) by thematic analysis (Braun & Clarke, 2006; Clarke & Braun, 2017). Then these initial identified behaviours for gifting encouragement were compared and triangulated with findings from focus groups and the descriptive notes generated in the online observations. Through multiple triangulation, four convergent behaviours for gifting encouragement were identified. Additionally, two more behaviours were found, but only verified by two data sources. The

schematic diagram of data analysis is shown in Figure 3.2. In the following part, we will report both convergent and divergent behaviours. For each behaviour, the information from different data sources is reported.

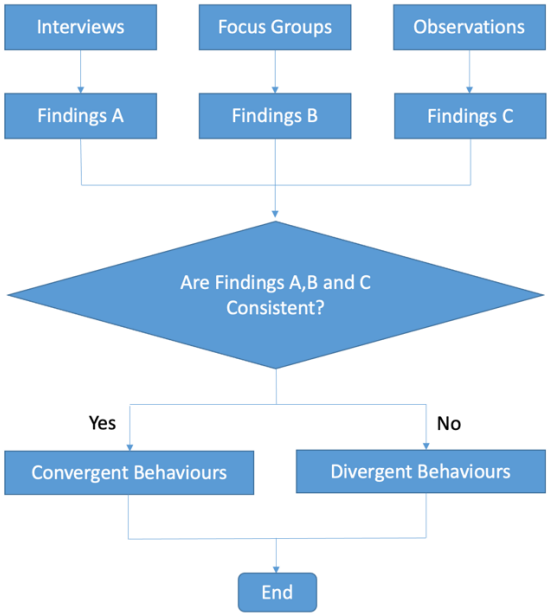


Figure 3.2. The schematic diagram of data analysis.

### 3.4.1 Four convergent behaviours

Behaviour 1: To provide a price for each extra service

*Results from the streamers' perspective (individual interviews)*

Provision of a price for extra services was used to attract more gifts according to streamers. When viewers requested special performances (*e.g.*, singing a song) or special roles (*e.g.*, being the moderator) during a stream, streamers provided a price for their request. For example, streamers may request a digital gift costing CNY6/USD0.89 for singing a particular song. As to the special roles, the most popular one is to be a *moderator* (also known as *room manager)* who has the power to mute other viewers or kick them out of the channel. One channel may have up to 200 moderators. Some streamers disclosed that they normally asked for a (particular) digital gift (*e.g.*, a "lobster" costing CNY99.9/USD14.86) from viewers before they granted the role (the moderator) to a viewer. For other streamers, although they did not provide a price for this role or other services, they expressed that they were "*more*

*likely to grant the role or provide services to generous viewers who had gifted more in their streams* (S8)".

*Results from the viewers' perspective (focus groups)*

Viewers expressed the view that to become a moderator is an incentive for them to gift. Other popular incentives include being selected into the streamer's fan group or to participate in activities organized by the streamers or platforms. Also, it seems that, sometimes, some viewers gifted the streamers not out of voluntariness, but because they wanted to get particular services, answers or feedback from the streamers.

*Results from the actual online behaviour (observations)*

After observing 167 streamers, we found 121 of them posted the exact gifts/prices of services in their channels; or they verbally mentioned the prices of services during their streams. Also, we observed that streamers encouraged gifting by adding viewers to their offline fan groups or appointing viewers to be the moderators. This can be seen in the example shown in Figure 3.3. We found, on several occasions, that streamers did not mention the price for becoming a moderator, but they did appoint the viewers who had gifted high value of gifts to be their moderators.


Figure 3.3. The streamer posted in her channel that any viewer who gifts her a "lobster" (a digital gift, costing CNY99.9/USD14.86) can get the role of moderator in her channel; any viewer who gifts her 3 lobsters can get her WeChat ID (personal contact details).

Behaviour 2: To create prize-winning opportunities for viewers

*Results from the streamers' perspective (individual interviews)*

Streamers reported they encouraged gifting by setting up raffles in their streaming channels. Streamers usually requested a particular gift before viewers get a chance to participate in a raffle as shown in Figure 3.4. Streamers found "*lured by huge awards (e.g. iPhone or huge currency), most of the viewers would like to spend small and affordable money to buy the raffle ticket and try their luck*" (S5). Consequently, streamers could attract more digital gifts.

*Results from the viewers' perspective (focus groups)*

Viewers admitted that sometimes they gifted not because of the stream itself, but because they "*wanted to win the raffle*" (A1). Some viewers said that they would "*gift more if there are more raffles*" (A21). Apart from raffles, viewers mentioned more online prize-winning activities organized by streamers, such as online quizzes and electronic red-envelope fights (a game, where different amounts of lucky money are allocated randomly). Although the activities are different, they all require viewers to gift to some extent before they can participate in the game.

*Results from the actual online behaviour (observations)*

Prize-winning activities such as online quizzes and electronic red-envelope fights were observed. We found this behaviour widely behaved on the platforms in which this function was available, such as Douyu and Xiongmao (live streaming platforms). In total, 109 out of 167 streamers had this behaviour. In our observations, the prices of the tickets to join the games varied across streamers. The awards also varied. Only a few raffles with big prizes (a rare example is shown in Figure 3.5) were observed. The popular awards included the role of the moderator, digital gifts and virtual currency (as shown in Figure 3.4). Of the platforms that supported the raffle function, almost half the streamers were found to conduct this activity (as shown in Figure 3.6).

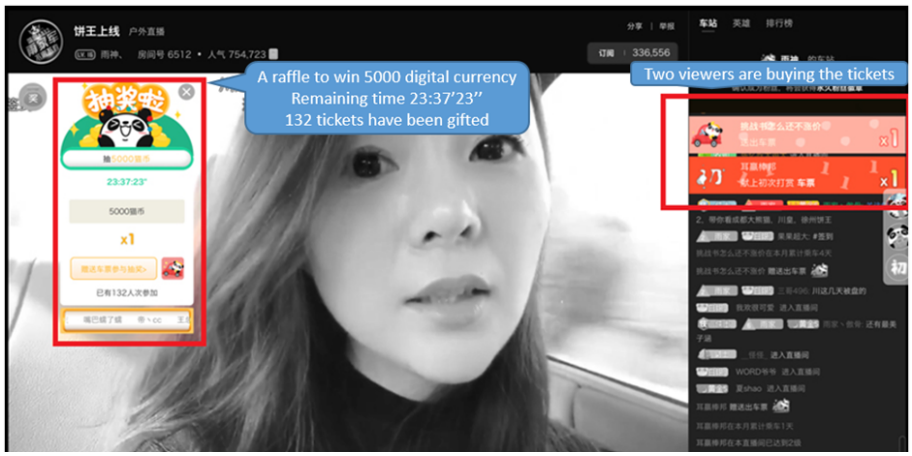


Figure 3.4. This shows the streamer set up a raffle to win 5000 digital currency (equivalent to CNY500/USD74.56). 132 tickets have been gifted. Each ticket for joining the raffle costs CNY6/USD0.89.

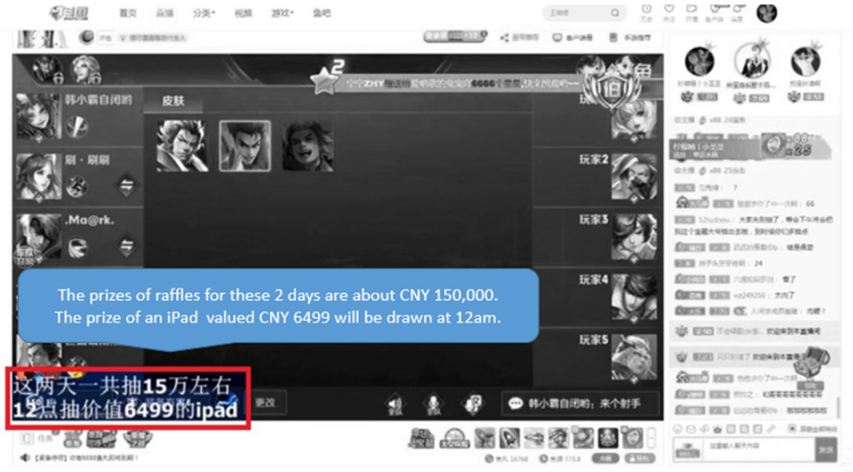


Figure 3.5. This channel shows that the prizes of raffles for these 2 days are CNY150,000/USD22343.25 in total. The prize of an iPad (CNY6499/USD966.89) will be drawn at 12am.

Figure 3.6. On the first page of Xiongmao live streaming platform, 7 out of 12 channels host raffles as highlighted. One channel hosts a raffle and a quizze.

Behaviour 3: To elicit competition between individuals

*Results from the streamers' perspective (individual interviews)*

Streamers created competition between individual viewers to encourage gifting. Two different practices were identified, including direct competition elicitation and indirect competition elicitation. Streamers usually take advantage of viewers' pursuit of top positions on the fame ranking lists. Viewer fame ranking lists (daily/weekly/monthly ranking lists) rank gift senders' names based on the value of digital gifts they send to the streamer. These fame ranking lists can be seen by all who enter the channel.

Direct competition elicitation: Streamers verbally lead a competition between two or more viewers. For example, the streamer says that "*Viewer B is going to surpass Viewer A to become the new No. 1 on the viewer fame list*" (S9). Subsequently, Viewer A might send more gifts to make sure to remain first on the list. On the other hand, Viewer B might send even more gifts to exceed Viewer A. In this situation, the streamer benefits from the competition between A and B. Interestingly, all the streamers who reported having this practice in the interviews were female.

Indirect competition elicitation: Streamers "*award the viewer who ranks first on the fame ranking list with gifts or personal contact details*" (S4 & S8). Viewers compete for the awards, and streamers benefit from viewers' competition.

*Results from the viewers' perspective (focus groups)*

Viewers recognized the elicitation of gifting competition between viewers by streamers, especially between super-fans and generous viewers. They said that if they came second in the fame list, they might send more gifts to exceed the viewer who came first, especially "*when the gap between the first and the second is not huge*" (A9).

*Results from the actual online behaviour (observations)*

Direct elicitation of online gifting competition between viewers were not very common in our observations. Overall, only 7 out of 167 cases were observed in the 305-hour online observation window. Also, all the 7 streamers who directly elicit competition were female.

In comparison, indirect competition elicitation was more common. Streamers were found to award the viewer who comes first on the fame list with real gifts (as shown in Figure 3.7),

personal contact details, etc. In total, 79 out of 167 streamers were observed to have this practice. Gender differences in using this technique were not observed.


Figure 3.7. This shows the streamer promises to knit a scarf for the viewer who comes first on the monthly fame list.

Behaviour 4: To elicit competition between groups

*Results from the streamers' perspective (individual interviews)*

Streamers also elicited competition between groups to encourage viewers to send more digital gifts. In the PK/VS mode where streamers can compete with another streamer, two streamers are both shown on the screen, and can project themselves within a fixed period time. During this time, the values of the gifts received by the two streamers are shown vividly on screen as shown in Figure 3.8. The winner is the one who receives more total value of digital gifts during the fixed competition period. By eliciting competition, streamers create more opportunities to make viewers excited about gifting, using the motivation of intergroup competition to encourage sending digital gifts.

*Results from the viewers' perspective (focus groups)*

Viewers mentioned that they liked to send more gifts to support their streamers when the streamers are in the PK/VS mode or other contests. Viewers said they "*did not want their streamers to lose in the competition*" (A19) so that they gifted more to fight for their streamer's

winning. Some believed that they would "*buy and send more digital gifts unintentionally under the competitive atmosphere*" (A10).

*Results from the actual online behaviour (observations)*

In our observations, 93 out of 167 steamers were observed to use PK/VS. More talent show streamers were found to use PK/VS than game-play streamers. Figure 3.9 shows PK is widely used by talent show streamers. Also, streamers who knew one another (and were probably collaborating) were more frequently involved in PK/VS than strangers (*i.e.* genuine competition between streamers).

Interestingly, streamers were noticed to deliberately verbally increase the intensity of the competition during PK/VS mode. For example, when Streamer A received more gifts, Streamer A would provoke the supporters of Streamer B by saying *"the fans in your channel are not giving strong support today"*. This led the supporters of Streamer B to send more gifts to Streamer B. Then, viewers of Streamer A gifted more as well, to make sure their streamer would win. Thus, both streamers benefit from the intergroup competition.

Some male streamers in the talent shows were observed to grab viewers' attention and encourage gifting by taking advantage of female streamers. Before the group competition, two streamers would talk about how to punish the loser who receives fewer gifts. When a male streamer PKs a female streamer, the punishment they agreed on, most of the time, was a sexy move/dance. Male streamers were found to say to their viewers *"we need to win so that we can see that girl's sexy performance. It is boring for a man to do it."*

Figure 3.8. This shows the two streamers in VS mode. The value of the gifts the streamers have received is clearly shown on screen. Currently, it is 14,900:108,200.

