

An analysis of the hot topics in the research on community group buying in China: From the perspective of visualization of co-word analysis

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Abstract: This study employs the co-word analysis method to systematically and quantitatively analyze the published literature in the field of community group buying in China. Bibliographic data were preprocessed using SATI software to generate a keyword co-occurrence matrix. Subsequently, tools such as SPSS and UCINET were utilized to perform word frequency analysis, cluster analysis, multidimensional scaling, and social network analysis, facilitating a visual representation of research hotspots. The data reveal that high-frequency keywords in current community group buying research can be categorized into three core areas: community group buying during the epidemic, operational strategies under the new retail background, and platform supervision. Among these, research on community group buying during the epidemic is relatively mature, while studies on operational strategies under the new retail environment are increasing. However, there are notable weaknesses in the supervision of community group buying platforms, indicating that both the breadth and depth of research in this area need to be strengthened to address existing challenges effectively.

Keywords: *Community group buying, Co-word analysis, Research hotspot.*

1. Introduction

With the development of the Internet, community group buying, in which residents in residential communities in China conduct online and offline shopping through the Internet, has emerged. Under this new consumption model, consumers' daily needs can be met by placing an order on the same day and picking up the goods at the community group buying point or choosing door-to-door delivery the next day. This way of reducing contact better meets the consumption needs of consumers during the epidemic. However, behind the convenient payment and purchasing methods, the emerging business model of community group buying still hides many structural contradictions and development risks. The existence of these problems not only restricts its current healthy operation, but also poses severe challenges to its long-term sustainable development. For this reason, in-depth research on community group buying is particularly urgent. At present, the research in the field of community group buying in my country is mainly empirical research, and there is a lack of articles that use knowledge graphs to systematically sort out and statistically analyze relevant literature. In this context, this article combs through relevant literature, analyzes the development and research status of community group buying, and while grasping the existing hot spots, puts forward future prospects, hoping to provide reference and reference for future research innovation and the actual development of community group buying.

2. Research Methods and Data Sources

2.1. Research Methods

This paper takes scientometrics, bibliometrics and library and information science as the theoretical foundation to deeply explore the laws of academic research. During the research process, professional information visualization tools such as SATI, UCINET, and SPSS were used in combination: SATI can efficiently complete the extraction and preprocessing of bibliographic data, laying a solid data foundation for subsequent analysis; UCINET focuses on social network analysis, helping to explore the relationship and cooperation model between research subjects; SPSS relies on its powerful statistical analysis capabilities to accurately explore the potential laws behind the data. In addition, relying fully on the massive data resources and intelligent analysis functions of the CNKI bibliometric visualization platform, with multi-perspective and multi-dimensional cross-analysis, it comprehensively explores the academic context of the "community group buying" field, clearly presents the research evolution trajectory, hot spot distribution and development trend in this field, and provides valuable reference and guidance for subsequent research.

This analysis system combs through the academic achievements in the field of community group buying from 2015 to 2025. From the perspective of literature output, the number of literature publications is counted, the core author groups, authoritative research institutions and high-quality journal distribution are identified, and an academic ecological network is constructed; at the content mining level, scientific clustering algorithms are used to analyze the knowledge clusters of high-frequency keywords, combined with the emergence detection algorithm to capture the dynamic evolution of research hotspots, and draw a comprehensive academic development map. Through the deep integration of bibliometrics and information visualization, it not only deconstructs the complex operating system of community group buying from a theoretical level and analyzes the coordination mechanism of multiple participating entities, but also provides academia and industry with an interactive and easy-to-understand panoramic research perspective in the form of a visual knowledge map, helping to deepen the understanding of the core laws in the field of community group buying.

2.2. Research Data

For the research on community group buying in China, we searched CNKI from 2015 to 2025 with the keywords "community group buying" and obtained 1,468 documents. After removing invalid documents such as notices, meetings, and news reports (129), we obtained 1,342 valid documents, as shown in Table 1. By removing duplicate keywords from these 1,342 documents and merging keywords with the same or similar meanings, we obtained 44 high-frequency words as observation objects (Table 2).

Table 1.

Number of journal articles related to community group buying in China in the past ten years.

Years	Number of journal articles
2015	2
2016	3
2017	8
2018	11
2019	54
2020	89
2021	332
2022	361
2023	273
2024	176
2025	31

Table 2.
High-frequency keywords after deduplication.

