Journal of http://www.satursonpublishing.com/
Research in Multidisciplinary Methods and Applications
ISSN 2957-3920 (Online) ISSN 3007-7060 (Print)
Volume 3, Issue 8, August 2024

Literature Econometric Analysis of Fast-Moving Food Sales Network Redundancy Identification Based on The WOS Platform

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Abstract: With the development of social economy, the competition pressure faced by fast-consuming food enterprises is increasing day by day. FMCG sales network layout has a great impact on FMCG business performance, so it is urgent for enterprises to identify redundant network accurately, optimize existing FMCG sales network layout, and improve business performance. In this paper, the literature of fast-digestion food was analyzed, and the development of fast-digestion food and the research focus of fast-digestion food were analyzed. Through the analysis of the literature on redundancy recognition, it can be found that the current research topics of redundancy recognition are relatively scattered, involving system redundancy recognition, character redundancy recognition, there is little research on redundancy identification of fast-moving food marketing outlets in various types of outlets or sites. This paper analyzes and discusses the network layout of fast-moving consumer food in China, and explains the problems existing in the existing model. Based on the existing model, this paper puts forward some suggestions to promote the establishment of FMCG network in China's food industry.

Keywords: Fast Food; Sales Outlets; Redundancy Identification; Bibliometric Method

1 INTRODUCTION

China's fast-moving food market has developed rapidly in recent years, but there are still some problems in the logistics model and marketing model. The phenomenon of "Cluster" of large-scale sales outlets is serious, especially the central business district network is too close, the format of business is similar, the operation is similar, leading to low-level excessive competition. At present, most of the city's sales outlets, mainly distributed in the city-level commercial center or regional commercial center, some areas of the density is too large, and residential areas to meet the residents living consumption-oriented outlets are relatively few. Many newly-developed commercial and residential buildings, residential areas, the lack of supporting commercial facilities, the actual needs of residents shopping has given birth to a large number of road markets, road stalls group, not only affect the traffic, but also affect the city. Therefore, we should seize the opportunity of making mid-and long-term planning of commercial outlets in major cities to make the spatial layout of commercial outlets more scientific, orderly and rational, so as to foster the core competitiveness of urban commerce and trade, to promote the sustainable development of urban commerce and trade is the key issue that every major city must face when developing commerce and trade economy.

1.1 LITERATURE ANALYSIS OF FAST FOOD

Zhang Lu (2022)[1] has studied the packaging of fast food, and she believes that in the context of consumer consumption escalation, the packaging of fast food is considered from multiple dimensions, such as function, experience, environmental protection, culture, etc. , she took the popular fast food on the market packaging as a case study. Lai Xinfeng and Wang Xin (2022)[2] take FMCG Enterprises as an example to study the supply chain problems of multinational FMCG Enterprises. Cho et al. . (2020)[3] studied the effects of frequent fast food consumption on atopic dermatitis in adolescents, and showed that frequent fast food consumption, energy drinks, and convenience foods were associated with new onset atopic dermatitis in adolescents. Al-tuwairqi and Matbouli (2021)[4] argue that obesity causes a variety of diseases such as

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hypertension, and that an important cause of obesity is people eating too much. Namdar et al. . (2021)[5] taking 421 adults aged 18-65 years in Iran as an example, the effect of fast food consumption on adult health literacy was studied. Studies show that people with lower levels of health literacy may consume more fast food. Dunn et al. . (2021)[6] a survey of fast food consumption among American adults showed that adults have high fast food consumption among American adults, especially among young black non-hispanics.