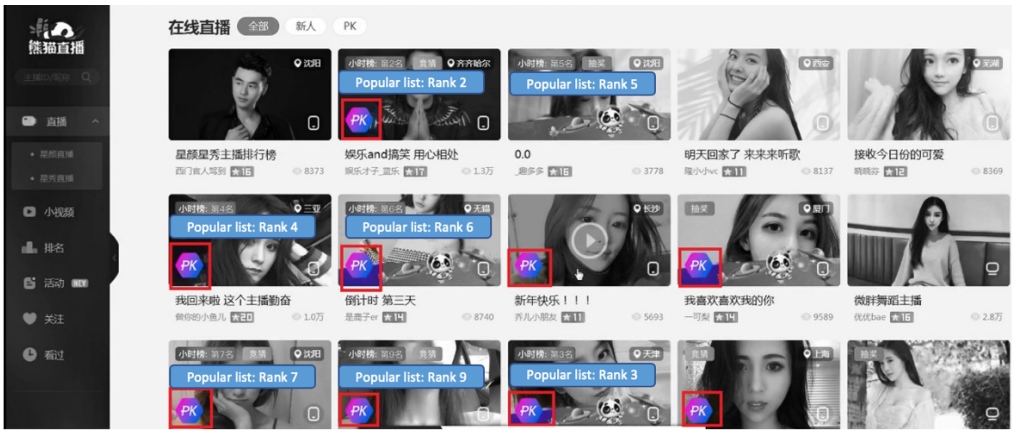


Figure 3.9. This shows a moment in Xiongmao live streaming platform where three-fifths of the streamers on the popular list (6 of them rank in the top 10 of hourly streamer fame list) are in PK mode as highlighted.

### 3.4.2 Two divergent behaviours

Besides the four congruent behaviours reported above, there are two additional divergent behaviours supported partially by two parties.

Behaviour 5: To encourage free or cheap gifts

*Results from the streamers' perspective (individual interviews)*

Some streamers disclosed that they attracted more digital gifts by encouraging viewers to gift free or cheap gifts. Viewers could be rewarded some free gifts by completing simple tasks (*e.g.* watching a stream for 15 minutes) on the platform. Also, some gifts are very cheap (*e.g.* CNY0.1/USD0.015). Streamers encouraged viewers to gift from the free or cheap gifts in order to get viewers used to gifting. Eventually, some streamers found more viewers would like to buy and send more gifts.

*Results from the viewers' perspective (focus groups)*

There are significantly divergent opinions from viewers regarding this behaviour. Some viewers disclosed they would start to buy more digital gifts after sending out their free gifts as expected by streamers. However, other viewers expressed that it was frustrating when streamers did not

show gratitude to them or give them any attention after receiving free or cheap gifts compared with expensive gifts, and that was why they would not gift cheap gifts. Nevertheless, some viewers said if streamers gave them attention and gratitude when they just gifted free or cheap gifts, they tended to buy cheap gifts all the time, and never shifted to more expensive gifts.

*Results from the actual online behaviour (observations)*

46 out of 167 streamers were observed to encourage viewers to send free or cheap gifts. Gender differences were not observed.

Behaviour 6: To ask confidence tricksters to help

*Results from the streamers' perspective (individual interviews)*

Streamers disclosed they would invite some confidence tricksters to take the lead to send digital gifts in their streams. They believed this could stimulate other viewers in the same channel to gift as well.

*Results from the viewers' perspective (focus groups)*

Most of the viewers admitted that when they saw other viewers gift streamers, they tended to gift as well; some viewers found they gifted unconsciously in this situation. However, three viewers held the opposite view and said that they would not send any gifts to streamers when they saw other viewers sending gifts. They explained that streamers might not show gratitude towards them, since streamers may not see who gifted them when viewers were all gifting at the same time.

*Results from the actual online behaviour (observations)*

Investigators could not figure out who were confidence tricksters and who were genuine donors through observation.

## 3.5 Discussion

Our findings suggest that social commerce practices evolve with the development of technology. Advances in technology facilitate the emergence of new platforms and new functions. Compared with previous social commerce practices/venues, our findings indicate three differences of this new form of social commerce practice. Firstly, the social commerce in

live streaming includes more subjects. Apart from selling from enterprises as in previous research (Lin et al., 2017), in the live streaming context, selling can take place on an individual basis, and everyone can potentially be a seller. Streamers (sellers) can be viewers (buyers) when they do not stream but watch others' streaming; whilst viewers (buyers) may become streamers (sellers) one day as well, considering the low threshold for becoming a streamer in the digital era. The roles of sellers and buyers are easy to interchange. Secondly, the social commerce in live streaming contains broader objects. In previous social commerce studies, objects to be sold are limited to products or services (Huang & Benyoucef, 2013). As investigated and described in our study, interactions, attention or virtual roles can now be used to get commercial benefits in the new social commerce practice. Thirdly, the social commerce in live streaming involves more interactions and communications. Live streaming platforms provide more functions for live interactions and instant communications between sellers (streamers) and buyers (viewers). Sellers (streamers), therefore, can make use of the new functions (*e.g.*, PK/VS modes) to conduct unique commercial interactions and communication to make profits. We therefore predict that there will be even more interactions involved in future social commerce practices.

Our study also illustrates viewers' gifting behaviours and motivations. Whatever behaviour encourages viewers to gift, viewers appear to be actively involved in gifting to satisfy their inherent needs, such as the pursuit of power and attention, entertainment, interactions with people, and money/prizes winning. This is in accordance with uses and gratifications theory (Ruggiero, 2000).

Triangulation is brought into behaviour studies and proved to be a useful and efficient method. Triangulation provides a comprehensive multi-perspective view, being used as "a validation strategy", "an approach to generalization of discoveries" and "a route to additional knowledge" (Flick, 2004, p. 183). Triangulation has been designed and described in the literature for decades, but mainly in theory (Kimchi et al., 1991; Thurmond, 2001; Flick, 2004). There have been very few studies conducted using triangulation in practice. This study serves as an example of investigating behaviours using triangulation. Triangulation also examined as a feasible, functional and promising method, which is appropriate for behaviour studies and may be applied in other research fields.

In Behaviour 1, streamers were found to make use of viewers' pursuit of power (*e.g.*, being the moderator), or engagement within a virtual community. Providing a price for extra services

may be interpreted as encouraging and charging for social interactions between streamers and their viewers. Previous research found that after gifting, viewers could get the opportunity for exclusive chats and receiving streamers' gratitude (Gros et al., 2017), develop a further relationship with the streamer (Lu et al., 2018), and influence the content of the stream to some extent (Lu et al., 2018). The current findings add to these findings by emphasizing that streamers often proactively request gifts before giving viewers benefits.

In Behaviour 2, what motives viewers to gift is not the content of the stream or the charm of the streamers, but the opportunity to win a prize, which becomes an extrinsic incentive rather than an intrinsic incentive. This appears to be a new property of the online platforms, allowing online live streaming to increase revenue through practices used in other well-established money-making platforms like gambling (Thomas et al., 2009).

Both Behaviour 3 and Behaviour 4 about eliciting competition, reveal the mutual influences of viewers' interactions. Behaviour 3 identified a gifting competition between individuals within the same channel, especially involving super-fans or rich viewers. This is consistent with previous research where viewers compete to be the top donor on viewers' fame ranking lists (Sjöblom et al., 2017). To directly elicit competition, streamers need to be aware of changes in the fame ranking lists and the dynamic situation in the stream. In comparison, indirect elicitation is relatively easier since viewers automatically fight for awards from the streamers. That may be the reason why we observed more indirect than direct elicitation.

In behaviour 4, it appears that some viewers are likely to get involved in and defend their streamers when the situation becomes an intergroup competition (Abrams & Hogg, 1990). This competition may increase or draw upon viewers' sense of community and group honour, and encourage them to gift more. Our finding is in accord with previous finding that the sense of community is an important gifting motivation (Hilvert-Bruce et al., 2018), but here, the sense of community is produced by differentiating the in-group from a relevant out-group, in accord with social identity theory (Tajfel & Turner, 2004).

From our observations, some streamers seem to work collaboratively to create synergy in live streaming. They seem to purposely create PK/VS competition with other streamers they know, which stimulates viewers from both sides to gift aggressively in reaction to gifting to the other "rival". In the group competition, no matter who wins, both streamers involved benefit. The more intense the competition is, the more gifts the two streamers receive. This imagined or

illusive conflict creates an interesting twist on classic theories of social identity-based competition (Abrams & Hogg, 1990; Tajfel & Turner, 2004).

Gender differences were noted for the first time in our study. Direct elicitation of competition between male individuals was used exclusively by female streamers. Also, in the PK/VS mode, viewers of the male streamers may have gifted more because they wanted to see the female streamer be "punished" (*e.g.*, to perform a sexy move). Viewers of the female streamer might have wanted to protect her from being "bullied" or made fun of by men in the other group. According to previous gender differences study, men response to status-focused loyalty programs more actively than women, but only when their high status is clear to be noticed by others (Melnyk, & van Osselaer,2012). No matter in the individual competition or group competition, how much viewers gift is always visible to all the viewers in the same channel. Hence, male viewers tend to respond more actively than female viewers in such competition.

In Behaviour 5, which might be termed as a "foot in the door" from persuasion science (Beaman et al., 1983; Dillard et al., 1984), lowering the value of the first requested digital gift tends to increase viewers' compliance so that they are willing to give more gifts. Viewers then are encouraged to gradually develop gifting habits, especially after getting positive feedback from streamers. But not all viewers agreed that they would comply with this behaviour.

In Behaviour 6, viewers may be inspired by a confidence trickster (an accomplice of the streamer giving a gift) to gift because of herd behaviour. This finding is consistent with previous studies where viewers' gifting behaviour was inspired by others (Zhu, Yang, & Dai, 2017) and the first gifting behaviour was often closely followed by dense gifting behaviours (Tu et al., 2018). Confidence tricksters work as stimulators in such cases. We were, however, unable to identify confidence tricksters through observation.

For the divergent findings in Behaviour 5 and Behaviour 6, although some viewers held different opinions, the focal point they cared about was whether they could get attention, social interactions, power or gratitude from the streamers. This reflects some consistency with the motivations underlying Behaviour 1. Behaviours 5 and 6 might be considered less fundamental than the first four reported.

## 3.6 Implications

### 3.6.1 Theoretical implications

First of all, our study explores the social commerce practice in live streaming, and points out exclusive characteristics of this new form of social commerce encompassing a wider range of selling subjects and selling objects, with more interactions and communication opportunities in the selling process. Our study is helpful for integral understandings of social commerce practices.

In addition, our research extends social commerce literature, and contributes to the methods used in behaviour studies. Before, most research investigates a phenomenon using a single method, such as interviews (Hamilton et al., 2014; Johnson, 2019; Tang et al., 2016), surveys (Cai et al., 2018; Gros et al., 2017; Hilvert-Bruce et al., 2018; Hu et al, 2017; Li et al., 2018; Sjöblom & Hamari, 2017; Sjöblom et al., 2017; Wan et al., 2017; Wohn et al., 2018; Zhu, Lu, & Gupta, 2017), or data crawling (Kaytoue et al., 2012; Pires & Simon, 2015; Tu et al., 2018; Zhu, Yang, & Dai., 2017). Our research innovatively uses multiple triangulation integrating three data sources and three methods in one study. The four behaviours that received convergent evidence from the three data sources might thus be considered as especially robust behaviours for encouraging more gifting during live streams.

This study also reveals some new motivations for digital gifting. The new motivations, beyond what found previously, include competition and group loyalty. Although new to the literature on live streaming, group loyalty practices are consistent with social identity theory (Abrams & Hogg, 1990) which indicates that people perceive who they are according to their group membership. People's social identities have influences on their attitudes and behaviours. Generally, people are motivated to evaluate their in-group as more positive than the relevant out-group, and will thus act to defend the in-group from the out-group when a situation becomes competitive.

### 3.6.2 Practical implications

Platforms may benefit from our study in terms of marketing and platform design. According to our findings, competition elicitation and prize-winning games have been thought of as useful behaviours by streamers. However, not all platforms have these functions at moment. Hence,

platforms may consider generating similar functions to satisfy viewers' needs. Platforms may organize more contests to create competitive situations. Thus, our findings can be used for reference for marketing-related activities.

Streamers may consider these behaviours and implement them in gifting encouragement. Since the streamers interviewed in our study are popular in the world's largest market, their behaviours can be taken seriously by other streamers. Also, the streamers interviewed come from different popular categories such as game-play, singing, and dancing, hence, the behaviours induced appear to be general and widely-used.

### 3.6.3 Limitations and future work

Several limitations of this study are acknowledged. In this study, the gifting encouragement behaviours were indicated by streamers, and verified by viewers in the focus groups and investigators' observations. However, the effectiveness of the behaviours has not been formally tested. This calls for experimental designs of quantitative research to test their effectiveness.

Secondly, further analysis is needed on psychological reasons why these behaviours work in gifting encouragement after confirming their effectiveness.

Thirdly, it will be interesting to conduct cross-cultural studies on gifting encouragement behaviours. This study focused exclusively on the Chinese users and platforms. More studies could be conducted to see if there are any differences in the behaviours for gifting encouragement in other cultures.