No.	Keywords	No.	Keywords	No.	Keywords
1	Community group buying	16	Group buying companies	31	Internet
2	New Retail	17	Social Marketing	32	Perceived Value
3	Fresh food e-commerce	18	Online group buying	33	E-commerce model
4	Pinduoduo	19	State Administration for Market Regulation	34	Community Economy
5	Community e-commerce	20	Internet platform companies	35	Alibaba
6	Supply Chain	21	Distributor	36	Antitrust
7	Group buying industry	22	Rural Revitalization	37	Development Strategy
8	consumer	23	Dumping	38	Post-epidemic era
9	Business Model	24	Community	39	Technology Acceptance Model
10	Marketing strategy	25	Operational Model	40	o2o
11	E-commerce platform	26	Head of Group	41	trust
12	Group buying model	27	Average order value	42	Brands
13	Fresh Products	28	Epidemic Prevention and Control	43	WeChat Mini Program
14	E-commerce	29	Meituan YouXuan	44	Influencing factors
15	Agricultural products	30	SWOT Analysis		

After collecting the keywords of the literature, SATI software is used to analyze the collected literature titles to form a keyword matrix of the literature. SATI software is a literature title information statistical analysis tool software designed and developed based on the .NET platform using C# programming technology. It performs field extraction and word frequency statistics on the data, and on this basis, it assists other data visualization software to form a knowledge network map [1, 2].

The keyword matrix generated by SATI processing was imported into SPSS software and converted into a Spearman correlation matrix to eliminate the influence of differences in keyword frequencies and form a correlation coefficient matrix. Then, the data in the correlation coefficient matrix was subtracted from "1" to obtain the dissimilarity coefficient matrix, which was the basis for subsequent data analysis.

3. Data Analysis

After calculating the dissimilarity coefficients between keywords, hierarchical clustering analysis was used to gradually aggregate keywords with similar semantics and related research topics based on the dissimilarity coefficients, forming keyword clusters with logical hierarchies, and mining potential research topics and knowledge modules in the field of community group buying. At the same time, multidimensional scaling (MDS) was used to map keyword data in high-dimensional space to two-dimensional or three-dimensional space, and to intuitively present the relative position relationship and correlation strength between keywords in the form of a visual scatter plot, revealing the distribution pattern and evolution trend of the research topic.

Finally, relying on professional social network analysis tools such as UCINET and NetDraw, combined with cluster analysis and multidimensional scaling analysis results, the keywords are used as nodes and the correlation between keywords as edges to draw an intuitive and information-rich social network map. Visual elements such as the size of nodes, the thickness of edges, and the distance between nodes in the map fully demonstrate the core and marginal status of research topics in the field of community group buying, the degree of cross-integration between various research directions, and the influence and correlation strength of different keywords, providing an intuitive and powerful basis for clearly grasping the current status of community group buying research and identifying research hotspots and cutting-edge trends.

3.1. Cluster Analysis

Cluster analysis is an important means of data mining. Based on the dissimilarity coefficients between keywords, through algorithms such as hierarchical clustering or K-means clustering, keywords

with close semantic associations and similar research contents are aggregated into clusters with logical hierarchies, so as to deconstruct complex academic research topics and extract the core context of the research field. In this study, relying on the powerful data processing capabilities of SPSS software, the dissimilarity coefficient matrix that has been standardized in the early stage is imported into the system to measure the similarity between keywords. On the basis of taking into account data characteristics and algorithm efficiency, the keywords in the community group buying field are systematically classified, and finally the cluster analysis tree diagram shown in Figure 1 is generated. The tree diagram divides the keywords of community group buying research into three core research categories with an intuitive hierarchical branch structure. From the horizontal branches of the tree diagram, it can be seen that the keyword groups under each category are highly related at the semantic level, forming a relatively independent research module; the vertical extension reflects the affiliation and logical progression between keywords.

