Live-Streamer as Digital Labor: A Systematic Review

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Abstract—To grasp an overview of recent study on live streamer and to provide a reference for future direction, this study summarized the relevant literature on live streamer in past five years. This study comprehensively searched literature in major databases and obtained 35 papers that meet the inclusion criteria. Major findings include that there is a lack of global diversity in current research, thus further research need to expand the platform and geographical focus. The ambivalent and nascent nature of live streaming call for a subjective and dialectical perspective to explore the power dynamic between the stakeholders in platform economy. There is a need for more longitudinal studies to have a better understanding of the phenomenon as it evolves over time and vary from sociocultural and socioeconomic environment.

Index Terms—Digital labor, platform economy, systematic review

I. INTRODUCTION

With the deepening understanding of digital economy, the concept of "digital labor" has received wide attention from scholars in communication, sociology, economics, and law. The digital-mediated labor by means of platforms is a particularly vibrant facet of the working world of contemporary societies, and an early glimpse of what capitalist societies might evolve into over the coming decades [1]. The power dynamic between platform, digital labor and other parties are highly intertwined in the digital-mediated working condition, featuring fragmented and precarious.

Among the various forms of platform economy, recent years have witnessed a phenomenal rise of live streaming. Over 9 million worked as live streamers in Twitch.tv by 2021 [2]. The explosive growth of live streamers has also raised many researchers' concerns. Specially, this striking new character on social media platform has attracted significant attention in media and communication debate. As an emerging research field, it is crucial to systematically examine how recent studies seek to understand the phenomenon. A preliminary search on this topic has yielded four similar literature reviews. This study departs from previous related reviews on four important fronts (Table I).

TABLE I: COMPARISON WITH RECENT REVIEWS OF DIGITAL LABOR RESEARCH

Review Focus	Analyzed Dimensions	Mapping Method used	Mapping platform/ geographical focus
Pap and C. Mako [3]	Platform Labour in Europe	Disruption of labor market; "Platformization" of work; "Servitization" of platforms commerce; Working and employment conditions; Technology infrastructure; Regulation of platform work; Future of digital work	No	No
Schmidlechner *et al.* [4]	Digital platforms for coordinating economic activity	Labor market; Job quality; Social policy; Social dialogue and industrial relations	No	No
This Review	Live-streamers as digital labor	Labor practice; Marginalization and Empowerment; Ideology; Platform governance; Affordance; Authenticity; Guild	Yes	Yes

As shown in Table I, none of current review of focus on particular form of digital labor and fail to analyze digital labor form a subjective perspective. In addition, none of current review provide information on the methodological trends and geographical focus. Therefore, the aim of this study is to emphasis the subjectivity of digital labor research by putting live streamer at the nub of the research focus, and bridge the gaps by addressing the following research questions:

- What methodologies are researchers employed in studying live streaming?
- Which platforms are investigated? What is the geographical focus?
- What research questions are researchers investigating about live streaming?

This study contributes to current understanding of live streaming by mapping what we know about it to date, how existing research was conducted, and what was studied. This systematic review identifies recent media and communication research that investigate live streamer as digital labor on social media platforms, such as Twitch.tv, Kuaishou, and Blued. This review contributes to literature by outlining key themes across research on live-streamers and provide a clearer picture of the current research state of the themes. It also the range of methods applied, platforms and geographical focus in this area. Central to the methodological contribution is the finding that there is a lack of global diversity in current research. This systematic review also serves to identify the gaps and point to potential directions

for further research.

II. METHOD

Based on the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) checklist [5], this study adopts the following steps to retrieve and select existing literature on live streamer (Fig. 1). First, through literature search, this study gathers various expressions of live streaming to determine the retrieval keywords. The preliminary search is conducted with the application of Boolean logic: "live streaming" or "livestream" or "Internet broadcast" or "network broadcast" or "webcast." Then, this study selects most used communication study databases: Web of Science and SCOPUS. As academic research on live streaming occurs in recent years, the search time is limited to the past five year to ensure the recency. This limited the time from 1 January 2018 to 23 September 2022. To ensure both quality and accuracy, only peer-reviewed journal papers with full text available have been included. This study establishes the following inclusion and exclusion criteria (Table II).

