



Research On New Chinese-Style Furniture Design Based OnBibliometric Analysis: Development Trends And Future Directions Of Traditional Architectural Elements Application

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ABSTRACT

The study aims to systematically review and analyze the research dynamics and development trends in the application of traditional architectural elements within the field of new Chinese-style furniture design, using bibliometric analysis methods. By statistically analyzing the recent academic papers and monographs in this field, the study reveals the core authors, main institutions, keyword co-occurrence networks, and thematic development paths. The findings suggest that new Chinese-style furniture design not only emphasizes the inheritance and promotion of traditional cultural elements but also focuses on the integration of modern design concepts and technologies. This approach aims to maintain traditional charm while meeting the functional needs and aesthetic tastes of modern life. This research hopes to provide scientific references and guidance for future research directions and design practices in new Chinese-style furniture design, promoting the innovative application of Chinese traditional cultural elements in modern design.

Keywords: Furniture Design, Traditional Architectural Elements, Contemporary Design, Furniture Design, bibliometrics

Introduction

Set against the rich cultural backdrop of traditional architecture in the Lingnan and Guangfu regions, this paper investigates how to effectively integrate these traditional architectural elements into new Chinese-style furniture design, aiming to achieve a combination of innovative inheritance of traditional culture and modern design. The research uses literature review and case study methods to analyze in detail the elements such as the layout, roof structures, and decorative arts of traditional architecture, and explores how these elements can be transformed into sources of inspiration for modern furniture design (Wang, 2011; Fang, 2008). This study introduces a new design concept of "cultural re-creation," emphasizing innovation through modern design means and technologies while respecting and inheriting traditional culture, enabling new Chinese-style furniture to convey not only the aesthetic spirit of traditional architecture but also meet the functional needs of modern use. The results show that the modern interpretation and application of traditional elements can effectively promote the inheritance and development of traditional culture and encourage interaction and development within the design and cultural fields (Peng & Chai, 2018; Qian & Dai, 2021). In summary, this research not only provides practical design cases and methodologies for designers and researchers but also offers a new perspective on how design activities can contribute to cultural inheritance and innovation, holding significant theoretical value and practical significance for anyone interested in the interaction between traditional culture and modern design.

Methodology

The recognized and scientific literature retrieval databases are Scopus [<http://scopus.com>] and Web of Science (WoS) [<http://www.webofknowledge.com>]. While the Web of Science (WoS) is renowned for its authoritative literature retrieval and analysis, Scopus is known for its broader journal coverage. To determine which database is more appropriate, searches were conducted on the topic of "product design" in both WoS and Scopus. Scopus retrieved 129 publications, whereas WoS retrieved 63 publications. These figures

represent the number of documents containing the phrase "modern Chinese furniture" in their titles, abstracts, or keywords over the years. Because of the high volume of publications, the data was gathered from Scopus on April 15, 2024. To select the most recent references, publications were chosen from those published after 2001. Hence, the total number of publications was reduced from 356 to 213. This represents the total number of publications on "modern furniture in China" issued from 2001 to 2020, excluding earlier and post-2024 publications (Aria & Cuccurullo, 2017). Therefore, from 2001 to 2024, the total number of scholarly publications identified through the Scopus database search for "modern Chinese furniture" titles is 369. The yearly publication counts for "product design," along with the top 10 publishing countries and regions, and the top 20 authors, can be directly visualized through VOS software. VOS Viewer is a tool designed to create maps based on distance, clustering keywords sourced from the titles and abstracts of research papers (Li & He, 2014). It visualizes bibliometric indicators by connecting nodes, each representing a keyword, a country, an institution, or an author. Using search terms "traditional architectural elements" and "contemporary Chinese aesthetics," the total of 356 publications was refined to 129 (Ebrahim et al., 2020).

Like other literature retrieval and bibliometric studies, the data collection process in this study may have some limitations. The data was primarily collected from Scopus database publications, with "product design" as the thematic search in titles to ensure the accuracy of data collection. Although about 95% of the literature was compiled from both WoS and Scopus databases, this study does not cover specific literature in the WoS database. In summary, this literature represents a metric analysis of a large number of articles in Scopus, using models to showcase research trends in product design (Ebrahim et al., 2020).