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# Chapter 4

# Why Do Viewers Continue to Watch Live Streams?

## An Empirical Study Connects Intention and Continuance Intention of Watching

Live streaming has become a fast-growing field and lucrative business. The success of the live streaming industry mainly relies on continuance use. However, limited research has been conducted to investigate why viewers continue to watch live streams. Based on expectation-confirmation theory (ECT), this chapter modifies the *post-acceptance model of information system continuance* to investigate factors influencing viewers' continuance intention of watching streams. Our theoretical model was empirically validated by an online survey (N=783). Results showed that: (i) perceived usefulness, perceived enjoyment and satisfaction had positive influences on viewers' continuance intention of watching live streams; (ii) satisfaction mediated the relationship between perceived usefulness and continuance intention of watching streams; (iii) satisfaction also mediated the relationship between perceived enjoyment and continuance intention of watching; (iv) confirmation had a positive impact on both perceived usefulness and perceived enjoyment, but not on viewers' satisfaction. This chapter successfully demonstrates a theoretically consistent association between intention of watching and continuance intention of watching, which helps us to understand viewers' stream-watching behaviours integrally. This chapter also provides theoretical evidence of antecedents of viewers' continuance intention of watching live streams, and discusses practical implications for live streaming platforms with regards to their design, functions and marketing.

The remainder of the chapter proceeds as follows. Section 4.1 presents the introduction of this chapter. Section 4.2 proposes the research model and hypotheses. Section 4.3 details methods, Section 4.4 presents results, Section 4.5 provides discussion of the results, and discusses the implications. Finally, Section 4.6 analyses the limitations of this study, and suggests future work.

## 4.1 Introduction

Live streaming provides interactive performances (Jia et al., 2020) and has become a comprehensive venue where users can make friends, gain knowledge and have fun. With the popularity of live streaming, a huge number of viewers watch live streams every day (Twitch,

2017). As a global phenomenon, an increasing number of people have been found to continue watching streams for hours and hours online. According to the latest data released by Limelight networks (2019), viewers on average spent nearly seven hours each week on stream-watching in 2019, a 59% increase compared with 2016.

Why viewers choose to watch live streams has been explored by many researchers. Uses and gratifications theory which suggests that users actively seek to adopt media to satisfy their needs (Blumler & Katz, 1974), has been widely used to explain viewers' watching intention, and has been adopted to explore their watching motivations (Gros et al., 2017; Sjöblom & Hamari, 2017). Motivators of stream-watching found in previous studies include entertainment, cognitive stimulation, social interaction, affective value, tension release, etc. (Gros et al., 2017; Hamilton et al, 2014; Sjöblom & Hamari, 2017). However, it is still unknown why viewers continue to watch live streams.

Theoretically, intention of watching and continuance intention of watching are different. The former is seen as a pre-adoption intention which is typically based on indirect experience (Bhattacherjee, 2001b), such as others' opinions and information disseminated through mass media; while the latter is seen as a post-acceptance intention (Bhattacherjee, 2001b) which is mainly based on viewers' previous watching experiences (as shown in Figure 4.1). Thus, continuance intention of watching streams is believed to be more unbiased and realistic (Bhattacherjee, 2001b; Fazio & Zanna, 1981). Practically, the success of streaming platforms, and even the whole live streaming industry, mainly depends on users' continuing use. Therefore, it is essential to understand why users continue to watch live streams, both theoretically and practically.

Based on social identity theory which stresses that people perceive self-concept from a social group they are in (Tajfel, 1974), a dual identification framework was developed to explain viewers' continuance intention of watching streams. The framework emphasizes the influences of streamer identification and group identification (Hu et al., 2017). However, this model and its explanations are not well-integrated with established models of watching intention which stress that viewers actively seek to watch streams to have their specific needs satisfied based on uses and gratifications theory. Identification might be an important need for some viewers, but is not all-encompassing. Therefore, using identity alone is not sufficient to explain users' continuance intention.

To fill in the research gaps mentioned above, we come up with our research questions:

(i) investigate factors influencing viewers' continuance stream-watching.

(ii) make a connection between watching intention and continuance watching intention.

We examine uses and gratifications theory in the context of the *post-acceptance model of information system (IS) continuance* (Bhattacherjee, 2001b), where new scales of perceived usefulness have been developed. Overall, this chapter investigates: what influences viewers' continuance stream-watching. This chapter is related to and fits in one of our overall objectives regarding "to understand why viewers continue to watch streams". Through this chapter, we could test and identify the factors influencing continuance watching intention behind their continuance stream-watching behaviour.

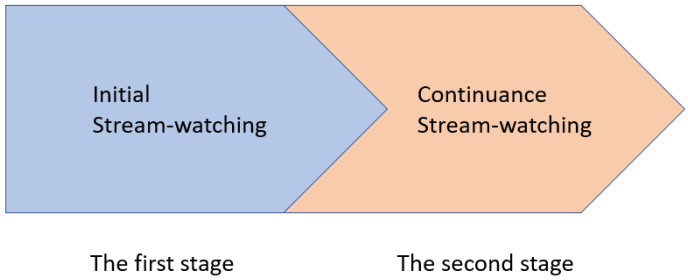


Figure 4.1. Stages of stream-watching and continuance stream-watching.

## 4.2 Background and Research Hypotheses

### 4.2.1 The post-acceptance model of IS continuance

The most prominent theory employed to explain viewers' post-adoption behaviour is the expectation-confirmation theory (ECT) (Bhattacherjee, 2001b; Oliver, 1980), which indicates that consumers' continuance intention is mainly determined by their satisfactions with prior product/service uses (Bhattacherjee, 2001b; Oliver, 1980). It originated from consumer behaviour research but has later been applied in multiple disciplinary domains (Bhattacherjee, 2001b).

The original ECT model represents the continuance adoption processes as follows: initially, before adopting a product or service, consumers produce an expectation of a product or service. Then, consumers adopt the product or service, and they perceive its performance after use.

Next, consumers compare their original expectation and perceived performance, and estimate whether their expectation is confirmed. A high level of confirmation lead to satisfaction, which has a positive influence on consumers' continuance intention (Olive, 1980; Bhattacherjee, 2001b).

Later, Bhattacherjee (2001b) noticed: (i) the original model could not explain why some initial consumers discontinued their use; (ii) the original model did not consider the emergence of consumers' psychological motivations after consumers' initial use of a product or a service. He then modified the model and extended it to a *post-acceptance model of IS continuance* (as shown in Figure 4.2). The processes of the modified ECT are as follows: before consumers use a product or service, they tend to form an expectation. Then the original expectation is compared with consumers' perceived performance after consumers adopt the product or service, and this comparison determines how much the consumers' expectation is confirmed. This confirmation also influences consumers' post-adoption expectation (presented as perceived usefulness in the *post-acceptance model of IS continuance*) which may change with time. On the one hand, consumers' perception of usefulness could directly affect their re-adoption intention. On the other hand, consumers' confirmation level and perceived usefulness, in turn, influence their satisfaction which mediates their re-adoption intention (Bhattacherjee, 2001b).

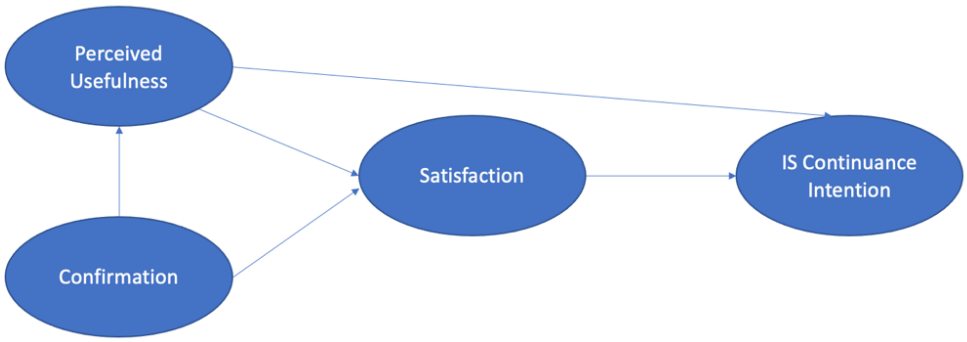


Figure 4.2. The post-acceptance model of IS continuance

The *post-acceptance model of IS continuance* has been widely used to investigate consumers' continuance intention in different contexts, such as online banking, electronic commerce, mobile data services, the web portal context, blogs, Internet protocol television, paid mobile apps, and mobile instant messaging (Bhattacherjee, 2001a; Bhattacherjee, 2001b; Hsu, & Lin, 2015; Kim, 2010; Lin et al.,2005; Lin et al., 2012; Oghuma et al., 2016; Shiau et al., 2011).

Similarly, continuance intention of watching streams is a post-adoption behaviour. Viewers decide to continue watching streams, at least in part, because they are satisfied with their prior watching experiences. Therefore, it is feasible to apply ECT to explain viewers' continuance intention of watching streams. In this chapter, we re-define perceived usefulness as the degree to which viewers perceive utilitarian benefits from stream-watching, including any cognitive, social or psychological benefits. This definition is consistent with the findings of intention of watching streams (Gros et al., 2017; Hamilton et al., 2014; Sjöblom & Hamari, 2017), and therefore, connects watching intention and continuance watching intention. As to the definitions of confirmation, satisfaction and continuance intention of watching streams, they were reworded to adapt to the live streaming context and are in line with previous ECT-based studies, as detailed in Figure 4.2. Based on the *post-acceptance model of IS continuance*, we set forth the following hypotheses:

**H1**: Confirmation has a positive effect on perceived usefulness.

**H2**: Perceived usefulness has a positive effect on satisfaction.

**H3**: Confirmation has a positive effect on satisfaction.

**H4**: Satisfaction has a positive effect on continuance intention of watching streams.

**H5**: Perceived usefulness has a positive effect on continuance intention of watching streams.

### 4.2.2 Perceived enjoyment

With the development of ECT models, researchers found that perceived usefulness is not the only construct influencing users' satisfaction and continuance intention. Subsequently, hedonic experiences have been paid attention and added to the ECT models. In contrast with perceived usefulness which is an extrinsic motivation, perceived enjoyment is an intrinsic motivation (Davis et al., 1992; Shiau & Luo, 2013). Perceived enjoyment, validated to be the counterpart of perceived usefulness, has become one of the most important constructs in ECT-based models (Kim, 2010; Lin et al., 2005; Oghuma et al., 2016; Thong et al., 2006).

Live streaming, as a new medium, provides different genres of streams for viewers to watch, such as singing, dancing, talk shows, and outdoor activities. Hence, it has hedonic and entertainment potential. Therefore, like perceived usefulness (Kim, 2010; Lin et al., 2005; Oghuma et al., 2016), perceived enjoyment is expected to influence viewers' continuance

stream-watching as well. Consistent with previous research (Gros et al., 2017; Hamilton et al., 2014; Sjöblom & Hamari, 2017), perceived enjoyment is defined here as the pleasure and fun that viewers derive from watching streams. Prior literature also found perceived enjoyment was influenced by confirmation (Kim, 2010; Lin et al., 2005; Oghuma et al., 2016; Thong et al., 2006) and could affect satisfaction and continuance intention (Lin et al., 2005; Oghuma et al., 2016; Thong et al., 2006). Hence, we formulate the following hypotheses:

**H6**: Confirmation has a positive effect on perceived enjoyment.

**H7**: Perceived enjoyment has a positive effect on satisfaction.

**H8**: Perceived enjoyment has a positive effect on continuance intention of watching streams.

Based on the reasoning processes presented above, our conceptual modal is designed as shown in Figure 4.3.

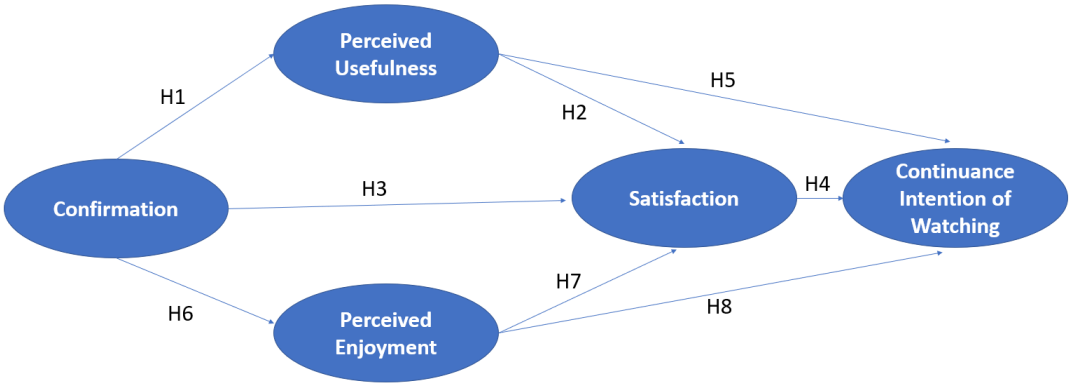


Figure 4.3. The proposed model

## 4.3 Research Method

### 4.3.1 Instrument development

We used surveys to collect data in this study. The reasons are as follows. Firstly, surveys are cost-efficient (Wright, 2005). Also, surveys can collect data from a large number of participants in a short time (Wright, 2005). There are five constructs measured in this chapter, including confirmation, perceived usefulness, perceived enjoyment, satisfaction, continuance intention of watching streams. The operationalization of measured constructs is presented in Table 4.1. The survey items of the constructs were either adapted from previous pre-validated ECT studies

or self-developed based on the conceptual definition. All the adapted items were reworded to suit the stream-watching context. As previous scales measuring perceived usefulness do not fit the stream-watching environment, six items were specifically developed based on uses and gratifications theory to appropriately reflect the environment of stream-watching.