TABLE II: INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria	Exclusion Criteria
Focus on live-streamers as digital labor in platform economy	Only study live streaming industry, or live-streaming users' behaviors, etc.
Media and communication discipline	Other discipline, such as economy and law
Written in English	Written in other languages

At the initial title and key screening stage, papers are selected if the title and keywords indicated that the study focus on live streaming platforms. Next, at abstract screening stage, papers are selected if the abstract indicated that the study focusses on live-streamers as digital labor in platform economy. Papers are excluded if the article only studied live streaming industry, and/or only studied live streaming users' behaviors. Finally, this paper identifies 35 papers that meet the criteria [6–40].
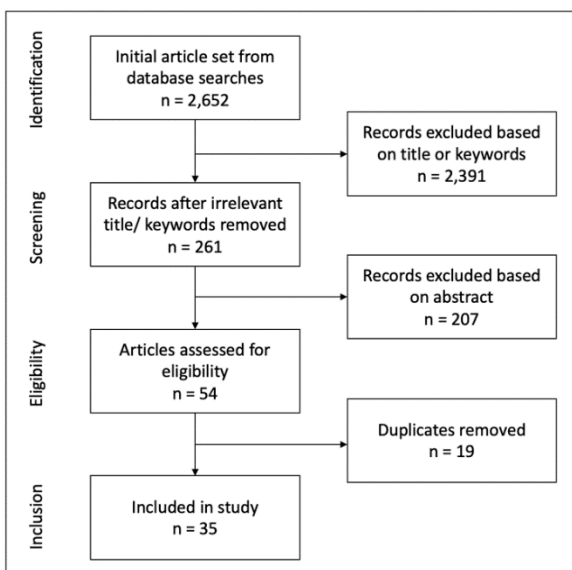

Fig. 1. Flow chart for review, based on Moher *et al*. (2009).

III. RESULTS

A. Method Used

This study indicates that scholars have apply various method to investigate live streaming. As shown in Fig. 2, the most common method is the combination of Internet ethnography and interview, with 12 of papers using both the ethnographic observation and semi-structured interview. Applying Internet ethnography and semi-structured interview alone are relatively common with 6 adopting each method respectively. Shimshak [6] studied the visual iconographies of how female live streamers who engage in sexual labor perform themselves by combining visual analysis with internet ethnography. Lu and Wang [7] mix critical discourse analysis of Kuaishou's media stories and official reports with ethnography to understand the evolvement of entrepreneurial streamers during the platform's transformations.

There are 3 papers apply critical discourse analysis, positioning meaning construction across language and relative actors (viewers, news reporters, etc.). In addition, 3 papers investigate the topic through critical analysis. For example, Song's [8] study discusses Chinese commercial DIY porn live-streamers from a critical media industry studies perspective. Jodén and Strandell [9] applies content analysis to examine the video/audio content and intense live chats of live streaming. To explore the politics and precarity of China's live-streaming platform, Cunningham et al. 's [10] paper adopts a mixed method including desk research, content and discourse analysis, and interviews. As the only research used quantitative method among the 35 papers, Xu *et al.* [11] conduct a survey recruiting 277 participants to confirm the positive impact of streamer credibility on brand attitude.
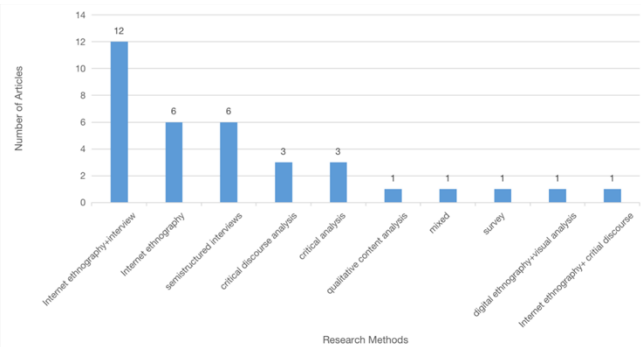

Fig. 2. Diversity of research methods.

