Analysis and Comparison of the Hotspots of Ontology Research in the Field of Library and Information in China and Foreign Countries

Wenjun Cai
Gannan Medical University
Ganzhou, China 341000

Guanchun Xu
Gannan Medical University
Ganzhou, China 341000

Abstract—**"Ontology" belongs to the abstract concept and is attributed to the philosophical category, which is widely used in the field of computer science and information science, and there is an affiliation between library and information and information science. Therefore, the research subject of "ontology" is also concerned and popular in the field of library and information. Based on the rudiment period and development history of "ontology" research in the field of library and information in China and foreign countries, aiming at the hot keywords of "ontology" research, this paper takes the authoritative data source object as the research carrier, and comprehensively expounds it with scientific econometric analysis and comparative analysis methods.**

Keywords—China and foreign countries; library and information; ontology research hotspot; analysis and comparison

I. INTRODUCTION

With regard to the ontology research hotspots, there are completely different priorities in the field of library and information at home and abroad, which mainly depends on many factors, such as national conditions, macro-environment, value orientation and so on. In recent years, with the vigorous development of computer and Internet technology, some types of knowledge with distinctive characteristics of the times, academic branches came into being, and the concept of "ontology" has settled at this time, introducing new types to the field of library and information. With the attitude of keeping pace with the times, taking the focus of ontology research as the starting point, the majority of scholars and experts take the hot spot of ontology research as the starting point, analyze and compare the research results of library and information at home and abroad in this field, so as to determine the commonness and difference of the hot spot of ontology research at home and abroad.

II. DATA SOURCES CHANNEL IN THE FIELD OF LIBRARY AND INFORMATION IN CHINA AND FOREIGN COUNTRIES

A. Data Sources from China

Taking the well-known "Knowledge Network" data document database as the data research object, and "ontology" as the retrieval keyword, the classification catalogue of periodical literature, "Library, Information and Digital Library" was used as the partial phrase of retrieval.

The time node was defined in the six years from 2012 to 2017. Finally, a total of 482 references were searched. According to the year retrieval, there were 91 articles in 2012, 99 articles in 2013, 102 articles in 2014, 110 articles in 2015, 95 articles in 2016 and 78 articles in 2017. From 2012 to 2017, the number of ontology articles in the field of library and information in domestic journals was shown in "Fig. 1". As can be seen from "Fig. 1", the number of documents studied by ontology was increased from 2012 to 2015, and decreased from 2016 to 2017. Of which, the specific literature sources were involved in the field of polarization of the "Matthew Effect". That is, 34 articles in Library Science Research, 49 articles in Information Science, 53 articles in Library and Information Work, 33 articles in Information Magazine, which shows that the ontology research literature in the field of library and information mainly focuses on the journals with high influencing factors.
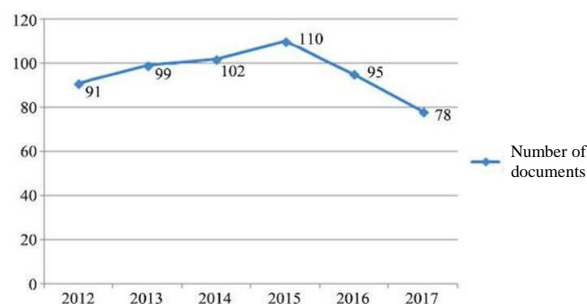

Fig. 1. Ontology outgoing message quantity in the field of library and information in domestic HowNet Journal from 2012 to 2017.

B. Data Sources from Foreign Countries

Taking the well-known scientific citation index data document database as the data research object, taking "ontology" as the retrieval keyword, the classification catalogue of periodical literature took "library and information science" as the retrieval sub-phrase, and the time node was defined in the six years from 2012 to 2017. Finally, 402 references with reference value were searched. According to the year retrieval, there were 54 articles in 2012, 57 articles in 2013, 62 articles in 2014, 78 articles in 2015, 94 articles in 2016 and 57 articles in 2017. From 2012 to 2017, the number of ontology articles in the field of

library and information in foreign journals was shown in "Fig. 2". As can be seen from "Fig. 2", it showed an upward trend, reaching a peak in 2016, while the number of documents in 2017 showed a decline from 2012 to 2016.
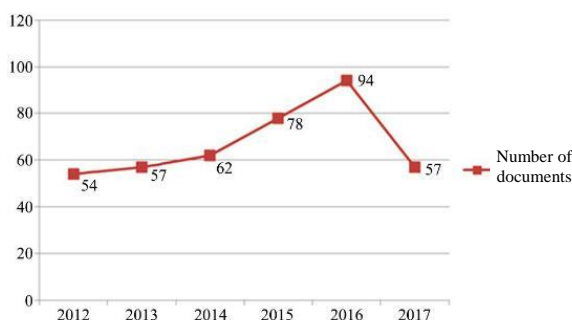

Fig. 2. Ontology outgoing message quantity in the field of library and information in overseas Science Citation Index Journal from 2012 to 2017.

