



LIVE STREAMING AND SALES PROMOTION IN ONLINE IMPULSIVE BUYING BEHAVIOR: A BIBLIOMETRIC NETWORK ANALYSIS

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(Submitted: March 17, 2025; Accepted: May 12, 2025)

Abstract. Online impulsive buying behavior is an area that has attracted much attention. Customers are heavily influenced by tools and promotions on online shopping platforms, especially live streaming in recent years. Due to the growth and importance of this area, our study was designed to investigate its development trends. With data including 260 articles from 2001 to 2024 collected on the SCOPUS database, we conducted bibliometric analysis and network analysis using the Biblioshiny of R Studio package and VOSviewer software to identify the research trend and emerging research themes. The trend of research is presented by descriptive analyses, including annual growth of articles, the most impactful author, distributions, and topic keywords. In addition, network analysis helps to identify prominent research clusters: (i) impulsive buying in live streaming; (ii) factors affecting online impulsive buying; (iii) hedonic values and emotional responses; (iv) social interaction, trust, and influencers; and (v) psychological drivers. Then, some of the research gaps include looking at the impact of live streaming and advertising together, the ability to diversify and combine elements/groups of elements, focusing on different customer demographics, interaction-based research, focusing on research on e-commerce platforms, and the impact of artificial intelligence, machine learning, and virtual reality on online impulse buying behavior.

Keywords: online impulsive buying behavior, e-commerce, live stream, live streaming commerce, sales promotion, bibliometric

1 Introduction

Originating from Hawkin Stern's definition in 1962, impulse buying behavior has attracted the attention of researchers and businesses [1]. Traditional retailers often take advantage of psychological, socio-demographic, and situational factors [2] to stimulate consumers' impulse buying behavior.

In recent years, the strong development of e-commerce platforms combined with the digital economy context has changed consumers' shopping experiences and behaviors. Instead of having to go to the store, choose products, and wait to pay, customers are gradually switching to online shopping. According to Statista, e-commerce retail sales accounted for 19% of global

retail sales in 2023, and in Vietnam, according to reports from Google, Temasek & Bain, more than half of the Vietnamese population shopped online in 2022 [3, 4]. The transformation and strong development of this new form of shopping has increased impulsive shopping decisions [5, 6].

Many authors have conducted bibliometric analyses to identify trends and gaps in research on online impulse buying behavior. For example, Abu Bashar and his colleagues studied 428 research articles on online impulse buying behavior published from 2000 to 2020 [7]. In addition, Abu Bashar's group narrowed the scope of the study by focusing on impulse buying behavior on social media platforms of customers [8]. However, there is currently no bibliometric analysis on the narrower topic of online impulse buying through live streaming and sales promotions. Therefore, based on previous studies and our interest in marketing and sales tools used in online sales, we will conduct a bibliometric analysis of research articles on online impulse buying under the influence of livestreaming and sales promotions.

By using Bibliometric analysis and conducting content analysis of sample research articles, this study will provide research trends and connections on topics, keywords, authors, etc. of previous studies on impulse buying behavior under the influence of live streaming or promotions. Then, the paper provides future research gaps by cluster analysis. To address the above purpose, our paper will consist of 6 main parts, including: literature review, methodology, descriptive analysis, network analysis, discussion of gaps, and conclusion.

Research on impulse buying online through e-commerce is growing rapidly, therefore we believe that to develop an understanding of this area, specific research results are needed to develop a consistent knowledge framework. Based on previous studies and current practical concerns, we set out three research questions and attempt to answer them through our research.

RQ 1: What are the trends of impulse buying online under the stimulation of sales promotion and livestream?

RQ 2: What is the most important topic in the literature on online impulse buying behavior in recent years?

RQ 3: What are the potential future research gaps?

2 Literature review

Many researchers also believe that online shopping creates a more favorable environment for impulsive buying behavior than traditional shopping [9]. In addition, due to the impact of the Covid-19 pandemic, online shopping has become the main shopping channel for many people

[2]. E-commerce exchanges or e-commerce websites operate on digital platforms, so there are many tools to reach and stimulate consumer impulses, such as promotions, short videos, targeted advertising and live sales and promotions [6, 10–12].

Regarding this research direction, there are also some typical articles. The research group of Professor Tommy K.H. Chan collected studies on online impulse buying behavior from 2002 to 2014 and used the S-O-R framework to identify three main factors: effect of online impulse-buying stimulus, interplay between cognitive and affective reactions, and interplay between cognitive and affective reactions [5]. Meanwhile, others focused on other aspects, such as culture [13] influencing impulse buying by analyzing 40 articles for the systematic analysis. The result was to understand the direct, mediating, and moderating role of culture in shaping consumer behavior, especially impulse buying behavior [13]. In addition, many studies delved into analyzing and understanding online impulse buying behavior in social commerce [14].

2.1 Online impulsive buying behavior

Consumer behavior, according to Philip Kotler and Kevin Lane Keller, is the way individuals or organizations select, purchase, use, and dispose of goods and services to satisfy their needs [15]. In the modern context, the development of information technology and supply chains has significantly changed the way consumers interact with the market through a non-traditional form of commerce – e-commerce. E-commerce is a way of operating in the market using the Internet, websites, applications, and browsers running on mobile devices to conduct business [16].

The combination of traditional consumer behavior and digital commerce space has created new types of behavior, notably impulse buying behavior - unplanned, spontaneous shopping behavior that is often stimulated by factors such as promotions, product displays, and images [1], [17, 18]. At this point, impulse buying behavior in e-commerce is called online impulse buying behavior. Online impulse buying behavior is the unplanned and sudden purchase of a product or service with immediate gratification expressed when shopping online [8, 19].

Online impulse buying behavior can be simply understood as the unplanned and inspired buying behavior of customers on online platforms. Online shopping is really bringing great, smooth, and easier experiences to consumers thanks to the features of information technology, thereby increasing the ability to buy impulsively [6]. With just simple mouse clicks, buyers can search for information, the product discovery process is easy with targeted recommendations or simple purchasing operations that increase the rate of impulsive buying. In addition to the factors that affect traditional impulsive buying behavior, impulsive buying behavior has some additional groups of factors, such as stimulation from the website, marketing stimulation, and emotional stimulation [6].

2.2 Live streaming commerce

Live streaming is essentially a combination of real-time video and text-based chat that emerged as an interactive media technology in the early 1990s [20]. Live streaming was previously known as live streaming sessions sharing music and sports, especially e-sports. The emergence and strong development of social networks made people see the potential of this form in commerce. Thanks to that, livestreaming is now an extremely effective form of sales. Studies on live streaming commerce appeared in 2018 and developed strongly in the period from 2020, partly due to the impact of COVID-19 [20]. Unlike traditional e-commerce, live streaming commerce creates an environment that allows hosts and customers to interact with each other, stimulating customers' spontaneous behavior [21]. Additionally, streamers are often famous people, so they increase customer trust [22, 23].