B. Platform Focused

As shown in Table III, current live streaming studies have a strong focus on a few prominent platforms. Twitch.tv, the US-based live streaming platform for content spanning gaming, entertainment, and sports, is the most prominent platform which examined by 14 papers. The focus on Twitch.tv suggests that it has have become the primary site for discussions of live streaming. Besides, 15 papers investigate China-based live-streaming platforms, the most mentioned are Blued (gay dating app), Kuaishou (short video-sharing and live-streaming app), Douyu (video game live-streaming app), and Momo (dating and live-streaming app). Among the article selected, only 2 publications study the platforms outside the US and China mainland: Hsiao's study

of in Lang Live Taiwan [12], and Shimshak's study of Kitty Live/Bigo Live in Thailand [6]. In other words, current live streaming research has a geographical focus on US and China mainland.

TABLE III: PLATFORMS MOST REFERENCED AND CORRESPONDING HEADQUARTERS

Platform	Articles referencing	Headquarter
Twitch.tv	14	The U.S.
Blued	3	China mainland
Kuaishou	3	China mainland
Douyu	3	China mainland
Momo	3	China mainland
Douyin	1	China mainland
Zhubei	1	China mainland
XianDanJia	1	China mainland
YouNow	1	The U.S.
Chaturbate	1	The U.S.
Lang Live	1	Taiwan
Kitty Live/Bigo Live	1	Thailand

C. Key Themes

This study applied a thematic analysis and used open and selective coding to examine the paper, excluding the introduction and literature review. Fig. 3 shows the seven key themes identified across the papers.
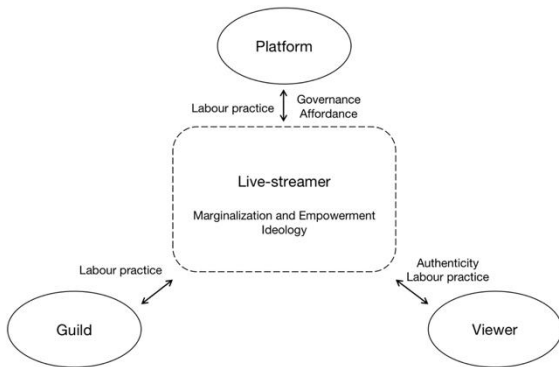

Fig. 3. The current research framework of live streamer.

1) Labor practice

Most commonly, these articles investigated six types of labor practices: Emotional labour, affective labor, relational labour, performative labor, creative labour, and hidden labor.

1) Relational labor. Tran [13] advanced the theory by pointing out the gendered nature of relational labor, discussed how female video game streamers advertise themselves through providing relation-building work like accompany in gameplay. These arguments are echoed by Ye et al.[14], who pointed out that female showroom live streamer is dependent on precariously relational labor and need to balance the tension between the implicitly sexualized closeness for profit and the appropriateness of their own moral principles. Wang [15] criticized "aspirational labor" which emphasizes the promise of future benefits, by highlighting the exploitative character of relational labor, since female streamers'

dependency on virtual gifting from wealthy males indicates their limited options. Furthermore, Lu and Wang [7] complement the theory by adding that streamers not only need to navigate followers, but also platform and government in the multi-faceted relational structure in which their agency intertwines with the broader platform ecology.

2) Emotional labor/ Affective labor. Emotional labor, or affective labour, refers to how streamers modulate their performance for viewers and ensure themselves in right mood [16]. Woodcock and Johnson pointed out that Twitch offers new techniques to mediate affective performance, including face expressions, voice, and immediate surroundings, which transform play into work [16]. Specifically, female streamers have been labeled as "nicer" for listening patiently to others, being talkative and genuinely concerned, which intersects with the expectation of women to be attentive and caring [17]. A remarkable feature of the affective labor is its sex-related, which Song [8] also called "erotic labor", as streamers need to titillate their viewers with sexual innuendos and fantasies to maintain streamer–viewer relationships and encourage gift-giving which circulate as affective signs [18, 19]. Shimshak [6] echoed the intersection of emotional labor and sexualized labour, as the rewarding of streamer-fans emotional engagement cannot be separated from sexual performance. The investment of emotional labor signifies the materialization and monetization of online intimacy in live streaming, ushering in a new era in which emotion must be invested in one's human capital to be financially viable [17].