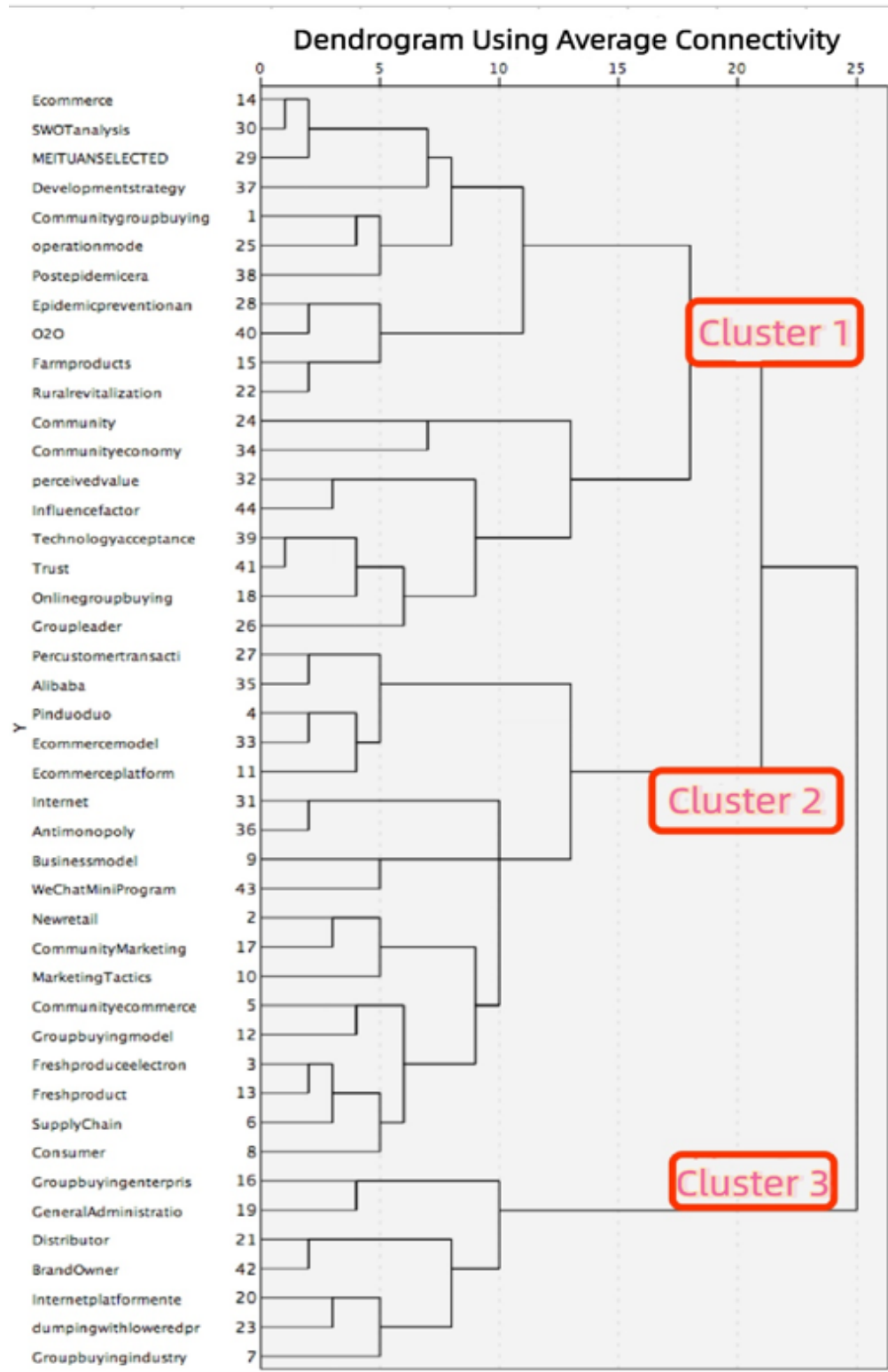


Figure 1.
Community group buying cluster analysis tree diagram.

3.2. Multidimensional Scaling Analysis

As an important data analysis method, multidimensional scaling analysis is centered on quantifying the degree of association between target keywords and intuitively presenting the closeness of each keyword in the form of spatial distance. In this analysis model, each measured keyword is distributed in the spatial coordinate system in a point-like form. Its specific location is not set arbitrarily, but accurately maps the strength of the association between the keyword and all other measured keywords. Specifically, when the correlation between two keywords is high, their point distance in space will be relatively close, which means that the two keywords have a strong internal connection in dimensions such as community group buying business scenarios, user needs or market behaviors; on the contrary, if the correlation between keywords is low, then their distance in spatial distribution is far, indicating that the connection between the two in related dimensions is relatively loose.