Research indicates that the characteristics of livestream include customer-internal characteristics, platform-related characteristics, social-related characteristics, and streamer-related characteristics. These characteristics and regulatory factors stimulate the psychology of consumers, thereby gradually stimulating their behavior [20]. These insights highlight the unique aspects of live streaming compared to traditional e-commerce. The components of a live sales show stimulate the psychology and trust of viewers and turn them into impulsive customers [23, 24].

2.3 Sales promotion

It can be said that promotion is an important marketing tool, has a long history, and is still used today. According to Paridhi Bhandari, promotion is a combination of short-term marketing activities that act as a motivation to stimulate customer buying behavior [25]. Sales promotions affect customers' pain points such as cost and price, so when they see a sales promotion, customers feel like they are getting a great deal. In addition, the short-term factor further urges buyers to make faster purchasing decisions, urging them not to think about whether they really need this item or not.

Currently, online sellers use this tool very popularly. They can display the original price and the promotional price so that customers can see the difference. Sales promotion programs often have countdown timers with urging words such as "10 minutes left" and "the program will end after one day," causing time pressure for buyers. Through the stimulation of promotional programs, buyers can easily make impulsive decisions; they can buy products they do not need just because they are cheaper [11, 26]. According to Shopify market research, e-commerce sales revenue can increase by 3% to 5% if there is a combination of two marketing methods: pricing strategy and promotion [27].

3 Methodology

We applied bibliometric analysis, including descriptive analysis and network analysis. This method helps to answer some specific research questions related to a research area, including understanding the area, providing information about emerging themes, research gaps, and suggesting possible future research directions.

3.1 Database and keywords selection

We collected articles from the Scopus database, which contains a large research base with many articles from reputable publishers.

To ensure an effective search strategy, we developed a keyword formula based on Boolean logic: “and” to connect the string and “or” to check multiple conditions occurring in parallel. First, to create the keyword string, we read recent literature review documents and combined them with documents on the issue of interest to come up with related keyword phrases. Then, in part 1, we used terms related to impulse buying behavior to limit articles related to this area. Second, we used “or” to combine searches between issues of interest such as livestream, promotion, and e-commerce. The two main parts are connected by “and.” Finally, create a search query phrase: “impulse buying” OR “impulse purchasing” OR “impulse shopping” OR “impulsive buying” OR “impulse*” OR “impulse purchase” OR “urge to buy impulsively” AND “livestream*” OR “live-stream” OR “live stream*” OR “social commerce” OR “e-commerce” OR “social media” OR “e-commerce exchange*” OR “sales promotion.”

3.2 Initial characteristics of the data

When searching with the above keywords, we obtained 1,084 documents. To be able to search for documents in the most effective and accurate way, we applied some conditions: 1. language: English; 2. selections of articles. After that, we used two filters to choose the most relevant articles. First, my research team read the title, abstract, and keywords of the study to eliminate studies that were outside the scope of our research. In the second filter, we carefully read the full text of the article to ensure that it was truly relevant to our research objectives and topic. Finally, the research team collected 260 articles on the topic.

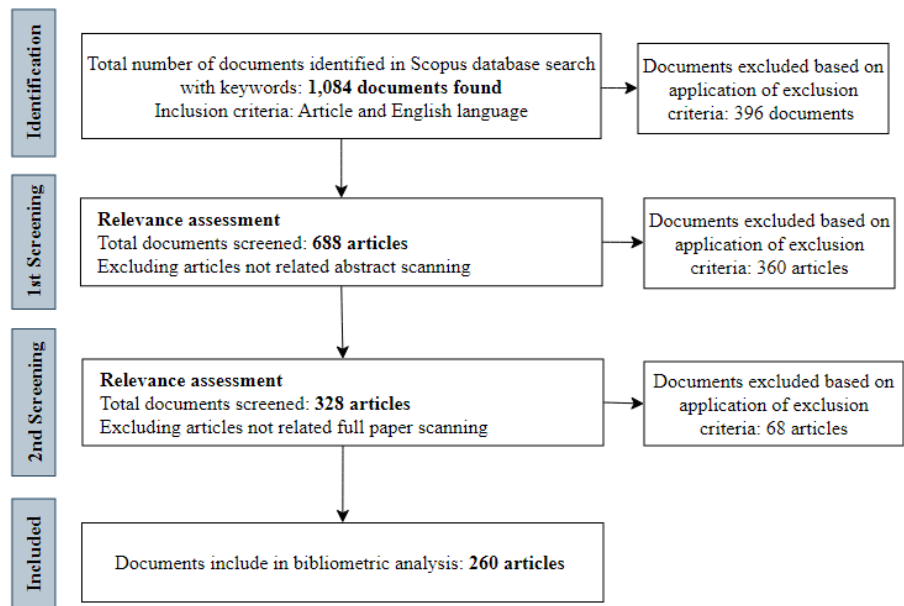


Figure. 1. Methodological Approach

3.3 Analysis software

Biblioshiny is a web-based graphical interface of the R Studio package, a package in R used to perform bibliometric analysis. Biblioshiny allows users without programming knowledge to easily interact with the functions of the R Studio package through an intuitive user interface. In this study, we leverage the core functions of Biblioshiny to obtain sample data. Then, bibliographic analysis includes keyword analysis, citation analysis, author collaboration networks, and other analyses related to scientific research. After that, we created a visual map to illustrate citation and co-citation analysis using VOSviewer software.

4 Descriptive analysis

4.1 Yearly distribution of reviewed papers

According to Figure 2, the dataset includes 260 journal articles published from 2001 to July 2024. From the first article in 2001, the increasing trend shows that the housing sector is in a developing stage and is receiving more and more attention from researchers. In particular, the number of published research articles has grown strongly since 2018. Since 2018, the number of research articles is 228, reaching nearly 86%. The slope of the graph shows the interest and outstanding development potential of this research area in the future. This study collected research up to July 3, 2024, so this trend is expected to continue to increase.

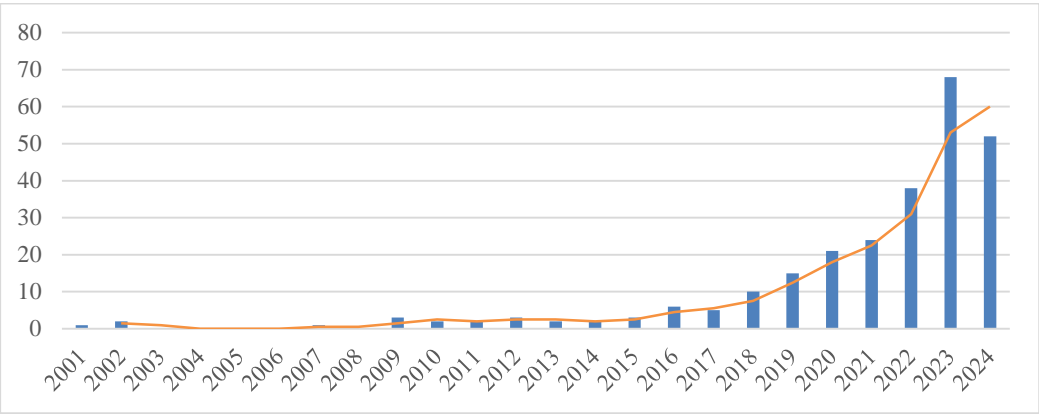


Figure. 2. Distribution of reviewed papers by year 2001–2024

4.2 Distribution of reviewed papers by the journal

According to statistics, there are 143 journals that publish research articles related to the topics of interest shown in Figure 3. Among them, Frontiers in Psychology journal leads with 17 research articles. Next is the Journal of Retailing and Consumer Services with 15 articles. Sustainability journal Switzerland is third with 7 articles.

