

# Visual Analysis of Intangible Cultural Heritage Research Hotspots Based on Knowledge Graph

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## ABSTRACT

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Intangible Cultural Heritage (ICH) research has experienced a significant period of systematic development and theoretical accumulation over time. To gain a clearer understanding of the evolution and trends within this field, existing research has been comprehensively organised and analysed. This study employs the knowledge graph method to provide a thorough examination of ICH research, drawing data from two (2) major academic databases: China National Knowledge Infrastructure (CNKI) and Scopus. By utilising advanced tools like CiteSpace and VOSviewer, the study offers a visual analysis of publications related to ICH, revealing patterns and shifts within this body of knowledge. The use of these tools enables the identification of key themes and trends, providing a more comprehensive perspective for future research. The research findings suggest that the study of intangible cultural heritage in China has gone through three (3) distinctive stages: an initial period of slow progress, followed by rapid growth, and ultimately entering a phase of stable development. Key research areas within this domain include the preservation, management, and sustainable utilisation of ICH. Furthermore, international research trends in China have been found to closely align with those in European countries, reflecting a high degree of synchronisation and similarity in research themes. However, despite these advancements, gaps remain in certain specific areas, such as design application, in-depth case studies, and innovative communication methods for ICH. Through the use of visual analysis tools, researchers can gain a more intuitive understanding of the development trajectory of the ICH field in China. This provides a scientific and practical reference for future studies and helps identify potential areas for further research in the field.

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## INTRODUCTION

Intangible Cultural Heritage (ICH), made up of all immaterial manifestations of culture, represents the variety of living heritage of humanity as well as the most important vehicle of cultural diversity (United Nations Educational, Scientific and Cultural Organization, 2005). ICH is a cultural "symbol" that condenses folk regional characteristics, a "miniature" that reproduces traditional lifestyle, and a "result of interaction" that reflects human beings and nature, history, and the environment. On October 17, 2003, the 32nd General Assembly of United Nations Educational, Scientific and Cultural Organization (UNESCO) adopted the Convention on the Protection of ICH, which is an important milestone in the protection of ICH in human history (Lazaro & Jimenez, 2022). Since then, the preservation, inheritance, and utilisation of ICH have emerged as pivotal global agendas, capturing extensive scholarly attention and practical exploration (Liu & Pan, 2023). Therein, it is agreed that ICH can be utilised to trigger development, be it economic or social, sustainable or 'non-sustainable' (Meissner, 2017). However, many studies only focus on some specific aspects of ICH research and lack a systematic and comprehensive review of ICH. By December 2022, China had selected a total of 43 items on UNESCO's ICH List (United Nations Educational, Scientific and Cultural Organization, 2022), ranking first in the world. In recent years, scholars have shown their considerable concerns about China's ICH research (Dang et al., 2021). However, there are great differences in the status and development trend of ICH related research at home and abroad, and there is no research to use scientific methods to analyse this field, which limits the further development of ICH research to some extent.

In 2012, Google officially proposed the concept of the knowledge graph, which aims to assist intelligent search engines (Hao et al., 2021). Knowledge graphs describe knowledge resources and their carriers through visualisation. Moreover, they mine, analyse, construct, draw, and display knowledge and their interrelationships to reveal the dynamic development law of the knowledge field (Wang et al., 2023). In popular terms, a knowledge graph shows complex knowledge through data collection, information processing, knowledge measurement, and graph drawing, reveals the development law of knowledge, and provides a valuable reference for subject research. Therefore, this study aims to perform a bibliometric analysis of the ICH literature, presented in the form of a knowledge graph, to help readers quickly understand the knowledge structure, major areas, and recent progress of ICH research.