1.2 Analysis Of Main Literatures On Redundancy Recognition

At present, the research on redundancy recognition is common in the field of computer science. Early research, such as Huang Yue et al. (2011)[7] through the circuit redundancy identification algorithm to identify redundant faults in digital circuits. Sun Changai et al. (2019)[8] proposed the concept of redundant variants and a Data-flow analysis-based approach for redundant variant recognition. The latest research is as follows: Wu Peng et al. (2022)[9] put forward a method of large group emergency decision-making based on DEA cross-efficiency and redundant information recognition, which realizes redundant information recognition by screening the zero component of the optimal solution of the model. With the development of redundancy recognition, redundancy recognition involves more extensive research fields, and the research methods are more diversified. Zhai Feifei and Zong Chengqing (2011)[10] applied redundancy recognition to the field of linguistics, classified redundancy at the lexical level, and studied the statistical recognition method of redundant words in spoken language. Tang Zhongli et al. (2021)[11] based on the open street map (OSM) data submitted by the public, explored the problem of target redundancy in OSM buildings, in order to realize the redundancy recognition of OSM, a set of hierarchy-based redundant data cleaning model of OSM building surface targets is constructed. In addition, some scholars on the network or site redundancy recognition research.For example, Morrison et al. (2001)[12] used a gis-based spatial interaction model to assess redundancy in identifying New Zealand bank branches. Xue et al. (2019)(13) identified redundant bank branches by constructing an evaluation index system which reflects the operating performance of bank branches. Cui Xin et al. (2022)[14] in order to clarify the importance of different stations in urban rail transit network, a method of identifying key stations based on network redundancy is proposed, and the Shanghai Metro network is taken as an example to identify key stations. It can be found that the research field of redundancy identification involves a wide range, and the main research methods involve computer science, GIS, statistics and operations research methods, location model.

1.3 Main Literature Analysis Of Network Layout Optimization

In the domestic literature, Liu Yinhan and Liu Yansui (1995)[15] firstly take Xi'an Retail Commercial outlets as the research object, and carry out the research on the structure and layout of commercial outlets from the structural characteristics and spatial distribution, it lays a foundation for the research of network layout optimization. Since then, the research on the optimization of the network layout of state-owned banks and commercial banks, state-owned enterprises, rural primary schools, postal and express delivery enterprises has gradually increased. With the reform of joint-stock system and the transformation of Operation Strategy, the distribution of bank branches has been greatly adjusted. Wang Shixiong (2004)[16] proposed that the network layout of state-owned commercial banks should follow the basic direction of marketization, intensification, flattening and electronization. Li Xiaojian and others (2006)[17] that the changes in the distribution of banking outlets mainly related to changes in the banking system. Tao Jiang and Hu Rongshang (2012)[18] found that there are also problems in commercial banks' network layout, such as the lack of total control over the network layout, the unreasonable site selection, the inefficient operation of the network and the unreasonable organizational structure of the network, on this basis, the paper puts forward some optimization measures, such as the integration of diversified channels. Hu Zhihao and Chen Taofeng (2019)[19] based on the transformation trend of commercial banks, after modeling and analyzing by DEA, this paper proposes that the network layout must conform to the principle of spatial layout optimization, and the network distribution patterns in different regions must be differentiated. This also means that the research on the optimization of network layout into a quantitative research-based time period.

For the express logistics enterprises, the rational layout of outlets plays a decisive role in the operation of express enterprises, thus drawing the attention of scholars to the optimization of the distribution of outlets. Chang Hao et al. (2018)[20] from the study of logistics network layout optimization algorithms, proposed the corresponding carbon emissions calculation reference standard and based on the carbon footprint of the minimum element method model to help logistics enterprise network layout optimization. Fu Shunli et al. (2021)[21] also from the algorithm, designed the delivery route optimization algorithm, to the best express outlets facilities, personnel, area layout and operations. Wu Xiao et al (2019)[22] analyzed the external and internal influencing factors of the distribution of outlets in express delivery enterprises by combining qualitative and quantitative analysis methods from the aspects of spatial clustering, network relevance and spatial correlation. On the other hand, Zhang Haijun and Guo Yangyang (2020)[23] established an integer programming model based on investigation to optimize the layout of self-lifting outlets.

By contrast, foreign scholars focus on the distribution of transportation network, energy network, and other research fields are more decentralized, research methods are mainly quantitative analysis. In the research of traffic network layout optimization, An et al. (2020)[24] proposed a traffic detector layout optimization method based on network centrality by using the complex network theory. Sun et al. (2021)[25] carried out a study on the optimization of bus network layout in county seat, aiming at the problems of unreasonable bus network planning, inconvenient operation optimization and inadequate protection in the county seat bus network system, the transfer

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optimization model of county public transport network is constructed. In the research of energy network layout optimization, Zhou et al. (2021)[26] proposed the star gas station and central processing facilities location. According to the difference of engineering application environment, the layout and site of pipeline network are optimized under different constraint conditions. Liu et al. (2019)[27] carried out the corresponding research on the layout optimization of large-scale oil and gas gathering and transportation system. A high-dimensional mixed-integer nonlinear layout optimization mathematical model including PIPE network structure parameters and pipeline design parameters is established. Zhou et al. (2018)[28] established an integrated optimization objective function and constraints for two-level tree-tree pipe network layout optimization design.

