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Analysis of Knowledge Maps on Domestic Security Culture of China

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Abstract

In order to explore the present situation and evolution trend of safety culture research in China, the safety culture related documents collected in CNKI Chinese database were taken as samples, and the samples were visualized by Citespace software. The results show that: (1) Central South University and China University of Mining (Beijing) have high academic influence in this field; (2) the research contents of safety culture mainly focus on the construction of corporate safety culture. The construction of safety culture in nuclear industry and the model of mechanism equation are discussed. (3) the research focus of safety culture is gradually inclined to the construction of methods and the structural model.

Keywords

Safety Culture; Citespace; Knowledge Map; Visualization.

1. Introduction

Safety culture is an important guarantee to ensure organizational safety. It has become a research consensus in academic circles at home and abroad to improve organizational through the construction of organizational safety culture [1-2]. With the active implementation of corporate safety culture in China, its proportion in enterprises is increasing.Although the construction of safety culture has achieved obvious results in various industries, it is still difficult to grasp the current situation of safety culture research systematically.

The combination of scientific knowledge map analysis and computer visualization technology can effectively analyze the measurement and hidden information of literature data. Based on the scientific knowledge map analysis method and related tools, this paper analyzes the literature data in the field of safety culture from several aspects, such as the number of and so on.In order to mine the hidden data of safety culture research, clarify its research content, detect hot issues and frontier research trends.

2. Data Sources and Research Methods

2.1. Data Sources

The data of this paper are from the database of China knowledge Network. In the CNKI database, the topic under the periodical type is used as the retrieval method. Set the search topic word "Safety Culture" and the retrieval time is 2008-2018. the journal source is "all journals ". Export references in the database in Refworks". format A total of 6973 periodicals were obtained, and 6908 articles were obtained after the initial removal of the literature.

2.2. Research Methods

Citespace software is used to draw the knowledge map of safety culture research [3-4]. Through dynamic and multivariate visual analysis, draw the development of security culture. It includes :1) through visual analysis of author units and cooperative relationships, research on key disciplines and academic teams ;2) through visual analysis of keywords, Research on hot

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issues in the field of safety culture ;3) through visual analysis of keyword time line and time area, the development trend and research focus of safety culture field are studied.

3. Visual Analysis of Knowledge Map of Security Culture

3.1. Data Analysis of Literature

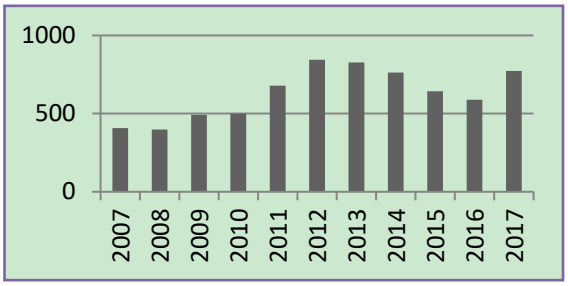

Fig. 1 Number of documents of safety culture

For an analysis of the number of Chinese periodicals in recent years, see figure 1. After 2010, the number of safety culture research literature increased greatly for many years, but there was a slow downward trend from 2014 to 2016, and the number of research literature reached a new high in 2017. It shows that the research in the field of safety culture is constantly improving, and safety culture has gradually become a research hotspot.

3.2. Author Analysis

This paper analyzes the research carried out by domestic scholars in the field of safety culture, and focuses on the research focus and direction of scientific research team [5-6]. The author's literature ranking is shown in Table 1.In recent years, China University of Mining and Technology (Beijing) issued 28 papers, the main research areas are: corporate safety culture; second, third, the Central South University School of Resources and Safety Engineering Wang Bing, Wu Chao, in recent years issued 26,23 articles, the main research areas are: safety culture system construction; fourth, the State Administration of Safety Production Supervision and Administration of Information Research Institute, in recent years issued 16 articles, the main research areas are: various industries safety culture; The fifth is Zhang Wei of North China Electric Power University. In recent years, the number of articles is 8. The research field is mainly nuclear industry safety.

Table 1. Ranking of the number of papers issued by authors

Ranking	Author	Institutions	Number of communications
1	Fu Gui	China University of Mining and Technology (Beijing)	28
2	Wang Bing	Central South University	26
3	Wu Chao	Central South University	23
4	Zhang Ailing	Information Institute of the State Administration of Supervision and Administration of Production Safety	16
5	Wang Wei	North China Electric Power University	8

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In addition to the third Fu Gui as a university research machine, the other authors are enterprise, the research field is focused on the construction of safety culture within each industry. It shows that in recent years, the construction of safety culture system is actively carried out within various industries.

