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A bibliometric analysis of customer loyalty factors in streaming commerce utilizing VOS viewer and R Studio

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Abstract

This study aims to examine customer loyalty as a critical factor in live streaming commerce, identifying key antecedents, consequences, and thematic trends to enhance understanding of consumer behavior in this rapidly evolving sector [1]. A bibliometric analysis was conducted using VOS Viewer and RStudio, leveraging data from 36 peer-reviewed articles sourced from the Web of Science (WoS) database (2015–2025). The methodology involved co-citation, co-authorship, and keyword co-occurrence analyses to map the intellectual structure of the field [2]. The analysis reveals a publication peak in 2021–2022, driven by the COVID-19 pandemic, with a decline in 2023 indicating thematic saturation. Leading journals include *Frontiers in Psychology* (28–30 articles) and the *Journal of Retailing and Consumer Services* (20 articles), with China-based institutions dominating contributions [3, 4]. The study underscores the multifaceted nature of customer loyalty in streaming commerce, highlighting trust, interactivity, and professional streamer behavior as key to fostering long-term consumer relationships. Emerging research gaps in niche areas like ethics and sustainability offer avenues for future exploration [5].

Keywords: Consumer satisfaction, Customer loyalty, Live streaming commerce, R studio, Trust, Bibliometric analysis, VOS viewer.

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1. Introduction

The intention to conduct a bibliometric review focused on the streaming sector, specifically examining customer loyalty as a variable, is grounded in the need to understand the dynamics of live streaming commerce. Live streaming has emerged as a significant mode of interaction between consumers and marketers, leveraging real-time communication to enhance

consumer engagement and purchase intentions. The immediacy of communication facilitated by live streaming platforms reduces barriers and fosters closer interactions between streamers and viewers, which is crucial for building customer loyalty [6].

Trust plays an essential role in live streaming commerce, influencing consumer behavior and loyalty. The cognitive affective conative (C-A-C) framework provides a comprehensive approach to understanding how trust impacts consumer decisions in this context. By identifying the antecedents and consequences of trust, researchers can better comprehend its importance in fostering long-term customer relationships within the streaming sector [7].

Moreover, enhancing professional knowledge about products is vital for streamers aiming to establish themselves as industry experts. Streamers must acquire extensive knowledge related to the products they market, including potential issues and solutions, to effectively engage with consumers and build trust. This expertise not only empowers streamers but also contributes significantly to consumer confidence and loyalty.

Bibliometric analysis tools such as VOS viewer and RStudio are instrumental in conducting detailed reviews of the literature on live streaming commerce. These tools enable researchers to perform advanced bibliometric analyses, including co-citation, co-authorship, co-word analysis, author keyword word-cluster analysis, and citation score analysis [8]. Such analyses help in understanding user behaviors and interactions within live streaming platforms, providing valuable insights into factors that drive customer loyalty.

The thematic structure of research domains within livestreaming services highlights the importance of a theoretical understanding of communication processes and interactions inherent in these services. As more research is conducted, the gap in knowledge narrows, offering a clearer depiction of livestreaming services based on meticulous analysis of sample documents [1]. This growing body of research underscores the significance of exploring customer loyalty as a variable within the streaming sector.

Live streaming platforms also offer unique opportunities for interactive marketing strategies. For instance, holding prize-giving quizzes can engage consumers effectively, while utilizing VR technology can further enhance interactions [9]. These strategies contribute to creating a dynamic environment where consumer engagement is maximized, thereby fostering loyalty.

The consumption patterns during events such as the COVID-19 lockdown have provided insights into how OTT media streaming influences consumer behavior. Studies have shown that increased interaction with streamers and other customers promotes users' purchase intentions [6, 10]. This phenomenon underscores the potential of live streaming platforms in driving customer loyalty through enhanced engagement.

In summary, conducting a bibliometric review using VOSviewer and RStudio will provide a comprehensive understanding of customer loyalty within the streaming sector. By analyzing various aspects such as trust, professional knowledge enhancement, interactive marketing strategies, and consumption patterns during significant events, researchers can uncover critical insights into factors that influence consumer behavior and loyalty in live streaming commerce.

2. Literature Review

2.1. Previous Studies

The streaming sector has emerged as a significant area of interest in recent years, driven by the rapid growth of live streaming platforms and their impact on consumer behavior. The literature on streaming highlights various aspects that contribute to customer loyalty, which is a critical variable for understanding the dynamics of this sector.

Live streaming platforms have revolutionized the way content is consumed and interacted with, creating unique opportunities for both content creators and viewers. The characteristics of live streamers play a crucial role in influencing viewer behavior and loyalty. For instance, parasocial relationship theory has been extended from traditional media to live streaming commerce to explain how broadcasters' characteristics affect viewers' behaviors [11]. This theory helps in understanding the attitudinal and behavioral loyalty of viewers towards streamers.

Consumer stickiness is another key concept in live streaming sales, where the relationship between consumers and streamers or brands is essential for retaining customers. Despite its importance in business practice, academic research on consumer stickiness in live streaming sales remains limited [12]. Studies have conceptualized and operationalized constructs related to consumer-streamer stickiness and consumer-brand stickiness to address this gap.

Trust is a fundamental factor that influences purchasing behavior in the context of live streaming commerce. Streamers act as opinion leaders and sources of information, guiding potential consumers' purchasing decisions through their shows or live interactions. Building trust with audiences during the livestream process is positively associated with purchase intention, highlighting the importance of streamer-audience interaction [7].

The perceived value of live streaming platforms also plays a significant role in shaping consumer behavior. Research has explored how live streamers' characteristics and platform features stimulate online stickiness and repurchase intention among consumers [13]. This involves providing valuable and attractive scenarios and content that meet consumer demands.

Moreover, the transmission of messages within live streaming platforms involves complex encoding and decoding mechanisms facilitated by various intermediaries between senders (streamers) and recipients (viewers) [1]. This intricate process underscores the importance of effective communication strategies in maintaining viewer engagement and loyalty.

Empirical studies have utilized questionnaire surveys to collect data on factors influencing consumers' purchase decisions on live streaming platforms. These surveys often focus on online stickiness, perceived value, satisfaction, trust, and repurchase intention [7, 13]. Such data collection methods help validate theoretical models constructed based on these factors.

Additionally, understanding who is more receptive to content created by live streamers can provide valuable insights for firms aiming to promote trials of their content. Conceptualizing the value creation process as a multifaceted ecosystem clarifies that many content creators operate within consumption communities, enhancing overall engagement.

Sequential consumption patterns also vary based on users' loyalty status to different streamer types. Recognizing both concurrent and sequential impacts of watching live-streamed content on gameplay provides a comprehensive view of user behavior [14].

Overall, the literature review indicates that various factors such as streamer characteristics, trust-building, perceived value of platforms, communication mechanisms, and empirical data collection are integral to understanding customer loyalty in the streaming sector. These insights are crucial for developing effective strategies to retain consumers in live streaming commerce.