4.3 Distribution of country and author

Excluding the 46 articles whose authors did not specify their country, Figure 4 shows the 10 countries with the most authors on this topic. In general, Asian countries have a greater interest than other regions. From Figure 4, we can see that China is the largest contributor, with 87 articles.

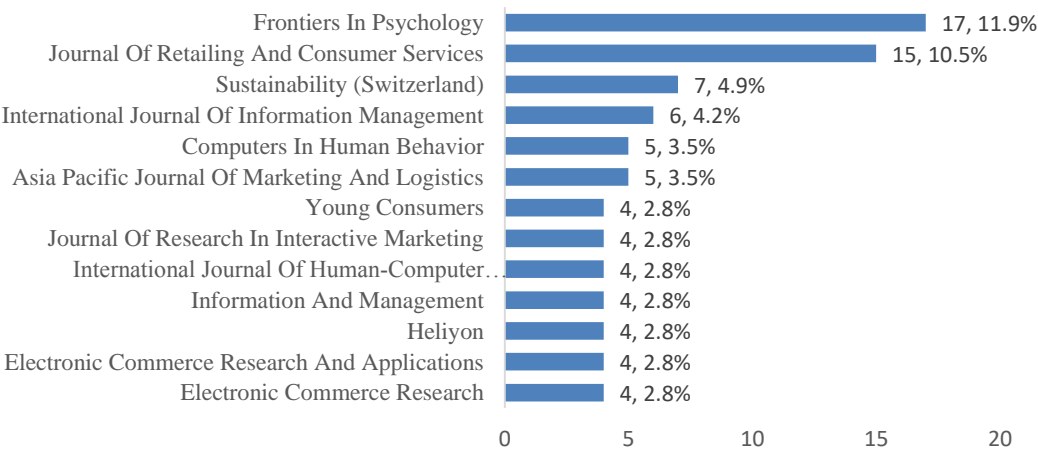


Figure. 3. Distribution of reviewed papers by journal

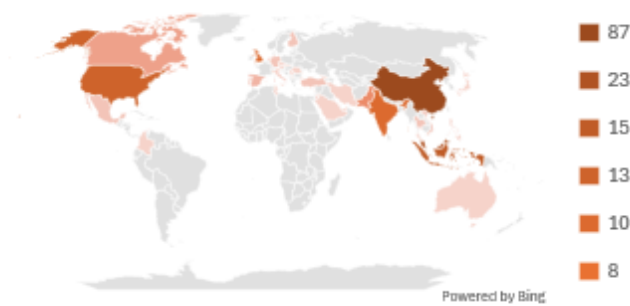


Figure. 4. Distribution of most relevant countries by corresponding author

In addition, two Southeast Asian countries, Malaysia and Indonesia, also contributed 23 and 15 articles, respectively.

With the data collected, the top corresponding authors are extracted as shown in Table 1. Beijing University of Posts and Telecommunications China contributed 18 articles and topped the list, while Shenzhen University China ranked second with 17 publications, and Ucsi University Malaysia ranked third with 15 articles. Asian universities were the top contributors, and all three top-ranked universities were from Asia. This is also true for the author’s country conclusions. The geographical points show that research on impulse buying behavior on online platforms, influenced by sales promotions or through live streaming, is of great interest in Asian countries, especially China or the Philippines [28]. This is also easy to understand when looking at the development of online shopping that is popular in this area.

Table 2 shows the most local cited references; local cited references can be understood as the number of articles in the current data sample that have cited each other. On closer inspection, it can be found that most of the references are devoted to impulse buying behavior, online impulse buying behavior, and its various aspects. The references related to e-commerce platforms, sales promotion, and livestream are limited, and this shows that there is not much work available to examine and understand impulse buying through e-commerce platforms, sales

Table 1. List of contributing university/affiliations

Affiliation	Articles
Beijing University of Posts and Telecommunications	18
Shenzhen University	17
Ucsi University	15
Dalian University of Technology	14
Universiti Putra Malaysia	12

Table 2. List of top 5 local cited reference

Author	Title	Year	Source	Citations
Beatty & Ferrell, 1998	Impulse buying: modeling its precursors	1998	Journal of Retailing	48
Dennis W. Rock, 1987	The buying impulse	1987	Journal of Consumer Research	46
Mehrabian & Russell, 1974	An approach to environmental psychology	1974		45
Verhagen & Van Dolen, 2011	The influence of online store beliefs on consumer online impulse buying: a model and empirical application	2011	Information & Management	39
Liu et al., 2013	Website attributes in urging online impulse purchase: an empirical investigation on consumer perceptions	2013	Decision Support Systems	37

promotion and livestream.

Looking at Figure 5 and the results of bibliometric analysis, Umair Akram has made significant contributions with highly cited papers, especially in 2018 (247 citations) and 2021 (130 citations), but no new papers since 2022. Abaid Ullah Zafar and Mohsin Shahzad published five high-quality papers between 2020 and 2023. Other authors, such as Zubair Akram (3 papers, 150 citations), Peng Hui (4 papers, 287 citations), and Xiayu Chen (4 papers, 212 citations), of which the 2019 paper has 187 citations, continued their research in the period 2019-2024.