Each survey item was measured on a Likert-type scale from 1 (strongly disagree) to 7 (strongly agree). Before implementing the survey, six doctoral students and four senior experts reviewed all the survey items. Based on their feedback, the survey was modified and was pilot tested on 120 viewers. The loading of PU5 was below 0.5, which is lower than the acceptable range for loading (Bagozzi & Yi, 1988). Therefore, PU5 was removed. All other items showed acceptable reliability and validity. The final survey items are presented in Table 4.2.

Table 4.1. Operationalization of the constructs

| Constructs | Operational definition | Reference |
|---|---|---|
| Confirmation (CO) | The degree to which viewers perceive congruence between expected and actual stream-watching performance. | Adapted from Bhattacherjee (2001b) |
| Perceived Usefulness (PU) | The degree to which viewers perceive utilitarian benefits from stream-watching, including any cognitive, social or psychological benefits which are distinct from stream-watching itself. | Self-developed |
| Perceived Enjoyment (PE) | The degree to which viewers perceive pleasure and fun from watching streams. | Adapted from Davis et al., (1992) |
| Satisfaction (SA) | Viewers' feelings of satisfaction from previous stream-watching experiences. | Adapted from Bhattacherjee (2001b) |
| Continuance Intention of Watching Streams (CI) | Viewers' intention to continue watching live streams. | Adapted from Bhattacherjee (2001b) |

Table 4.2. The measurement items

| Variables | ID | Items | Sources |
|---|---|---|---|
| CO | CO1 | My experience with watching live streams was better than what I expected. | Adapted from Bhattacherjee (2001b) |
| | CO2 | I get the level of service I expect from stream-watching. | |
| | CO3 | Overall, most of my expectations from watching live streams were confirmed. | |
| PU | PU1 | Watching live streams helps me kill time. | Self-developed: According to findings based on use & gratification theory (Gros et al., 2017; Hamilton et al., 2014; Sjöblom & Hamari, 2017) |
| | PU2 | Watching live streams makes me feel less lonely. | |
| | PU3 | Watching live streams helps me gain knowledge, information and skills etc. | |
| | PU4 | Watching live streams helps me have social interactions with others | |
| | PU5 (Deleted) | Watching live streams helps me escape from the reality. | |
| | PU6 | Overall, I get benefits from watching live streams in my daily life. | |
| PE | PE1 | I find watching live streams to be enjoyable. | Adapted from Davis et al., (1992); Sweeney & Soutar (2001) |
| | PE2 | The actual process of watching live streams is pleasant. | |
| | PE3 | I have fun watching live streams. | |
| | PE4 | Watching live streams makes me feel relaxed. | |
| SA | SA1 | Watching live streams makes me feel very satisfied. | Adapted from Bhattacherjee (2001b) |
| | SA2 | Watching live streams gives me a sense of enjoyment. | |
| | SA3 | Watching live streams makes me feel very contented. | |
| | SA4 | Watching live streams makes me feel very delighted. | |
| CI | CI1 | I intend to continue watching live streams rather than discontinue doing. | |

| | | | |
|---|---|---|---|
| | CI2 | My intentions are to continue watching live streams than use any alternative means (watching TV). | Adapted from Bhattacherjee (2001b) |
| | CI3 | If I could, I would like to discontinue watching live streams (reverse coded). | |

### 4.3.2 Participants and data collection

The empirical data was collected through an online survey Wenjuanxing (wenjuanxing.com) over 17 days. Wenjuanxing is a website providing a range of services, including data collection, data storage and data analysis. It has sent out over 109 million questionnaires since 2006. Wenjuanxing was chosen because it has user-friendly functions which can ensure each device only answers once and terminates the survey in no time when participants are found not eligible in the study. The respondents were the Chinese viewers who were 18 years old or older with stream-watching experiences at the time of survey. After eliminating 313 invalid responses (i.e. respondents under 18 years old, or had just watched live streams once, gave straight line answers, were incomplete, provided conflicting answers, or too short response time), the final valid survey responses yielded 783. The demographic information of final respondents is detailed in Table 4.3.

Table 4.3. Demographic information for respondents

| Items | Categories | Frequency | Percent |
|---|---|---|---|
| **Age** | 18-24 | 347 | 44.3% |
| | 25-30 | 147 | 18.8% |
| | 31-35 | 111 | 14.2% |
| | 36-40 | 99 | 12.6% |
| | Over 41 | 79 | 10.1% |
| **Gender** | Male | 332 | 42.4% |
| | Female | 209 | 26.7% |
| | Others or not disclosed | 242 | 30.9% |
| **Occupation** | Students | 258 | 33% |
| | Professionals | 426 | 54.4% |

| | | | |
|---|---|---|---|
| | Unemployed or retired | 99 | 12.6% |
| **Marital Status** | Single | 311 | 39.7% |
| | In a relationship | 279 | 35.6% |
| | Married or partnership | 193 | 24.6% |

## 4.4 Results

Structural equation modelling (SEM) is useful to "test and evaluate multivariate casual relationships" (Fan et al., 2016, p. 1). It is a statistical technique combining "measurement model and structural model into a simultaneous statistical test" (Hoe, 2008, p.76). Our data analysis both involves measurement model testing and structural model testing. Hence, SEM is suitable and used in the following analysis. We used SPSS 26.0 and Mplus to analyse data.

### 4.4.1 Measurement model

The goodness-of-fit of our proposed model was tested with its results detailed in Table 4.4. All the required criteria indicate good model fit.

Table 4.4. Measurement model

| **Index** | **χ2/df** | ***p*** | **TLI** | **CFI** | **RMSEA** |
|---|---|---|---|---|---|
| **Value** | 1.86 | 0.000 | 0.979 | 0.983 | 0.033 |
| **Level of acceptance** | < 3 | < 0.05 | ≥ 0.95 | ≥ 0.95 | ≤ 0.06 |

The index χ2/df is the chi-square divided by the degrees of freedom, which is a measure of model fit. The chi-squared test shows the difference between observed and expected covariance matrices (Hoe, 2008). Chi-squared test values closer to zero, which means smaller difference between expected and observed covariance matrices, indicate a better fit (Hoe, 2008). When the chi-square divided by the degrees of freedom, the value below 3 indicates better fit (Hoe, 2008).

A p-value less than 0.05 is normally required to show statistically significant. This indicates evidence is strongly against the null hypothesis (Di Leo, & Sardanelli, 2020).

TLI is Tucker–Lewis index, which "measures a relative reduction in misfit per degree of freedom" (Shi et al., 2019, p. 3). The index may be negative or more than 1 occasionally. Normally, TLI ≥ 0.95 demonstrates a good fit (West et al., 2012).

CFI is the comparative fit index, which can test the discrepancy between the data and the hypothesized model (Shi et al., 2019). It ranges from 0 to 1 with higher values demonstrating better fit. Normally, CFI ≥ 0.95 is considered a good fit (West et al., 2012).

RMSEA is the root mean square error of approximation, which analyses the discrepancy between the hypothesized model, optimally chosen parameter estimates, and the population covariance matrix (Shi et al., 2019). It ranges from 0 to 1 with the values ≤ 0.6 demonstrating better fit (Browne & Cudeck, 1993).

Confirmatory factor analysis (CFA) was used to test our scales. The details of the CFA results are presented in Table 4.5 and Table 4.6. Factor loading is the correlation coefficients for the variables and factors and average variance extracted (AVE) "a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error" (dos Santos, & Cirillo, 2021, p.1). With all the loadings and AVEs not lower than 0.5, the scales demonstrated reasonable convergent validity (Bagozzi & Yi, 1988). In addition, the square roots of the AVEs were all higher than their corresponding correlation coefficients (as shown in Table 4.6), indicating good discriminant validity (Fornell & Larcker, 1981). In addition, both Cronbach's alpha (CA) and Composite Reliability (CR) are used to measure the internal consistency. All the values of Composite Reliability (CR) and Cronbach's Alpha (CA) reached 0.7, demonstrating satisfactory reliability (Fornell & Larcker, 1981).

Table 4.5. Scale properties

| Variable | Items | Factor Loading | AVE | CR | CA |
|---|---|---|---|---|---|
| CO | CO1 | 0.823 | 0.646 | 0.846 | 0.845 |
| | CO2 | 0.827 | | | |
| | CO3 | 0.760 | | | |
| PU | PU1 | 0.688 | 0.500 | 0.831 | 0.831 |
| | PU2 | 0.668 | | | |

| | | | | | |
|---|---|---|---|---|---|
| | PU3 | 0.729 | | | |
| | PU4 | 0.719 | | | |
| | PU6 | 0.718 | | | |
| PE | PE1 | 0.776 | 0.602 | 0.858 | 0.858 |
| | PE2 | 0.766 | | | |
| | PE3 | 0.800 | | | |
| | PE4 | 0.760 | | | |
| SA | SA1 | 0.838 | 0.723 | 0.912 | 0.913 |
| | SA2 | 0.857 | | | |
| | SA3 | 0.847 | | | |
| | SA4 | 0.858 | | | |
| CI | CI1 | 0.993 | 0.779 | 0.911 | 0.896 |
| | CI2 | 0.653 | | | |
| | CI3 | 0.961 | | | |

Table 4.6. Correlation matrix

| | **CO** | **PU** | **PE** | **SA** | **CI** |
|---|---|---|---|---|---|
| **CO** | **0.804** | | | | |
| **PU** | 0.205 | **0.707** | | | |
| **PE** | 0.316 | 0.065 | **0.776** | | |
| **SA** | 0.169 | 0.206 | 0.199 | **0.850** | |
| **CI** | 0.130 | 0.226 | 0.244 | 0.265 | **0.883** |

## 4.4.2 Structural equation model

Our proposed hypotheses were examined using SEM. The results are presented in Figure 4.4 and Table 4.7. Among all the proposed hypotheses, only one was rejected. As expected, confirmation ($\beta$=0.205, $p<0.001$; $\beta$=0.316, $p<0.001$) ($\beta$ is a coefficient value) had a positive effect on perceived usefulness and perceived enjoyment, supporting H1 and H6. However, confirmation ($\beta$=0.081, $p>0.05$) was not found to have a significant impact on satisfaction.

Hence, H3 was not supported. Also, perceived usefulness (β=0.179, p<0.001) and perceived enjoyment (β=0.162, p=0.001) were found to positively influence satisfaction. Hence, both H2 and H7 were supported. Furthermore, satisfaction (β=0.190, p<0.001), perceived usefulness (β=0.174, p<0.001) and perceived enjoyment (β=0.195, p<0.001) were found to have a positive impact on continuance intention of watching streams, supporting H4, H5 and H8. The results explained 13.8% variance in continuance intention.

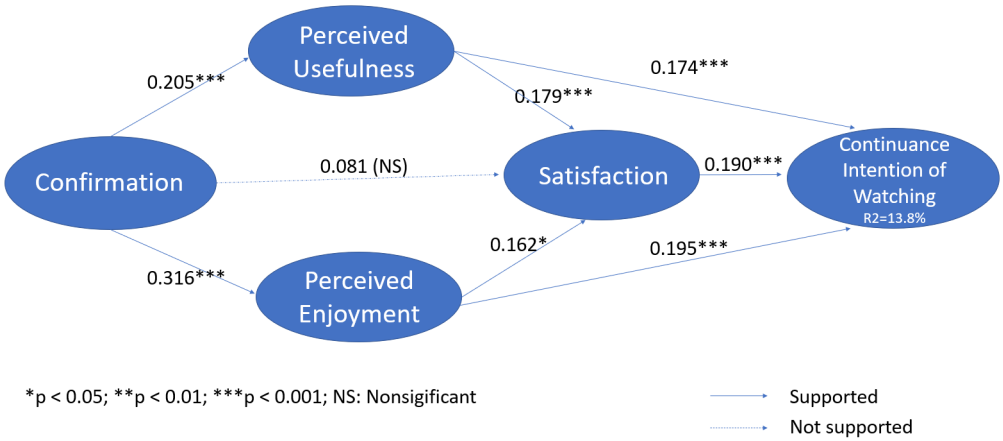


Figure 4.4. Model testing results

Table 4.7. Paths results

| Hypothesis | Path | Coefficient* (β) | Results |
|---|---|---|---|
| **H1** | CO→PU | 0.205 | Supported |
| **H2** | PU→SA | 0.179 | Supported |
| **H3** | CO→SA | 0.081 (NS) | Not Supported |
| **H4** | SA→CI | 0.190 | Supported |
| **H5** | PU→CI | 0.174 | Supported |
| **H6** | CO→PE | 0.316 | Supported |
| **H7** | PE→SA | 0.162 | Supported |
| **H8** | PE→CI | 0.195 | Supported |

*All accepted hypotheses were supported by path coefficients significant at p<.05

## 4.5 Discussion

This study successfully demonstrated a theoretically consistent association between intention of watching and continuance intention of watching. The items of perceived usefulness were developed based on uses and gratifications theory, the most widely adopted theory in explaining viewers' intention of watching. Results of our research showed that viewers' initial intention of watching and continuance intention of watching were not isolated from each other. This helps us to understand viewers' stream-watching behaviours integrally: viewers actively seek to watch live streams to satisfy their specific needs, mainly to obtain utilitarian benefits (including social benefits) and/or hedonic benefits. When their expectations get confirmed and their specific needs/benefits are satisfied/obtained, viewers are more likely to develop satisfaction and continue their stream-watching behaviour. Our study is in line with a previous longitudinal study that found perceived usefulness influences both users' adoption intention and continuance adoption intention (Sun & Jeyaraj, 2013).