## LITERATURE REVIEW

With the increasing attention and enthusiasm for participation in ICH around the world, a large number of scholars, researchers, non-governmental organisations, and organisations have invested in the protection of ICH. At present, there are many studies on ICH, involving history, geography, anthropology, tourism, and other disciplines, mainly focusing on the following aspects:

First, the theoretical research of ICH itself. The research focuses on the definition, classification and specific project analysis of ICH (Dagnino et al., 2015; Fitzmaurice, 2010). Second, in the aspect of ICH protection, relevant research points out that the cognition and coordination of ICH protection should be improved, and the public's attention and participation in ICH protection should be strengthened through the exhibition hall, education, digitisation and productive protection (Blake, 2018; Doulamis et al., 2017; Xiao, 2021; Xu & Zou, 2022). Third, in the development of ICH products. This type of research pays more attention to the development of cultural and creative products and the innovation of design methods (Olalere, 2019; Shen, 2021; Tang et al., 2019). Fourth, in the consumption of ICH. It mainly uses marketing theory to carry out consumption categories or market segments and determine consumers' behavioural consumption patterns for specific cultural heritage resources (Petronela, 2016; Zhang et al., 2023).

Thus, ICH is an interdisciplinary field involving multiple research fields and has broad research prospects. The rapid increase in the number of articles in the ICH field makes it challenging to conduct a comprehensive literature review with traditional methods. To address this issue, this study adopts the method of knowledge graph using a mixed approach of bibliometrics and content analysis to analyse key

topics and research directions in the field globally. To existing literature by combining quantitative and qualitative methods.

Knowledge graphs play a crucial role in connecting diverse information, it is utilised in various domains, including spatial analysis, artificial intelligence, and natural language processing, to store heterogeneous information and support tasks like question answering and reasoning (Belth et al., 2020; Shen et al., 2022). Researchers have also explored the use of knowledge graphs in biodiversity data to establish connections globally and represent information comprehensively (Gu et al., 2022). These studies show that constructing knowledge graphs can improve research efficiency, especially in the aspects of research direction extraction and relationship recognition. In conclusion, a knowledge graph serves as a powerful tool for organising and connecting information in a structured manner, enabling efficient data retrieval, analysis, and decision-making for ICH domains.

## METHOD AND DATA SOURCE

The knowledge graph analysis method takes a certain knowledge field as the research object takes the literature involved in this field as the research data, imports the data into the visualisation software, and draws the graph of the correlation between the development trend and structure of this discipline, showing the distribution and evolution of the relationship, which belongs to the category of scientometrics. Guided by research objectives, the research flow chart of this paper is shown in Fig. 1.

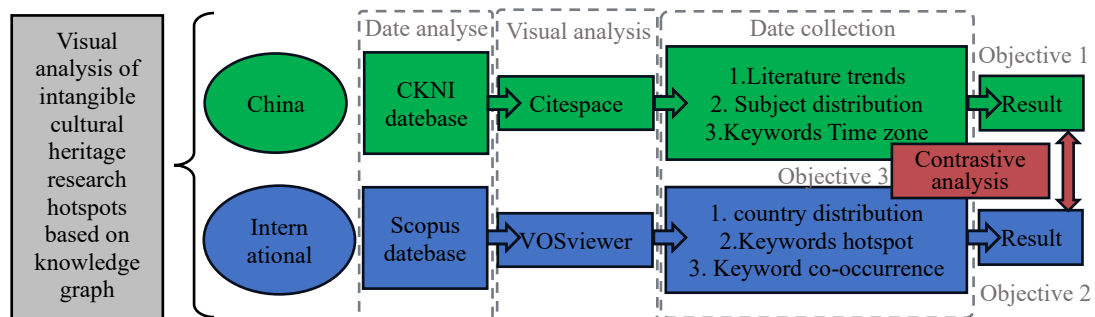


Fig. 1. Method Framework

Source: Authors (2024)

This paper aims to explore the current research status of ICH, track research frontiers and hotspots, and provide reference and guidance for future practical and theoretical research in this field. To make the existing research clearer, we propose the following research objectives:

- (i) Research the status and hotspot of ICH in China
- (ii) International research status and hot spots on ICH
- (iii) The similarities and differences between China and international studies on ICH

To achieve research objective 1. Using "intangible cultural heritage" as the search term in the China National Knowledge Infrastructure (CNKI, currently China's largest online academic literature retrieval database) database, the search period is 1997-2023, and 82,717 documents are obtained. Excluding irrelevant documents, 81,426 documents are finally used as basic data. Then the obtained literature data is converted into a format that can be recognised by CiteSpace software (Developed by the Joint Institute of Drexel-DLUT for Knowledge Visualization and Scientific Discovery). Set the period of the literature and

the relevant parameters of the single time partition, select the Pruning networks mode, and select the Node Types Keywords to generate the knowledge graph successively.