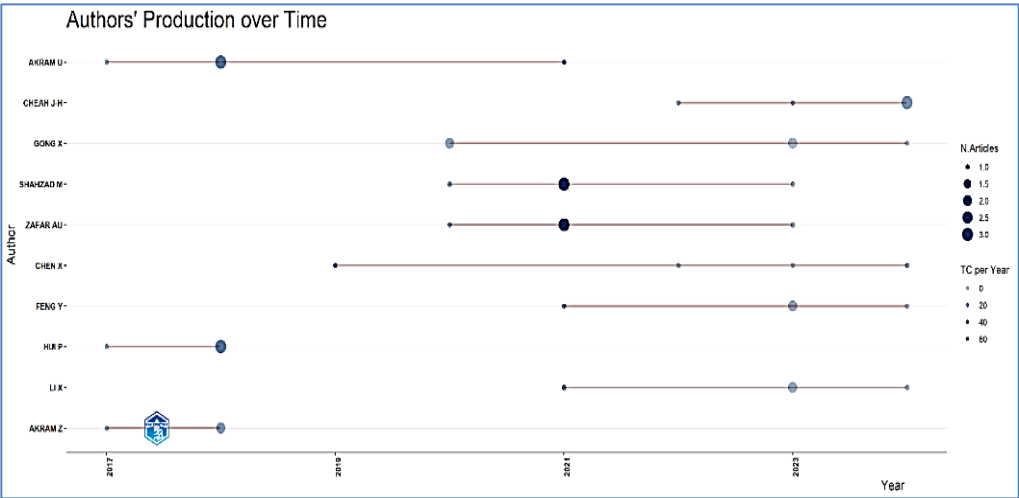


Figure 5. Authors' production over time

4.4 Keyword analyses

Biblioshiny analysis is used to extract the most frequently used keywords and phrases from the title and author's keywords. Figure 6 compiles and lists the list of frequently used keywords by the authors as well as in the title. The keyword cloud in Figure 6 is displayed with the size of each term denoting how frequently it is used—large size indicates most commonly used; tiny size indicates extremely seldom used. Due to its vast word cloud, impulse buying has been utilized the most. Other words that have dominated the cloud include impulsive buying behavior, electronic commerce, and live streaming. A total of 634 keywords were produced from our consideration set of 260 articles. To clean up the keywords, we filter and group the keywords/phrases that have the same meaning and use the most common words. The reason is because the authors use many synonyms or different expressions. Additionally, the highest degree of similarity between the two keywords can be observed.

In the 260 research papers collected, the terms of electronic commerce, social media, and impulse buying are much used. This study highlights the significance of the change in consumer buying behavior from traditional commerce to e-commerce.

Figure 7 illustrates the trending topics updated from 2012 to 2024. We can easily see that retail, online shopping, marketing, and the internet are trending topics starting from 2012, 2013, and 2014; this conclusion is quite reasonable because during this period, thanks to the development of the internet and information technology, people became more aware and shopped online. From the size of the dot represents the term frequency, topics such as impulse shopping or consumer behavior have been re-studied since 2018. This can be explained because when there is a new form of goods exchange, namely online shopping, consumer behavior or impulse shopping behavior will also change accordingly. The subjects of electronic commerce, sales, and social media have received much attention in the past two years, which further demonstrates the authors' interest in these topics and highlights the importance of the change in consumer shopping behavior from traditional commerce to e-commerce.



Figure. 6. Word cloud

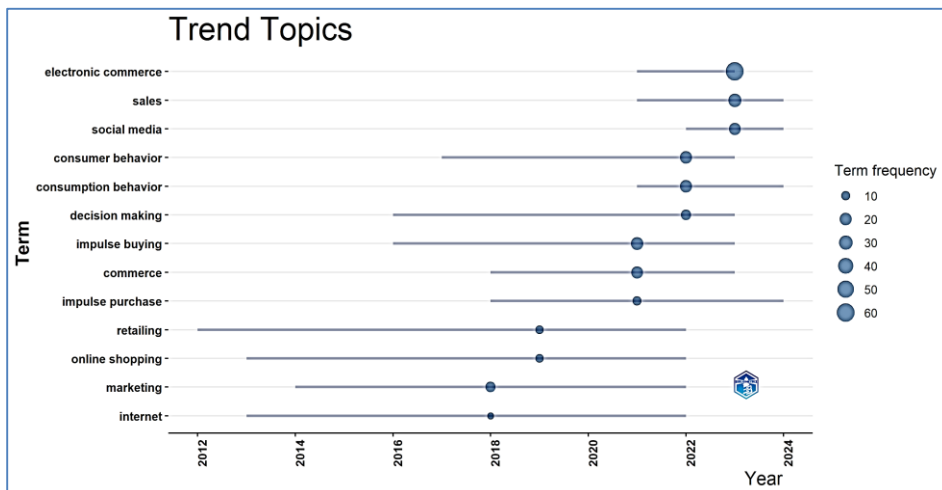


Figure. 7. Trend topics

4.5 Methodological Approaches

Thematic evolution is often used to represent the changes and developments of topics over time in a specific context within an academic body of work, demonstrating how some ideas become more or less important over time. After analyzing the ideas and research topics highlighted by the keyword system, we proceed to build and analyze thematic evolution from the collected sample. Figure 8 depicts the topic of development over time periods from 2001 to 2024. The topic of urge-to-buy impulsively was very popular in the period from 2001 to 2022 but lost popularity

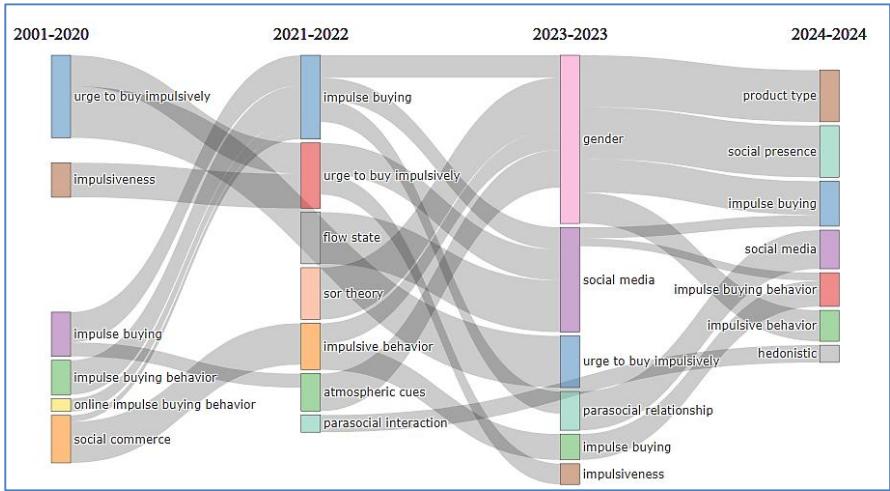


Figure. 8. Thematic evolution

in the later period. In contrast, topics such as impulse buying, impulse buying behavior, or online impulse buying behavior did not receive much attention in the period from 2001 to 2020 but became popular topics in the later periods. In the period from 2021 to 2022, there are some new topics that are being researched a lot, such as SOR theory, flow state, and these topics are also combined for research in 2023. In 2023, in addition to the old topics, impulse buying behavior or impulse buying impulse is being researched a lot under the influence of gender and social media, which proves that research is developing both horizontally and vertically. Old topics continue to be researched. In 2024, researchers are paying more attention to aspects such as product type, social presence, impulse buying, and social media. In general, research topics develop closely following the development of the world and adapting to that change. More extensive research on non-traditional commerce and aspects affecting customer behavior, such as flow experience, atmospheric cues, gender, etc.

4.6 Theoretical perspective

As can be seen from Table 3, many researchers adopt theoretical perspectives such as Impulse Buying theory, Stimulus–Organism–Response theory, and Impulsive purchase behavior theory. These are theories closely related to the issue of interest. In addition, each research article has an interest in a different aspect affecting impulse buying behavior/online impulse buying, so there are other theories used, such as trust theory, sales promotion, and livestream. Not all of the sample articles adopted theoretical lenses that directly stem from the research results achieved.

