A Visual Analysis of Hotspots and Trends in Retirement Model Research Based on Citespace and Netdraw

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Abstract. By using visualization tools such as citespace and netdraw to sort and analyze the research literature related to elderly care models in CNKI from 2010 to 2019, we present the research methods, research hotspots, and research trends of elderly care models in form of a visualization mapping. The research results show that the current research hotspots of the elderly care model mainly focus on the elderly care model, population aging, home care, elderly care services, and other hotspots; the research trends focus on the "Internet+" elderly care, artificial intelligence elderly care, and other emerging elderly care models. The purpose of this study is to sort out the hot spots and research trends of elderly care models and to provide further ideas and directions for future research on elderly care models in China.

Keywords: Retirement models · Big data · Research trends · Citespace · Netdraw

1 Introduction

Literature is not only a summary of the frontiers of a discipline but also a predictor of its development trends. A systematic review of scientific literature in a certain field can help researchers to have a good understanding of the development history, research hotspots, and research frontiers of the field, thus promoting its prosperity and development. According to the data, the elderly population in China has reached 248 million in 2020, with the proportion of the elderly population reaching 17.17% and the total number of elderly people over 80 years old reaching 30.67 million; it is expected that by 2025, the elderly population over 60 years old will exceed 300 million. This means that the demand for elderly services in China will reach its peak and China will become a super-elderly country. This means that the demand for elderly services will reach its peak and China will become a super-aged country. With the increasing aging of the population, the imbalance between supply and demand, the heavy burden on the elderly, and the immaturity of the elderly care industry are becoming more and more prominent. It is becoming increasingly difficult for traditional elderly care services to meet the current and long-term population aging problem in China, and solving this problem is of great importance to the quality development of the economy and society.

Although the research in the field of elderly care models in China has been advancing, few papers have comprehensively reviewed the literature on elderly care models in China. Based on the database of CNKI, this paper uses co-word analysis and visual analysis tools such as Citespace and Netdraw to provide a comprehensive analysis of the research characteristics, hotspots, and trends in the field of elderly care models from quantitative and visual perspectives, to have a more systematic and comprehensive understanding of the research directions and hotspots in this field, and to reflect the hotspots and trends of elderly care models from multiple perspectives. The aim is to provide a more systematic and comprehensive understanding of the research directions and hotspots in this field and to reflect the hotspots and trends of the elderly care model from multiple perspectives.

2   Research Methodology and Data Sources

2.1   Research Methodology

Firstly, the research methods adopted in the literature on pension models over the last decade were summarised and the matrix data were converted into "##h" files by Usenet, and the "##h" files were recorded into Netdraw for mapping analysis.

Secondly, bibliometrics is a quantitative method combining mathematics and statistics to perform descriptive statistical analysis of the literature system and bibliometric features through different dimensions. Cite space software, one of the widely popular tools for mapping knowledge, is an information visualization software developed by Professor Chaomei Chen of Drexel University based on Java language, which mainly includes literature co-citation The software includes literature co-citation analysis, collaborative network analysis, and co-occurrence network analysis. This study uses co-occurrence network analysis. This study adopts the co-occurrence network analysis method, which summarises the cumulative number of occurrences of a set of words in the same article, reflecting the effect of the words on the content and subject matter of the article, and thus revealing the affinity between these words, to present and analyze the structural changes of the subject matter or discipline they represent in a three-dimensional manner.

2.2   Data Sources and Processing

To ensure the authoritativeness, representativeness, and recognition of the selection, this paper selected Chinese core journals and CSSCI source journals from the CNKI database with the theme of "elderly care model" or "elderly care mode", and select the period from 2010 to 2019. After de-duplicating and sorting the search results and removing entries such as journal conference calls, volume headings, individual academic results, book reviews, subject group signatures, and no authors, a total of 1,075 valid documents were obtained, which were then used as the basis for processing and analysis.

3 Analysis of Research Methods in the Literature Related to Retirement Models

In this paper, with the help of net draw, the co-occurrence relationship between research methods and corresponding chronologies of pension models from 2010-to 2019 is presented in the form of visual mapping, as shown in Fig. 1, after induction.

The circular nodes in the figure indicate the different specific years, the square nodes represent the research methods used, and the nodes with connected lines indicate that the two nodes had a word frequency co-occurrence. Figure 1 shows that empirical research methods, such as questionnaires and interviews, are mostly used in the field of retirement models, which are relatively homogeneous in form. This is due to the limitations of the disciplines, for example, science and technology disciplines obtain data through experiments and then analyze the data to conclude, and the abundance of data lays the foundation for the diversity of research methods, while humanities and social sciences disciplines read a lot of academic literature and books, and make innovations in content and methods based on sorting and summarising existing knowledge.