The Bibliometrix package is an R tool specifically developed for detailed scientometric and bibliometric analyses, allowing for comprehensive scientific plotting. The Vos tool facilitates the import of bibliographic data through various routines from renowned databases like WoS and Scopus. Figure 1 illustrates the primary data collection process, which is suitable as a preferred reporting item for systematic reviews and meta-analysis flow charts (PRISMA). This helps in blending the qualitative analysis of bibliometric outcomes with the content of publications.

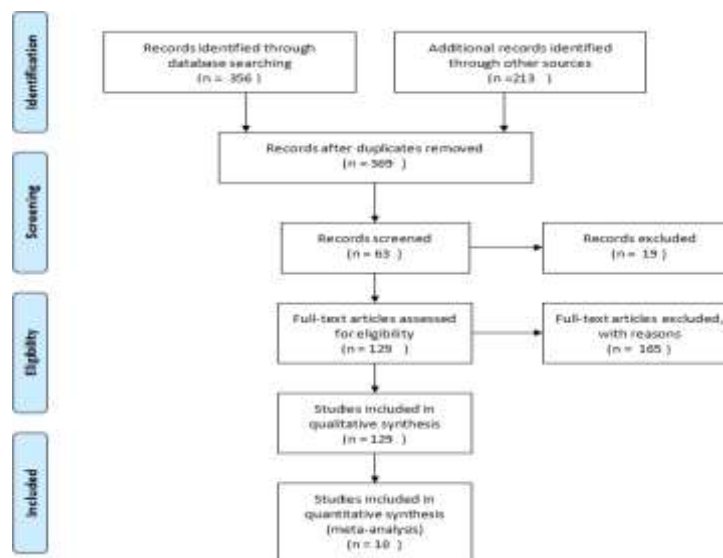


Figure 1, The PRISMA flow diagram for the bibliometric analysis on traditional architectural elements and modern furniture in China Models.

Table 1 presents a summary of the key information from the collected bibliometric data. It includes a total of 120 papers, consisting of 10 review articles, 90 research papers, and the remaining papers are conference abstracts and other types of documents. A qualitative analysis was conducted on the previously mentioned 10 publications (out of the total 90 articles) to depict the sub-themes currently prevalent in the traditional architecture of the Lingnan and Guangfu regions and new Chinese-style furniture design, particularly focusing on traditional architectural elements and new Chinese-style furniture design. The following section will provide titles and qualitative analysis for the data.

Table 1 is an overview of the key facts from the bibliometric data collected.

Description	Results
Sources (Journals, Books, etc)	90
Documents	120
Annual Growth Rate %	4.06
Document Average Age	5.54
Average citations per doc	3.8

Keywords Plus (ID)	481
Author's Keywords (DE)	445
Authors	248
Authors of single-authored docs	44
Single-authored docs	47
Co-Authors per Doc	2.33
International co-authorships %	17.5
article	73
book	1
conference paper	26
review	10

Quantitative

Analysis of Publication Years

From 2001 to April 20, 2024, Figure 2 illustrates the annual scientific output of publications related to furniture design and traditional Chinese elements. In this period, a total of 120 papers were released, comprising 90 research papers, 10 review articles, one monograph, and 26 conference papers. The publication frequency grew significantly, from a single article in 2013 to 15 articles by 2019, marking two major turning points within this timeframe. From 2019 through 2021, the number of published papers stabilized. Since the beginning, research on health education and myopia prevention has exhibited a gradual increase, drawing more academic focus in 2021 and 2023.