Table 3. List of top 10 theoretical perspective

Theoretical perspective	No. of papers
Impulse Buying theory/ impulse purchases theory/ Impulsive buying theory	57
Stimulus–Organism–Response/ S-O-R theory	51
Impulse buying behavior theory/ Impulsive purchase behavior theory	15
Flow theory/ Flow experience theory	11
Social commerce theory	11
Online impulse buying theory	10
Live streaming theory/ livestream theory	9
Social presence theory	9
Online Impulse Buying Behavior theory/ Online impulse buying behavior theory	8
Urge for impulse buying theory/ Urge to Buy Impulsively theory/ Parasocial relationship theory	7

5 The relationship between online impulse-buying factors

We reviewed 260 identified studies and extracted all relevant variables. During the literature review, we found that most studies on the factors of the tool affecting online impulse buying behavior used the model of independent variables→ intermediate variables→ dependent variables. The mediating variables helped to clarify the process of linking independent variables and dependent variables. However, the number of variables was quite large, so we grouped the relevant variables and named them. Figure 9 describes the relationship of variables commonly used in sample studies.

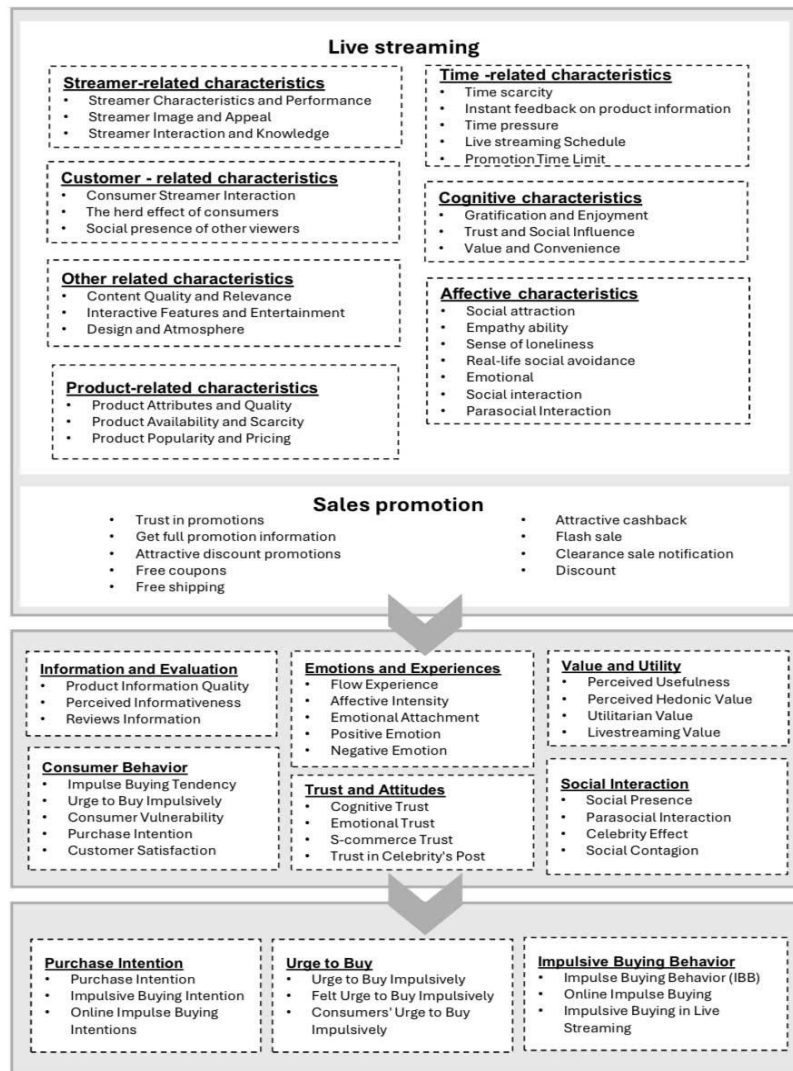


Figure. 9. The relationship between online impulse-buying factors

5.1 Independent variable

The independent variables in this topic are often consumer stimuli. Since we focus on two tools, livestream and sales promotion, the stimuli also come mainly from these two tools.

First, we have synthesized and classified the stimuli from live streaming into groups of stimuli including (1) the group originating from the streamer, such as their appearance, popularity, professionalism, expertise, credibility, and interactivity [21, 30]; (2) the group of stimuli from the product itself, such as the quality, price, design, and usefulness of the product [31, 32]; (3) the group of stimuli from viewers and other buyers, such as questions, comments, or

reviews from previous buyers or the interaction of buyers with the seller or with the product [33, 34]; (4) time factors such as whether the broadcast schedule is suitable for the right audience, the scarcity of time also stimulates consumers [35, 36]; (5) Cognitive stimuli such as satisfaction, trust, satisfaction or pleasure also affect and lead to behavior trust [37]; (6) Emotional stimuli, sometimes loneliness or social avoidance, are also strong factors [22, 38]; (7) Many other factors such as sales promotion, content, concept, or atmosphere of the live broadcast can also become independent variables [39, 40].

Second, many studies use small tools in sales promotion to see their impact on customers' spontaneous behavior, such as free shipping, gifts with conditions, direct discounts on products, or limited-time discounts. In addition, the development of non-cash payment methods helps sellers take advantage of tools such as refunds, giving money when paying in advance. In addition, information about promotional programs is highlighted and can be automatically applied to avoid consumers having to ask for advice from employees [41, 42].

Nowadays, people often watch live streams not only because of direct interaction and seeing the products more vividly but also because of the way platforms and companies offer promotions to attract consumers, so it can be seen that sales promotion can also be a stimulus from livestreams. Besides, these two big tools can be independent, such as in addition to purchasing via live streaming, customers can still enjoy free shipping or discounts when purchasing on e-commerce platforms.

5.2 Intermediate variables

In the research papers we used as research samples, the mediating variables can include information and evaluation, emotion and experience, value and utility, trust and attitude, consumer behavior, and social interaction.

Information and evaluation can be the quality of product information, evaluation information, cognitive information influenced by independent variables related to the product, the streamer, etc. [43]. Similarly, emotion and experience are the reactions of consumers participating in online impulse buying reactions when they experience positive emotional reactions, such as joy and excitement, or negative emotions when seeing negative feedback on the product [22, 39]. Trust and attitude are expressed mainly from customers' cognitive trust and emotional trust in the promotion or live stream [24, 30]. Value and utility are the cognitive values and utilities that customers feel [44]. Social presence, social interaction, or social contagion is also stimulated by elements of live streaming and promotions [45]. In addition, stimuli also promote purchase intention, emotional consumption, or customer loyalty [46].

5.3 Dependent variables

The dependent variables are divided into three main groups: impulse buying intention, impulse buying urge, and impulsive buying behavior.

Impulse buying intention can be simply understood as the consumer's immediate desire to buy a product without prior planning, spontaneously, and without deliberation. This intention is often related to unexpected stimulation and temptation from the product or shopping environment [18]. Emotional factors, attractive shopping environment, and external motivation play an important role in forming impulse buying intention [17].