However, due to the increasing severity of the aging population and the increasingly diverse needs of older people in old age, the state is paying more and more attention to research in the field of old age. As can be seen from Fig. 1, research methods in the field of elderly care models have been innovated in recent years. More and more research methods from other disciplinary fields (economics, social statistics, etc.) have been applied to the field of elderly care models, and more complex model analysis (structural equation model, Probit model, etc.) and econometric analysis have been gradually used, but these methods are still less used in the relevant literature. This paper uses bibliometric methods to analyze the literature on retirement models in the last decade and presents a scientific, rational, and imaginative picture of the hotspots and trends in the research on retirement models, which not only innovates the existing research methods in the field
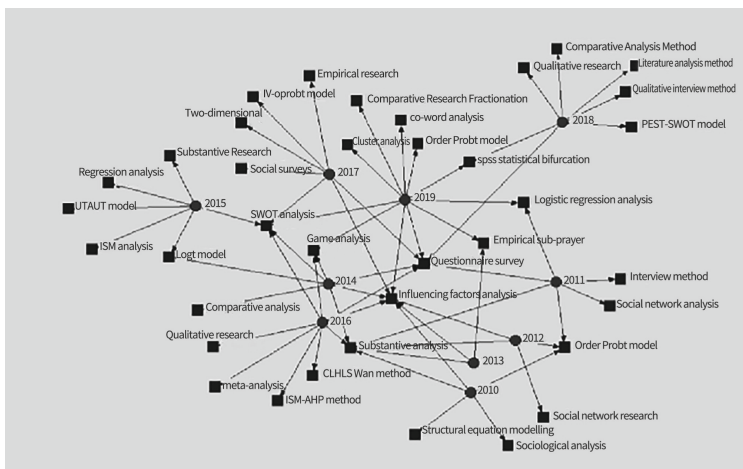

Fig. 1. Knowledge mapping of research methods for models of aging

of retirement models but also provides support for the future development of retirement care and policy formulation in China.

4   Analysis of Hotspots of Research Related to the Elderly Care Model

4.1   Statistical Analysis of High-Frequency Keywords

High-frequency keywords can effectively present research concerns, thus revealing the hot topics in this research area. Centrality reflects the degree of centrality of each term. The most closely related keyword in the model of elderly care is institutional elderly care, with a centrality of 0.63, which constitutes a co-occurrence relationship with other keywords. In addition to this community home care and family, care are also more closely related to the other keywords.

After analyzing 1075 pieces of literature on elderly care models, the keywords appearing more than 20 times in total are shown in Fig. 1, which shows that elderly care models, medical and health care integration, and home care have the highest frequency, 214, 103 and 100 times respectively, which represent the hot topics (elderly care models, medical and health care integration, home care, etc.) that have been concerned and discussed in the field of elderly care models in the past ten years. By analyzing and sorting out these hot topics, researchers can help clarify the current status of research in the field of elderly care models. The higher the frequency of the keywords, the more attention is paid to them. However, this inference is not entirely accurate and is influenced by other factors, such as the fact that the frequency of mutual care is low because it is a concept that has only been introduced in recent years, and the research literature on this topic is very limited, so keyword co-occurrence analysis is also needed (Table 1).

4.2   Keyword Co-occurrence Analysis

Suddenly appearing keywords are keywords that appear or are used rapidly within a certain period of time, which can reflect the research hotspots and evolution trends within a certain period of time. The higher the degree of sudden appearance of a keyword, the higher the academic attention of the keyword. Therefore, this paper uses CiteSpace software to map the emergent words in the field of retirement model from 2010 to 2019 (Fig. 2), and studies the changing trends of the topics in this field at different time periods by tracking the changes of the sudden words of retirement model.

The emergent terms in the field of pension models in the last decade are the 19 keywords in Fig. 2, such as rural, social pension, pension security, etc. The black part indicates the emergent year of the keyword (for example, the keyword "housing pension" has an emergent year of 2012 and an ending year of 2014, with an emergent intensity value of 6.4133). By analogy, we can divide the hot trends in research on retirement models in the last decade into two stages.