This survey provides a conceptual model that explains what influences viewers' continuance stream-watching from an ECT perspective, which extends our understanding on ECT into broader contexts. In addition, this study included perceived enjoyment in the model and proved its important role in predicting viewers' continuance intention in the stream-watching context. Overall, results supported most of the hypothesized relationships in the proposed model. Findings indicated that perceived usefulness, perceived enjoyment and satisfaction were predictors influencing viewers' continuance stream-watching in a path model. Our findings are consistent with the results of users' continuance intention to use mobile instant messaging, online social networks and mobile banking (Jusuf et al., 2017; Oghuma et al., 2016; Sun et al., 2014). Particularly, our study demonstrated that perceived enjoyment, the intrinsic motivation, was more influential than perceived usefulness which is the extrinsic motivation in our model. These findings are in line with the results of social media, Twitter and mobile data services continuance usage research (Agrifoglio et al., 2012; Chen & Demirci, 2019; Hsu et al., 2015).

Our study shows that confirmation exerted a significant influence on both perceived usefulness and perceived enjoyment, which is consistent with previous ECT-based studies (Chen & Demirci, 2019; Kim, 2010; Lin et al., 2005; Oghuma et al., 2016). However, contrary to our hypothesis, this study found that confirmation had no significant effect on satisfaction. This finding is inconsistent with some other continuance studies (Chiu et al., 2020; Kim, 2010; Oghuma et al., 2016; Zheng, 2019), especially some literature pointing out that confirmation

has the strongest influence on satisfaction (Thong et al., 2006). We noted that the inconsistency findings are from studies related to mobile data service, mobile instant messaging and mobile Internet service, all providing fixed services without content. Compared with these, live streams are products with different content, which means no two streams are the same. In this circumstance, it might be a little hard to directly develop satisfaction for viewers with previous stream-watching experiences. More studies are needed to confirm how this relationship plays out in the stream-watching context.

With regards to satisfaction, there have been contradictory opinions on whether satisfaction could mediate the relationships of perceived usefulness and perceived enjoyment with continuance intention (Bataineh et al., 2015; Kim, 2010; Oghuma et al., 2016; Wen et al., 2011). This study provides empirical evidence that satisfaction could work as a mediator in both relationships/paths. Unlike the results from prior literature (Bhattacherjee, 2001a; Bhattacherjee, 2001b; Chang & Zhu, 2012; Lin et al., 2005; Lin et al., 2012; Oghuma et al., 2016; Shiau et al., 2011; Zhang et al., 2015), satisfaction was not found to work as the most influential precedent in predicting viewers' continuance intention of watching streams.

Practically, both streamers and live streaming platforms may benefit from our study. Based on our finding that perceived enjoyment contributes the most to continuance intention of watching streams, streamers and live streaming platforms should produce more pleasure-oriented streams to attract viewers and improve their loyalty. Our study also provides a firm basis for future studies, for example, the prevention of stream-watching addition.

## 4.6 Limitations and Future Work

Two limitations are identified from this study. Firstly, this model only explained 13.8% of the variance in the continuance stream-watching context. More factors, like social norms, and perceived ease of use should be considered and tested in the future to increase explanatory power.

Secondly, direct generalization of our findings to countries with different cultural backgrounds may not be proper. This study was conducted in China. Different cultural features may result in different results. Therefore, future studies could investigate the antecedents of viewers' continuance intention of watching streams in different countries or cultural backgrounds.

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# Chapter 5

# Investigating Factors that Influence Continuance Intention

## A Value-based Continuance Intention Model

With the popularity of live streaming, users spend a large amount of time on stream-watching. Although the expectation-confirmation theory (ECT) has been widely used to explain continuance intention, some deficiencies in the current ECT-based models have been identified. It seems that current models are not theoretically complete since they are lacking the consideration of users' costs of use. In this chapter, we propose a *value-based continuance intention model* (V-ECM) to fix the deficiencies, and use it to investigate factors influencing users' continuance intention of watching streams. Our hypotheses were tested using a survey of 1220 online viewers with continuance stream-watching experiences. Results indicated that: (i) continuance intention was positively influenced by satisfaction, perceived value, perceived ease of use and subjective norms; and (ii) satisfaction, as an important mediator, was affected by confirmation, perceived value, subjective norms and perceived ease of use. V-ECM theoretically extends ECT-based studies by involving perceived value, a process of overall practical assessment between users' perceived benefits and perceived sacrifices. As a more comprehensive and generalized model, V-ECM is useful for explaining and predicting users' continuance intentions in the online and/or technology-related contexts.

The remainder of this chapter is structured as follows: Section 5.1 presents the current studies on continuance intention and deficiencies of current models. Section 5.2 provides the background literature, Sections 5.3 and Section 5.4 describe our hypotheses and methods, Section 5.5 details the data analysis results, Section 5.6 presents a discussion of the results and their implications, and finally, Section 5.7 analyses the limitations of this study, providing suggestions for future research.

## 5.1 Introduction

The live streaming industry has been growing explosively and becoming popular worldwide. Taking Twitch for example, there were 2.2 million streamers and 15 million daily viewers in 2018 (Business of Apps, 2020), and 1.44 million concurrent viewers in 2020 (Business of Apps, 2020). Its popularity is reflected not only in the increase in the numbers of users, but also in

the time users spend on stream-watching. In 2016, 81% of users watched more live streams compared to the previous year (NeilPatel, 2018). Overall viewing hours rose 89% from 2017 to 2018 (Conviva, 2018), making stream-watching among the "largest global surges in viewership throughout 2018" (Vimeo, 2020, n.p.). As of 2018, Twitch active users spent, on average, 106 minutes on stream-watching each day (NeilPatel, 2018). In late 2019, the total time spent viewing Twitch streams reached 2.3 billion hours (Business of Apps, 2020).

It has been widely accepted that, theoretically, intention and continuance intention are different. Intention is a pre-adoption intention influenced by users' indirect experiences, while continuance intention is a post-acceptance intention mainly influenced by users' direct experiences (Bhattacherjee, 2001b). Likewise, intention of watching differs from continuance intention of watching. Intention of watching could properly explain why users choose to watch live streams (for the first time), but it fails to illustrate why they continue to watch. Hence, in theory, there is a need to study and explain users' continuance intention of watching streams. In practice, to probe users' continuance intention of watching is also important since the eventual success of live streaming industry is, to a great extent, determined by users' continuance use (Jia et al., under review).

The expectation-confirmation theory (ECT) has been widely used to explain customers' continuance intention. In particular, Bhattacherjee's *post-acceptance model of information system (IS) continuance* (Bhattacherjee, 2001b) is one of the most widely accepted models. Most continuance intention studies have been built on this model. However, theoretically, it seems that most ECT-based models (Bhattacherjee, 2001a; Bhattacherjee, 2001b; Lin et al., 2005; Hsu, & Lin, 2015; Gupta et al., 2020; Jia et al., under review) are incomplete since they only take into account that users' perception of expected benefits may change over time (Bhattacherjee, 2001b), but fail to consider that users' perception of losses and costs may also change over time. In other words, current models only work properly in an ideal situation in which users perceive only benefits without any losses or costs in their use of a product/service. They assume that no matter how high users may perceive the losses and costs of use, they would re-use the product/service they were satisfied with, as long as they still perceive some benefits of use.

To solve the deficiencies mentioned above, we propose a *value-based continuance intention model*, named V-ECM, which includes a process of overall assessment between users' perceived benefits and perceived sacrifices. V-ECM integrates *post-acceptance model of IS*

*continuance* (Bhattacherjee, 2001b) and *value-based adoption model* (VAM) (Kim et al. , 2007), and is used to afford insight into the factors affecting users' continuance intention of watching. Furthermore, V-ECM is a generalized model that could be applied to explain and predict users' continuance intention of watching live streams. V-ECM may also be used to explain other online and/or technology-related continuance intentions, such as continuance intention of watching short videos, and continuance intention of using smartphone apps.

Overall, this chapter investigates further regarding viewers' continuance stream-watching. This chapter is related to and fits in one of our overall objectives regarding "to understand why viewers continue to watch streams". Through this chapter, we could identify more factors influencing continuance watching intention.

## 5.2 Theoretical Background

### 5.2.1 Expectation-confirmation theory (ECT) and ECT-based models

The expectation-confirmation theory suggests that consumers' continuance intention is mainly influenced by their satisfaction with previous use experiences (Bhattacherjee, 2001b). This theory has been widely used to study users' continuance intention and post-adoption behaviour in different contexts. Among all the ECT-based models, Bhattacherjee's *post-acceptance model of IS continuance* (Bhattacherjee, 2001b) is one of the most widely accepted. In this model, customers form an expectation of a product/service before they use it. After they use the product/service, they compare the perceived performance with their original expectation. This determines to what extent their expectation is confirmed. After using the product/service, users' post-consumption expectation (presented as perceived usefulness in the model) defined as users' perception of expected benefits, changes with time. The impact of the confirmation of expectations mediates perceived usefulness, and these together predict satisfaction, which acts as a mediator of continuance intention (Bhattacherjee, 2001b). Most post-adoption studies have been built on this model.

Earlier studies of continuance intention mainly focused on the utilitarian benefits, a functional dimension. In this phase, perceived usefulness (or perceived performance) was one of the most important variables in the continuance intention models, such as studies of blog users (Shiau

et al., 2011), online bank users (Bhattacherjee, 2001b), and electronic commerce users (Bhattacherjee, 2001a).

Later, some studies, such as continuance intention studies in mobile data service (Kim, 2010) and web portals (Lin et al., 2005), examined the hedonic benefits, and added perceived enjoyment (or perceived playfulness) to their models.

Subsequently, additional variables were taken into consideration and proposed in various ECT-based models. For example, knowledge self-efficacy, perceived usability (usefulness, enjoyment, user interface) and perceived security (Oghuma et al., 2016; Jin et al., 2013; Gupta et al., 2020). Also, performance value, value-for-money, emotional value, and social value were investigated in continuance intention for paid mobile applications (apps) (Hsu, & Lin, 2015).

All the models mentioned above only emphasize the importance of users' perceived benefits, no matter whether utilitarian, hedonistic and/or social. Although some researchers started to consider the negative influences (e.g., perceived fee) (Kim, 2010) in the continuance intention and added them to the continuance intention models, the models are still not theoretically complete since the variables (e.g., perceived fee) representing negative influences are neither generalized nor comprehensive.

In practice, users may perceive high performance of a product/service and are satisfied with it after initial use, and have their positive expectation of the product/service confirmed, but they have to discontinue their use because their perception of losses and costs in continuance use change. For example, a businessman believes a service useful, helpful and necessary, but unfortunately, he just goes bankrupt. As a result, he has to stop his continuance use because at this time he perceives much higher costs in continuance use than before (e.g., he could not afford this service anymore), even though he still has his expectation confirmed, perceives good performance, and has high satisfaction. As we can find in this process described, users tend to practically compare their perceived performance/benefits with their perceived costs/losses of use, to calculate if their continuing use worthwhile. If users' perceived benefits are higher than their perceived losses/costs, they are more likely to continue to use the product/service. However, if users perceive more losses/costs than benefits, continuance use is unlikely to happen. Therefore, current ECT-based models are lacking a comprehensive and generalized step where users can conduct such assessment. This leads to a question of whether

it is possible to import a more comprehensive variable from another theory (or model) to improve ECT-based models. This thought motivated us to propose a more appropriate variable and a new model.

### 5.2.2 The value-based adoption model (VAM)

The value-based adoption model (Kim et al., 2007) could help solve the problem of lack of a comprehensive and generalized variable as mentioned in Section 2.1. It theorizes that users' adoption and usage intention are determined by perceived value (PV), which is the overall assessment/trade-off between their total perceived benefits (PB) and total perceived sacrifices (PS) from the perspective of value maximization (Kim et al., 2007). This formula is presented as:

$$PV = PB - PS$$

When the perceived value is high, users are more likely to use and adopt a product or a service. High perceived value can be achieved by high benefits perceived and low sacrifices perceived from using the product/service.