An impulse buying urge is a strong and immediate feeling that arises when a consumer wants to buy a product without prior planning. Consumers may be triggered by environmental stimuli such as promotions or advertising campaigns [47].

Impulsive buying behavior is the act of buying by customers, so it is different from the two groups above, which are only intention and urge to buy. In many cases, customers have the intention to buy but do not have the purchase behavior, so sometimes intention and urge can be the intermediary variables to clarify the connection of the stimulus factors to impulsive buying behavior [48].

6 Network analysis

After the descriptive statistics of the characteristics of the research sample, we conducted network analysis. Network analysis provides knowledge about the relationship between authors, keywords, and articles based on their connections and link strengths. From the keyword-based data sample from the SCOPUS database and through the filtering and network analysis processes using VOSviewer. In the network analysis, a minimum threshold of 5 keyword occurrences was applied. Only keywords appearing in at least 5 articles were included in the co-occurrence network. In this section, we will analyze the articles that are paired using the bibliometric method.

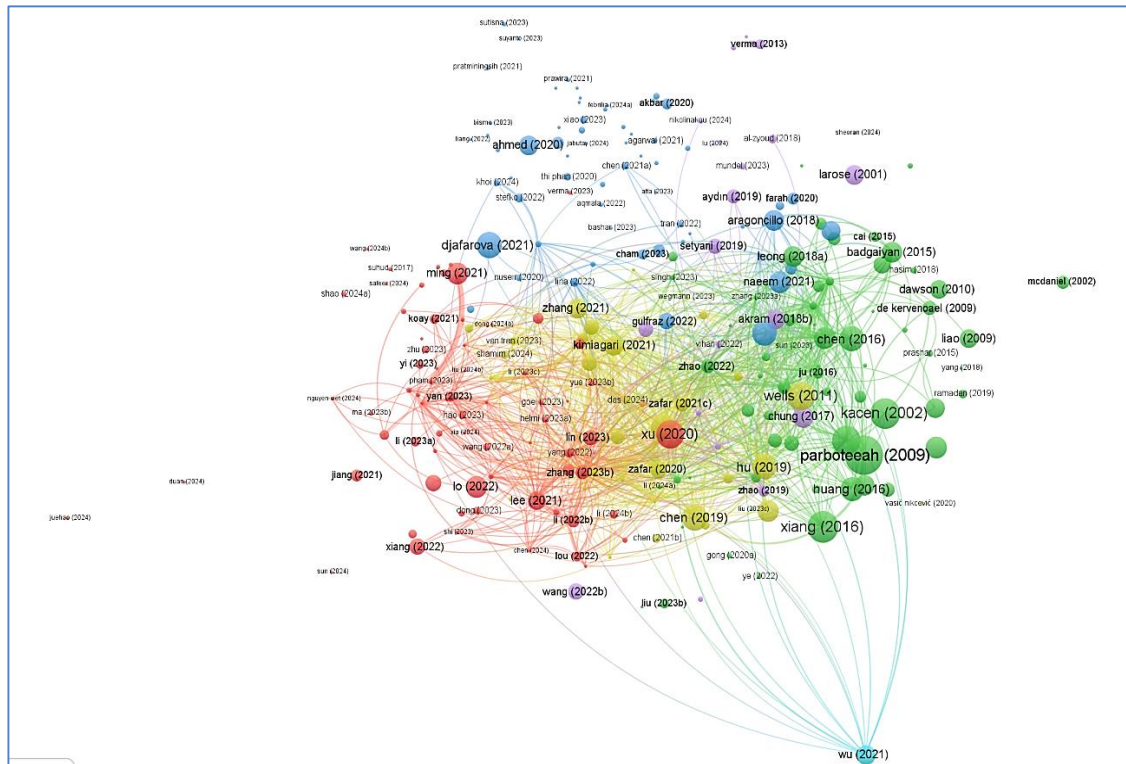


Figure. 10. Emerging knowledge themes

Figure 10 shows the network of 260 papers in the sample. After plotting, we obtained 7 clusters and 17 papers without links with each other. The 7 clusters obtained include cluster 1 red with 67 papers, cluster 2 green with 57 papers, cluster 3 blue with 62 papers, cluster 4 yellow with 31 papers, cluster 5 purple with 21 papers, cluster 6 turquoise with 2 papers, and finally cluster 7 orange with 1 paper. Five major knowledge clusters along with their leading articles based on the number of links are presented in Table 4. Discussion on these clusters and related knowledge themes is presented in the following section.

Table 4. Lead articles from the major knowledge themes

Authors	Title	Year	Journal
Cluster 1 red: Impulsive Buying in Live Streaming			
Luo et al., 2024	Inducing shoppers’ impulsive buying tendency in live streaming: integrating signaling theory with social exchange theory	2024	Internet Research
Lee & Chen, 2021	Impulse buying behaviors in live streaming commerce based on the stimulus-organism-response framework	2021	Information Switzerland
Lo et al., 2022	Why do consumers buy impulsively during live streaming? A deep learning based dual stage SEM-ANN analysis	2022	Journal of Business Research
S. C. Lin et al., 2023	Exploring factors influencing impulse buying in live streaming shopping: a stimulus-organism-response SOR perspective	2023	Asia Pacific Journal of Marketing and Logistics
X. Zhang & Zhang, 2024	Investigating impulse purchases in live streaming e-commerce: A perspective of matchups	2024	Technological Forecasting and Social Change
Cluster 2 green: Factors Influencing Online Impulse Buying			
Kacen et al., 2012	Spontaneous selection: The influence of product and retailing factors on consumer impulse purchases	2012	Journal of Retailing and Consumer Services
Huang, 2016	Flow and social capital theory in online impulse buying	2016	Journal of Business Research
Miao et al., 2020	The effects of personality, culture and store stimuli on impulsive buying behavior: Evidence from emerging market of Pakistan	2020	Asia Pacific Journal of Marketing and Logistics
Akram et al., 2018	How website quality affects online impulse buying: Moderating effects of sales promotion and credit card use	2018	Asia Pacific Journal of Marketing and Logistics
Ju & Ahn, 2016	The effect of social and ambient factors on impulse purchasing behavior in social commerce	2016	Journal of Organizational

			Computing and Electronic Commerce
Cluster 3 blue: Hedonic Values and Emotional Responses			
Jabutay & Limpachote, 2024	Young adults' perceived social isolation and e-impulse buying on social commerce platforms: linking roles of perceived stress and hedonic browsing	2024	Young Consumers
Chauhan et al., 2023	Analysis of Impulse Buying Behavior of Consumer During COVID-19: An Empirical Study	2023	Millennial Asia
Tran, 2022	Consumer impulse buying behavior: the role of confidence as moderating effect	2022	Heliyon
Farah & Ramadan, 2020	Viability of Amazon's driven innovations targeting shoppers' impulsiveness	2020	Journal of Retailing and Consumer Services
Nguyen et al., 2024	The Role of Product Visual Appeal and Sale Promotion Program on Consumer Impulsive Buying Behavior	2024	Emerging Science Journal
Cluster 4 yellow: Social Interaction, Trust, and Influencers			
Shamim et al., 2024	How do social media influencers induce the urge to buy impulsively? Social commerce context	2024	Journal of Retailing and Consumer Services
Han, 2023	Checkout button and online consumer impulse-buying behavior in social commerce: A trust transfer perspective	2023	Journal of Retailing and Consumer Services
Shamim & Islam, 2022	Digital influencer marketing: How message credibility and media credibility affect trust and impulsive buying	2022	Journal of Global Scholars of Marketing Science: Bridging Asia and the World
Zafar et al., 2023	Forecasting impulsive consumers driven by macro-influencers posts: Intervention of followers' flow state and perceived informative-ness	2023	Technological Forecasting and Social Change