The first stage is the development stage of traditional retirement model (2010–2016), in which the core key words found through vocabulary recurrence are rural, social retirement, retirement protection, housing-based retirement, population ageing, etc. This stage

Table 1. High-frequency keywords related to retirement models, 2010–2019

Frequency	Centrality	Key Word
214	0.22	pension mode
103	0.03	combination of medical care and nursing care
100	0.04	home care
95	0.13	population aging
82	0.10	elderly care services
72	0.37	family pension
68	0.05	Aging
50	0.09	the elderly
46	0.30	community pension
43	0.63	institutional pension
38	0.35	rural
33	0.24	social pension
32	0.23	elderly care institutions
31	0.40	community home care
30	0.14	providing for the aged by housing
29	0.22	rural pension
28	0.02	elderly care
24	0.06	mutual support for the aged
23	0.13	Smart pension
23	0.28	influencing factors

Note: Frequency represents the total number of keyword recurrences; the centrality factor reflects the position of the keyword among all keywords.

is mainly based on the study of relatively traditional retirement model in the context of population ageing in China, and the main research methods adopted are qualitative and empirical research. The research topics include rural elderly care, community elderly care, home elderly care, social elderly care, etc.

The second phase is the exploration phase of emerging elderly care models (2017–2019), with keywords such as "Internet+", medical and health care integration and smart elderly care appearing, indicating that these are the most popular research terms for elderly care models at present. Compared with the emergence value of the keywords before and after, the emergence intensity value of "medical and health care integration" is the highest, which indicates that it is a very meaningful turning point in the research of the elderly care model. It is easy to see from the change in keywords that the number and proportion of elderly people in China is increasing year by year as the burden of population ageing increases. In this stage, the research is more about innovative research compared to the traditional elderly care model, which can be subdivided into the Internet

Fig. 2. Knowledge map of emergent words

of Things stage and the Artificial Intelligence stage according to the difference in research stages. The IoT stage is mainly about information technology and intelligence, and is characterised by the integration and optimisation of existing configurations and resources for the purpose of enhancing service experience. The artificial intelligence stage is the advanced stage of smart ageing and is the real form of realisation of smart ageing in the future. This stage of research into emerging models of ageing shows a significant increase in the amount of literature relating to the use of econometric methods as well as complex model research methods.

In summary, combined with the analysis of the existing literature on elderly care models, the research hotspots of elderly care models in the past decade can be summarised as follows: background research on elderly care issues and research related to smart elderly care.

4.2.1 Background Research on Old Age

Since we entered the ageing society in 2000, China will face a huge challenge of old-age care due to the significant increase in the number of elderly people, the deepening of ageing and the gradual increase in the elderly dependency ratio. The ageing of the population is a global trend. In the face of the global trend of population aging, all countries are making corresponding countermeasures, but compared with other countries and regions, China's population aging has the characteristics of "getting old before getting rich" and "getting old before getting ready". However, compared to other countries and regions, the ageing of our population is characterised by "ageing before wealth" and "ageing before preparation" [1]. As a result, there is still insufficient preparation for the accumulation of material wealth in society and the construction of a social service system for the elderly. A report released by the China Development Research Foundation predicts that by 2050, there will be nearly 500 million people over the age of 60 in China. Wei Qiang and Lu Jing. According to the report, the burden of old age will be nearly three times higher in 2050 than in 2019, which means that one elderly person will need two labourers to take care of the old age problem. Obviously, the supply of

resources for elderly services cannot keep pace with the growth of the elderly population. It is clear that the supply of elderly services cannot keep pace with the growth of the elderly population. For a long time to come, the contradiction between the rapidly growing spiritual and material needs of the elderly population and the relatively insufficient resources and supply of elderly care services will be the main contradiction in the development of China's ageing industry and business. Therefore, scholars have pointed out that the solution to this major problem is to provide the elderly population with the necessary resources. Therefore, scholars have pointed out that the first task to solve this major contradiction is to improve the efficiency and quality of elderly care through the innovation of the original elderly care model, so as to solve the elderly care dilemma. This will help to solve the old age dilemma.

4.2.2   Research Related to Smart Aging

(1) Feasibility study on a smart aging model
Under the rapid development trend of China's aging society, the state attaches great importance to the development of the elderly industry industry industry, combined with the opportunity of the rising construction of smart cities around the world, the construction of smart elderly models has appeared to a better opportunity, based on the integration of technology-based smart elderly model in China began the initial attempts The initial attempts to develop a smart aging model based on integrated technology have begun in China. The existing literature on the feasibility study of smart elderly care focuses on three perspectives: elderly care needs, policy support and technical support.
1) Ageing needs perspective
Wang Xiaohui and Xiang Yunhua classified the needs of the elderly into four categories: life care, health care, spiritual comfort, and cultural entertainment. The four categories are life care, health care, spiritual comfort, and culture and entertainment. Huazhong Sheng et al. argue that the needs of the elderly include not only life services (life care, financial management of the elderly, property management, leisure travel, spiritual comfort, etc.) but also medical and health services (chronic disease management, rehabilitation care, long-term care, Chinese medicine, and health care, etc.) Although scholars differ in their classification of the levels of needs of the elderly, they all emphasize that the needs of the elderly are multi-dimensional, diversified, and personalized. However, there is a shortage of an effective supply of elderly care resources in China, and the traditional elderly care model can no longer meet the needs of the elderly. How can the existing resources be used to meet the reasonable needs of the elderly? In response to this problem, Sheng sees the need to improve the level of intelligence in the supply of elderly services, to increase the degree of "an adequate response to demand". The issue of "adequate demand response" should be improved in the provision of elderly services [3]. Wei Qiang and Lv Jing emphasize the development of smart aging services to meet the diversified needs of the elderly by improving the efficiency of services and thus solving the problem of insufficient supply. The development of smart elderly care will help to solve the problem of insufficient supply and meet the diversified needs of the elderly [2].