In the field of community group buying, with the help of the multidimensional scaling analysis (ALSCAL) module of SPSS software, it is possible to systematically sort out the massive keyword data related to community group buying, conduct in-depth mining and calculation of the data through this algorithm, and finally generate a visualized multidimensional scaling analysis result of community group buying, namely Figure 2. The keyword distribution pattern and point correlation presented in Figure 2 are highly consistent with the cluster results in Figure 1 generated by cluster analysis in the early stage.

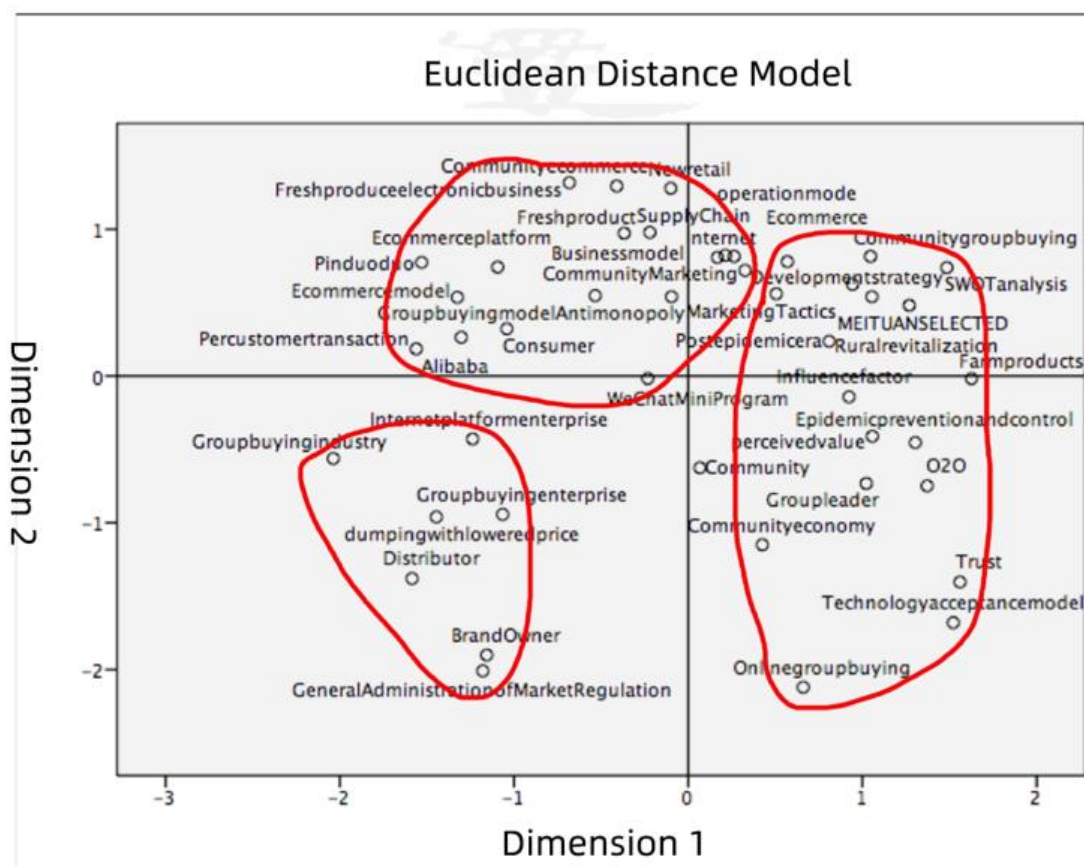


Figure 2.
Multidimensional scale diagram of community group-buying.

3.3. Social Network Analysis

As a professional tool in the field of social network analysis, Ucinet software can deeply explore the complex relationship network behind the data. Its built-in one-dimensional analysis tool NetDraw converts abstract data relationships into easy-to-understand graphic structures in an intuitive and visual way. In the research scenario of community group buying, using Ucinet software to conduct analysis, it is first necessary to systematically collect and organize community group buying related data, covering relationship data in multiple dimensions such as platform and group leader, group leader and group member, platform and supplier, supplier and commodity, such as supply chain, e-commerce platform, development strategy, etc. After encoding and entering these data according to the specific data format requirements of Ucinet software, the calculation function of the software can accurately calculate the centrality indicators of various nodes, including point centrality, betweenness centrality and proximity centrality. Point centrality reflects the number of direct connections between a node and other nodes, revealing the activity of the node in the network; betweenness centrality measures the importance of a node in connecting other non-adjacent nodes, reflecting its ability to control information flow; proximity centrality evaluates the "distance" from a node to all other nodes in the network, showing its convenience in obtaining information.