2.1.1. Concepts and Theories of Customer Loyalty

The literature on customer loyalty is extensive and multifaceted, encompassing various models and theories that explain why customers remain loyal to certain brands or services. One prominent theory is the Technology Acceptance Model (TAM), which posits that perceived ease of use and perceived usefulness are critical determinants of user acceptance and continued usage of technology. This model has been integrated with the Uses and Gratifications Theory (UGT) to understand motivations behind using online streaming services, highlighting how personal gratifications derived from content consumption can foster loyalty [10].

Another significant framework is the Stimulus-Organism-Response (SOR) model, which analyzes online consumer behavior by examining how external stimuli (such as content design and navigation) affect internal states (organism), leading to specific responses (e.g., impulsive buying behavior). This model is particularly relevant in e-commerce livestreaming, where virtual environment cues play a crucial role in shaping consumer actions [15].

The concept of social support also plays a vital role in fostering customer loyalty in live streaming sales. The interaction between streamers and consumers can enhance perceived streamer support, which positively impacts consumer stickiness during live streaming sessions [12].

This interaction-based approach underscores the importance of building strong relationships between streamers and their audience to maintain high levels of engagement and loyalty.

Furthermore, research indicates that loyalty to firm-owned channels decreases the positive effect of live-streamed content, although this reduction is less pronounced compared to loyalty towards mega streamers. This suggests that while firm-owned channels may have some influence on customer loyalty, individual streamers with large followings have a more substantial impact on maintaining viewer engagement.

In addition to these theories, the value creation process within the creator economy highlights the interdependence between content creators, firms, and consumers. Consumers' heterogeneous preferences combined with firm and creator incentives create complex consumption communities where loyalty can be cultivated through tailored content and interactive experiences [14].

Moreover, strategies employed by marketers, such as sending gifts or offering exclusive deals during live streaming sessions, can significantly influence consumer behaviors. These tactics not only enhance immediate purchase intentions but also contribute to long-term loyalty by creating memorable experiences for viewers [8].

The bibliometric analysis using tools like VOS viewer and R Studio will provide insights into the productivity and impact of research on live streaming commerce. It will illustrate temporal trends in publications and citations, revealing how emerging topics like live streaming commerce have gained traction over recent years [5, 8]. Such analysis will help identify key areas where customer loyalty has been extensively studied and highlight gaps for future research.

Understanding the motivations behind travel live streaming also offers valuable perspectives on customer loyalty. As an emerging research object, travel live streaming has garnered significant attention among scholars due to its potential for creating engaging content that resonates with viewers' interests [3]. This form of streaming can build strong emotional connections with audiences, thereby enhancing their loyalty towards specific travel brands or destinations.

Finally, integrating various disciplines such as sociology, psychology, and information systems into academic research can further enrich discussions on user behavior in live-streaming commerce. By combining different theoretical approaches, researchers can develop a more comprehensive understanding of factors influencing customer loyalty in this dynamic sector [5].

In summary, concepts and theories of customer loyalty within the streaming sector encompass a range of models including TAM, UGT, the SOR model, social support theory, value creation processes in the creator economy, marketing strategies during live streams, bibliometric analysis tools like VOS Viewer and R Studio, motivations behind travel live streaming, and interdisciplinary approaches. These frameworks collectively contribute to a deeper understanding of how customer loyalty is cultivated and maintained in the context of online streaming services.

Therefore, in this study, bibliometric analysis was conducted to address the following questions:

1. What are the journal's most common or popular research topics?
2. Which countries and regions are most popular for publishing articles on related topics?
3. Which journals do researchers prefer to publish in, and which journals have the most citations?

2.2. Tools for Bibliometric Analysis

Tools for bibliometric analysis are essential for systematically evaluating the literature within a specific field, such as the streaming sector. VOS viewer and RStudio are two prominent tools utilized for this purpose.

VOS viewer is a software tool designed for constructing and visualizing bibliometric networks. It is particularly effective in mapping scientific landscapes by creating visual representations of citation networks, co-authorship networks, and keyword co-occurrence networks. The software allows researchers to identify clusters of related publications, authors, or keywords, facilitating the understanding of research trends and the identification of influential works within a domain [1]. VOS viewer's ability to handle large datasets makes it suitable for comprehensive bibliometric reviews, providing insights into the structure and dynamics of scientific fields.

RStudio, on the other hand, is an integrated development environment (IDE) for R, a programming language widely used for statistical computing and graphics. In the context of bibliometric analysis, RStudio offers various packages such as *bibliometrix* that enable researchers to perform detailed quantitative analyses of publication data. These packages support functions like citation analysis, co-citation analysis, and collaboration network analysis [2]. The flexibility of RStudio allows researchers to customize their analyses according to specific needs, making it a versatile tool for bibliometric studies.

The combination of VOS viewer and RStudio provides a robust framework for conducting biometric reviews. VOS viewer's visualization capabilities complement RStudio's analytical power, enabling researchers to not only quantify but also visually interpret complex bibliometric data [9]. This synergy enhances the ability to uncover patterns and relationships within the literature that might not be evident through numerical analysis alone.

In addition to these tools, other software such as SPSS can be employed for descriptive data analysis in bibliometric studies. SPSS facilitates the examination of basic statistical properties of publication data, such as frequency distributions and central tendencies. This preliminary step is crucial for ensuring data quality before proceeding with more advanced analyses using VOS Viewer or RStudio.

The use of these tools collectively enables a comprehensive approach to bibliometric analysis. Researchers can leverage VOS Viewer's visualization capabilities to map out the intellectual structure of a field while utilizing RStudio's statistical packages to perform detailed quantitative analyses.

By employing these tools effectively, researchers can conduct thorough bibliometric reviews that not only quantify research outputs but also elucidate underlying patterns and trends within the streaming sector. This multifaceted approach ensures that the review is both rigorous and insightful, contributing valuable knowledge to the field [1, 6, 10, 12].

3. Methodology

3.1. Research Design

This study employs a bibliometric analysis to systematically review the literature on customer loyalty in live streaming commerce. The research design leverages two primary tools: VOS viewer for visualizing bibliometric networks and RStudio for quantitative data analysis. VOS viewer facilitates the creation of co-citation, co-authorship, and keyword co-occurrence networks, enabling the identification of thematic clusters and influential works [1]. RStudio, using the *bibliometrix* package, supports advanced statistical analyses, including citation and collaboration network analysis [2]. The combination of these tools ensures a robust examination of publication trends, author contributions, and thematic evolution. The analysis focuses on peer-reviewed articles published between 2015 and 2025, sourced from the Web of Science (WoS) database, to maintain high scholarly standards.

3.2. Selection of Data Sources

The selection of data sources is a critical step in conducting a bibliometric review focused on the streaming sector, particularly examining customer loyalty as a variable. To ensure the robustness and comprehensiveness of the analysis, it is essential to utilize reputable academic databases that provide access to peer-reviewed journals and scholarly articles.