Among the high-yield authors, the research on safety culture has gradually formed a team. Such as Central South University Wu Chao, Wang Bingxue team, mainly carry out the construction of safety culture discipline system. Based on the construction of organizational safety culture, the two core principles of organizational safety culture construction, that is, organizational safety culture grid theory and leverage principle, are refined and analyzed. And construct its "wheel shape" structure system.

Fu Gui academic team of China University of Mining and Technology (Beijing) mainly carries out behavior safety "2-4" model research. Its most cited article "the role of corporate safety culture and its quantitative measurement discussion ", using theoretical analysis, case empirical method, give the definition of corporate safety culture, and its quantitative measurement to explore [7-8].

In recent years, the author of the "security culture" field cooperation network knowledge map, see figure 2. It shows that a stable core journal group and high-yield author group have been formed in the field of safety culture. Central South University and China University of Mining and Technology (Beijing) are scientific research institutions with high academic influence in the field.

Fig. 2 "Safety culture" author cooperative network knowledge map

3.3. Analysis of Research Institutions

The analysis of research institutions can reveal the higher influence of scientific research in the research field, and the more active institutions. A list of the ranking of "safety culture" research institutions obtained by using Citespace visualization analysis is shown in Table 2, and the visual map of "safety culture" research institutions is shown in figure 3.

In recent years, the research in the field of safety culture has been scattered, mainly concentrated in the three units of the College of Resources and Safety Engineering of Central South University, the Nuclear and radiation Safety Center of the Ministry of Environmental Protection and the School of Resources and Safety Engineering of China University of Mining and Technology (Beijing), which have 218 nodes and 0.0012 links. The School of Resources and Safety Engineering of Central South University has set up the Center for Innovation and Promotion of Safety Theory of Central South University, which has continuously contributed to the innovative construction of theoretical disciplines in the field of safety.

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Table 2. Ranking of "Safety Culture" Research institutions

Ranking	Institute	Number
1	School of Resource and Safety Engineering, Central South University	39
2	Department of Environmental Protection Nuclear and Radiation Safety Centre	37
3	China University of Mining and Technology (Beijing) College of Resources and Safety Engineering	34
4	Dafeng District	22
5	China Nuclear Power Operation Management Co., Ltd	11
6	School of Mining and Safety Engineering, Shandong University of Science and Technology	8
7	China Nuclear Power Engineering Co. Ltd	8
8	North China Institute of Science and Technology	6
9	China Institute of Safety Production	6
10	China Institute of Safety Production	5

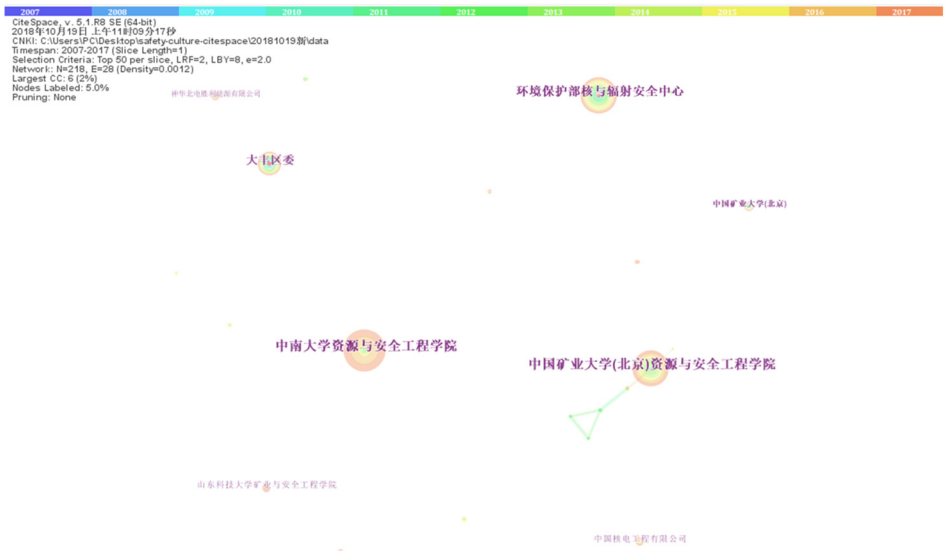

Fig.3 Visual map of the institute of safety culture

4. Research Hotspot and Research Frontier Analysis

4.1. Research Hotspot

The analysis of keywords can reveal the research focus and research direction. A list of high frequency keywords of "safety culture" research obtained by visual analysis of the application of Citespace is shown in Table 3, and the visual map of "safety culture" research hotspots is shown in figure 4. A total of 129 analysis nodes, line 625, link tightness of 0.0757. It shows that the research in the field of safety culture is more concentrated. Figure 4 and Table 3 show that the research scope mainly focuses on the construction of enterprise safety culture, enterprise nuclear industry safety culture construction and institutional equation model. Among them, enterprise safety culture management construction covers the most abundant content.