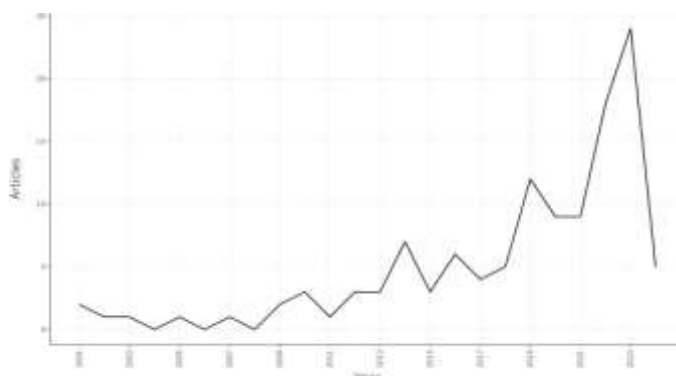


Figure 2, Annual scientific production of articles Furniture Design and Traditional Chinese Elements, 1921-2023.

Figure 3 displays the average annual citation rates from April 20, 2021, to April 20, 2024. According to this data, the year 2011 had the highest average annual citations, followed by 2009, with the lowest citation rates occurring in 2011 and 2015. Between 2019 and 2022, there was an increase in citation rates, indicating a renewed scholarly interest in this topic in recent years.

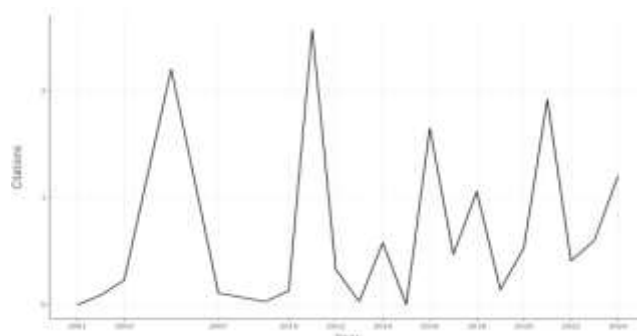


Figure 3, Average annual citations in Furniture Design and the Use of Traditional Elements research from 2001 to 2024.

The image references 34 publications, including articles, reviews, and conference proceedings. Figure 4 illustrates the most cited documents from 2001 to 2024. The analysis focuses on the number of citations to measure the impact of published works. As shown in the figure, the two most locally cited categories belong to "Theoretical Studies in Literature and Art" and "Energies," although most citations occurred between 2010

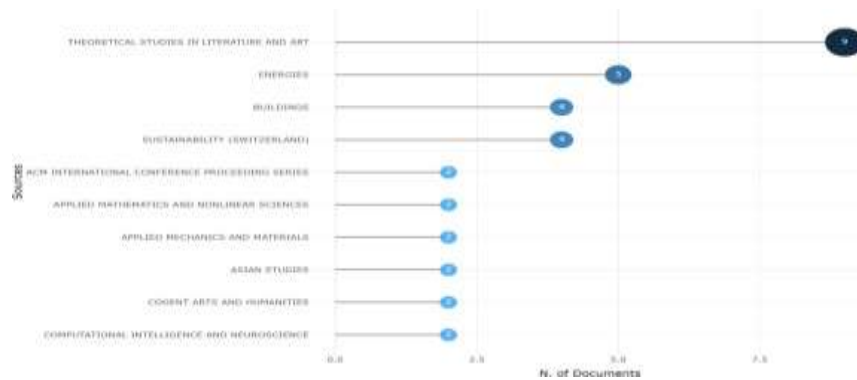


Figure 4, The 10 most cited papers in the field of The use of traditional elements in furniture. Analysis of Authors

Between 2001 and 2024, a total of 120 scholarly papers were published on the subject of furniture design and the application of traditional elements. This means that an average paper had 44 authors and 248 contributing collaborators. Figure 5 depicts the output of the most relevant authors from 2021 to 2024. The timeline of the authors is displayed in red. Xu J. authored four articles between 2009 and 2022 on furniture design and the use of traditional elements in furniture. Xu J. (2014) has been contributing for the longest period among the authors. The bubbles' size reflects the number of documents each author has published, and the color intensity of the bubbles indicates the annual citation counts. The total annual citations also correlate with the intensity of the bubble color. From 2021 to 2023, several authors wrote highly cited papers. The graph indicates that an increasing number of researchers are becoming interested in and are conducting research on furniture design and the application of traditional elements.