The Web of Science (WOS) database is chosen as the primary source for this bibliometric review. WOS is renowned for its extensive coverage of high-quality research publications across various disciplines. It offers rigorous, peer-reviewed content, which is crucial for scholarly advancement. The selection criteria applied to filter the results include focusing solely on academic journals while excluding proceedings, book chapters, reviews, and editorial materials [8]. This approach ensures that the data collected is relevant and contributes significantly to the research objectives.

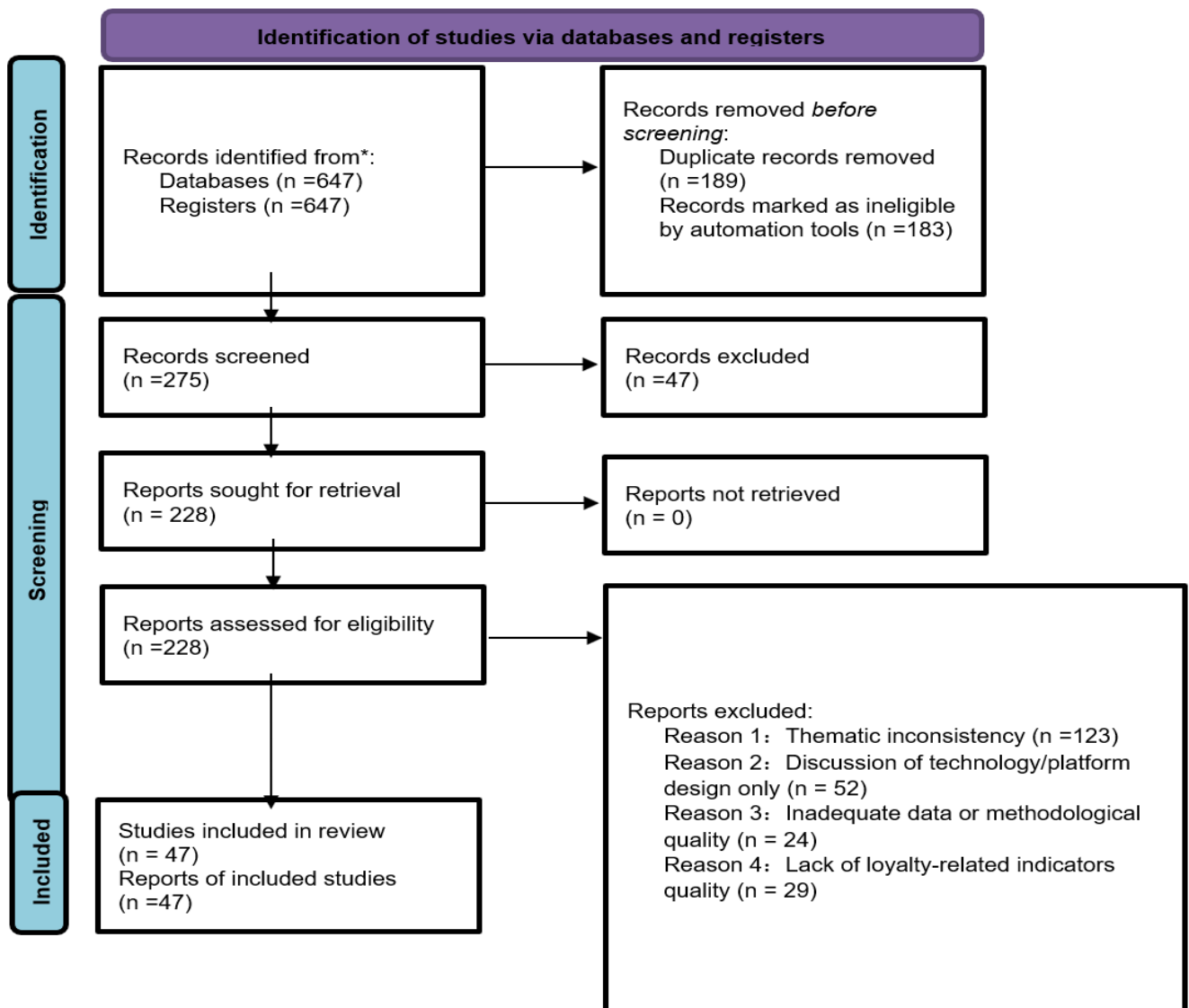
The topic covered in this study was customer loyalty in live streaming. Using the search query ("live streaming" OR "livestream*" OR "live commerce" OR "livestream* shopping" OR "live broadcast*" OR "real-time streaming" OR "video streaming" OR "influencer* streaming" OR "streaming commerce" OR "live selling") AND ("loyalty" OR "customer retention" OR "brand attachment" OR "consumer satisfaction" OR "customer engagement" OR "consumer engagement" OR "retention" OR "attachment" OR "trust") time frame: 2015-2025. Furthermore,

The study specifically focuses on engineering, social sciences, business, management, environment, and decision science. Consequently, 47 documents were selected for further analysis using search-related keywords.

3.3. Criteria for Article Inclusion and Exclusion

To ascertain the precision of the data, the 36 articles selected for bibliometric analysis must undergo verification. Inaccurate data can lead to erroneous inferences; instances of this include multiple authors contributing to the same journal and the usage of incorrect keywords, among other factors. Given the limited dataset in this investigation, it is feasible to conduct a manual review of the data. The validity of various elements, such as author names, publication frequencies, institutional affiliations, nationalities, keywords, and document titles, was rigorously scrutinized to verify

the data's integrity. A fundamental bibliometric analysis was performed throughout the survey. The objective of the data analysis was to discern publication trends, evaluate impact, and explore the influence of publications on research regarding customer loyalty in live streaming. Figure 1 delineates the bibliometric analysis. The VOS viewer software is capable of utilizing the TXT files from the WOS database to visualize network co-occurrences, evaluate the impact of publications, and conceptualize, visualize, and generate affiliated networks.