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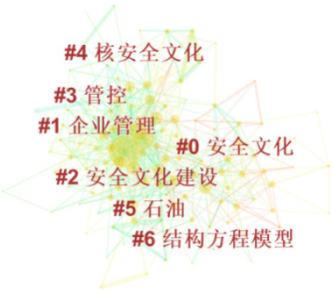

Fig.4 Visualization map of the research hotspot of "safety culture"

Table 3. Safety culture high-frequency keywords

ranking	keyword	frequency	ranking	keyword	frequency
1	Security culture	1352	4	Safety in production	602
2	Building a culture of safety	1235	3	Nuclear cultural construction	183
3	Business management	713	6	Corporate culture	125

4.2. Research Frontiers

Keyword time line analysis can reveal the research frontier in the research field. Application Citespace Visual Analysis of "Safety Text".

The visual map of the time line of Safety Culture is shown in figure 5. There are 129 analysis nodes, Line 625, Link tightness is 0.0757. The node size indicates the frequency of occurrence, The larger the node, the higher the research heat. Combined with figures 5, It shows that most of the research hotspots in the field of safety culture before 2014 mainly focus on the construction of enterprise safety culture and the management of safety culture, after 2014, the research focus gradually inclines to the method construction, the structure model and so on. It also shows that the study of safety culture slowly rises from practical research to theoretical research.

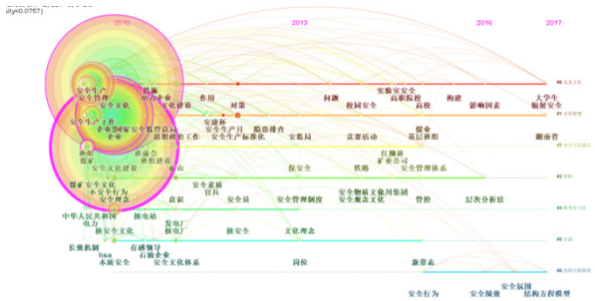

Fig. 5 Literature keywords timelines are viewable

5. Conclusion

(1) With the continuous improvement of research in the field of safety culture, safety culture has gradually become a research hotspot.

(2) In recent years, research in the field of safety culture has been scattered, mainly in the three units of the School of Resources and Safety Engineering of Central South University, the Nuclear and Radiological Safety Center of the Ministry of Environmental Protection and the School of Resources and Safety Engineering of China University of Mining and Technology (Beijing), respectively. The School of Resources and Safety Engineering of Central South University has

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set up the Center for Innovation and Promotion of Safety Theory of Central South University, which has continuously contributed to the innovative construction of theoretical disciplines in the field of safety.

(3) The research focuses on the construction of enterprise safety culture, enterprise nuclear industry safety culture and institutional equation model. Among them, enterprise safety culture management construction covers the most abundant content.

(4) Most of the research hotspots in the field of safety culture before 2014 mainly focus on the construction of enterprise safety culture and the management of safety culture.

Acknowledgements

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References

[1] Wang Bing,Wu Chao.Research on construction principles of safety culture[J].Journal of Safety Science and Technology, 2015(12):26-32.

[2] Wu Chao.Some advances of safety science fundamental theories of China in recent ten years[J].The Chinese Journal of Nonferrous Metals, 2016, 26(8):1675-1692.

[3] Wang Bing,Wu Chao.Research on basic issues of safety culturology[J]. China Safety Science Journal, 2016, 26(8):7-12.

[4] Wang Bing,Wu Chao.Basic issues and methodology of organizational safety culture assessment. Journal of Safety Science and Technology, 2017(10):66-73.

[5] Li Jie,Guo Xiaohong. Knowledge domains mapping of the safety culture research[J]. Wuhan Univeraity of Technology (Sicial Science Edition),2014(4):525-532.

[6] Tan Zhanglu,Shan Fei,Chen XiaoCi. Analysis of knowledge map in domestic coal mine safety research field[J].Journal of XI'AN University of science and technology,2017(6):837-843.

[7] Fu Gui,Yin Wentao,Dong Jiye.Behavior-based accident causation the 2-4 model and its safety implications in coal mines[J].Journal of China coal society, 2013, 38(7):1123-1129.

[8] Fu Gui,Li Changxiu,Xing guoJun. Inveatigations into the impacts of enterprise safety culture and its quantitative measuring[J]. China Safety Science Journal, 2009, 19(1):86.