3) Performative labor. Performative labor refers to the work which adheres to a set of platform-established performative and self-styling standards. Wang [18] illustrated how the platform algorithmic structures like trending metrics push streamers to imitate popular streamer to perform themselves, transfer streamers into monetizable performative workers. This is in line with Lu and Wang's [7] observation that the 'apprentice' streamers, who work under confidential or informal agreements, follow a set of norms to perform as duties to gain traffic and virtual gift. It is essential to note that, while platform infrastructure and algorithmic affordances shape streamers' self-promotion practices, their performative labor generates data traffic on which the platform can monetize, thereby directly pointing to commodification [7, 8, 21]

4) Creative labor. Creative labor refers to the challenge that streamers must overcome to brand themselves to audiences, sponsors, and potential customers in the platform-driven culture production. Meisner and Ledbetter [22] organized three types of creative labor shaped by platform affordances. Firstly, cross-platform self-branding means that platform's design features encourage creators to spread content across other platforms to maximize the brand presence [22]. Secondly, single-platform self-branding requires creators to self-promote and perform, motivated by

both entrepreneurial spirit and creative agency [21]. Thirdly, in participatory branding, platforms afford substantial viewer-streamer interaction in co-constructing content. Since streamers must manage the complex relationships between the expectations of advertisers and the audience's desire for authenticity and honest viewpoints, creative labor is frequently paired with emotional and affective labor on the part of streamers [23].

5) Hidden labor. A key subtheme this paper identifies under the theme of labor practice is hidden labor, a term used to describe the invisible labor outside the streaming time. Scholars have noticed the work of day-to-day maintenance for potential earnings, including responding to emails, checking statistics, team management, and ensuring the stream is well run requires extra technical skills [23–26]. Specifically, Johnson [25] identifies other types of off-camera labor in running a video game channel, including stream aesthetics (streamers need to use distinctive icons, music, and visuals to make their channel competitive), networking (streamers need to connect with the community of other streamers to draw viewers), and social media management (streamers need to maintain a presence on other platforms to draw devoted viewers to live-streaming platforms). Another kind of hidden labor emerged is the invisible side of relational labor. For example, female streamers need to maintain intimate relationships with male viewers such as sending good night greetings messages after streaming time for generating potential income [14]. Song [8] also mentioned that outside the live-streams, streamers need to keep fit and build muscles to maintain their good looks to accumulate erotic capital. Finally, some questioned the hidden cost in streamers' professional career, as streamers must endure the financial and social safety net insecurity while be always-on-the-clock until become highly successful [16, 17].

2) Marginalization and empowerment

Most commonly, the studies discuss five types of marginalized groups in streamers: gender, LGBTQ+, race, disability, and lower-class. A key dimension is the gendered nature in livestreaming. Scholars discussed how female game streamers are delegitimized by the patriarchal gamer culture, and often must deal with gender-based sexual harassment [13, 17, 26–29]. For example, Ruberg *et al.* [17] noted that female video game streamers sidestep talking about their body when streaming, bearing insulting terms that devalue their work. Moreover, female streamers are inevitably positioned in an intimacy economy, in which their income generation is inevitably entanglement with embodiment, aesthetic, and erotic that meet male viewers' needs [6, 14, 15, 19, 21, 28]. The second type focuses on the LGBTQ+ streamers. Wang and Song examined the homosexual subculture and gay streamers on dating apps, who position at the margins of both platform capitalism and state regulation. Another sexual minority this study identifies is trans, as digital platform has become a major site for them to negotiate their online

in/visibility [30].