In conclusion, in the face of insufficient effective supply, the traditional model of elderly care services has limitations, so the construction of a demand-driven elderly care service system and its functional class of intelligence is urgent.

2) Policy support perspective

In order to respond to the needs of China's aging society and promote the development of the elderly service industry, the State Council and various ministries have launched a series of relevant policies and promotional measures in recent years. 2012, the National Office for the Aging first put forward the concept of "intelligent elderly care" and mobilized social resources to encourage and support practical exploration. 2013, the National Committee for the Aging specifically established the "National Intelligent Elderly Care Expert Committee" to coordinate the development of the cause and industry of intelligent elderly care services in China. In July 2015, the State Council issued the "Guiding Opinions on Actively Promoting "Internet+" Action", which pointed out that relying on the existing Internet resources and social forces, community-based projects can be developed. In July 2015, the State Council issued the "Guiding Opinions on Actions to Actively Promote "Internet+"", which pointed out that relying on existing Internet resources and social forces, community-based information service network platforms can be built to provide nursing care, health management and rehabilitation services for the elderly at home. In July 2017, the "New Generation of Artificial Intelligence Planning" was promulgated, indicating that the future elderly care model can be fully upgraded with artificial intelligence technology to achieve changes in the production and service methods of traditional industries such as elderly care and health. He Zhenyu et al. have sorted out China's elderly care policies from 2013–2017 by quantifying them, and concluded that China has issued this series of guidelines and planning outlines on smart elderly care in recent years, indicating that the Chinese government is paying more and more attention to the development of the smart elderly care industry. This shows that our government is paying more and more attention to the development of the smart ageing industry. In the future, our government will continue to improve the policies related to smart ageing in the light of the actual development, in order to promote smart ageing in depth.

In conclusion, the intensive introduction of policies shows that the development of smart ageing is strongly supported by the state and has formed a wide awareness in society, which has laid a solid policy foundation for the promotion of smart ageing services in China.

3) Technical security perspective

In the past decade, the construction and development of the Internet have promoted the integration of various industries and their services, stimulating innovation and development of new service industries and existing service models, and elderly services have benefited as well. Technical standards for cloud computing, big data, the Internet of Things, and intelligent terminal devices have been largely mature and complete The expanding scale of Internet users, the expanding penetration rate of the Internet, the huge number of mobile phones, and the development of related software have laid the basic hardware and software foundation for the development of "Internet+ elderly care" services The in-depth application of 5G technology in public services such as education, healthcare, and elderly care provides a strong technical guarantee for smart elderly care [4]. Wearable devices and telemedicine technologies The development of wearable devices and telemedicine technology is also becoming increasingly mature [5]. The development of wearable devices and telemedicine technology is also becoming more

and more mature, and some devices such as simulation touch and 3D stereo images have already appeared in the elderly care market. Although the development of artificial intelligence in elderly care is not perfect at present, through the big data collected from elderly care scenarios, and further data mining and deep learning, artificial intelligence in elderly care will make great progress.

In conclusion, although problems exist, the development of China's smart elderly care industry as a whole is on the rise, and the value of information technology in elderly care services will continue to be discovered and recognized.

5   Conclusions

As can be seen from the above, the elderly care model has always been one of the research focuses in the field of elderly care. A study of the evolution of the research hotspots reveals that: the elderly care model is a process of diversified development, and there are also initial elderly care models in the existing elderly care model system, and the models are interpenetrating and intersecting with each other; a study of the relevant elderly care models reveals that: from family elderly care to institutional elderly care, and then to the combination of medical and nursing care, the development of elderly care models is to better meet the diversified needs of elderly care A social development trend: the study of specific elderly care models consists of two main parts: on the one hand, it elaborates on the main points, and on the other hand, it explores how to improve the development because of the bottlenecks and shortcomings of the development. Therefore, research to explore the need to meet the diversified needs of elderly care in the context of deep aging is fully in line with the development of elderly care models.

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