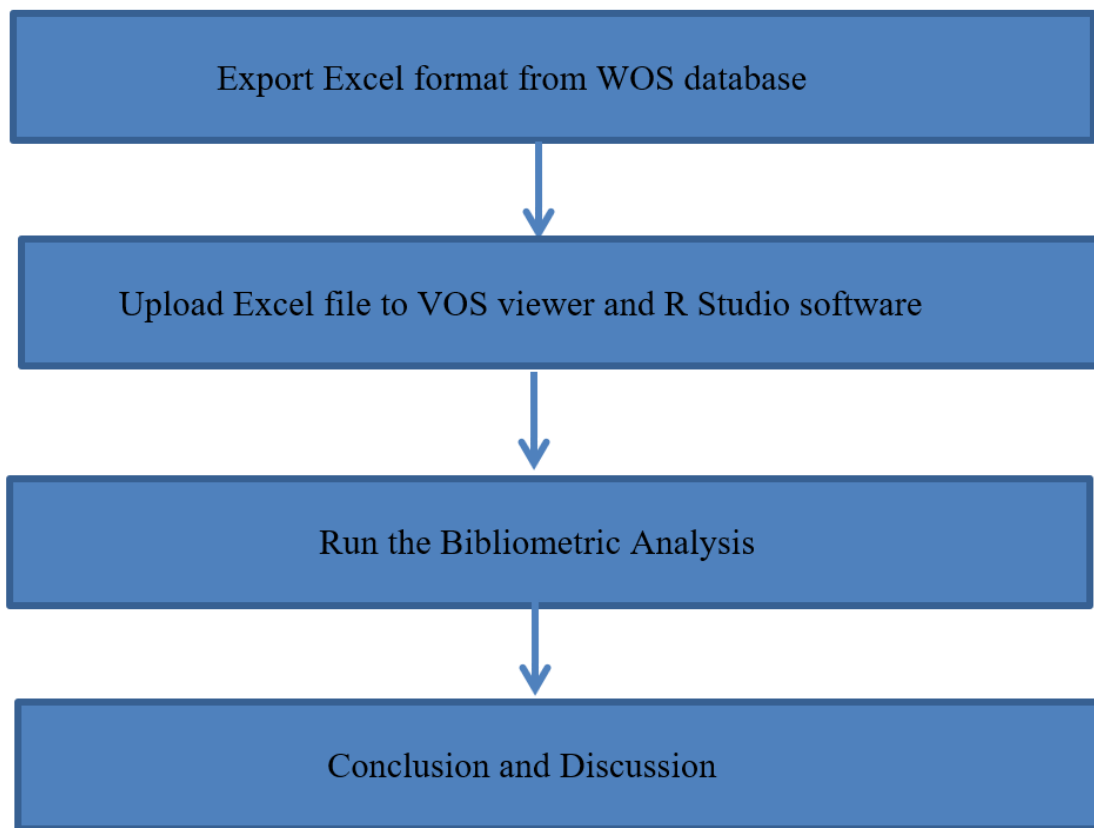


Figure 1.
Bibliometric analysis process.

4. Finding

The WOS database was used to analyze growth, document and source type, language, geographical distribution, subject area, keyword analysis, author citations, active institutions, and citation analysis by year and year of publication. The results are presented in frequency and percentage forms. This study uses VOS Viewer and RStudio software's co-authorship analysis, co-occurrence analysis, and citation analysis to visualize this data. This chapter provides an overview of the results from the bibliometric analysis using the WOS database to answer the research questions.

4.1. Publication Trends Over Time

The examination of publication trends over time in the streaming sector reveals significant insights into the evolution and focus areas within this domain. The analysis of bibliometric data using tools such as RStudio allows for a comprehensive understanding of how research interests and outputs have shifted. Based on the analysis of the "Annual Scientific Production" graph from 2015 to 2023, the content features of Live Streaming Commerce (LSC) research have undergone significant dynamic evolution. This evolution is influenced by both the internal maturity of the discipline and external factors such as the COVID-19 pandemic. In the early stage (2015-2017), research was primarily exploratory, focusing on foundational concepts and challenges, with a predominance of qualitative analyses. During the growth phase (2018-2020), empirical methods were introduced, expanding the scope to include consumer behavior, platform dynamics, and marketing strategies. The peak period (2021-2022), driven by the pandemic, saw a surge in publication volume, with research shifting towards applied and quantitative analyses, emphasizing crisis-driven innovation and technological integration. The decline in 2023 suggests saturation in certain themes, prompting a shift towards niche areas such as ethics, sustainability, and interdisciplinary approaches.

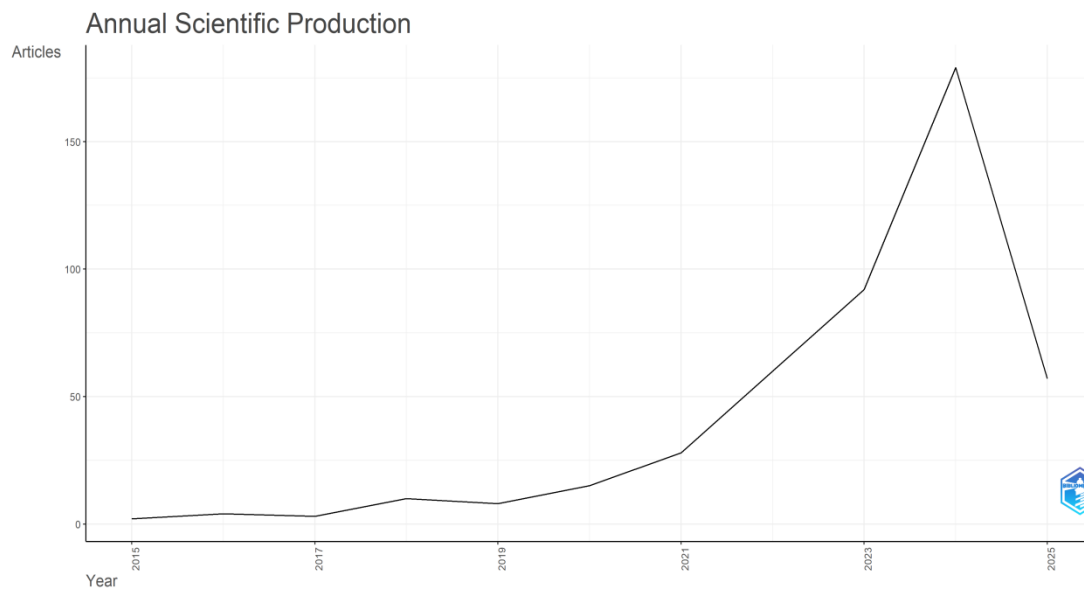


Figure 2.
Annual Scientific Production.

4.2. Top Journals Publishing on Streaming Topics

Top journals publishing on streaming topics have been identified through a comprehensive bibliometric analysis. This analysis utilized tools such as VOSviewer and RStudio to examine the publication patterns, citation metrics, and influential articles within the streaming sector.

The academic literature on live streaming commerce, as depicted in the "Sources' Production over Time" graph, is characterized by: A temporal transition from negligible activity (2015–2019) to rapid expansion (2020–2023), likely spurred by the pandemic-driven rise of digital commerce. Varied journal contributions, led by *Frontiers in Psychology* (28–30 articles), followed by the *Journal of Retailing and Consumer Services* (20 articles), and others at around 15 articles each, showcasing a multidisciplinary approach. Dynamic trends, with sustained post-2020 growth and a notable focus on psychological insights.