Some papers discuss how the marginalized groups empower themselves through live streaming. The growing women video game streamers re-authorize themselves and reclaim the "egirl" slur the masculinized game culture [14]. In the trans context, live streaming platform has craft out a space for them to gain both economic and existential aspirations, in which they consider self-commodification as a way of self-empowerment [30]. Persaud and Perks [31] examine the drag live streamers on Twitch.tv, argued that queer microcelebrities cultivate fans and achieve economic gains through providing highly visible queer representation. For less educated women, live streaming provides them an opportunity to go up the social ladder [10]. Johnson [32] argued that livestreaming has afford financial and inclusion opportunities for people with disabilities and mental health issues. Chan and Gray [33] investigate how live streaming platform has become a space for black users to resist and gain visibility and fame, who are traditionally excluded in white male–dominated digital environments. Nevertheless, there are also voices underlines the tension between streamers' self-chosen act and the platform's control of technological infrastructure and affordance, which challenge and constraint streamers' self-empowerment [30, 32].

3) Affordance

This study identifies three types of affordances that live streaming platform owners employ to shape the conduct of streamers.

● Interaction. There are three interactions Twitch.tv presents users: the streamers' gameplay, an embedded live stream of the streamer narrating and playing the game, and a chat window [16, 19]. Compared to comments, the live chat window, in which streamers and viewers talk synchronously, is essential for platforms to enhance perceptions of authenticity and closeness and entice viewers to engagement and interaction [22]. Johnson's study further how this platform affordance actively enables and structures the norms of co-created content [34]. Nonetheless, the function is relying on streamers' liveness and extra relational labor like paying attention to their facial reactions when reading comments, which ultimately prolongs their effort for self-branding. Besides, the gamification of interface adapts the online interaction to the logic of capitalization further. In China's live-streaming platforms, increasing game mechanics like Levels (higher-level streamers can receive greater benefits from the platform) and Badges (granted to users with high monetary contribution) stimulate user engagement especially virtual gift-giving, directly transferring interaction to commodification [35].

● Monetization. A key dimension of affordance revolves around how platform commodify digital labor through the monetary system. Traditional ways for streamers to make an income include paid subscription (which is split between the streamer and platform), donations (either directly to the streamers or through in-app currency), and sponsorship [29]. Noteworthy, many scholars notice a distinctive mechanism of monetization on China's live-streaming platforms: virtual gifting

system, in which streamers earn by encouraging their audiences to buy them digital presents with real money [7, 8, 14, 15, 18, 20, 29, 35–38]. These presents are first transmitted to the app, where the platform takes a cut first. Virtual gift is distinguished from commenting and liking by visually stimulating visual representations and textual notifications, and the more the cost of the gift, the more spectacular the visual effects [35]. The mechanism entices both the streamers to offer more affective labor to attract gifting, and the views to spend more. In this mechanism, streamers' labor value cannot be self-determined, as it can only be judged by platform algorithm which is based on viewers' consumption, and the virtual gifting is therefore "hijacked" for maximizing platform's interest instead of the streamers' [35, 37]. Consequently, the dominance of platform affordances in monetization is foregrounded in whichever income source, while streamers' negotiation agency is increasingly belittled whose value fluctuates in real time.

- Aspiration. The aspiration affordances highlight the platform-led logic that streamers actions are guided by growth mindsets, future goal, and visibility orientation. For example, streamers engage in aspirational work like using cross-platform promotion feature to grow fan bases [22]. In the regime of visibility, the popularity-ranking algorithms construct a new framework that platform affordance demonstrates metric power [8, 12, 20, 38]. The popularity calculation is not only based on viewer counts but also the revenue generated through virtual gifting [34]. While the highest paid streamers win more visibility to be displayed in the ranking, others undertake the risk of disappearing from the live interface [20, 35]. Another major aspirational affordance is 'PK' in which streamers are chosen by the platform algorithms to compete against one another to see who can receive more virtual gifts in the game [15]. It is noteworthy that under the cloak of entertainment, the nature of PK is highly gendered, as it is designed to stimulate male patrons into gift giving to "protect" their camgirls who strive to attract more virtual gifts to win the PK, whilst the platform enjoys taking a cut from the ongoing "love crises" [14, 15].