Based on the current situation of the layout of fast-moving consumer food outlets, this paper enriches and perfects the research methods of the layout of fast-moving consumer food outlets, and provides scientific support for improving the satisfaction of the layout of fast-moving consumer food outlets.

In this paper, the Chinese Knowledge Network database and Web of Science Database as the source of literature, intelligent search and manual screening of the fast food network-related literature as research samples, the present situation, characteristics, research hotspots and trends of FMCN in China and abroad were analyzed by using the comprehensive research method of literature measurement and content analysis, this paper describes the research results of FMCN, and provides reference for the future research on FMCN layout.

2 Materials And Methods

2.1 Publish An Annual Analysis

As an important index in literature analysis, volume statistics can show the development trend of a certain topic in the research time, a total of 63 articles were retrieved, and 595 English articles were searched on web of science with the theme“TS = (fast moving consumer food * OR FMCG * OR FMCG food)”. The Chinese and English literatures from 2000 to 2022 are analyzed, as shown in figure 2-1. As can be seen from figure 2-1, the domestic research on"Fast food" is very few, less than 100 articles, only sporadic in 2006, compared with domestic, foreign research earlier, the quantity of literature is also relatively large. In terms of the year when the literature first appeared, the foreign literature first had the research on fast food in 1975. It can be said that"Fast food" originated from abroad. There are only 6 papers on fast food in China, even in the year with the most literatures. and the research on fast food in the future is low. From the foreign fast food research volume, is in a fluctuating rise in the state, and will present a rise in the future. From the volume of papers, foreign research on fast-moving consumer food is more mature than domestic, the future development prospects are better.

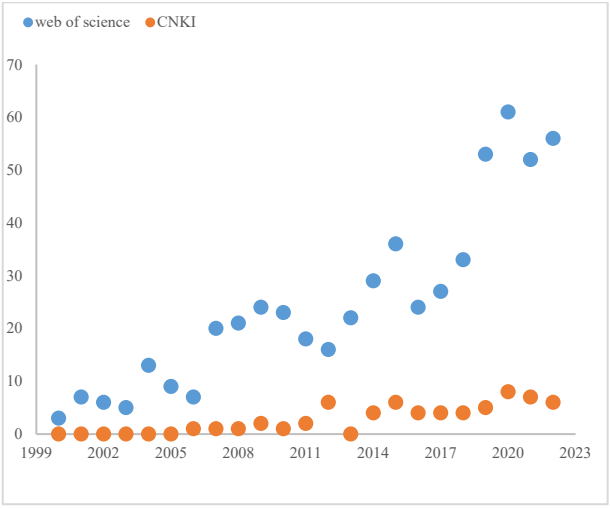

Figure 2-1. Fast Food Distribution Statistics Based On CNKI And WOS

A total of 59 articles, including 48 academic journals and 11 dissertations, were searched with redundancy recognition as the subject words in the advanced search of cnki. A total of 7101 articles were searched in web of science with the subject term“Ts = (Redundant identification)”. Search date 2023 May. Because of the large gap in the number of english-language literature, the search scope was narrowed to“Ti = (Redundant identification * OR Redundant recognization)” in the advanced web of Science search to facilitate statistical analysis, a total of 116 articles were retrieved. The three retrievals are counted, as shown in figure 2-2. Because the number of documents on the subject of redundancy recognition in CNKI and the number of documents on the subject of redundancy recognition in web of science are small, there is a huge difference between the number of documents on the subject of redundancy recognition in CNKI and those on the subject of redundancy recognition in web of science, it is difficult to clearly show the number of a picture, so it is marked in the top left corner of the picture, so that the number of documents can be seen clearly.