To achieve research objective 2. Search with the keyword "intangible cultural heritage" in the Scopus database (data updated on December 12, 2023), a total of 5,041 articles were included as data sources. Export the literature in the "Plain Text" format, record as "author, titles, source publications and abstracts", Knowledge graph analysis of the literature content through the VOSviewer analysis tool, Keyword distribution information and related links, generate the keyword protruding graph.

## RESULTS AND DISCUSSION

### Analysis of Chinese ICH based on the CNKI database

#### ICH trend analysis of the number of published literatures

The author in the CNKI database "intangible cultural heritage" as the theme of search, as of December, data shows ICH papers a total of 81426, from Fig. 2 overall trend analysis, research related to ICH began at the end of the 20th century, and began to increase rapidly around 2004, and increased year by year. The literature presents three (3) stages of development: slow start (1997-2004), rapid growth (2004-2010), and steady development(2010-Now). The topic of the ICH will still be the key areas in recent years, with the increase of research, the relevant system is gradually being improved and mature. Therefore, it can be seen that ICH is rich in the theoretical literature, taking ICH as the research focus can not only reflect the rationality and value of the research but also be forward-looking.

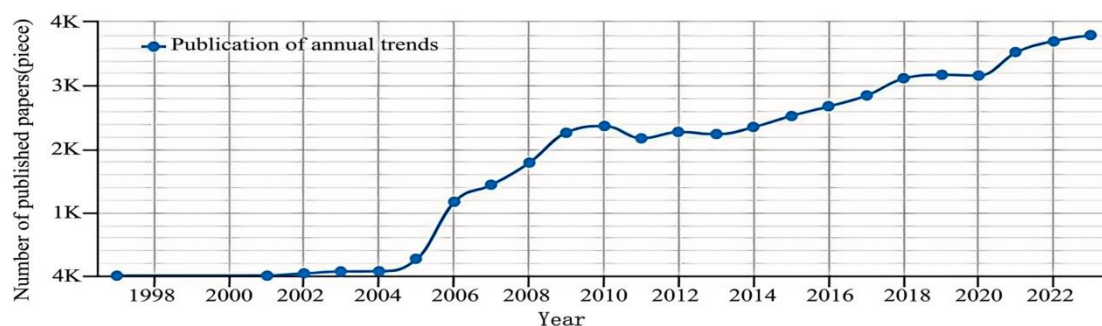


Fig. 2. Overall trend analysis plot of the CNKI database

Source: Yuting et al. (2019)

#### The ICH research topic analysis

Research topic distribution graph of ICH (Fig. 3), The top 15 relevant subject areas identified from the literature are shown. It can be found that "intangible heritage protection (24.03%" is a research hotspot of ICH, accounting for one-fifth of the overall study. In addition, "rural revitalisation ("10.71%", "visual symbols of ICH (10.29%", "Active inheritance (6.74%)", "sports ICH (6.40)", and other fields also occupy an important position. It can be seen that the related research of ICH takes protection as the basic means, the research topics are abundant, and the proportion of each research topic is relatively balanced, showing the phenomenon of common prosperity.