4) Platform governance

Researchers demonstrate how streamers adhere to platform guidelines, which are monitored by algorithmic detection systems to continuously monitor and modify their behavior [7, 39]. Platforms use a variety of algorithmic and manual behavioral monitoring and content moderation techniques that reflecting panoptic surveillance. A distinguishing feature of platform governance in the participatory sociocultural context is that the monitor of streamers' behavior is both bottom-up and top-down, since streamers are regulated not only by the platform, but also by one another and their viewers [39]. For instance, the attire of female streamers is co-monitored by the platform and users' commenting, which often establishes sexist notions of legitimacy and merit [27, 39].

It is also important to highlight the dominating force behind the platform regulation - the state governance. Facing the regulation, streamers constantly test the boundaries of the regulation and adjust their actions accordingly, while the markets also evolve. Lu and Wang [9] take the risky virtual battles as an example to show how streamers tested the grey zones of policy and how the platform legitimized it through commodification. A major part of platform governance regarding the state is censorship [7, 10, 20, 38, 39]. On one hand, policy makers tightened the control of vulgar, obscene, and violent user-generated content that "harms social morality" and platforms followed suit by accelerating self-censorship strategies such as machine learning monitors and account-blocking. Meanwhile, streamers learned to present sexual fantasies implicitly and disseminate content on less censored platforms as a form of creative resistance [8, 10, 20]. On the other hand, in the capital market, the success of affective and erotic economy provides streamers a feasible path to boost visibility under the heavy censorship [38]. These studies suggest that power doesn't necessarily exist in a hierarchical form of coercion, but rather in the relational space where streamers' agency interacts with the platform's ecology and a larger sociocultural setting. Streamers carry out ongoing negotiation with platform and policy makers, and the streamer-platform-state interactions would variably involve conflicts and compromises.

5) Ideology

Mostly, scholars discussed the neo liberalization of live streaming, which mine the everyday laypersons for human capital and profit [17, 36]. Live streamers' labor to manage the tensions between certainty and uncertainty, monetization, and intimacy, and constantly adapt to the changing market are crucial parts of neoliberal subject [30]. The neoliberal subjectivity highlights self-entrepreneurship, equating one's success to the outcome of time and effort devote to the streaming, which tied to the aforementioned relational and emotional labor [16, 29]. Xu and Zhang [37] underlined the role of platform governance in constructing the ideology. Through platform affordances throughout the whole labor process including ranking and monetization system, streamers internalize the rule of popularity and inevitably self-exploit in the "game of making out," ultimately making "destiny self-determination" the ideology of platform economy [35, 37].

Specially, scholars position gender exploitation in neoliberal capitalist regime where objectification and sexualization are internalized through subjective choices. Under the neoliberal capitalist regime, female streamers are endowed with agency on condition that it is used to build themselves into characters who closely resemble heterosexual male fantasies [14]. In the video game live-streaming context, the neo liberalization of game live streaming signals a de-politicization of identity politics that devalue female streamers' labor through physical and emotional abuse, and thus naturalize and reinforce the white cisgender male gamers' dominance [17]. In addition, the issue of gamer legitimacy is also related to what called the ideology of "gamer meritocracy" [27]. The live-streaming platform, instead of a truly equal playing field, represents the ideology of gamer meritocracy that the dominant players (white, cisgender, male streamers) deserve their career success, while others (female streamers) who are successful

must be cheating [29].

6) Authenticity

Streamers build authenticity that navigate the expectations of viewers through their self-performance of persona, from professional eSports player to drag queen, which is a key factor determining user's engagement and donation [12, 21, 30, 31]. The nature of authenticity is interpersonal, which is co-constructed by streamers' characteristics and viewers' understanding of how streamers are like in their private lives in parallel [12, 41]. The sharing of personal topics cultivates para-social relationship a sense that viewers feel having real personal relation with the performer, who is perceived to be credible [9, 11, 22]. In the case of esports live streaming, the building of para-social relationships enhance viewer's loyalty and their perception of streamers' credibility, which positively influences viewers attitude to streamers sponsored advertising [13]. Nonetheless, the relationship involves new challenge for streamers to balance authenticity and moneymaking. One such example is the tension that trans* streamers experience between their daily authenticity and their professional performativity, which involves technology equipment, attire, and accessories for eye-catching and profit [30]. On Twitch.tv, streamers also try to "sell" products while not breaking the sense of genuine connection to viewers [23].