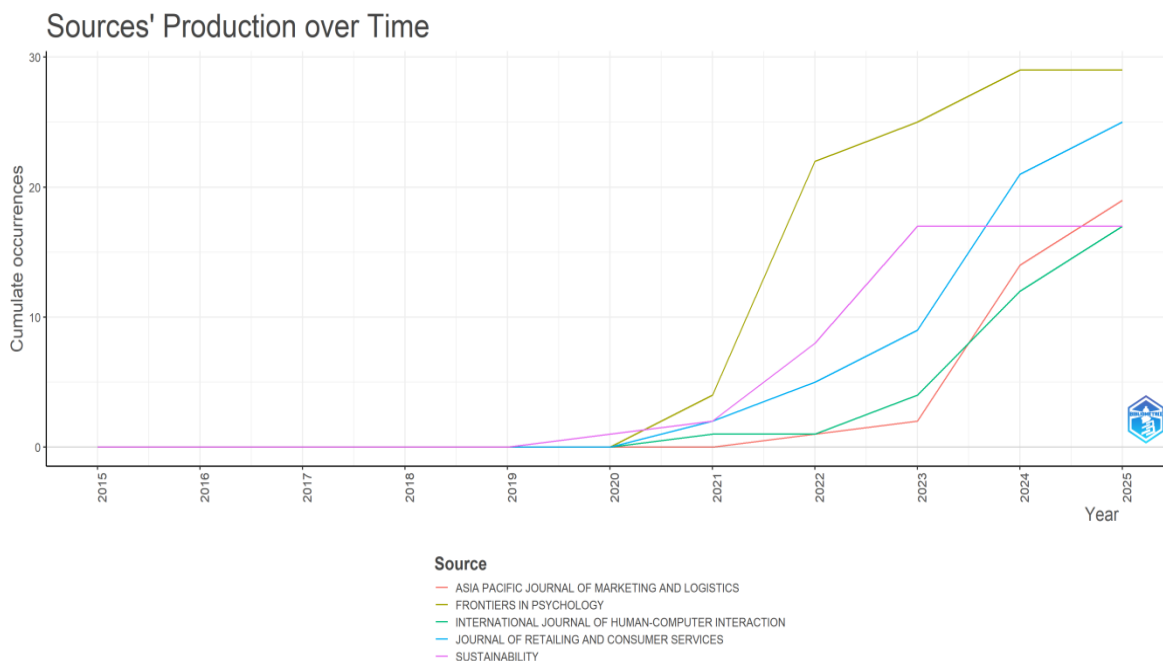


Figure 3.
Source's Production over Time.

4.3. Leading Authors and Institutions in Streaming Research

The examination of leading authors and institutions in streaming research reveals a diverse array of contributors who have significantly advanced the field.

Figure 4: Both are horizontal bar charts listing authors by document count. Image 4, being clearer, shows Kim Minseong, Li Jie, Lu Yaobin, and Xue Jiaolong each with 4 documents, followed by authors like Akram Umair and Cheah Jun-Hwa

with 3 documents each. Image 2 mirrors this data. The top authors—Kim Minseong, Li Jie, Lu Yaobin, and Xue Jiaolong—demonstrate significant individual contributions to LSC research. The prevalence of authors with Chinese names (e.g., Li, Lu, Xue) suggests a geographical concentration, likely tied to China’s prominent LSC market.

Figure 5: The chart reveals that Renmin University of China and Sichuan University, each with 16 articles, are at the forefront of live streaming commerce research, underscoring China's pivotal role in this area. This concentration is likely attributable to China's sophisticated LSC platforms, with studies frequently oriented towards local markets, emphasizing region-specific consumer behavior and platform dynamics.

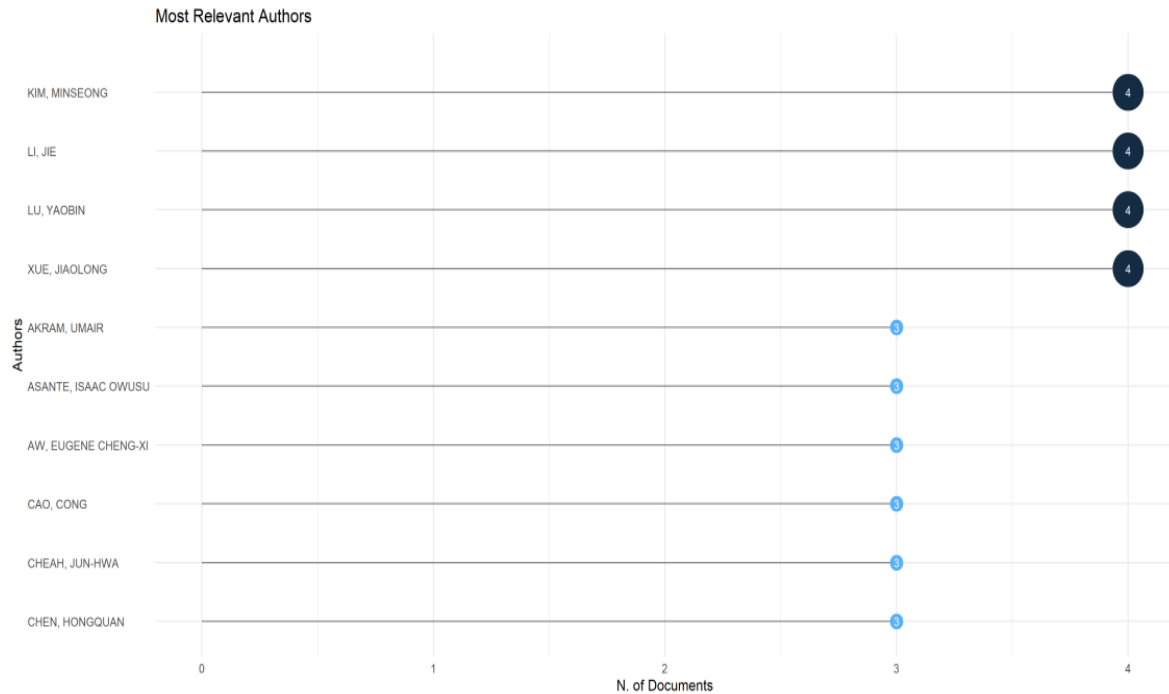


Figure 4.
Most Relevant Authors.