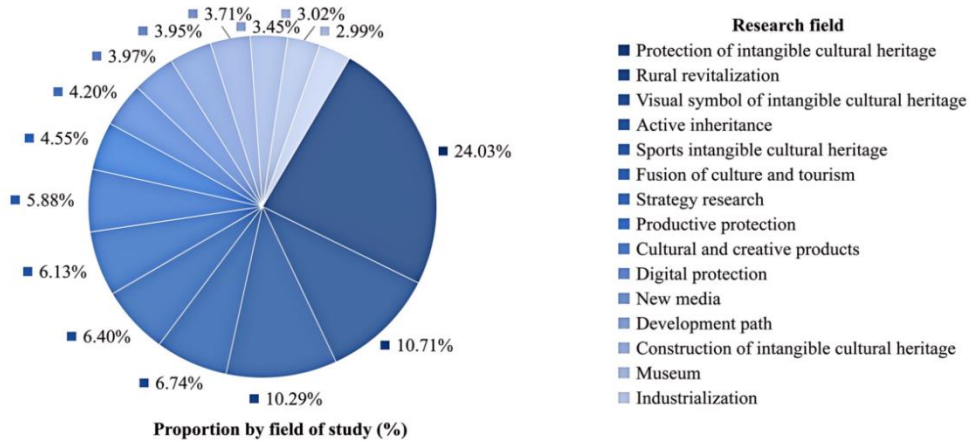


Fig. 3. Research topic distribution graph

Source: Zhu et al. (2022)

### ICH Keywords Time zone knowledge graph analysis

Based on the graphing by Time zone in CiteSpace, the stage hotspots and directions in the ICH field are sorted out (Fig. 4). The nodes are presented in different hues, with the markings in the purple inner circle indicating a higher centrality and an important development direction in this field. The colour of the connection between nodes can not only reflect the co-occurrence relationship between nodes but also can be used as a standard to measure the research trend. The figure shows twelve clustered knowledge groups marked with "#" symbols. These groups reflect the research direction in the field of intangible cultural heritage, and they are important areas that scholars need to study.

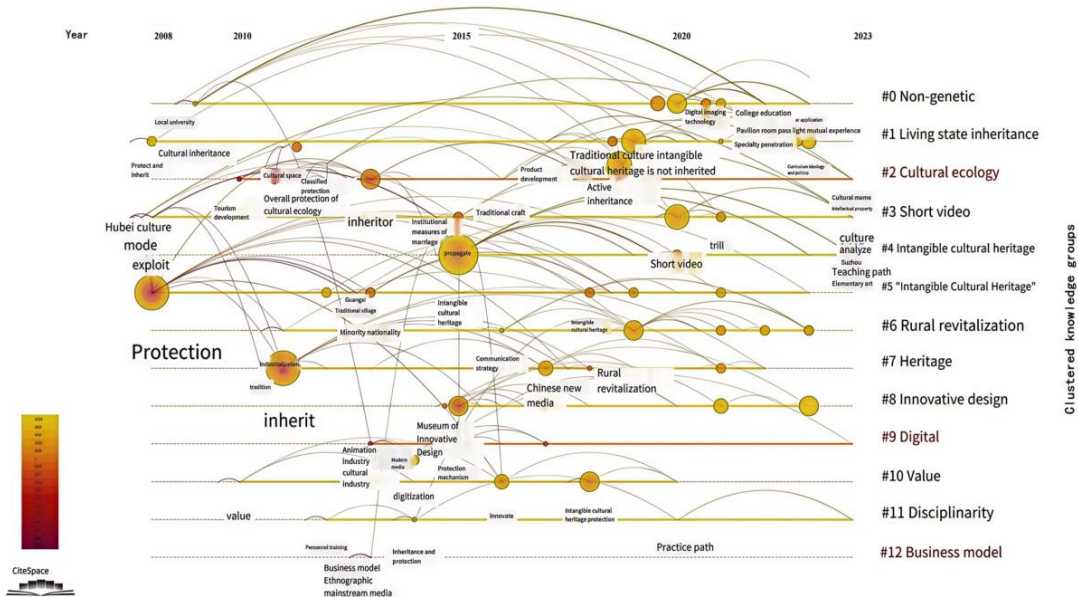


Fig. 4. Keywords Time Zone Knowledge Graph in Chinese ICH Literature from 2008 to 2023

Source: Authors (2024)

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Combined with Fig. 3 and Fig. 4, ICH research can be divided into three (3) aspects, namely, maintaining development and continuing innovation, management, development, and utilisation of the national intangible cultural heritage industry.