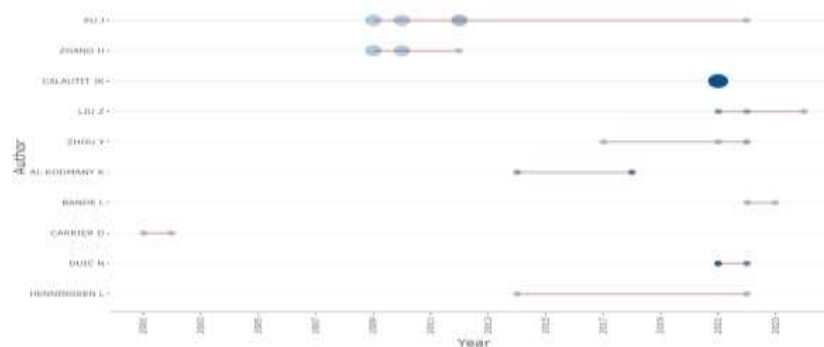


Figure 5, From 1970 to 2022, 20 writers in the field The use of traditional elements in furniture design (red line: timeline of authors, bubble size: public number ions, bubble color intensity: total citations per year).

Analysis of Source

The category includes 120 sources, such as journals, books, and series from conference proceedings. Figure 6 depicts the increase in new sources between 2001 and 2024. This graph displays the leading sources for the disciplines of furniture design and traditional Chinese elements. Over time, the number of journals has steadily increased. Additionally, between 2007 and 2017, the growth of the "Ventilation" journal plateaued but resumed a rapid growth trend after 2020. Although "Product Design" was not published until 2008, it became the foremost important source in this research field by 2010.

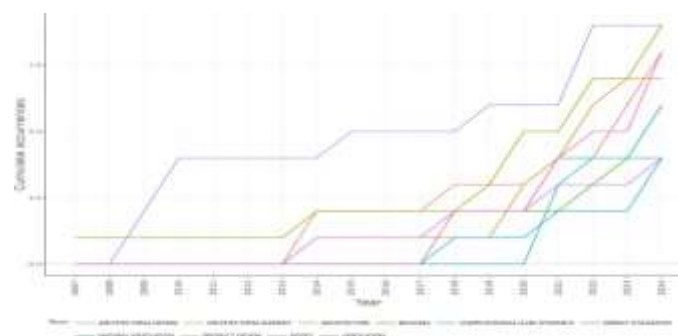


Figure 6, Shows the annual incidence of the most important use of traditional Chinese elements in furniture research from 2007 to 2024.

Analysis of Countries

In the research domain of furniture design and traditional Chinese elements, 20 countries have published a total of 120 publications. Figure 7 shows the rankings of the top 20 countries based on scientific output. The countries where university authors from China have published the most papers are indicated with a red line, while those where Chinese university authors have collaborated with at least one foreign co-author are shown with a blue line. There are two types of publications: Publications can be categorized into multi-country publications (MCP) and single-country publications (SCP). China tops the list with over 40 papers, while the United States and the United Kingdom follow with 6 and 5 papers respectively, making these the three most prominent countries. Additionally, China holds the record for the highest number of publications produced without international collaborations. Authors from Nordic countries place a stronger emphasis on collaboration.

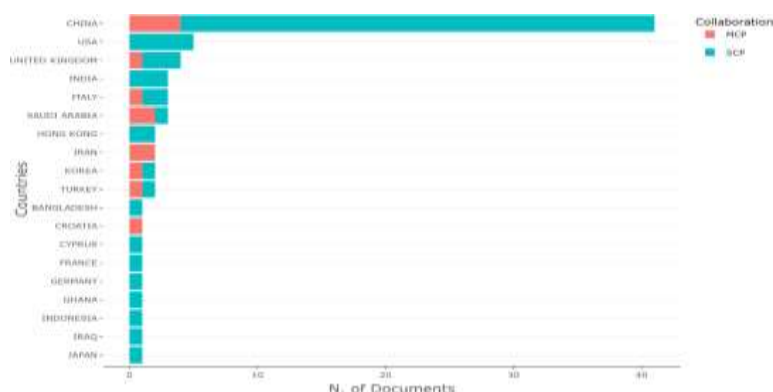


Figure 7, The top 20 corresponding authors' countries (red line: multi-country publication (MCP), blue line: single-country publication (SCP)).