Cluster 5 violet: Psychological Drivers			
Mundel et al., 2023	Processes underlying social comparison with influencers and subsequent impulsive buying: The roles of social anxiety and social media addiction	2023	Journal of Marketing Communications
Setyani et al., 2019	Exploring the psychological mechanisms from personalized advertisements to urge to buy impulsively on social media	2019	International Journal of Information Management
Nikolinakou et al., 2024	What drives addiction on social media sites? The relationships between psychological well-being states, social media addiction, brand addiction and impulse buying on social media	2024	Computers in Human Behavior
Lim & Kim, 2022	The effect of unmindfulness on impulse purchasing behaviors in the context of online shopping from a classical attitude theory perspective	2022	Behavior and Information Technology

6.1 Impulsive buying in live streaming commerce

Live streaming commerce is growing very strongly and opening up a race for sellers, e-commerce exchanges, and online platforms. This form of sales creates a connection and interaction between sellers and buyers on a real-time basis [20]. Livestreams create a lot of stimulation for viewers and urge them to buy even though they had no intention of buying before. Currently, customers can buy online through live broadcasts on social networks such as Facebook and e-commerce exchanges such as Shopee, Lazada, and TikTok Shop. There are 4 main groups of factors of e-commerce livestreams synthesized by [20] that affect consumer behavior, which are factors related to customers themselves, factors related to the platform, factors related to society, and factors related to streamers. The host of the live broadcasts is also a factor that affects customers' impulse buying behavior [46], so sellers often use three main types of hosts. Method 1 is to hire a famous person with influence and prestige on social networks in many areas to lead the promotion of the product; customers will feel more trust and be more easily convinced [12, 43], [67]. Method 2 is that businesses will recruit an employee and train them on the product to demonstrate understanding of the product, professionalism, and suitability and provide full information to customers [32, 43, 46]. Method 3 is that they can combine both to ensure prestige and suitability for the product [12]. The anchor interacts with the audience by introducing products and answering questions from the audience [68], while the audience interacts with each other through comments and questions [49, 68, 69]. This shows the flow, the parasocial interaction, and sometimes the anchor also creates a time effect that stimulates spontaneous

purchases [22, 49, 70]. In addition, factors such as content, space, sound quality, and broadcast quality affect the viewer's audiovisual quality and also stimulate buying behavior [49, 70].

6.2 Factors Influencing Online Impulse Buying

Different shopping formats have different factors that influence impulse buying behavior. When customers move from traditional in-store shopping to online shopping, they are exposed to website stimuli (images, videos, payment features, website features, etc.), marketing stimuli (promotions, gifts, prices, products, gifts, scarcity), and shopping situation stimuli (product variety in the online store) [5]. Website stimuli such as quality, interface, visual appeal, or ease of use also stimulate consumers' purchase intentions [6, 53, 54]. A website with a reasonable layout, fonts, and colors and that is easy to use helps retain customers [50]. For example, Shopee uses a simple, clean layout with payment/add-to-cart buttons in easy-to-see locations and a very easy-to-use interface, while Lazada tends to focus more on text information, which can sometimes be confusing for users. The explosion of online shopping is not only convenient for buyers but also for sellers. Small businesses or small traders do not need to spend money on expensive rental costs; instead, they can sell their products directly on e-commerce exchanges and websites, so they save money, can optimize selling prices, and become more attractive [6]. In addition, we often see e-commerce exchanges having big promotions and setting customers a limited time to create urgency. These promotions make customers feel like they are getting a lot of benefits and do not give them time to hesitate, leading to unplanned purchasing behavior [2, 71]. In addition, shipping and payment issues also stimulate customers [36, 72]. When ordering and paying by online methods, it can reduce the feeling of "loss" compared to paying in cash [73], so customers can easily buy when they do not really need it.

6.3 Hedonic Values and Emotional Responses

According to a report by Vietnam Television VTV about online impulse buying behavior, almost all customers feel satisfied and happy immediately after purchasing a product that was not in their plan [74]. There are many studies in the areas of psychology and behavioral economics that have shown that shopping can bring positive emotions such as excitement, joy, or a sense of control to consumers [30]. This phenomenon is often called "retail therapy." In the 260 research articles that our group has compiled, many articles use the Stimulus–Organism–Response model to study factors of hedonic values or emotions as a main factor or mediator affecting impulse buying behavior [41]. Hedonism helps create impulse buying intentions by encouraging the search for immediate pleasure, which online shopping provides, reducing perceived behavioral control or self-control [41]. In addition, marketing strategies often exploit hedonism by emphasizing the instant gratification that a product provides. Messages such as "Buy now so you

don't miss out" or "Reward yourself" encourage consumers to act on hedonic emotions [41, 42]. Hedonism promotes this behavior because it creates positive emotions, even in the short term, and flash sales programs greatly influence customers' emotions [10]. In addition, cluster 3 is also the cluster with many studies focusing on young people showing that social isolation, low self-control, and stress from life to work, along with hedonistic stimulation, have an impact on their online impulse buying behavior [56, 75].

6.4 Social Interaction, Trust, and Influencers

In cluster 1, we analyzed the aspect of the host in livestream affecting consumer purchasing behavior; in cluster 4, we want to talk about influencers in general, and trust and social interaction factors. Customers tend to trust and be influenced by celebrities, especially in the context of marketing and advertising [76, 77]. This is the reason why businesses often invite celebrities to represent them. In recent years, influencers are not only actors, models, or singers, but these subjects have been expanded thanks to the emergence of entertainment forms; they can be content creators on social networking platforms, bloggers... In particular, influencers do not necessarily have to participate in a TVC advertisement or appear on the packaging to promote the product; they can post articles, and images of them using the product on social networking sites to attract viewers and followers. Customers are more likely to trust what influencers share because they think they are experts, attractive, and entertaining, and all of these factors motivate customers to buy that product [59, 62, 78]. In addition, online shopping also helps customers interact with each other through tools such as "like," "comment," and "share" their real experiences with the product, thereby stimulating other customers to make impulse purchases [79, 80, 81]. However, to do the above, building trust from customers is essential. Customers trust the posts of celebrities, then the impact can be converted into buying behavior [61], or in other words, trust in branded posts is influenced by the reputation of the influencer, the reputation of the message, and the reputation of the media [59]. In addition, trust may mediate the relationship between celebrity and brand credibility and impulse buying [59].