- (i) Maintain development and continue innovation. As can be seen from Fig. 3, "intangible cultural heritage protection" is the most concerned keyword in this field. The research direction has been closely concerned by the academic community, and the research focus is mainly on the systems and methods of inheritors, transmission, cultural inheritance, and living inheritance. At the same time, the sustainable development of this field needs to take science and technology as the guide to action, activate and continue with innovative thinking, and analyse the development of this field from the perspective of combining macro and micro research.
- (ii) Management of ethnic intangible cultural heritage and cultural industry. "Cultural ecology", "ethnic minorities", "industrialisation", "business model" and other keywords of this research direction. With the continuous development of society, the conflict between tradition and modernity has gradually influenced the research in this field. Nowadays, scholars emphasise in-depth thinking and exploration of the issues of tradition and modernity, integration and regeneration. To find out the unique industrial expression form and development path in this field.
- (iii) Development and utilisation. Intangible resources have strong regional representative characteristics, the development of tourism is the main path of intangible protection, given the cultural breath strong tourism area, through effective development and utilisation, deal with the government, tourism enterprises, tourists, and the friendly relationship between residents, make the traditional culture living inheritance and sustainable development.

## Analysis of international ICH based on Scopus database

### Countries distribution analysis

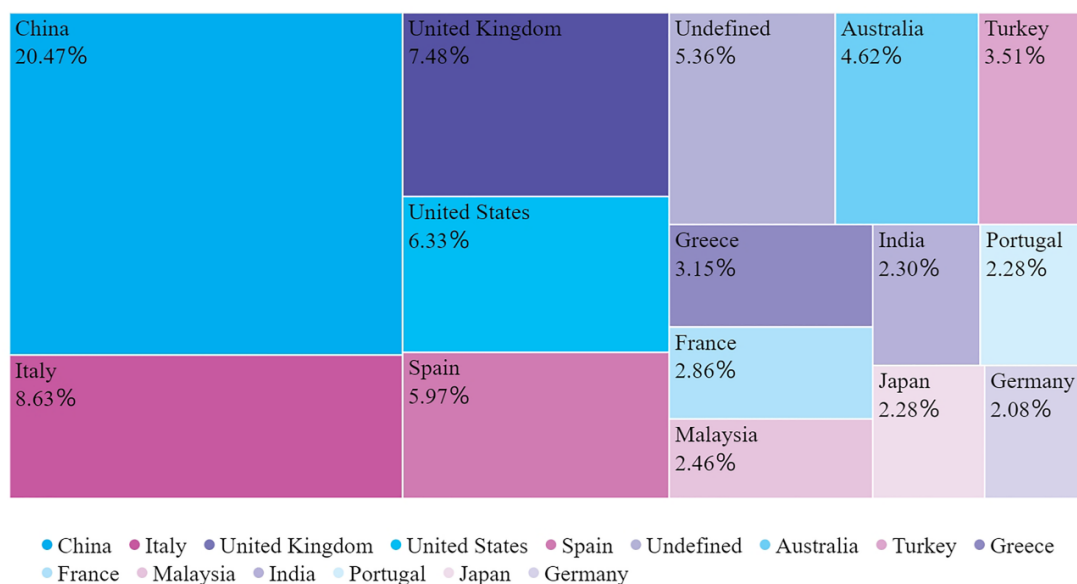


Fig. 5. The Proportion of ICH Literature Published by Each Country

Source: Authors (2024)