Figures 8 and 9 depict the total count of authors from each publishing country or region, showing the number of collaborative works published by leading nations in the areas of traditional Chinese elements and furniture design. The depth of the blue color in both charts represents the number of authors from each country, with varying shades of blue illustrating the links between China's top 24 authors and the foremost authors in the USA. China is highlighted as the primary hub for research in furniture design. The USA, the UK, and India follow as the countries with the next highest levels of productivity. The red lines in Figure 8, whose thickness indicates the volume of joint publications within each country, show the extent of collaboration. The thickest red lines, signifying the most substantial collaborations, are found between Australia and Asia. Figure 9 points out that collaboration levels between China and the USA are particularly strong. China is central to the network of published research, due to its extensive scientific ties with other nations.

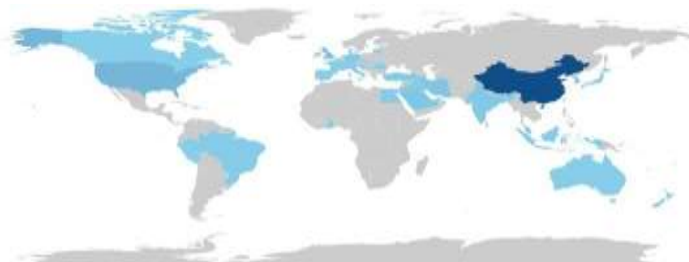


Figure 8, A world map of national cooperation in the field of The use of traditional Chinese elements in furniture



Figure 9, A world map of national cooperation in the field of the use of traditional Chinese elements in furniture (blue intensity: number of authors per country, gray: eastern countries, red line thickness: number of joint publications).

Analysis of Topics

To investigate research themes associated with the use of traditional Chinese elements in furniture design, a keyword network is employed. This network uncovers numerous similarities across various bibliographic datasets. Networks of clustered terms serve to underscore distinct themes, with each keyword linked to a specific theme. Figure 10 displays a thematic map, with each theme represented distinctly. In this map, each bubble corresponds to a group of keywords from the network. The name of each cluster is derived from its most frequent term. Key thematic indicators include architectural design, furniture design, traditional elements, and exterior decoration.

The bubble size in the thematic map corresponds to the frequency of the cluster words, while their placement reflects the centrality and density of the cluster. In the research area of architectural elements and furniture design, centrality and density illustrate the prevailing trends and themes. The thematic map is organized such that the top-left corner features well-established but isolated themes, the top-right corner holds themes related to design, the bottom-left corner captures emerging or waning themes, and the bottom-right corner includes the primary and cross-disciplinary themes. Keywords such as traditional architecture, sustainable development, and the furniture industry are represented by ten frequently occurring clusters.