After completing the calculation of the centrality index, the data is visualized with the help of the NetDraw tool to generate the community group buying centrality analysis diagram shown in Figure 3. In this visualization, each node represents a subject in the community group buying network, such as the group leader, supplier, user, etc. The size of the node can be set according to the centrality value. The higher the centrality, the larger the node, which intuitively highlights its important position in the network; the lines between the nodes represent the relationship between the subjects, and the thickness of the lines can indicate the closeness of the relationship or the frequency of interaction.

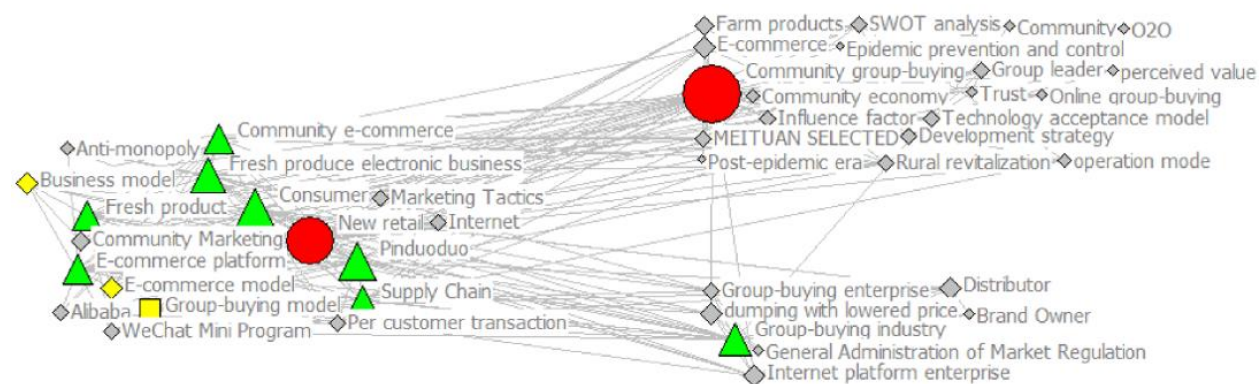


Figure 3.
Social network analysis diagram of community group-buying.

As shown in the figure, the data of this study was processed using NetDraw to achieve data visualization. Each node in the figure represents each keyword in the community group buying study, and the position of each node and the connecting lines between them reflect the correlation between the nodes. Through the centrality function of UCINET, the color and shape of each node are marked according to its degree. In this study, we set the degree pair D of each node and mark it according to the different D values. When $D < 10$, it is marked as a gray diamond; when $10 \leq D < 15$, it is marked as a yellow rectangle; when $15 \leq D < 25$, it is marked as a green triangle; when $D \geq 25$, it is marked as a red circle.

4. Research Focus of Community Group Buying

4.1. Community Group Buying in the Epidemic Era

In early 2020, the COVID-19 pandemic swept across China like a surging wave. This three-year public health event has profoundly reshaped the life landscape of residents in various places. During the epidemic prevention and control period, measures such as lockdown management and home isolation were fully implemented, and the normal production and life rhythm of residents was completely disrupted. Offline commercial activities were almost suspended, physical supermarkets were closed due to limited flow, and farmers' markets were closed. Not only was it difficult for people to carry out their daily work, but even the purchase of basic daily necessities and medical supplies became a thorny problem. There was a shortage of daily necessities such as fresh vegetables, grains, oils, rice and noodles, and it was even more difficult to find epidemic prevention materials such as masks and disinfectants, and residents' lives were in trouble. Under this severe situation, community group buying broke out with its unique operating model and became a "people's livelihood savior" in special times. Community group buying is based on the community, relying on the organization and coordination ability of the group leader, collecting residents' needs through online communities, and then the platform integrates orders, uniformly purchases and distributes materials, forming a closed loop of "contactless delivery". This model not only effectively reduces the risk of virus transmission, but also relies on the scale advantage of centralized procurement to ensure the supply of materials while controlling costs, quickly filling the gap in residents' demand for material procurement. For a time, community group buying sprang up across the country, with platforms such as Yu and Xie [3] expanding rapidly, and giants such as Yi [4] also joining the market. A large amount of capital poured in, driving the industry to explosive growth.