III. HOTSPOT ANALYSIS ON ONTOLOGY RESEARCH IN THE FIELD OF DOMESTIC LIBRARY AND INFORMATION

A. Hot Keywords

Whether the content of periodical literature has continuous research hotspot in the present depends on the retrieval quantity of keywords, which can intuitively reflect the focus of attention of readers and academic research circles. Among them, whether the subjects drawn up and studied by the authors of the literature who play the main role in the field of library and information are concentrated in a scientific field. It is possible to analyze what belongs to the hot literature content and which belongs to the research not in popular demand through the concentrated topics in the field of literature research. Aiming at the database of HowNet, the investigative data object input the information measurement software, with the limited year of 2012 to 2017, and the nodes are selected as keywords. 56 nodes are obtained, and 109 of the literature data associated with them are obtained through the analysis of the operation of the software. Through this method, the top ten retrieval keywords can be determined, including domain ontology, associated data, digital library, ontology construction and so on, among them, the involved fields include ontology, ontology construction and ontology integration. For example, aiming at the direction of information retrieval in the field of library and information, in order to ensure the accuracy of retrieval query, some experts and scholars have established an efficient and convenient retrieval model based on the JESS domain ontology of reasoning engine. This kind of system model can extract valuable concepts and terms, so as to realize the integration of ontology knowledge elements.

B. Constructing a New Knowledge Base

In recent years, domestic scholars and experts have constantly upgraded and innovated the way of knowledge acquisition to provide more accurate retrieval services for the majority of users, reduce the probability of literature similarity caused by hot keyword retrieval, and further improve the retrieval efficiency. In view of the concepts of knowledge extraction, knowledge signal, knowledge

transformation, knowledge fusion and so on, a new explanation has been given again, and the knowledge system has been gradually improved and the technical barrier has been broken through. For example, Zhai Dongsheng constructed a semantic knowledge base with the help of computer cloud computing technology and graphic database model as the main reference object. If the user carries on the retrieval query to the required knowledge through the semantic knowledge base, the query speed will be more than five times as fast as in the past, not only the efficiency has been improved, but also the query precision has also been greatly improved.

C. Popular Author

Through the research and comparison, it can be seen that most of the core forces in the field of library and information in our country are concentrated in the major colleges and universities. Of which, the influential colleges and universities are: Wuhan University, Peking University, Jilin University, Nanjing University, etc. Most of the authors of hot research topics in this field are in-service teachers, master students and doctoral students, and the subjects studied by these authors represent the hot issues in the field of current research. Based on this, through the analysis and statistics of the number of documents published by the authors of ontology research, the authority of the data documents in the field of domestic library and information can be confirmed. The development trend of ontology research can be determined by collecting the core groups of authors in these colleges and universities. For example, Professor Qiu Junping of Wuhan University, who led the research team, adopted scientific metrology research methods for the ontology of the field of library and information. Professor Bi Qiang, School of Management, Jilin University, has carried out in-depth research on the relevant knowledge of semantic Web, and the research results are also remarkable.

IV. HOTSPOT ANALYSIS ON ONTOLOGY RESEARCH IN THE FIELD OF OVERSEAS LIBRARY AND INFORMATION

A. Hot Keywords

Aiming at the literature database of Scientific Citation Index abroad, the data objects studied are inputted into the visual bibliometric analysis software, and the atlas is created. With the help of binary counting method, 10 minimum co-occurrence topics are selected. Finally, 227 topics are obtained through software statistics. In order to make the analysis results more authoritative, the previous 60% of the topics with high similarity and high correlation are visualized, and 136 subject words are determined. From these 136 subject words, it is not difficult to find that the trend of ontology research hotspots in the field of library and information abroad is different from that in domestic books and information fields, and more attention is paid to the research of semantic web in foreign countries. Meanwhile, the ontology research in the field of library and information is associated with the Internet and the system, which involves the related knowledge of information retrieval and the research quantity of ontology modeling. If the keyword "ontology" is eliminated, the input keywords are

conceptualized and abstracted, and have a high correlation with the computer field in the process of retrieval abroad. It can be seen from this that foreign countries are more inclined to deal with technical problems and practicability in the field of scientific research. For example, Lee has established the user's music information retrieval system for the foreign information retrieval system, and the system will be constantly upgraded and improved with the change of users' needs. And for example, the language model established by Lhadj can effectively solve the problem of mismatch between synonyms and polysemous words. The establishment of this model combines the ontology of external resources with the content collected in the document, and provides more convenient services for the majority of users.

B. Popular Author

Through the retrieval of the popular authors of the literature database of Scientific Citation Index, it is found that there are seven papers on the ontology research of information behavior of network users, all of which are from Professor Zhitomirsky-geffet M of Israel bar-ilan University. There are five literatures on semantic models, all of which are from Professor Mar-condes CH of the University of Brazil fed fluminense. According to the statistics of the volume of documents issued by foreign institutions, it is found that the main publishing organizations in the field of library and information are mostly concentrated in some countries in Europe and the United States. From the number of subjects and literature studied by the two authors in Brazil and Israel, it can be seen that the high yield authors may not come from the high yield institutions. It can be concluded that the distribution characteristics of popular authors in ontology research in the field of library and information abroad are: the high yield of research institutions and the dispersion of popular authors.

V. CONCLUSION

According to the analysis and comparison of ontology research hotspots in the field of library and information at home and abroad, it can be seen that: most of the domestic research institutions in this field are concentrated in various colleges and universities, but the research direction is mainly theoretical knowledge, and the practicability and technology are relatively lacking. However, foreign countries follow the principle of combining theory with practice in this field, which is more practical and technical. Foreign countries pay more attention to the specific work of ontology construction, such as the field of medicine and chemistry. Therefore, researchers, experts and scholars in our country should use in the fields of agriculture, chemistry, biology, medicine and so on, and gradually reduce the gap with the developed countries.

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