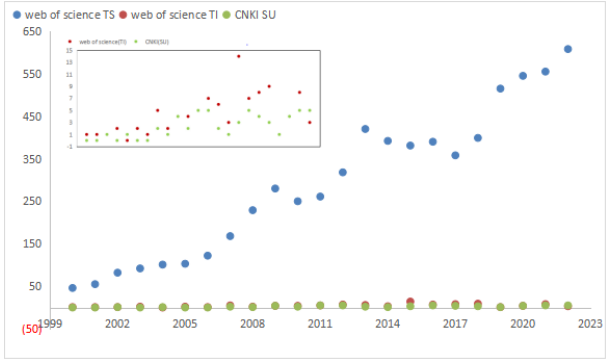

Figure 2-2. Redundancy Identification Traffic Statistics Based On CNKI And WOS

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2.2 NETWORK ANALYSIS OF SCIENTIFIC RESEARCH COOPERATION

2.2.1 CO-OCCURRENCE ANALYSIS

At the author's level, the literature cooperation both at home and abroad is scattered, and there are a few small group cooperation. Among them, as shown in figure 2-3, the domestic research on the optimization of the network layout is represented by Yu Jianguo's team and Yang Linlin's team, as well as Liu Yumei's team and Zeng Xiaohong's team, but most authors in China remain uncooperative. As shown in figure 2-4, similar to the situation of the domestic authors, the co-operation is slightly more than that of the domestic authors, but the co-operation between the authors is still dominant. A few small groups that work closely together are the Martina team, the Miquel team, and so on.

FIGURE 2-3. CO-OPERATION OF DOMESTIC AUTHORS

FIGURE 2-4.COOPERATION OF FOREIGN AUTHORS

2.2.2 ANALYSIS OF INSTITUTIONAL COOPERATION

From the perspective of institutional cooperation, the research on the optimization of network layout at home and abroad is also less cooperation. Among them, as shown in Figure 2-5, the cooperation among Harbin University of Commerce is the main Faculty of Economics, Ljubljana, and the cooperation among Southeast University School of Architecture is more prominent.

As shown in Figure 2-6, the co-operation between universities is also the main focus in the foreign research, especially in Beijing Jiaotong University, Zhejiang University, India Gandhi Deihi Technical University for Women.

FIGURE 2-5. DOMESTIC INSTITUTIONAL COOPERATION

FIGURE 2-6. COOPERATION WITH FOREIGN INSTITUTION

As shown in Figure 2-7, the co-operation among countries in the foreign literature collected by the core set of WOS is relatively close, with the co-operation between China and other countries being the most frequent, followed by the United States, Italy, Turkey, australia, Canada and other countries. This shows that the overseas research on the optimization of network layout presents the characteristics of internationalization, all countries have contributed to the research of network layout optimization, and our scholars pay special attention to the related research of network layout optimization.

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FIGURE 2-7. FOREIGN LANGUAGE COOPERATION

3 ANALYSIS OF RESEARCH TRENDS

3.1 KEYWORD CO-OCCURRENCE ANALYSIS

3.1.1 CO-OCCURRENCE ANALYSIS OF KEYWORDS IN FAST FOOD

A total of 782 articles were searched by using“Fast consuming food” as the subject word in the core set database of web of science, and the key words co-occurrence map was analyzed by using VOSviewer software. As you can see in Figure 3-1, the results are divided into red and green areas. The red part indicates the types of fast food, while the green part deals with the locations and causes of fast food.

The time zone map can reflect the research situation of related topics in a certain period of time. As can be seen from figure 3-2, there are 9 categories of fast food as the subject word, the developing trend of fast food can be clearly seen from the category of extraction. According to the development trend of time zone map, it can be roughly divided into three time periods. 2007-2012 is the initial period, the research focus is mainly on the research objects, mainly around the supply chain, food and China;. 2012-2020 is the transition period, the research mainly focuses on the fast food management strategy, mainly focuses on the management, design and so on. During the 2014-2022 recession, research on fast food declined, the number of studies declined, and the number of subjects studied declined. Only the word“Quality” can be seen at this stage.