In November 2022, as life in many cities such as Guangzhou, Beijing, Ding [5] gradually returned to normal, offline business regained vitality. However, community group buying has not declined due to the recovery of offline consumption scenarios. Instead, it continues to occupy an important position in residents' daily lives. Behind this is the profound change in residents' consumption habits during the epidemic. Over the past three years, community group buying has cultivated a large number of loyal users with its convenience, high cost performance, and door-to-door delivery. Even after life returns to normal, many residents still maintain the habit of online shopping, taking into account both online and offline channels in their daily shopping. Especially for busy office workers and elderly people with limited mobility, community group buying enables them to buy the supplies they need without leaving home; at the same time, its pre-sales, group buying and other marketing activities, as well as customized products for community residents, continue to attract consumers' attention. In addition, the supply chain resources, distribution systems and user data accumulated by community group buying platforms during the epidemic have also enabled them to have stronger market competitiveness, and they can accurately select products and optimize services based on user needs, thereby continuing to meet people's diverse life needs in a normalized market environment and becoming an indispensable part of residents' daily lives.

In the complex context of the post-epidemic era, the function and value of community group buying have been constantly evolving with the dynamic adjustment of the epidemic prevention and control situation, and the subject categories involved have also shown significant diversification. This ecological system is no longer limited to the core roles of platforms, group leaders, suppliers and consumers in the traditional purchasing process, but further extends to logistics distribution, warehousing management, disinfection and epidemic prevention and other security links under the influence of the epidemic. These new subjects and traditional roles work together to build a three-dimensional operation pattern of community group buying in the post-epidemic era.

The academic research on community group buying has also been continuously deepened with the development of practice. Many scholars have cut in from different dimensions, providing theoretical support and practical reference for the development of the industry. Yu and Xie [3] analyzed the business model and development status of community group buying to promote the sustainable

development of the community group buying industry as a whole Yu and Xie [3]. Yi [4] discussed the evolution of interpersonal relationships between community group buying volunteers and residents during the Wuhan epidemic [4, 5] explained the integration path of online promotion and offline services of community group buying through SWOT analysis, in order to provide reference for the future development of community group buying Ding [5]. Ding and Zhang [6] analyzed the current situation of community group buying and the business model of rural community group buying, and discussed how the industry can promote the sustainable development of the rural community group buying industry as a whole through segmenting customers, focusing on improving product quality, paying attention to improving after-sales service quality, and building an efficient logistics supply system [5].

4.2. New Retail Community Group Buying Operation Strategy

As an innovative paradigm of the retail industry in the digital economy era, new retail is deeply subverting the business logic of traditional retail with technology empowerment and model reconstruction as the core. Traditional retail follows the linear logic of "goods - market - people" and is centered on goods; while new retail relies on digital technologies such as big data and artificial intelligence to reconstruct it into "people - goods - market", starting from consumer demand, realizing reverse optimization of the supply chain and reshaping the industry ecology. Driven by new retail, community group buying not only absorbs technical nutrients, but also activates community attributes to form a unique operating system. It is closely tied to digital technology, and big data analysis helps precise operation. By collecting user data to build portraits, it can achieve refined product selection and pricing. Supply chain digitization is another technical advantage. The traditional retail supply chain is lengthy, costly and easily imbalanced in supply and demand. Community group buying uses the Internet of Things to achieve full-link visualization, intelligent warehousing to monitor inventory, algorithms to predict sales and allocate goods, and cold chain logistics to ensure freshness. This organic combination of technological empowerment and community attributes is like injecting a dual-wheel drive into community group buying, allowing it to continue to deepen its roots in meeting residents' daily needs while building an advantage that is difficult to replicate in the fierce market competition. At a time when the retail industry is highly homogenized, community group buying has taken a differentiated path of "understanding both technology and life" by relying on the deep integration of technology and community.

Academics and industry have conducted extensive research on community group buying in the context of new retail. Du Jian et al. analyzed the current development model and existing problems of community group buying from the perspective of new retail and gave some practical suggestions Du, et al. [7]. Yin [8] took CM Company as an example and gave implementation guarantee measures for the business model optimization plan, which will help achieve the sustainable development of CM Company and establish a mutually beneficial relationship Yin [8]. Wang and Li [9] explored the impact of consumer personal factors, information quality factors, system quality factors, service quality factors, product quality factors, etc. on the willingness of consumers to use community group buying platforms [9].