Notably, some scholars mentioned the authenticity stigmatization and reclaimant in live streaming. In the gaming communities where the majority players are young, white, heterosexual men, players who do not fit this image are perceived as inauthentic members [13, 27]. The inauthenticity directly tied to female's bodies, as breasts themselves serve as an indication for phony gaming identities [27]. More recent, researchers noted that live streaming had become a site for to reclaim authenticity. Tran [13] takes the flexible genre of authorship in Twitch.tv as an example to show how female live streamers transform the term "egirl" from victimization to lucrative reclamation through self-sexualization and hyperfeminization. These demonstrate the importance to realize that live streamers are not necessarily passive victims, but rather situate them in an ambivalent and fluid sociocultural environment.

7) Guild

An emerging theme of livestreaming study is guild. Streamers who join a streamer guild must provide the guild the exclusive right to utilize their images, persona, and content for profit as contract employee; in return, the guild is responsible for training and managing their streaming activities and providing them with base salary and performance-based commissions [14, 20, 29, 35, 37]. The contract stipulates the minimum streaming hours per week, minimum gifting received per week, and the streamers' cut of revenue (depending on streamers' popularity ranking) [29]. To maintain income, guilds train female streamers to treat male patrons like boyfriends and teach them "tricks" like establishing intimacy through messaging them "good morning" in daily life [29, 35]. Besides, guilds also design scripted behaviors and pre-determined roles for streamers to better appeal to fans, from being bizarre to flirty [36]. Through the hegemonic constructed, highly routinized virtual relationships, the guilds institutionalize, professionalize, and datafication the labor chain.

Guilds functions as "algorithmic experts" that mediate between individual streamers and the platform. For live streamers, those who guilded have higher weight in the popularity ranking and recommendation algorithm as stable, trained, and controllable labor [20, 36]. The "teamwork" of self-branding also shelters them from the intensifying market competition. For the livestreaming platform, the formation of guilds shares the administrative cost on one hand, producing highly successful streamers for profit on the other hand [41]. Despite this, given the guilds take a cut from platform's revenue, it is important to realize the tension between the guild's power and the platform's restrain. Specially, Lu and Wang [7] find Kuaishou directly split the income with streamers to break the guild system, which is accompanied by the birth of another form of folk streamers communities, jiazu (literally "family"). A jiazu consists of one "master" (core influencer) and several apprentices (fresh-hand influencers) and is more unruled and often semi-family businesses compared to strict and professional guilds [7]. Jiazus formulated collective responses to Kuaishou's business model shift and make profit in a quasi-symbiotic relationship, meanwhile Kuaishou strategically balance the power by weakening the visibility of jiazus in its media release and various types of ranking [7]. It becomes clear that streamers' agency is institutionally foregrounded in the fluid and corporatized environment of guilds and conditioned by the ongoing negotiation between guilds and platforms.

IV. DISCUSSION

A. Implications for Future Study

This study also identifies current trends and issue of research and points to future directions. First, there is a need to expand the platform and geographical focus. At present, about half of research on live streaming was focused on Twitch.tv, reflecting a lack of global diversity and a bias of Global North in live streaming research. Thus, a direction of future research is to answer Davis and Xiao's "de-westernising" call for platform studies by paying attention to platform specificities [41]. Little do we know about the mechanisms of other platforms in the vast ecosystem of live streaming based outside the US and China, such as AfreecaTV of Korea and NicoNico of Japan. Previous studies have established the research framework to study live streamers as digital labor, mostly in the US and China context. On this basis, comparative analyses across countries to investigate whether similar mechanisms apply in other countries. The ecosystem of live-streaming varies from one region to another, future researchers need to explore live-streaming in varieties of contexts, such as Asia and South America to expand our understanding of live-streaming as a global phenomenon.