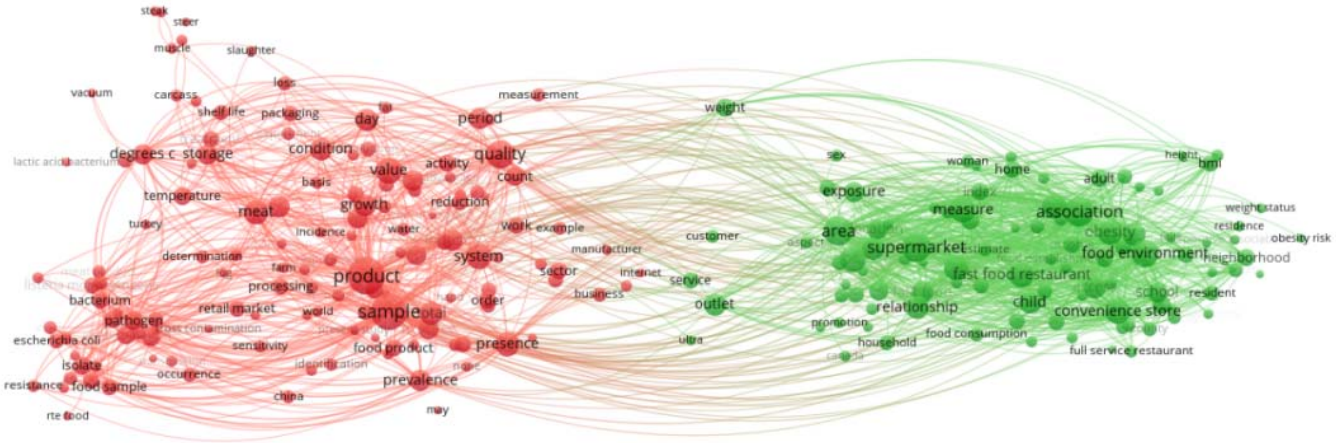

FIGURE 3-1. WOS-BASED KEYWORD CO-OCCURRENCE DIAGRAM

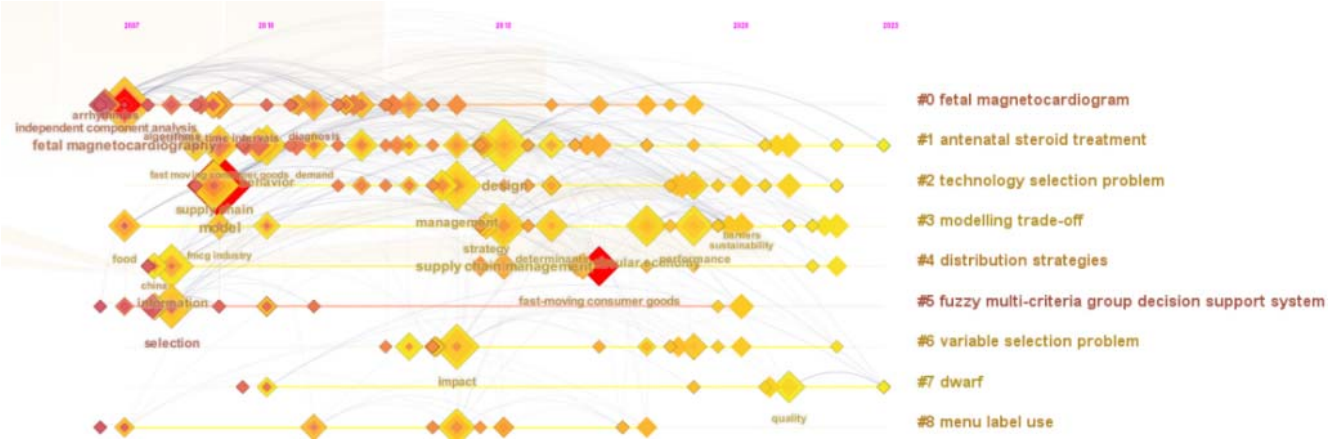

FIGURE 3-2. TIMELINE KNOWLEDGE MAP VIEW OF FAST FOOD KEYWORDS

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3.1.2 *Keyword Co-Occurrence Analysis For Redundancy Recognition*

Redundant refers to redundant or verbose content (including information, language, code, structure, services, software, hardware, and so on) are called redundant. Redundancy can be divided into two meanings, the first meaning refers to redundant unnecessary parts, the second meaning refers to the artificial addition of duplicate parts, which is used to back up the original single part, in order to enhance its security, which is widely used in information communication system.

A total of 4753 articles of Web of science core set literature were selected for keyword co-occurrence mapping analysis in web of science, and the results were shown in Figure 3-3. From the graph, we can see that 1093 items were divided into three categories according to their colors, the green part contains 429 subject words, the green part contains 411 subject words, and the blue part contains 253 subject words.