Existing research content covers multiple dimensions such as model characteristics, competitiveness analysis, optimization strategies, influencing factors, etc., but there is still room for further improvement in related research. With the continuous iteration of new retail technology and the in-depth evolution of the community group buying market, future academic research needs to break the barriers of a single discipline, build a research framework of multidisciplinary cross-integration, and respond to complex problems in the development of the industry from a more systematic and three-dimensional perspective. This multidisciplinary integration is not a simple theoretical superposition, but a research synergy formed through the complementarity of methodologies. Using empirical research, case analysis and other methods, we can deeply explore the operating laws of community group buying, explore its innovative development path under the background of new retail, provide more targeted and effective

guidance for industry practice, and promote the high-quality development of community group buying in the new retail era. At the same time, research should also focus on the sustainable development of the industry, explore the potential value of community group buying in promoting the upward movement of agricultural products, ensuring people's livelihood supply, and promoting community digital governance, and inject social significance into its high-quality development.

4.3. Supervision of Community Group Buying Platforms

In recent years, community group buying has accurately entered the daily consumption scenes of residents with its innovative model of "online group buying + offline delivery", ushering in an explosive growth period. However, the rapidly growing market size and broad development prospects have also made the industry competition increasingly fierce. In order to seize market share, some platforms have resorted to malicious competition methods such as low-price dumping, false propaganda, and data falsification. With the intensification of industry competition, many deep-seated problems faced by community group buying platforms have gradually been exposed. At the level of market competition, malicious competition between platforms has not only led the industry into a vicious cycle of homogeneous low-price competition, but also caused a huge waste of resources and weakened the overall innovation momentum of the industry. In the field of data security, some platforms have illegally collected and overused consumer personal information in pursuit of commercial interests, triggering a crisis of public trust in the platform. In terms of operation and management, as a key node in the community group buying model, the group leader faces problems such as unstable income, high work intensity, and lack of security, resulting in a high rate of group leader turnover, which poses a major challenge to platform operations.

Zhang [10] suggested that the social responsibility of community group buying platforms should be strengthened and internal supervision of the platforms should be strengthened. The platforms not only need to cooperate with government supervision, but also should establish their own supervision mechanisms and take the initiative to supervise rather than relying solely on consumer complaints Zhang [10]. Fang [11] proposed to improve the regulatory framework: improve the efficiency of platform supervision. Strengthening policy supervision is not to restrict the survival and development of Internet companies, but to promote the orderly, healthy and sustainable development of Internet products and services. Always maintain a prudent regulatory attitude, strengthen supervision of platform economic competition, prevent disorderly expansion of capital, and build a fair and orderly market environment [11]. In their research, Li and Liao [12] believe that the legal responsibilities of various entities in community group buying should be strengthened. Imposing certain legal responsibilities on various entities in the community group buying platform is a powerful deterrent to illegal operators and an effective protection of consumers' rights and interests [12].

Faced with the chaos and problems that have emerged in the development of the community group buying industry, the regulatory research on community group buying platforms has gradually become the focus of attention in academia and all walks of life. Government departments, industry associations, experts and scholars have conducted in-depth research and discussions from the perspectives of improving laws and regulations, formulating industry standards, and innovating technical regulatory means. At the same time, all parties are also actively exploring the establishment of a multi-governance regulatory system that combines government supervision, industry self-discipline, and social supervision, aiming to solve the existing problems in the community group buying industry by improving the regulatory mechanism and strengthening law enforcement, creating a good market environment for the sustainable development of the industry, and promoting high-quality development of community group buying in norms.

5. Summary

The co-word analysis method is used to analyze the frequency of existing literature on community group buying. The keyword co-occurrence matrix is obtained by processing the literature titles through

SATI. SPSS, UCINET and other tools are used for data analysis. Cluster analysis, multidimensional scaling analysis and social network analysis are performed on high-frequency keywords to achieve data visualization. From the clustering results, it can be seen that the current research is mainly concentrated in three areas, namely community group buying under the epidemic, new retail community group buying operation strategies and community group buying platform supervision. Community group buying under the epidemic and the operation strategies of community group buying under the background of new retail are in relatively more research attention, while there are currently fewer related studies on platform supervision of community group buying. Platform supervision is also a focus that cannot be ignored and will attract attention in future research.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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