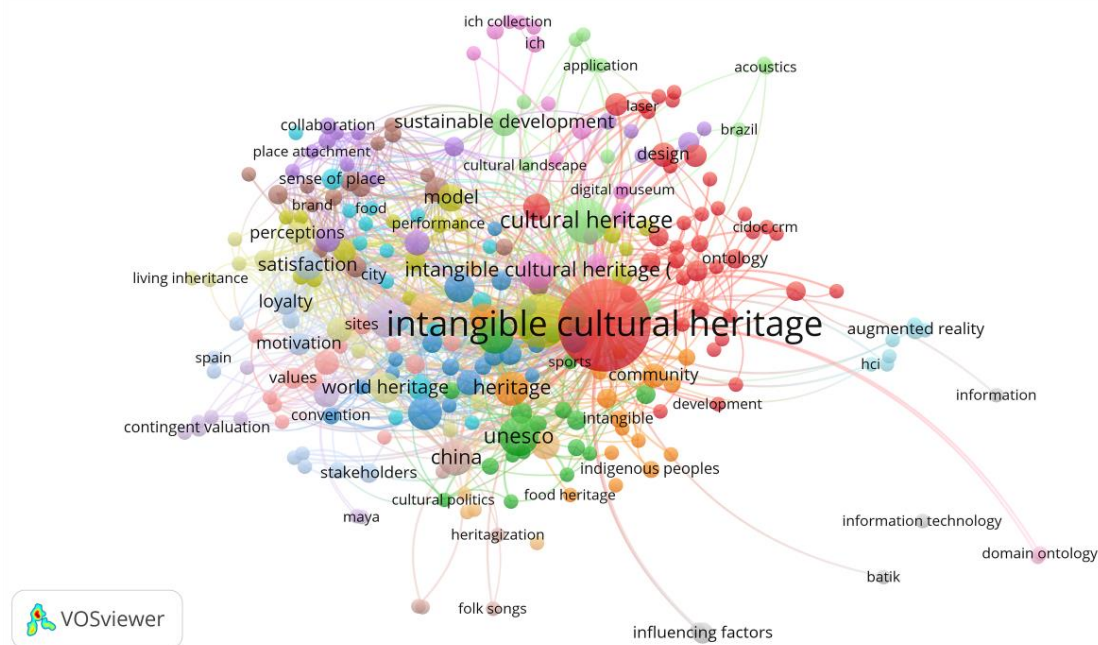


Fig. 7. Keyword Co-Occurrence Graph

Source: Wang et al. (2022)

## CONCLUSION

In the CNKI database ; data pool ; data library ; data bank, and ICH literature for sample data, using Citespace software to generate the Chinese ICH research publications, research topic distribution, and keyword time zone graph, can get the Chinese ICH research literature, have good research prospects, and research through a process from gradually realise to start development, divided into slow start (1998 to 2004), rapid improvement (2004 to 2010), steady state development (2010 - present) the three (3) stages. In the distribution of research topics, "protection", "rural revitalisation", "visual symbols of ICH", "Active inheritance" and "sports ICH" are the complementary patterns. In the keyword time zone analysis, the research tends to diversify.

Using VOSviewer software, the Scopus database literature analysis, ICH research country/regional distribution, research hotspot, and keywords, analyses the following conclusions: the international level of ICH research literature far less than China, and China in promoting the international ICH research played one fifth, ranked first, this is the European countries. In terms of research hotspots, the research focused on the theory of ICH itself and the scope was small. The correlation and intersection of ICH research and elements of the field are close and complex.

Finally, the research and horizontal comparison of ICH in China and the international community are that both domestic and foreign, ICH protection, rural revitalisation, and industrialisation development are all research hotspots. The overall research trend is synchronous, and the research in China should be faster. The differences are mainly reflected in three (3) aspects:

- (i) In terms of research scope, China is more comprehensive and richer. For example, there are few international studies in the fields of education and communication, and the international level pays more attention to the role of "design" in ICH protection.



- (ii) In terms of research methods, China focuses on qualitative research and applied research, while the international world prefers quantitative research, the research is more innovative.
- (iii) In terms of research connection, the degree of domestic and foreign cooperation is weak, and academic exchanges need to be strengthened.

In short, the value of ICH is unique and an effective proof of cultural continuity. In this study, the chaotic data can generate a traceable knowledge graph through visualisation techniques, to provide a reasonable and sufficient basis for ICH related research, organise and analyse the dynamic development law of ICH, and provide reference and direction for future development.

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#### CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

#### AUTHORS' CONTRIBUTIONS

Zhang Jiabin carried out the research and wrote and revised the article. Rohana Zur revised and approved the article submission. Mu Yun supervised the research progress. Ernawati makes logical suggestions.

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