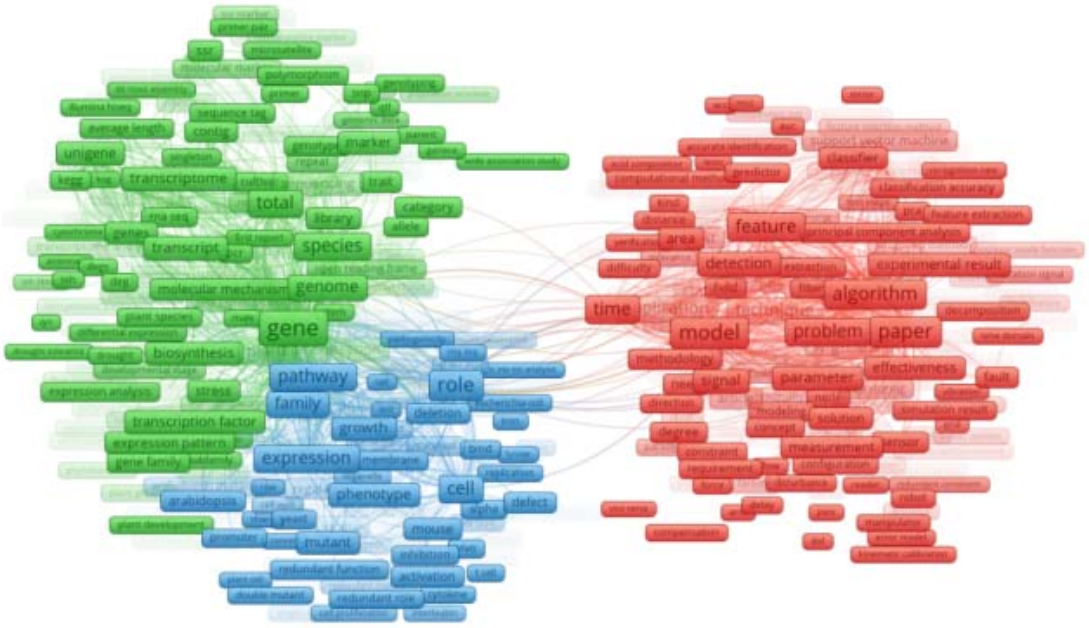

Figure 3-3.WOS-Based Keyword Co-Occurrence Map For Redundancy Recognition

Figure 3-4 shows the time zone diagram of redundancy recognition. From the diagram, 18 categories are extracted, which are small biomarketset, signalling network, passway redundancy and so on. The graph shows redundant recognition classification from 2007 to 2022. The darker the color, the more distant it appears, and the shallower it is, the closer it is. The appearance of glycoprotein storage disease, gas pipeline network, aggregation point and feature extraction-, algorithm selection method, small cmg-based satellite are more recent. From the time zone map of the distribution, 20 years after the relevant topics less research, 2007-2013 more related topics. According to the time classification, the research of redundancy recognition can be divided into three stages: 2007-2013, rising period, more relevant research, development momentum is good. From 2013 to 2020, the period of development is less than that of the previous period, but it is still developing. During the 2020-2022 recession, there were few research topics, and only three of them, “Quality,”“Hyperspectral imaging,” and“Object detection,” can be seen.

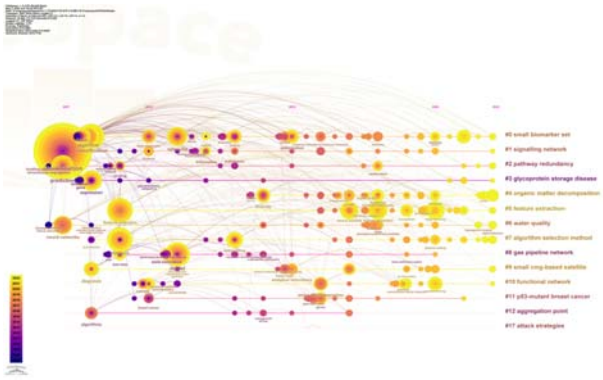

Figure 3-4. Timeline View Of Timeline Knowledge Atlas For Redundant Recognition Of Keywords

3.2 *Keyword Clustering Analysis*

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3.2.1 Clustering Analysis Of Keywords In Domestic Literature

The domestic literature to network layout as the core of network layout optimization research keywords are closely linked, co-occurrence network intricate. It can be found that the main research objects involved in the optimization of network layout are commercial network, Bank Network, express logistics enterprise network, etc. , also involves the industrial park, Power Supply Enterprise Network site and other aspects of the content. The research methods involved mainly include network analysis, analytic hierarchy process, layout evaluation, data mining, visualization, spatial analysis. The factors that influence the optimization of the network layout are the number of the network, the spatial organization, the substitution rate, the target customers, the customer group, the population density, etc. , system optimization and adjustment, market segmentation, practice path exploration, electronic channel development, etc. .