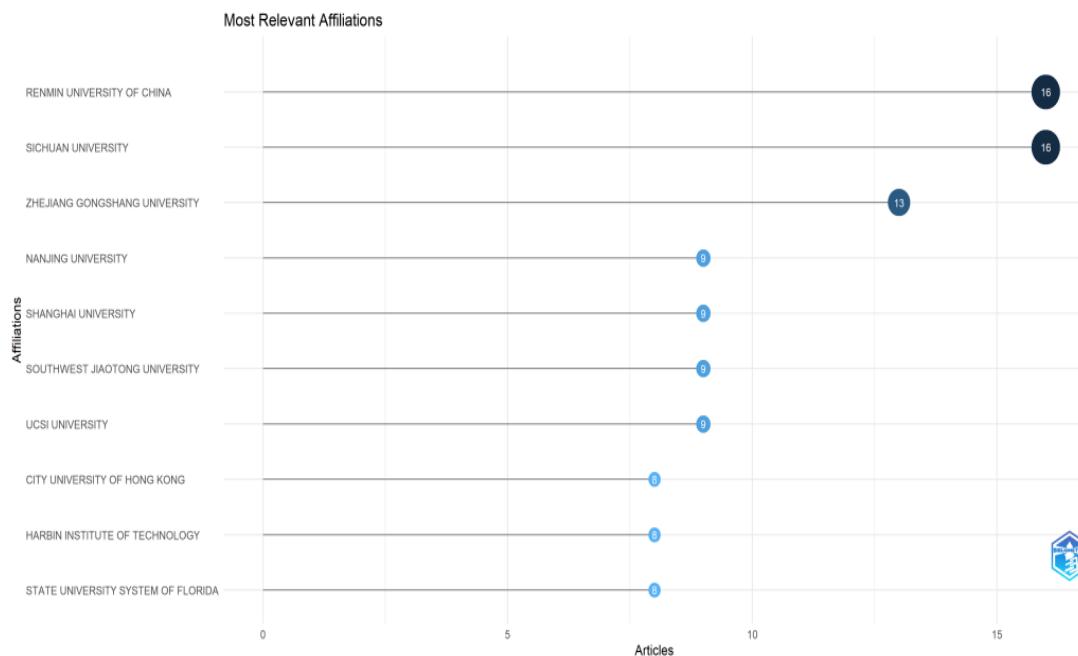


Figure 5.
Most Relevant Affiliation.

4.4. Thematic Clusters in Streaming Research

Thematic clusters in streaming research are essential for understanding the diverse aspects and trends within this rapidly evolving field. Research themes in live streaming commerce are categorized into four quadrants based on their centrality (relevance) and density (development degree): Motor Themes (High Relevance, High Development) Topics like eye-tracking, advertising effectiveness, celebrities, emotion, and fostering parasocial relationships are central and well-

established. These themes highlight the role of influencer marketing, emotional engagement, and advanced technologies in driving live streaming commerce. Basic Themes (High Relevance, Low Development) Themes such as trust, brand engagement, consumer engagement, purchase intentions, and the technology acceptance model are foundational yet underexplored. For instance, trust connects to word-of-mouth and adoption, signaling its importance in consumer acceptance, though it remains underdeveloped.

Niche Themes (Low Relevance, High Development) Specialized areas like anxiety, brand attachment, and social influence are well-researched but less central, possibly reflecting specific subfields or contextual studies.

Emerging or Declining Themes (Low Relevance, Low Development) The theme responses appear here, indicating it may be an emerging area with growth potential or a topic losing traction. The interconnections between themes, such as brand engagement linking to consumer engagement illustrate the complexity of the research landscape, offering a nuanced view of how live streaming commerce operates.

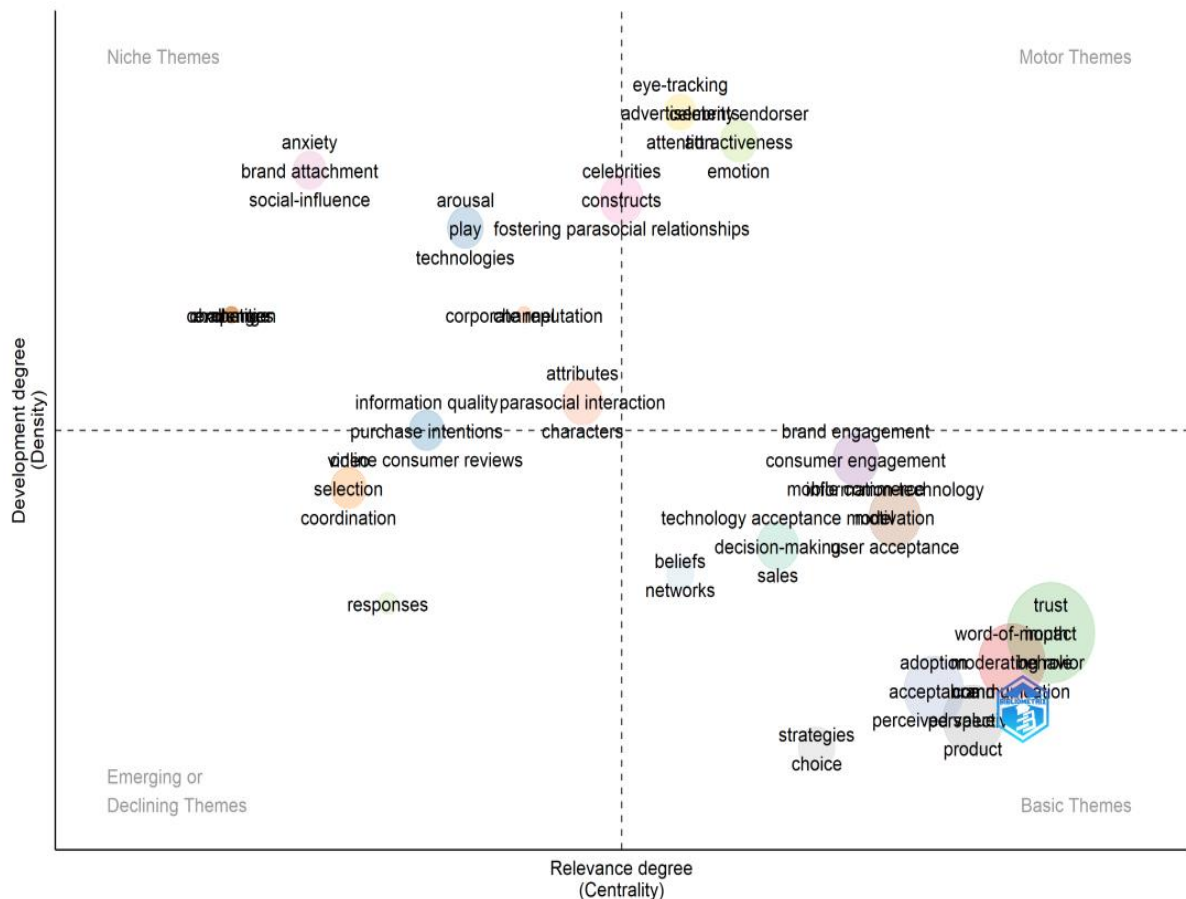


Figure 6.
Thematic Clusters in Streaming Research.

4.5. Identification of Key Themes Using Co-Word Analysis

The identification of key themes within the streaming sector, particularly focusing on customer loyalty, is crucial for understanding the dynamics and factors influencing consumer behavior. Co-word analysis, a bibliometric method, allows us to uncover these themes by examining the frequency and co-occurrence of keywords in scientific literature.

The tree map visualization highlights critical categories and their proportional significance, offering a quantitative lens on live streaming commerce: Trust (15%): The largest category, with a sub-focus on online trust (51%, 3% of total), underscores its foundational role in digital commerce. Impact (12%): Includes commerce (31%, 2% of total), reflecting the broader influence of live streaming on business outcomes.

Behavior (8%): Encompasses social commerce (50%, 3% of total) and antecedents (30%, 2% of total), emphasizing behavioral drivers. Intention (6%): Features loyalty (36%, 2% of total), linking intent to retention.