Second, pay attention to specific sociocultural and socioeconomic context. For instance, as Yang [42] pointed out the distinctive Chinese ideals that construct Chinese Internet, the research of China's live streaming industry must stress differentiation from the West. While the precarity of Western streamers origin in the volatile nature of small and medium enterprises market, streamers' work is influenced by authorities' decisions and the complexities of state-owned

capitalism in China [10]. Another example is the affective female live-streamers in different context: In Thailand, female streamers are perceived as erotic and subservient due to the country's legality of sexual tourism; in comparison, Chinese female streamers carefully place their positions in the grey zone to avoid explicit erotic that breaking the social moral standard [14]. Thus, this paper suggests future investigations tied to particular areas, social context, and platforms.

Third, apply a subjective and dialectical perspective to the study ambivalent and instable nature of digital labor. The tension between empowerment and exclusion, expectations and stress, certainty and uncertainty are subjective measured, which cannot be fully observe on the screen. It has found that there was a wide appliance of qualitative methods, which offers a flexible analytical framework for nuanced cultural critique, multiplicities of meaning, and complexities [27]. In terms of the complexities of digital labor, one key implication for future study is to avoid the 'dialectic of exploitation versus empowerment' [43]. Scholars should locate streamers neither as passive victims bearing online harassment and cultural exclusion, or simply enjoy the opportunities offered by the platform to self-empowerment and moneymaking. Instead, attention should be paid to the power dynamic between the stakeholders (live-streamer, platform owner, viewer, guild, the state, and more) that are intertwined with each other in the fluid live-streaming ecosystem.

Fourth, position live-streaming in a border ecosystem. Beside streamers' relationship with viewers and platform, this paper identifies guild as an emerging research focus. The role of Multi-Channel Networks (MCN) agency – third party service providers that works with multiple platforms and manage live streamers – is still underestimated. Besides, the relationship between streamers and brands is essential part in the capitalization of the digital labor, although some articles mention the relationship between streamers and sponsors, the role of brands have not been drawn into an integrated socioeconomic relationship. A further look at MCNs and brands can shed new lights on how digital labor is commodified in the institutionalized live-streaming industry. The force of the state is also a crucial part in platform economy, which strategically shaping the market landscape, culture production, and technological innovation [10].

Finally, a prominent gap in current literature is the lack of longitudinal studies to address the historical origins. could capture how interaction ritual chains are created as a streamer's community evolves over time. Since 2016, China's State Administration of Press, Publication, Radio, Film and Television (SARFFT) a series of actions to regulate livestreaming content [10]. During the period, the platforms evolved new forms of self-censorship, streamers invented new ways to perform and secreted themselves strategically in the ever-changing cultural politics, which reform regulations in return. This indicates that, instead of a single-round regulation, the is a long-term negotiation that constantly shaping and reshaping the live-streaming landscape.

V. CONCLUSION

This study is a systematic review on the live-streamer as digital labor in platform economy. Currently, no similar literature review on live streaming is found in the field of media and communication research. And this review is a first attempt to put live-streamer – the subject of labor – at the nub of the theory framework. According to the 35 articles selected, this paper summarized the platform focus, method used, and seven key themes in current research. It was found that most of current research focus on US-based platform Twitch.tv and China-based platforms such as Kuaishou and Blued, while other platforms and their specific sociocultural and socioeconomic environment based outside the US and China are underestimated. Also, there was a wide appliance of qualitative methods in current research, offering a flexible analytical framework for nuanced critique, multiplicities of meaning, and complexities of the subjectivity of digital labor. This paper identifies seven key research themes: labor practice, marginalization and empowerment, ideology, platform governance, affordance, authenticity, and guild. Live streamers engage with various labor practice, and often involve in certain forms of marginalization and empowerment in the neoliberal capitalist regime. In addition, they interact with the three principal actors in platform economy – platform, audiences, and guilds – through ongoing negotiations with platform affordance and governance, building authenticity to maintain relationships with audiences, and contracting with guilds that serve as intermediaries between individual streamers and the platform.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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