As shown in figure 3-5, Optimization is the key word in the foreign literature, that is, the study of network layout is more important than the domestic research, and the foreign research is more important. Therefore, we can find that the keywords related to optimization such as design, system, model, genetic algorithm, network are especially prominent in foreign literature. In addition, the number of keyword links between foreign research is less than domestic keyword links, which indicates that the overseas research topics on network layout optimization are more scattered.

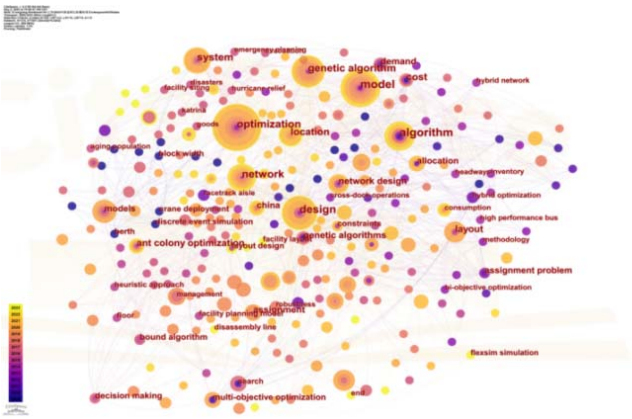

Figure 3-5. Foreign Keyword Distribution

Combined with CITESPACE software, through the analysis of keyword clustering, help to clarify the network layout optimization under the theme of the various categories of research. The studies on network layout optimization in domestic literature can be classified into 7 categories: Cluster 0 network layout, cluster 1 layout optimization, cluster 3 all-member marketing, cluster 4 Zhongguancun, Cluster 5 express delivery companies, cluster 6-level analysis, cluster 7 distribution patterns, details as shown in table 3-1.

Table 3-1. Domestic Keyword Clustering Details

Cluster ID	Size	Silhouette	LLR
0	36	0.998	Network layout (7.46,0.01) ; network layout optimization (4.52,0.05) ; postal enterprises (2.37,0.5) ; commercial bank network (2.37,0.5) ; economic and financial situation (2.37,0.5)
1	33	0.899	Layout optimization (19.77,1.0E-4) ; power supply enterprise (6.35,0.05) ; exit mechanism (3.15,0.1) ; functional structure (3.15,0.1) ; service mode (3.15,0.1)
2	31	0.978	Commercial outlets (11.31,0.001) , county-level cities (7.46,0.01) , optimization strategies (7.46,0.01-RRB- , network layout (5.19,0.05) , Yanchengheng (3.69,0.1)
3	15	0.972	All-staff marketing (4.57,0.05) ; online and offline marketing (4.57,0.05) ; industrial park (4.57,0.05) ; grass-roots outlets (4.57,0.05) ; customer structure (4.57,0.05)
4	11	0.975	Zhongguancun (5.21,0.05) , city commercial bank (5.21,0.05) , Beijing Municipality (5.21,0.05) , the government business (5.21,0.05) , Haidian District (5.21,0.05)
5	10	0.933	The main influencing factors were express delivery enterprises (10.24,0.005) , influencing factors (5.03,0.05) , Nanjing (5.03,0.05) , spatial organization (5.03,0.05) and coverage rate (5.03,0.05)
6	7	0.994	Hierarchical analysis (7.42,0.01) ; layout evaluation (7.42,0.01) ; express outlets (7.42,0.01) ; campus (7.42,0.01) ; layout (0.84,0.5)
7	6	0.934	Delivery Mode (7.42,0.01) ; network optimization (7.42,0.01) ; terminal nodes (7.42,0.01) ; Express (7.42,0.01) ; network layout (0.84,0.5)

3.2.2 Clustering Analysis Of Keywords In Foreign Literatures

Combined with CITESPACE software, through the analysis of keyword clustering, help to clarify the network layout optimization under the theme of the various categories of research. The studies on network layout optimization in

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domestic literature can be classified into 7 categories: Cluster 0 network layout, cluster 1 layout optimization, cluster 3 all-member marketing, cluster 4 Zhongguancun, Cluster 5 express delivery companies, cluster 6-level analysis, cluster 7 distribution patterns.

As shown in Figure 3-6, the studies on the optimization of network layout in foreign literatures can be classified into six categories, namely: Cluster 0computational analysis, cluster 1GA BPNN model, cluster 2machine learning, cluster 3browsing, cluster 4urban planning, Cluster 0.0, cluster 1ga bpnn model, cluster 2machine learning, cluster 3browsing, cluster 4urban planning, cluster 5charging network, as shown in table 3-2.