Satisfaction (4%): Includes purchase intention (29%, 2% of total) and e-commerce (28%, 2% of total), highlighting satisfaction drivers. Experience (3%): Covers attachment (25%, 1% of total) and adoption (23%, 1% of total), focusing on experiential factors. Customer Engagement (2%): A smaller but notable category, reinforcing engagement's role. These metrics align with thematic findings, particularly emphasizing trust and consumer engagement as pivotal elements.

Tree

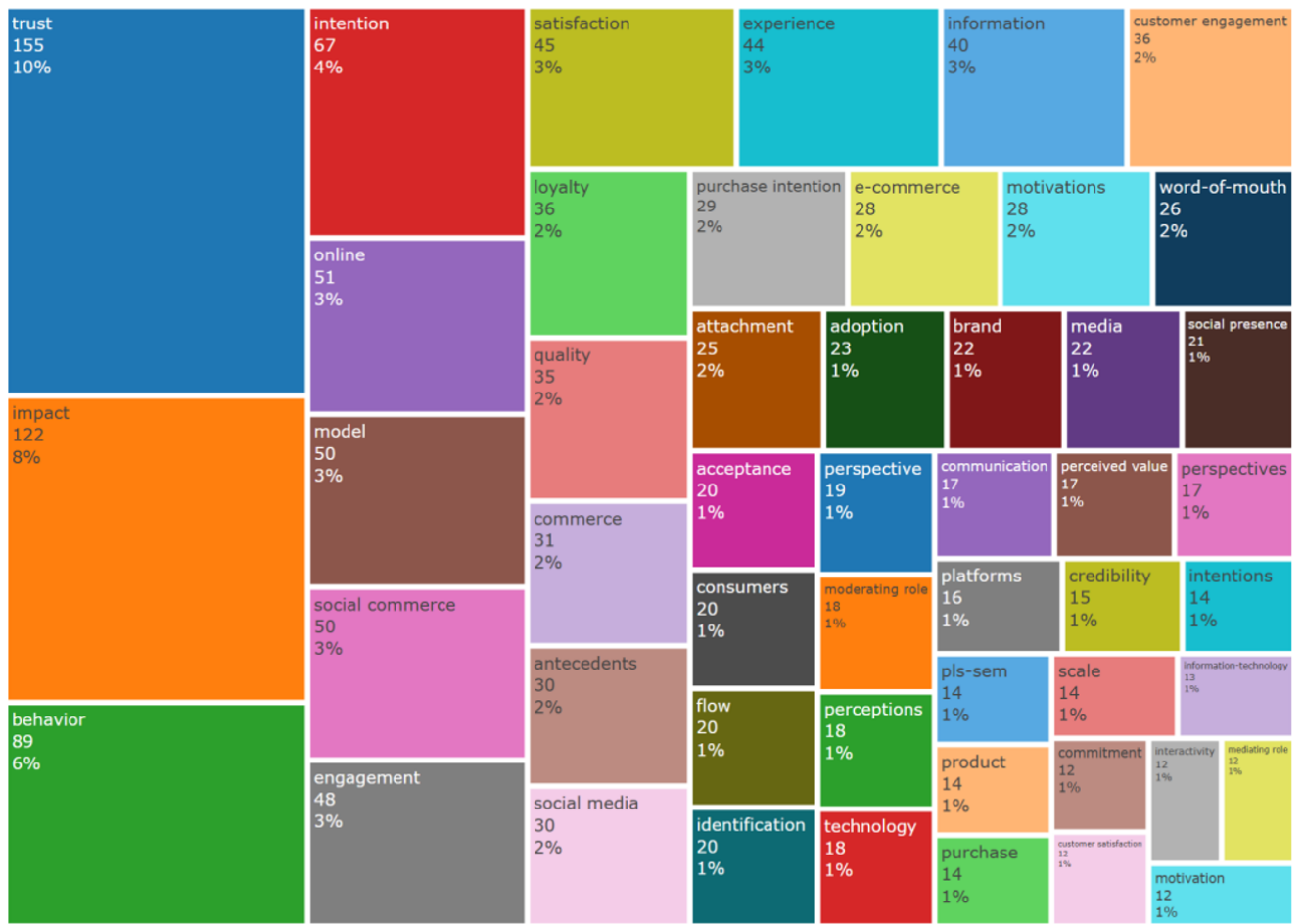


Figure 7.
Tree map Identification of Key Themes.

4.7. Keyword Co-occurrence Network

Figure 8 is a network visualization map that displays author keywords that appear at least five times. The map has a total of 30 keywords. The node size is directly proportional to the keyword frequency. The keyword co-occurrence network reveals that research on live streaming commerce is primarily centered around core themes such as trust, social commerce, engagement, and consumer behavior. Key thematic clusters include (1) trust-building and repurchase intention in social commerce, (2) immersive user experiences through interactivity and telepresence, (3) the influence of streamers and parasocial interaction, (4) the application of technology acceptance and information system models, and (5) the role of user-generated content and influencer marketing. These clusters highlight the multidisciplinary nature of the field, combining elements of marketing, psychology, and information systems, and suggest future directions in AI integration, short-video platforms, and cross-cultural consumer dynamics.