Perceived value has been to some extent integrated into ECT before, with different components of perceived benefits and perceived sacrifices in different contexts. For example, in the mobile Internet context, the components of perceived benefits mainly pertain to usefulness and enjoyment, while technicality and perceived fee are the components of perceived sacrifices (Kim et al., 2007). In the Internet protocol television (IPTV) context, researchers held the view that personalization, high quality, content richness, and value-added services make up the components of perceived benefits, while perceived sacrifices is comprised of perceived fee, change of viewing habits, technicality, and knowledge of alternatives (Lin et al., 2012). In these studies, perceived benefits and perceived sacrifices were viewed as two categories of variables rather than as the important constructs in the models.

Therefore, with the presentation of perceived value considers and includes both perceived benefits and perceived sacrifices, we intend to use perceived value to replace perceived usefulness (and/or perceived enjoyment and/or other similar related variables), since perceived value is a more theoretically comprehensive variable and could simplify the model.

## 5.3 Research Model and Hypotheses

### 5.3.1 The baseline model

Perceived value (PV = PB - PS) is a generalized variable borrowed from VAM (Kim et al., 2007) to replace perceived usefulness (and/or perceived enjoyment and/or other similar related variables) in current ECT-based models. We define perceived benefits as any advantages or gains from using a product/service, no matter whether utilitarian, hedonic, or social, such as entertainment, monetary benefits, emotional value, psychological value, social value. We define perceived sacrifices as any losses or costs from using a product/service, such as monetary loss, time, loss of fame, or efforts spent in using. Overall, both perceived benefits and perceived sacrifices can include monetary or non-monetary factors, extrinsic or intrinsic factors, tangible or intangible factors, etc. Perceived value thus refers to users' overall perception of using a product/service after considering its benefits and their sacrifices. In this study, perceived value refers to users' overall perception of watching live streams after assessing benefits and sacrifices they perceive. As Bhattacherjee's *post-acceptance model of IS continuance* (Bhattacherjee, 2001b) is our baseline model, after replacing perceived usefulness with perceived value, we set forth the following hypotheses:

**H1**: Confirmation has a positive effect on perceived value.

**H2**: Perceived value has a positive effect on satisfaction.

**H3**: Satisfaction has a positive effect on continuance intention of watching.

**H4**: Confirmation has a positive effect on satisfaction.

**H5**: Perceived value has a positive effect on continuance intention of watching.

### 5.3.2 Perceived ease of use

Perceived ease of use has been demonstrated to be a useful predictor of technology adoption intention in studies on users' acceptance of computer technology (Davis, 1989), e-portfolios (Abdullah et al., 2016), web-based learning platforms (Sánchez & Hueros, 2010), smartphone usage (Joo & Sang, 2013), continuance usage of a fitness app (Beldad & Hegner, 2018), and

continuance IT usage (Thong et al., 2006). It refers to the perception that the use of a system/application is easy and convenient (Davis, 1985).

Continuance stream-watching is also a technology-related activity. Live streaming is a new medium, and its use is different from traditional media such as television and newspapers. Streams can be accessed through live streaming websites or using live streaming apps. Therefore, similar to other technology adoption behaviours (Davis, 1989; Joo & Sang, 2013), continuance stream-watching may be influenced by perceived ease of use as well. Hence, we propose:

**H6**: Perceived ease of use has a positive effect on continuance intention of watching.

Perceived ease of use has also been validated to positively influence online users' satisfaction in the prior literature (Amin et al., 2014; Dalcher & Shine, 2003; Joo et al., 2011; Joo et al., 2018; Lin et al., 2017; Shah & Attiq, 2016; Tu et al., 2012), which means that users are more likely to develop satisfaction when they perceive that the online system/application is easy to use. Hence, we hypothesize:

**H7**: Perceived ease of use has a positive effect on satisfaction.

In addition, perceived ease of use has been found to correlate to perceived usefulness and/or perceived playfulness in continuance intention studies (Beldad & Hegner, 2018; Joo et al., 2018; Thong et al., 2006; Wangpipatwong et al., 2008; Zhou, 2011). As perceived value is a broader variable used to replace perceived usefulness and perceived playfulness, we predict that:

**H8**: Perceived ease of use has a positive effect on perceived value.

### 5.3.3 Subjective norms

Subjective norms (also known as social norms) have been identified as a critical factor in the previous continuance intention studies. It refers to "the perceived expectations of specific referent individuals or groups, and the person's motivation to comply with those expectations" (Fishbein & Ajzen, 1977).

Prior quantitative studies demonstrated that subjective norms have a direct positive influence on continuance intention (Bhattacherjee & Lin, 2015; Chang et al., 2014; Chen et al., 2012; Kim, 2011; Lee, 2010; Mouakket, 2015; Yoon & Rolland, 2015; Zhou & Li, 2014). Also, in a

recent qualitative study of live streaming, users were found to watch streams recommended by others (Jia et al., 2020), which means that subjective norms could affect users' stream-watching behaviour. We propose that subjective norms also affect users' continuance intention of watching. This leads to the following hypothesis:

**H9**: Subjective norms have a positive effect on continuance intention of watching.

The relationship between subjective norms and satisfaction has not been investigated in much depth in the continuance intention studies. The existing literature shows (or partially demonstrates) that subjective norms positively influence satisfaction (Chen et al., 2012; Hsu & Chiu, 2004). Hence, we predict that:

**H10**: Subjective norms have a positive effect on users' satisfaction.

Subjective norms have also been found to influence perceived usefulness in the technology-related studies (Teo, 2009; Teo, 2010; Weiz et al., 2016). Furthermore, subjective norms were shown to have a positive impact on perceived usefulness in a meta-analysis study (Schepers & Wetzels, 2007). Again, as mentioned before, in this study, perceived value is a broader variable and is used to replace perceived usefulness. Therefore, we propose:

**H11**: Subjective norms have a positive effect on perceived value.

Based on the reasoning and hypotheses formulated above, our proposed conceptual V-ECM is shown in Figure 5.1.

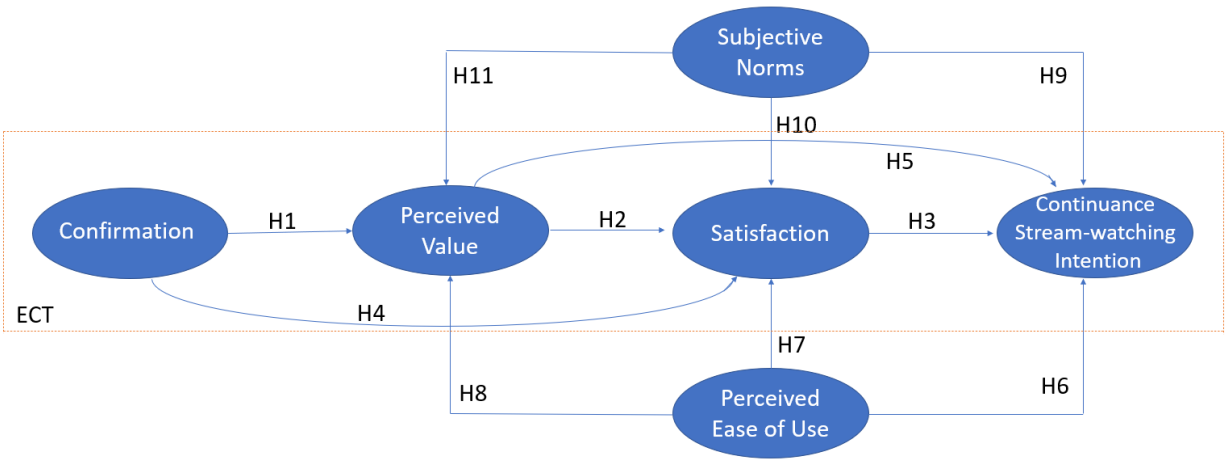


Figure 5.1. Proposed V-ECM.

## 5.4 Research Methods

Online survey was adopted to collect data in this study. Compared with other data-collecting methods such as interviews and focus groups, online survey is easier to access a large number of participants in a short period of time (Wright, 2005). Also, it can be disseminated easily and save money (Wright, 2005).

### 5.4.1 Participants

The subjects of this study were the Chinese users who were 18 years or older at the time of the survey and who had continued stream-watching experience. Data were collected through Wenjuanxing (https://www.wjx.cn/), one of the most popular Chinese online survey tools providing a range of services, including data collection, data storage and data analysis. Wenjuanxing was chosen due to its user-friendly functions. Survey designers are allowed to choose "each device only answer once" and terminate the survey in no time when participants are found not eligible in the study. These functions could avoid repetitive responses from a single participant and save time. There was a total of 1,220 final valid responses after deleting invalid responses (e.g., responses with all the same answer, an extremely short response time, or conflicting views). The age of the subjects ranged from 18 to 60 with a median age of 25. In particular, 66.2% of the subjects were under 30 years old, which is consistent with a survey finding that a majority of live streaming users are not older than 30 years old (Statista, 2020). The details of the demographic information of the subjects are shown in Table 5.1.

The most popular stream category among the subjects was entertainment (such as singing, dancing), accounting for 68%. Other popular categories included gaming (47%), product-selling (31.3%), education and knowledge sharing (27.5%), and E-sport (24.6%)

Table 5.1. Demographic information of the subjects

| Items | Categories | Frequency | Percent |
|---|---|---|---|
| **Age** | 18-24 | 559 | 45.8% |
| | 25-30 | 249 | 20.4% |
| | 31-35 | 163 | 13.4% |
| | 36-40 | 147 | 12% |

| | | | |
|---|---|---|---|
| | Over 41 | 102 | 8.4% |
| **Gender** | Male | 522 | 42.8% |
| | Female | 455 | 37.3% |
| | Other or not disclosed | 243 | 19.9% |
| **Occupation** | Students | 500 | 41% |
| | Professionals | 576 | 47.2% |
| | Unemployed or retired | 144 | 11.8% |
| **Marital Status** | Single | 496 | 40.7% |
| | In a relationship | 396 | 32.5% |
| | Married or partnership | 328 | 26.9% |

### 5.4.2 Measurement development

In this study, six constructs were measured, including confirmation, perceived value, satisfaction, subjective norms, perceived ease of use, and continuance intention of watching. Constructs were surveyed with items adapted from pre-validated measures. Each adapted item was modified to fit the live streaming context.

A 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree) was adopted to measure subjects' attitudes. All of the items were reviewed by four academic experts and six senior doctoral students before implementation. Items that were questioned in the review process were modified. A pilot survey (N=102) was subsequently conducted. All of the items were tested and showed satisfactory validity and reliability. The operationalization of the constructs is detailed in Table 5.2, and the items of the constructs are presented in Table 5.3. In particular, CI1 and CI2 focus on different dimensions. Their differences are as follows:

CI1: Viewers continue to watch streams, but they may also continue to use other media.
CI2: Viewers only continue to watch streams.

When designing a questionnaire, researchers are expected to identify whether the constructs are unidimensional or multidimensional (Bhattacherjee, 2012). Unidimensional constructs can be measured using a single test or item, while multidimensional constructs need to be measured by two or more questions (Bhattacherjee, 2012).

Table 5.2. Operationalization of the constructs

| Constructs | Operational definition | Reference |
|---|---|---|
| Confirmation (CO) | Viewers' perception of the congruence between expected stream-watching and actual performance. | Adapted from Bhattacherjee (2001b) |
| Perceived Value (PV) | Viewers' overall perception of stream-watching after considering both benefits (advantages) and sacrifices (costs). | Adapted from Kim et al. (2007) |
| Satisfaction (SA) | Viewers' feelings about prior experience of watching live streams. | Adapted from Bhattacherjee (2001b) |
| Perceived Ease of Use (PEoU) | Viewers' perception of being free of effort when watching streams. | Adapted from Venkatesh and Davis (1996) |
| Subjective Norms (SN) | Viewers' perception of approval or disapproval of watching live streams from important others. | Adapted from Fishbein and Ajzen (1980) |
| Continuous Intention of Watching (CI) | Users' intention to continue watching live streams. | Adapted from Bhattacherjee (2001b) |

Table 5.3. The measurement items

| Constructs | No. of items | ID | Items | Sources |
|---|---|---|---|---|
| CO | 3 | CO1 | My experience with watching live streams was better than what I expected. | Adapted from Bhattacherjee (2001b) |
| | | CO2 | I get the level of service I expect from stream-watching. | |
| | | CO3 | Overall, most of my expectations from watching live streams were confirmed. | |

| | | | | |
|---|---|---|---|---|
| PV | 3 | PV1 | Taking all the pros and cons into consideration, watching streams is beneficial to me. | Adapted from Kim et al. (2007) |
| | | PV2 | Comparing the benefits and sacrifices, watching streams is worthwhile for me. | |
| | | PV3 | Overall, watching streams gives me good value. | |
| SA | 4 | SA1 | Watching streams makes me feel very satisfied. | Adapted from Bhattacherjee (2001b) |
| | | SA2 | Watching streams gives me a sense of enjoyment. | |
| | | SA3 | Watching streams makes me feel very contented. | |
| | | SA4 | Watching streams makes me feel very delighted. | |
| PEoU | 3 | PEoU1 | The use of live streaming to watch streams is clear and understandable. | Adapted from Venkatesh and Davis (1996) |
| | | PEoU2 | I find it easy to watch streams. | |
| | | PEoU3 | I find it easy to do what I want to do in my use of live streaming to watch streams. | |
| SN | 3 | SN1 | People who are important to me want me to watch live streams. | Adapted from Mathieson (1991) |
| | | SN2 | People who influence my behaviour think I should watch live streams. | |
| | | SN3 | People whose opinions I value prefer me to watch live streams. | |
| CI | 3 | CI1 | I intend to continue watching streams rather than discontinue doing. | Adapted from Bhattacherjee (2001b) |
| | | CI2 | My intentions are to continue watching streams rather than to use any alternative means (watching TV). | |
| | | CI3 | If I could, I would like to discontinue watching streams (reverse coded). | |

## 5.5 Data Analysis and Results

Our study used structural equation modelling (SEM) to test the measurement model and assess the hypotheses. SEM is a powerful statistical research technique for model-testing involving multiple-item constructs (Jöreskog & Sörbom, 1993). We adopted the method of maximum likelihood, the most widely used approach in SEM studies (Hair, Black, Babin, Anderson, & Tatham, 1998). SPSS 26.0 and Mplus were used for the data analysis.