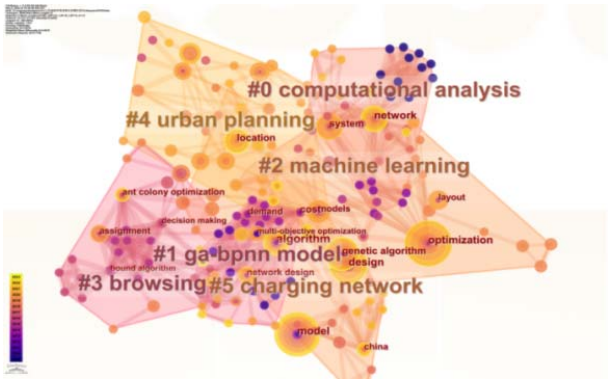

FIGURE3-6. FOREIGN KEYWORD CLUSTERING

TABLE 3-2. FOREIGN KEYWORD CLUSTERING DETAILS

Cluster ID	Size	Silhouette	LLR
0	32	0.854	computational analysis (9.29, 0.005); geographical information system (gis) (4.62, 0.05); cable routing problem (4.62, 0.05); mixed-integer programming (4.62, 0.05); optimal wind farm design (4.62, 0.05)
1	31	0.919	ga-bpnn model (5.09, 0.05); bus transit (5.09, 0.05); hospital layout (5.09, 0.05); layout optimization tool (5.09, 0.05); carrier selection (5.09, 0.05)
2	30	0.86	machine learning (5.85, 0.05); electric vehicle (5.85, 0.05); transportation network (5.85, 0.05); charging station (5.85, 0.05); system (5.85, 0.05)
3	29	0.884	browsing (5.41, 0.05); occupational health and safety (ohs) (5.41, 0.05); facility planning model (5.41, 0.05); multi-track station layout design (5.41, 0.05); purchasing (5.41, 0.05)
4	29	0.826	urban planning (13.33, 0.001); potential emission reduction (4.39, 0.05); bikeway (4.39, 0.05); network modeling (4.39, 0.05); traffic congestion (4.39, 0.05)
5	25	0.892	charging network (6.94, 0.01); bayesian network (6.94, 0.01); two-stage land use (6.94, 0.01); chongzhou city (6.94, 0.01); emergy theory (6.94, 0.01)

4 CONCLUSIONS

Through the bibliometric analysis and keyword co-occurrence map analysis of fast-food, we can find that there are few articles about fast-food, especially the Chinese literature, only 31 articles, of these 31 articles, only three are published in core and CSSCI journals. Due to the lack of literature, the proportion of high-quality journals is close to 10% , which is higher than other types of journals. There are 433 web of science core collections in English literature, which is much more than that in Chinese literature, because fast food originated in foreign countries and was later introduced into China. The earliest said“Fast food” is the origin of fast food.

At present, the research on network layout optimization is on the rise both at home and abroad. There is little cooperation between domestic and foreign authors, but the trend of internationalization is obvious. A small number of institutional cooperation to the university-based. The optimization of network layout is mainly focused on commercial network, Bank Network, express logistics enterprise network and so on. The research methods are network analysis, analytic hierarchy process, layout evaluation, data mining, etc. . The keyword distribution of foreign literature shows that the research methods are mainly quantitative research, involving more network algorithm research. Domestic studies can be clustered into 7 categories, while foreign literature can be clustered into 6 categories. According to the time-line map and the emergence map, the domestic literature focuses more on the study of dot layout, such as dot layout, dot structure and other keywords appear earlier, and the emergence time is longer. The research on optimization of network layout in foreign countries is more focused on optimization, such as model, algorithm, system network and so on.

The problem of network layout is not only a theoretical problem, but also a practical problem, not only a social problem but also an economic problem. To carry out this comprehensive and complex problem research, planning methods must also keep pace with the times. We must learn from other research results and theories, in order to more in-depth analysis of the nature of

the problem studied. In the future, the research focus will be on consumption sinking to rural areas and model optimization.

FUNDING

This research was funded by the Research Fund of Xianyang Soft Science Research Program: Transformation of Scientific Achievements in Xianyang City from the perspective of Innovation Chain and Industrial Chain Integration (L2023-RKX-SJ-036) and Shaanxi Provincial Natural Science Basic Research Program: Research on Carbon Transfer Ecological Compensation Mechanism of Guanzhong Plain Urban Agglomeration (2024JC-YBMS-581)

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