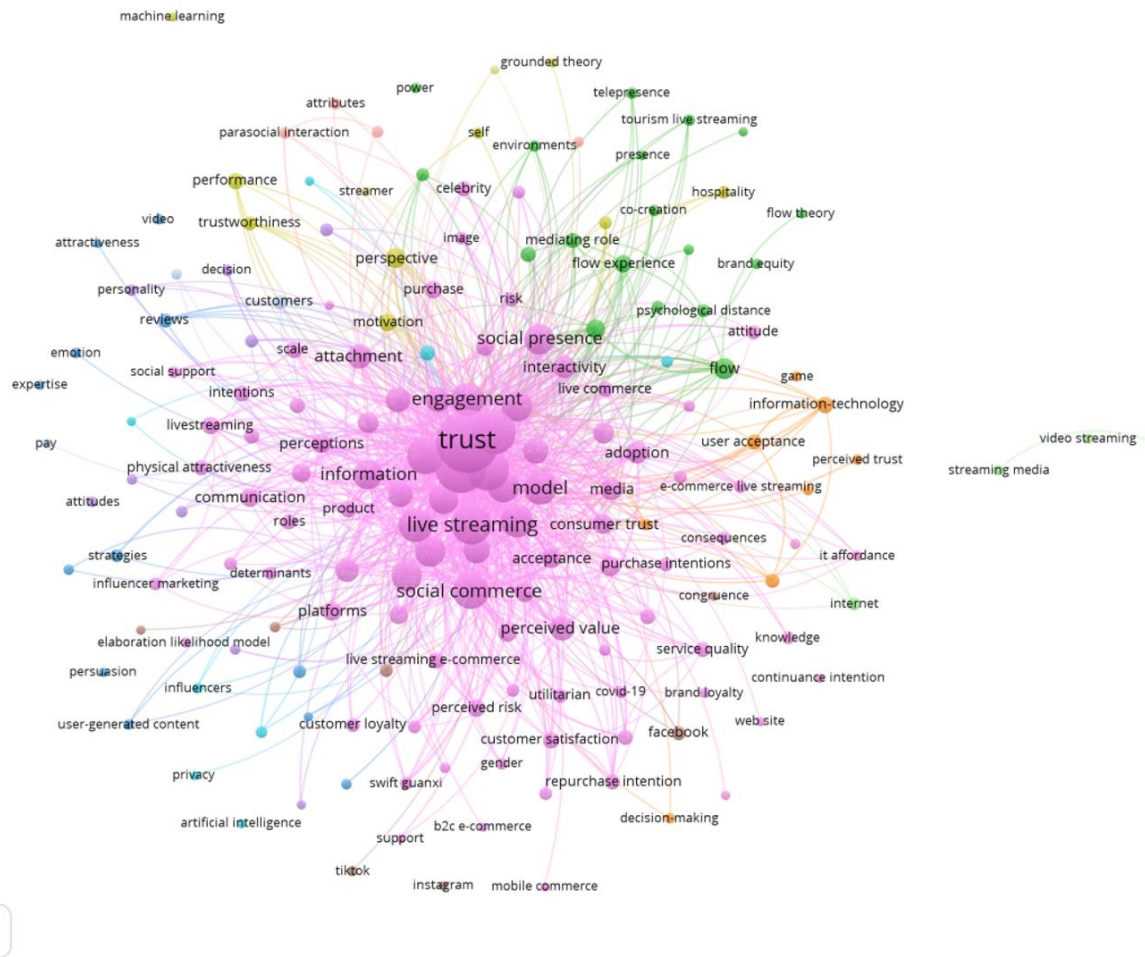


Figure 8.
Network Visualization Map.

5. Discussion and Implications for Future Research

5.1. Practical Implications

The synthesis of findings from the bibliometric analysis on streaming commerce and customer loyalty reveals several key insights. The bibliometric approach, as outlined by Mai et al. [1], captures information from the literature through data streams from a macro perspective, providing a comprehensive overview of the research landscape. This method is particularly useful for identifying trends and gaps in the field of streaming commerce.

Customer loyalty in the context of live streaming commerce is influenced by various factors, including perceived risk, purchase intention, and customer satisfaction. According to Meng and Lin [13], perceived risk has a significant impact on purchase intention, which in turn affects customer loyalty. The interaction between purchase intention and customer satisfaction further enhances customer loyalty, indicating that satisfied customers are more likely to remain loyal.

The role of streamers and their intentional behavior in hiding information about products or transactions can impact viewers' perceptions and ultimately their purchase intentions [2]. This highlights the importance of transparency and authenticity in live streaming environments to maintain customer trust and encourage repeat purchases.

Moreover, the interactive nature of live streaming platforms allows viewers to engage with streamers and other customers through commentaries and likes, which can serve as references for evaluating products [6]. This aspect of social interaction is crucial for building parasocial relationships between viewers and broadcasters, which positively affects repurchase behavior.

The bibliometric analysis also identifies significant contributions from various authors in the field of travel live streaming. Chen et al. [3] sorted citations from 930 publications to analyze research contributions, revealing that travel live streaming has been extensively studied from 2015 to 2023. The number of publications in this area includes theses, conference proceedings, online publications, summaries of meetings, and editorial materials.

Furthermore, the theoretical significance of using bibliometric methods to review travel live streaming is emphasized by Chen et al. [3] who note that this approach fills a gap in understanding the industry's dynamics. The interactivity between consumers and broadcasters, as well as users' attachment to live streaming platforms, are key areas of focus in relevant studies [11].

Satisfaction plays an intermediary role in influencing consumers' repurchase intentions within live streaming e-commerce platforms [13]. The immersive experience provided by these platforms enhances consumer satisfaction, thereby promoting repurchase intentions.

In summary, the synthesis of findings from the bibliometric analysis underscores the multifaceted nature of customer loyalty in streaming commerce. Factors such as perceived risk, trust, satisfaction, transparency, social interaction, and parasocial relationships all play vital roles in shaping consumer behavior and loyalty. Future research should continue to explore these dimensions to develop more effective strategies for enhancing customer loyalty in live streaming commerce environments.

5.2. Suggestions for Future Research

Future research in the streaming sector should consider several avenues to deepen our understanding of customer loyalty and its determinants. One promising direction is the exploration of the mediating effects of concentration and enjoyment on the relationship between social presence and consumers' purchase intentions. The indirect effects, which sum up to 0.48, suggest that these factors play a significant role in shaping consumer behavior. This finding underscores the importance of examining how different elements of user experience contribute to loyalty.

Additionally, incorporating external variables such as experience and voluntariness into models predicting the intention to use information technologies can provide valuable insights. Studies have verified the roles of these variables, particularly in contexts involving innovative technologies and commercial mobile platforms [16]. By expanding these models, researchers can better understand how various factors influence attitudes and behavioral intentions.

The impact of interruptions on concentration and subsequent consumer satisfaction is another area worth investigating. Previous studies have shown that disruptions can negatively affect online shopping experiences, thereby reducing purchase intentions. Conversely, maintaining high levels of concentration has been positively correlated with future shopping intentions both online and in retail environments [17]. Exploring strategies to minimize interruptions could enhance customer loyalty.

Moreover, examining the role of self-referencing and self-brand congruity in mediating rational and emotional appeals offers another fruitful research path. These factors have been identified as chain mediators between appeal types and purchase intentions [18]. Understanding how consumers relate personally to brands can inform more effective marketing strategies.

The use of entertainment by streaming platforms has grown significantly, influencing customer engagement through mechanisms like live-streamed sponsored product-based competitions (SPCs). These events increase product usage and spending by facilitating knowledge transfer when products are expertly demonstrated [14]. Investigating other forms of interactive content could reveal additional methods for fostering loyalty.

Live streaming commerce's high media richness, characterized by immediate feedback, multiple cues, language variety, and personalization also warrants further study. Operationalizing these dimensions can help identify how they contribute to user engagement and retention [8]. Researchers should explore how different aspects of media richness affect consumer behavior across various streaming platforms.

Finally, leveraging bibliometric tools such as VOS Viewer and RStudio for analysis can uncover trends and patterns in existing literature. This approach will help identify gaps in current research and suggest new directions for investigation. By systematically reviewing past studies, researchers can build a comprehensive understanding of the factors influencing customer loyalty in the streaming sector.

In summary, future research should focus on enhancing models with external variables, minimizing interruptions to concentration, exploring self-referencing mechanisms, utilizing interactive content effectively, examining media richness dimensions, and employing bibliometric analysis tools to guide investigations. These efforts will contribute significantly to advancing knowledge in this dynamic field [8, 14, 16, 17].

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