6.5 Psychological Drivers

Unlike cluster 3, which focuses on the hedonic and emotional values of customers, cluster 5 will focus on the psychological motivations that drive customers to make impulsive online purchasing decisions. First, people often compare themselves with others or celebrities, often making negative social comparisons. This creates an inferiority complex and the desire to buy unnecessary things to close that gap [63]. Second, unmindfulness is considered an important factor contributing to impulsive purchasing behavior because it makes consumers easily get caught up in purchasing decisions without careful analysis [66]. In addition, factors such as price,

promotions, or scarcity that sellers intentionally show increase consumers' fear of missing out and stimulate them to make immediate purchasing decisions instead of thinking about whether they really need the product or not [33, 65, 82].

7 Discussion of the gaps

After dividing the articles into prominent topic clusters, we will summarize the potential research gaps based on the content of the collected papers. This content will be presented in Table 5.

Table 5. Identified research gaps and potential future research directions

Topic cluster	Research topic	Research gap
Cluster 1	Anchor characteristics	The study only focuses on the stimulus from the host, limiting the focus on other stimuli in live streaming commerce [43]
Cluster 1, 2	AI Technology	The factors are quite traditional so it is possible to apply the development of technology, it will be valuable to explore how the model can be transferred to different platforms or apply AI to improve the user experience, virtual streamer [40]
Cluster 1, 2	Combining factors	Research is often only about stimuli from live streaming or from other factors. In the future, it is possible to combine livestreams with promotions or livestreams with Time Pressure [71]
Cluster 1, 3	Demographics	Most studies do not differentiate between customer groups by age, or the division is unclear. It is possible to combine specific target groups such as studies on Generation Z and Generation [21, 67]
Cluster 1, 4	Product conformity	Need to investigate the relationship and mutual fit between different types of streamers or influencers and products [12]
Cluster 1, 2, 3, 4	Urge to buy impulsively	Many studies only stop at urge to buy impulsively. Continue to study the destination of impulse buying behavior [62]
Cluster 2	Time pressure	The study is limited because it is limited to time pressure. Future research can study more about the product itself, the experience of flow, and the joy of feeling [35]

Topic cluster	Research topic	Research gap
Cluster 2, 3	Factor diversity	Research focuses on personal factors or situational factors or placing personal factors as intermediaries. Research combining two factors that affect online impulsive shopping behavior [42]
Cluster 2, 4, 5	Shopping location	Research is often about online shopping via s-commerce, f-commerce, and websites, but there are not many studies focusing on e-commerce exchanges [48]

First, we focused on collecting research articles with the context of online broadcasting and found that researchers often focus on the human factor, specifically the streamers. They have exploited it from many different angles, such as the ability to interact, prestige, and expertise of the streamer [21, 83]. However, they have not yet clearly distinguished whether this host is a celebrity, an influencer, or simply an employee of the business. In my opinion, the difference in the host himself makes consumers' evaluations of these groups of subjects different, so the ability to influence and urge customers to buy is also different. In addition, viewers receive stimulation from many different sources in addition to receiving stimulation from streamers, but studies on other sources of stimulation are few and scattered [39, 84]. Future researchers can add factors such as product, streaming quality, and content to enrich their studies.

Second, there are some studies focusing on a specific target group, such as young people, young adults, young customers, or adults. However, this has many limitations because they do not apply a specific time frame to clearly divide each target group [55]. Besides, there are studies focusing on Gen Z or Gen X [21, 85], which can make it easier for future studies to inherit and expand. We have not found any studies that have studied the two age groups, Gen X and Gen Z, with the aim of highlighting the differences between their behaviors and thereby providing solutions for businesses with diverse customers. Therefore, this may be a research gap in the future.

Third, as mentioned in the previous section, studies often focus on factors of the personal factor group, such as emotions, personality, or the situational factor group such as promotions, discounts, or only include a few factors of this group as mediators or moderators for the factors of the remaining group. The gap here is the need for studies that combine both of these factors and put them in parallel to better understand how they interact and jointly affect online impulse buying behavior.

Fourth, online shopping is a part of e-commerce but there are many different e-commerce platforms. After studying the research articles in the sample collected, we found that most of the

studies are studying a broad definition of e-commerce. Others focus on social commerce [45], websites [86], or f-commerce [87]. It seems that they are ignoring an online shopping platform that attracts a lot of users, especially where each seller on the same platform uses very different methods to stimulate and make their customers order unconsciously. That is e-commerce platforms. What is special about e-commerce exchanges is the diversity of products on a platform, customer navigation, and stimulation for customers to shop. For example, e-commerce platform Shopee does not only sell via descriptions and images, but it also sells goods with the support of short videos and livestreams. In these tools, Shopee cleverly integrates promotions, time pressure, and easy return policies with the aim of making customers feel regretful when missing out.

Fifth, many researchers have only stopped at the research step of urge to buy impulsively [37, 38] or impulse buying intention [50, 88] without going directly into behavior. Therefore, future studies can use the urge to buy impulsively to continue studying customer behavior or directly go from stimulating factors, through other intermediate and regulatory factors, to impulse buying behavior.

Finally, information technology is fast growing today. Instead of having employees work overtime to reply to customer messages, many businesses have used automatic message-reply software during off-hours, and these messages are so suitable that many respondents think they are interacting with an employee. In recent years, artificial intelligence has developed and is widely used to sell on online platforms. Many e-commerce exchanges have optimized customer search and combined it with machine learning to learn consumers' internet usage habits to navigate and suggest products that best suit their needs. Many businesses have used AI technology to livestream instead of hiring celebrities as hosts. This opens new research directions on impulse buying behavior in the future.

8 Conclusion

This study contributes to the growing body of literature on online impulse buying behavior, particularly under the influence of live streaming and sales promotion. By analyzing 260 articles published between 2001 and 2024, we identified five major thematic clusters: impulsive buying in live streaming, influencing factors, hedonic and emotional responses, social interaction and trust, and psychological drivers. These clusters provide a structured overview of current research directions, with increasing attention observed in Asian countries.

Using bibliometric and network analysis tools such as Biblioshiny and VOSviewer, the study visualizes research trends, highlights the most influential works, and maps knowledge networks. In addition to identifying key topics, our findings reveal notable research gaps,

including limited studies on AI-driven interactions, demographic differences (e.g., Gen Z vs. Gen X), and the interplay between multiple stimuli such as live streaming and time pressure.

Practically, the insights offer implications for marketers and e-commerce platforms to better design customer engagement strategies and enhance impulse purchasing mechanisms. The application of the S-O-R model remains prominent in explaining how external stimuli—such as influencers, promotions, and platform features—trigger internal responses that drive consumer behavior.

Nonetheless, the study has limitations. It is restricted to English-language articles from the SCOPUS database, and keyword co-occurrence analysis may not fully capture the conceptual richness of individual studies. Future research may address these limitations by expanding the dataset, exploring multilingual sources, and incorporating deeper content analyses.

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