### 5.5.1 Measurement model

The goodness-of-fit of the model was measured using several fit metrics as presented in Table 5.4. Our model met all other criteria, demonstrating a good model fit.

Table 5.4. Measurement model

| Index | χ2/df | *p* | TLI | CFI | RMSEA |
|---|---|---|---|---|---|
| **Value** | 1.736 | 0.000 | 0.983 | 0.986 | 0.025 |
| **Level of acceptance** | < 3 | < 0.05 | ≥ 0.95 | ≥0.95 | ≤ 0.06 |

The index χ2/df is the chi-square divided by the degrees of freedom, which is a measure of model fit. The chi-squared test shows the difference between observed and expected covariance matrices (Hoe, 2008). Chi-squared test values closer to zero, which means smaller difference between expected and observed covariance matrices, indicate a better fit (Hoe, 2008). When the chi-square divided by the degrees of freedom, the value below 3 indicates better fit (Hoe, 2008).

A p-value less than 0.05 is normally required to show statistically significant. This indicates evidence is strongly against the null hypothesis (Di Leo, & Sardanelli, 2020).

TLI is Tucker–Lewis index, which "measures a relative reduction in misfit per degree of freedom" (Shi et al., 2019, p. 3). The index may be negative or more than 1 occasionally. Normally, TLI ≥ 0.95 demonstrates a good fit (West et al., 2012).

CFI is the comparative fit index, which can test the discrepancy between the data and the hypothesized model (Shi et al., 2019). It ranges from 0 to 1 with higher values demonstrating better fit. Normally, CFI ≥ 0.95 is considered a good fit (West et al., 2012).

RMSEA is the root mean square error of approximation, which analyses the discrepancy between the hypothesized model, optimally chosen parameter estimates, and the population covariance matrix (Shi et al., 2019). It ranges from 0 to 1 with the values ≤ 0.6 demonstrating better fit (Browne & Cudeck, 1993).

The scales were tested via confirmatory factor analysis (CFA), with the results presented in Table 5.5 and Table 5.6. Factor loading is the correlation coefficients for the variables and factors, and average variance extracted (AVE) is "a measure of the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error" (dos Santos, & Cirillo, 2021, p.1). They were assessed to check the convergent validity. Each item loading on the correct factor was higher than 0.6, and every AVE exceeded 0.5 (shown in Table 5.5), demonstrating acceptable convergent validity (Bagozzi & Yi, 1988). Also, all the square roots of the AVEs exceeded their corresponding correlation coefficients (shown in Table 5.6), which indicates satisfactory discriminant validity (Fornell & Larcker, 1981). Both Cronbach's alpha (CA) and Composite Reliability (CR), measures of internal consistency, were tested to assess the model's reliability. Table 5.5 shows that all the values of CA and CR exceeded 0.7, which reveals good reliability (Fornell & Larcker, 1981).

Table 5.5. Scale properties

| Constructs | Items | Loading Factors | AVE | Composite Reliability | Cronbach's Alpha |
|---|---|---|---|---|---|
| CO | CO1 | 0.736 | 0.570 | 0.799 | 0.798 |
| | CO2 | 0.791 | | | |
| | CO3 | 0.737 | | | |
| PV | PV1 | 0.736 | 0.589 | 0.811 | 0.811 |
| | PV2 | 0.761 | | | |
| | PV3 | 0.804 | | | |
| SA | SA1 | 0.772 | 0.654 | 0.883 | 0.883 |
| | SA2 | 0.825 | | | |

| | | | | | |
|---|---|---|---|---|---|
| | SA3 | 0.811 | | | |
| | SA4 | 0.826 | | | |
| SN | SN1 | 0.798 | 0.646 | 0.845 | 0.844 |
| | SN2 | 0.851 | | | |
| | SN3 | 0.760 | | | |
| PEoU | PEoU1 | 0.810 | 0.580 | 0.803 | 0.799 |
| | PEoU2 | 0.803 | | | |
| | PEoU3 | 0.658 | | | |
| CI | CI1 | 0.971 | 0.711 | 0.877 | 0.859 |
| | CI2 | 0.607 | | | |
| | CI3 | 0.907 | | | |

Table 5.6. Correlation matrix

| | **CO** | **PV** | **SA** | **SN** | **PEoU** | **CI** |
|---|---|---|---|---|---|---|
| **CO** | **0.755** | | | | | |
| **PV** | 0.380 | **0.767** | | | | |
| **SA** | 0.266 | 0.288 | **0.809** | | | |
| **SN** | 0.164 | 0.253 | 0.191 | **0.804** | | |
| **PEoU** | 0.224 | 0.137 | 0.249 | 0.094 | **0.762** | |
| **CI** | 0.202 | 0.331 | 0.365 | 0.268 | 0.272 | **0.843** |

## 5.5.2 Structural model

All but one of the proposed hypotheses were supported. All the supported paths in the model were significant at $p<0.01$. Figure 5.2 presents the results of the structural model. The results showed that both confirmation ($\beta=0.339$, $p<0.001$) ($\beta$ is a coefficient value, and is calculated by the software Mplus in the path analysis) and subjective norms ($\beta=0.193$, $p<0.001$) had positive impacts on perceived value. Hence, H1 and H11 were supported. However, perceived ease of use ($\beta=0.043$, $p>0.05$) was not found to have a significant effect on perceived value.

Hence, H8 was rejected. The results explained 18.3% of the variance in perceived value. Confirmation (β=0.137, p=0.001) was also found to have a positive effect on satisfaction. In addition, perceived value (β=0.184, p<0.001), subjective norms (β=0.104, p<0.001) and perceived ease of use (β=0.184, p<0.001) were all found to positively influence satisfaction. Hence, H4, H2, H10 and H7 were supported. The results explained 15.5% of the variance in satisfaction. Furthermore, satisfaction (β=0.235, p<0.001), perceived value (β=0.200, p<0.01), perceived ease of use (β=0.171, p<0.001) and subjective norms (β=0.157, p<0.001) were all found to have positive impacts on continuance intention of watching. Hence, H3, H5, H6, and H9 were supported. The results explained 24% of the variance in continuance intention of watching. In particular, satisfaction was the strongest influence on continuance intention of watching. Table 5.7 details the main findings of our study.

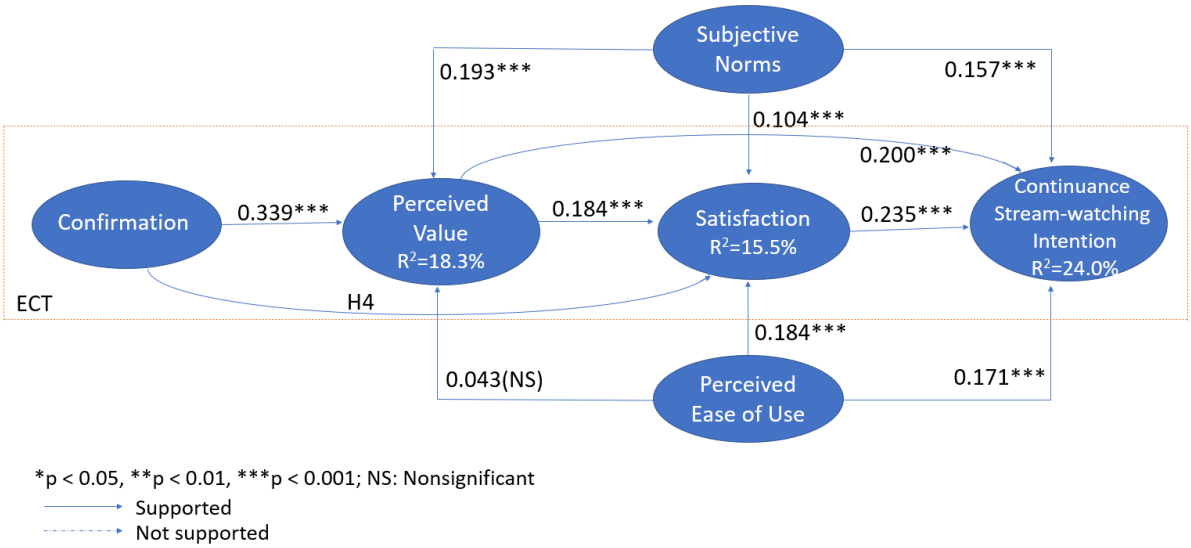


Figure 5.2. Structural equation model results for V-ECM.

Table 5.7. Summary of findings

| Hypothesis | Path | Coefficient* (β) | Results |
|---|---|---|---|
| **H1** | Confirmation ⇒ Perceived value | 0.339 | Accepted |
| **H2** | Perceived value ⇒ Satisfaction | 0.184 | Accepted |
| **H3** | Satisfaction ⇒ Continuance intention of watching | 0.235 | Accepted |
| **H4** | Confirmation ⇒ Satisfaction | 0.137 | Accepted |

| | | | |
|---|---|---|---|
| **H5** | Perceived value ⇒ Continuance intention of watching | 0.200 | Accepted |
| **H6** | Perceived ease of use ⇒ Continuance intention of watching | 0.171 | Accepted |
| **H7** | Perceived ease of use ⇒ Satisfaction | 0.184 | Accepted |
| **H8** | Perceived ease of use ⇒ Perceived value | 0.043 (NS) | Rejected |
| **H9** | Subjective norms ⇒ Continuance intention of watching | 0.157 | Accepted |
| **H10** | Subjective norms ⇒ Satisfaction | 0.104 | Accepted |
| **H11** | Subjective norms ⇒ Perceived value | 0.193 | Accepted |

*All accepted hypotheses were supported by path coefficients significant at $p<.01$

## 5.6 Discussion and Implications

Theoretically, this chapter points out the deficiencies in current ECT-based models and extends ECT-based studies by including a practical process of trade-off between users' perceived benefits and perceived sacrifices. Most previous studies only focus on users' perceived benefits. This leads to an inappropriate impression that users will continue their use of a product/service as long as they are satisfied with their previous use, even if their perceived costs and sacrifices of use become very high. In comparison, our proposed V-ECM can fix the deficiencies in the current ECT-based models by using perceived value which could reflect both perceived benefits and perceived sacrifices, to replace perceived usefulness (and/or perceived enjoyment and/or other similar related variables). This replacement of construct makes V-ECM a better and more comprehensive model to explain and predict continuance intention. Overall, our V-ECM stresses that before users continue to use a product/service, they tend to compare their perceived benefits and perceived sacrifices according to their practical circumstances, and this trade-off (presented as perceived value) is one of the determinants of their continuance intention.

In addition, more factors (e.g., perceived ease of use and subjective norms) are included in V-ECM and proved to be important predictors in influencing users' continuance intention, which extends ECT studies as well. Our proposed V-ECM explains well why users continue to watch live streams. As demonstrated by our V-ECM, besides satisfaction, which has been validated by many previous ECT-based studies, users' perceived value, subjective norms, and perceived ease of use all have direct influences on continuance intention of watching. Also, V-ECM is a

more generalized model which can be used to explain and predict continuance intentions in other online and/or technology-related contexts. V-ECM can also constitute the bedrock for future studies (e.g., how to prevent watching addition).

In our study, users' confirmation was found to have a positive association with perceived value and satisfaction. This suggests that for live streaming platforms, it would be important to manage users' expectations and to exceed them. For example, platforms should let users know upfront what services the platforms can provide, without exaggerating or misleading, in order to remove users' uncertainty and hence confirm their expectations.

Perceived value has been confirmed to be an important determinant in the model, suggesting that users tend to access and compare the benefits they can get and the sacrifices they experience from watching live streams. If they perceive positive value (users perceive more benefit than sacrifice), they are more likely to perceive high satisfaction and continue to watch. However, if users' perception of value is negative (they perceive fewer benefits than sacrifices), their satisfaction is likely to be lowered and their continuance intention of watching is likely to be hindered. Theoretically, it is the first time that perceived value has been found to work in continuance intentions of watching. The implications are that live streaming platforms should provide streams with good quality and more value, which would promote users' perceived usefulness, enjoyment and/or social values to trade off their perceived sacrifices from watching.

Satisfaction has been proved to be the most influential precedent in our study, which is consistent with most of the previous ECT-based studies (Bhattacherjee, 2001a; Bhattacherjee, 2001b; Chang & Zhu, 2012; Lin et al., 2005; Lin et al., 2012; Oghuma et al., 2016; Shiau et al., 2011; Zhang et al., 2015). Satisfaction works as a significant mediator as well. Besides mediating the relationship between perceived ease of use and continuance intention of watching as mentioned above, satisfaction also mediates the relationship between subjective norms and continuance intention, the relationship between confirmation and continuance intention of watching, and the relationship between perceived value and continuance intention. Therefore, live streaming platforms should act accordingly to improve users' satisfaction in these different aspects. Apart from the suggestions mentioned above which may indirectly improve users' satisfaction, there may exist more solutions live streaming platforms could use to increase users' satisfaction, such as to improve services, to solve users' complaints and to provide compensation, to surprise and delight users, and to provide personalized services.

Our study indicates the significant impact of subjective norms in the V-ECM. Perceived value is, for the first time, confirmed to be influenced by subjective norms in a continuance intention study. More related studies are encouraged to test this relationship. Our results also strengthen the literature on the relationship between subjective norms and satisfaction, which has not been investigated in much depth before. In addition, our results reveal that subjective norms not only have a positive influence on users' intention of watching as confirmed before (Jia et al., 2020), but also positively affect users' continuance intention of watching. In other words, subjective norms could affect users' behaviour intention in any phase of watching. Live streaming platforms could continue to make use of the effect of celebrity endorsement. It may also work if live streaming platforms could invite and encourage more celebrities, teachers, or politicians to broadcast on their platforms, since these people are more likely to be young people's important others for normative purposes.

Perceived ease of use was also found to have considerable influence in our model. Our finding of the relationship between perceived ease of use and satisfaction is consistent with previous related studies (Amin et al., 2014; Dalcher & Shine, 2003; Joo et al., 2011; Joo et al., 2018; Lin et al., 2017; Shah & Attiq, 2016; Tu et al., 2012). In terms of the controversy over whether perceived ease of use is a factor impacting users' continuance intention over decades, our study reveals that in the live streaming realm, perceived ease of use could affect users' continuance intention of watching in both direct and indirect (mediated by satisfaction) ways. Our findings are partially consistent with some continuance intention studies (Gefen & Straub, 2000; Joo et al., 2018; Roca et al., 2006; Roca & Gagné, 2008; Wangpipatwong et al., 2008). Based on our findings, live streaming platforms could therefore modify and improve their websites, apps, interface, and functions, to make them even easier to use, in order to increase users' satisfaction and continuance intention of watching. Our results also show that there is no correlation between perceived ease of use and perceived value. As our research is the first attempt to investigate their relationship, more studies are encouraged to test if they are correlated.

## 5.7 Limitations and Future Work

In this study, the subjects were the Chinese users. The results indicate that our proposed model works in Chinese culture. One possible future work is to test if the model works in other cultures. For example, by comparing the Chinese and the American users (Twitch users).

Theoretically, our model should work for other technology and online-related continuance intentions as well, including short video watching. Future related work could test the V-ECM in other contexts.

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# Chapter 6

# Summary

This chapter contains three sections. Section 6.1 summarizes previous chapters, Section 6.2 presents a general discussion, and Section 6.3 discusses the limitations and potential future work.

## 6.1 Research Summary

This thesis conducted four individual studies to investigate users' online behaviours and behavioural intentions in live streaming from both streamers' and viewers' aspects by mixing qualitative and quantitative studies. In particular, Chapters 2 and 3 concentrated on the investigation of users' online behaviours in the unique social commerce practice in live streaming by exploring how streamers attract more viewers and encourage online gifting using innovative multiple triangulation, including data source triangulation and methodological triangulation. Data were systematically drawn from three sources, including self-report data from 10 popular streamers, self-report data from 23 viewers, and observational online behaviour on 167 streamers. Three methods were used according to the characteristics of each data source, namely interviews, focus groups and observations. Through multiple triangulations, three convergent behaviours for attracting viewers were identified: (i) to increase streamer-viewer interactions, (ii) to create synergy with other streamers, and (iii) to conduct self-promotion. Also, four behaviours for encouraging online gifting were identified: (i) to provide prices for extra services, (ii) to create prize-winning opportunities for viewers, (iii) to elicit competition between individuals, and (iv) to elicit competition between groups.

These two chapters theoretically extend social commerce literature, help to comprehensively understand the unique social commerce practice in live streaming and streamers' commercial behaviours, as well as streamer-viewer interactions. Moreover, these two chapters provide an innovative method in behaviour studies by integrating different data sources and methods in one study of a phenomenon, and backing up verbal claims about gifting practices with observations of practice.

Chapters 4 and 5 mainly investigated users' continuance intention of watching streams. In Chapter 4, we modified the *post-acceptance model of information system continuance.* Our theoretical model was empirically validated by an online survey (N=783). The collected data and proposed model have been analysed and tested using structural equation modelling (SEM). Results showed that: (i) perceived usefulness, perceived enjoyment and satisfaction had positive influences on viewers' continuance intention of watching streams; (ii) satisfaction mediated the relationship between perceived usefulness and continuance intention of watching streams; (iii) satisfaction also mediated the relationship between perceived enjoyment and continuance intention of watching; (iv) confirmation had a positive impact on both perceived usefulness and perceived enjoyment, but not on viewers' satisfaction.

The study in Chapter 4 provides theoretical evidence of antecedents of viewers' continuance intention of watching streams, and discusses practical implications for live streaming platforms with regards to their design, functions and marketing. Chapter 4 successfully makes an association between initial intention of watching and continuance intention of watching, and helps to understand viewers' stream-watching behaviours integrally.

In Chapter 5, to fix the deficiencies in current ECT-based models, we proposed *a value-based continuance intention model* (V-ECM) by involving perceived value, a process of overall assessment between users' perceived benefits and perceived sacrifices. Our hypotheses were examined using SEM by a survey of 1220 online viewers with continuance stream-watching experience. Results indicated that: (i) besides satisfaction which had been validated in Chapter 4, new determinants (subjective norms and perceived ease of use) influencing viewers' continuance intention of watching streams were identified; and (ii) satisfaction, as an important mediator, was affected by confirmation, perceived value, subjective norms and perceived ease of use.

V-ECM theoretically extends ECT-based studies and improves the explanation of the variance in continuance intention of watching. As a more comprehensive and generalized model, V-ECM is useful for explaining users' continuance intentions and predicting users' continuance behaviours in the broad online and/or technology-related contexts. V-ECM also provides important foundation for prevention of watching addition. Overall, this thesis contributes to theoretically improving our understanding of users' behaviours and behavioural intentions in live streaming. Insights from this research can practically improve the design, functions and

marketing within live streaming platforms, and provide foundation for future studies, such as prevention of watching addition.

## 6.2 General Discussion

The appearance and development of live streaming has significantly changed many people's lives, work, leisure activities and entertainment. With increasing number of users spending more time online, online behaviour becomes an important research topic, and it is predicted to be even more important in the near future. This thesis contributes to comprehensive understandings of users' online behaviours in this new medium, and provides a solid foundation for future users' online behaviour studies.

As discussed in Chapter 3, with the advent of technology, digital media are providing more functions, and have been evolving from the text-oriented blogs to today's most popular live streaming which combines text, image, audio, and video (Jia et al., under review). Accordingly, users' online behaviours have been increasing from reading and writing texts to today's live interactions with other users. It is speculated that future online behaviour activities and interactions may evolve from 2D to 3D (e.g., virtual reality) with even more communication and interaction opportunities.

Streamers' behaviours, especially commercial behaviours are systematically investigated for the first time by this research. In the previous studies, the research subjects mainly focused on viewers (Gros et al., 2017; Sjöblom et al., 2017; Yu et al., 2018; Zhu et al., 2017; Tu et al., 2018), with only a few investigations conducted on streamers (Friedlander, 2017; Johnson, 2019). Also, among the limited studies on streamers, few investigated streamers' online behaviours (Friedlander, 2017; Johnson, 2019). This thesis extends the research subjects in behaviour studies.

Live streaming users seem to satisfy their needs through their online behaviours, which is in line with uses and gratifications theory (Ruggiero, 2000). Concerning viewers' gifting behaviour, as found in Chapters 2 and 3, viewers appear to be actively involved in gifting to satisfy their needs, such as curiosity, the pursuit of exclusive power and attention, entertainment, interactions with people, and money/prizes winning. By taking advantage of viewers' needs, streamers behave differently (e.g., granting viewers the power to be the

moderators) to satisfy viewers' needs. This in turn satisfies streamers' own needs of attracting more viewers and/or gaining more profits.

With regards to viewers' stream-watching behaviour, initial stream-watching and continuance stream-watching are two stages of an integral stream-watching process, and need to be considered as a whole. As examined in Chapter 4, uses and gratifications theory (Ruggiero, 2000) and expectation-confirmation theory (Bhattacherjee, 2001; Oliver, 1980) can be combined to explain the integral stream-watching process: viewers actively seek to watch live streams to satisfy their specific needs, mainly including utilitarian needs and hedonic needs. When their expectations get confirmed and their specific needs are satisfied, viewers are more likely to develop satisfaction and continue their stream-watching behaviour. Although why viewers choose to watch live streams has been well investigated in previous studies (Gros, et al., 2017; Sjöblom & Hamari, 2017; Hamilton et al., 2014), this thesis extends our understanding by finding out the important factors affecting viewers' continuance intention of stream-watching, including perceived value, satisfaction, subjective norms and perceived ease of use.

Methodologically, this thesis serves as an example in investigating behaviours using an innovative, systematic method (multiple triangulation). Most previous behaviour studies only involve a single data source or method. This has been challenged due to biases and low reliability (Decrop, 1999). Triangulating different standpoints and methods could solve these problems. Multiple triangulation has been designed and described in the literature for decades, but mainly in theory (Kimchi et al., 1991; Thurmond, 2001; Flick, 2004). There have been very few studies conducted using multiple triangulation in practice. According to the studies in Chapters 2 and 3, methodological triangulation could balance out the disadvantages of each method. Also, data source triangulation could help to obtain convergent and divergent information. When standpoints from different data sources back up or conflict with each other, this approach can provide us with a balanced whole picture. Through this thesis, multiple triangulation has been examined as a feasible, functional and promising method, which is appropriate for behaviour studies and may be applied in other research fields.

## 6.3 Limitations and Future Work

Critically speaking, this thesis, achieved our overall objectives came up with in the Introduction. Our thesis well investigated what behaviours streamers have and how streamers interact with viewers in live streaming, and explored viewers' continuance stream-watching intentions. Nevertheless, there are minor limitations in our research as indicated in Sections 2.6, Section 3.6, Section 4.6 and Section 5.6, respectively.

More potential research directions can be further investigated based on this thesis. First of all, future studies may explore users' interactions with other special purposes, for example, users' online behaviour in live streaming for remote education. Because of Covid-19, the online live class has been largely used for the education purpose since live streaming is accessible to students without physical interactions. It is meaningful to investigate educators' and students' online behaviours, and how these online behaviours influence the quality of teaching and learning in a live streaming setting.

Secondly, our thesis only took Chinese users and platforms as our example, direct generalization of our findings to countries with different cultural backgrounds may not be proper. Hence, it will be interesting to conduct cross-cultural studies on users' online behaviours and behavioural intentions. Future studies may compare whether there are cultural differences in online behaviours and behavioural intentions in live streaming.

Thirdly, future studies may develop overall frameworks and conduct in-depth investigations related to online behaviours and behavioural intentions based on this thesis, such as prevention of users' addictive stream-watching behaviours. With users spending a large amount of time watching streams (Conviva, 2018; NeilPatel, 2018; Twitch, 2019; Business of Apps, 2020; Vimeo, 2020) stream-watching addiction becomes a problem (Cheng et al., 2019). Based on our conceptual models of continuance intention of watching, we found the factors influencing viewers' continuance intention of watching. It will be worthwhile to explore whether we could make use of these factors to prevent users' addictive behaviours, for example, to increase users' perceived sacrifices to lower the level of users' perceived value.

Future research may also investigate users' behaviours and behavioural intentions in other digital media, for example, the short online videos. Short online video-watching recently has become popular (Oberlo, 2020). So far, there has been limited research on short online video

users' behaviours. It will be interesting to compare users' behaviours in live streaming and those in short online videos, and scrutinize whether different digital media could influence users' online behaviours differently and how they influence users' online behaviours. This may lead to better understanding of behaviours and behavioural intentions in digital media.

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Yu, E., Jung, C., Kim, H., & Jung, J. (2018). Impact of viewer engagement on gift-giving in live video streaming. *Telematics and Informatics, 35*(5), 1450-1460.

# Statements of Contributions

DRC 16

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Jia, X., Wang, R., Liu, J. H., & Xie, T. (2020). How to attract more viewers in live streams? A functional evaluation of streamers' strategies for attraction of viewers. In Nah FH., Siau K. (Eds.), HCI in Business, Government and Organizations (pp. 369-383), Springer. https://doi.org/10.1007/978-3-030-50341-3_29

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