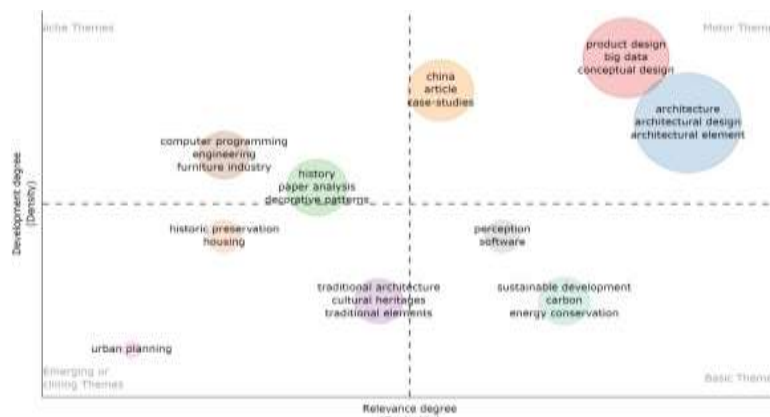
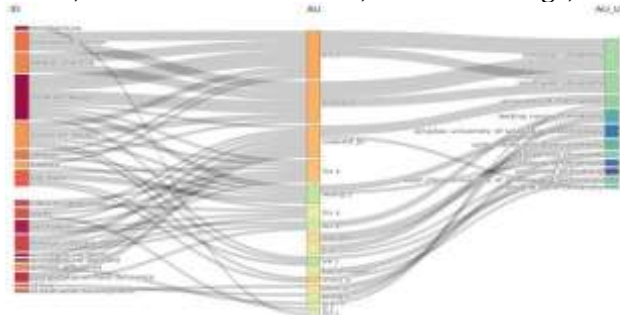


Figure10, A thematic map of traditional architectural elements and product design keyword network clusters employed in studies (bubble size: cluster word appearance).

Analysis of Keywords

A trilateral graph was created to display the key terms associated with the articles, including the use of architectural elements, product design, and furniture design. Figures 11 and 12 demonstrate that there are numerous key terms, with the most prominent ones attracting the most attention. Figure 11 is organized into three primary metadata sections: keywords are positioned in the center, authors to the left, and sources to the right. Figure 12 illustrates the relationships between popular keywords, prominent authors, and the connections among the authors themselves. Authors such as Xu J., Zhang H., Calautit Jk., Liu Z., Wang Z., Liu Y., Su X., and Bande I. have used almost all the popular keywords in their papers.

The most popular related keywords include architectural elements, concept-based design, design practice, product design, furniture design, design history, big data, roofing, elements, architectural design, Chinese elements, and traditional elements. The leading author keywords are New Chinese furniture, architectural classical elements, design models, traditional architecture, cultural heritage, CFD, and daylight.



Top keywords (left), top authors (middle section), and top University (right field) for The use of traditional architectural elements in furniture publications are shown in Figure 11.

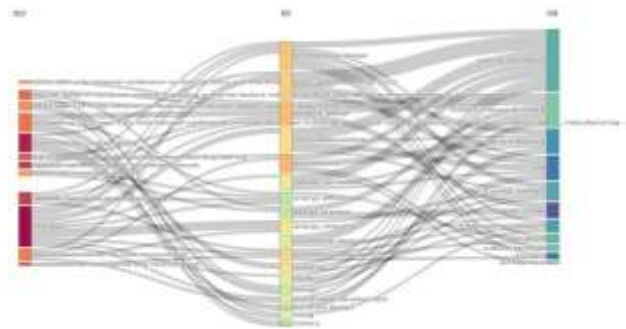


Figure 12, Three field graph title articles in The use of traditional architectural elements in furniture of the link between author keywords plus (right field), top keywords (middle field), and source (right field).

Figure 13 presents a conceptual structure diagram that showcases the connections among keywords found in the publication set. This diagram uses a two-dimensional map to represent the average positioning of each term across the articles, with the map's center highlighting the core focus of research on furniture design and element. In this structure, the words from each document are interconnected through a network, helping readers to grasp key issues in the research field and pinpoint the emerging frontiers of research. Techniques such as factor analysis and network analysis are utilized to identify subdomains. The map is developed using Correspondence Analysis (CA), a technique for reducing dimensionality, to construct the conceptual framework. The purpose of this factorial approach is to simplify the data's dimensions and represent them within a more concise spatial context.

Figure 13 illustrates that each color shade corresponds to a group of keyword clusters within a specific category. As a result, the keywords are split into two main groups. The red cluster, which includes 17 keywords, is more dominant compared to the blue cluster. The cluster includes keywords such as architectural design, product design, roofing elements, architecture, architectural elements, sustainable development, China, big data, textual historical analysis, and traditional elements.

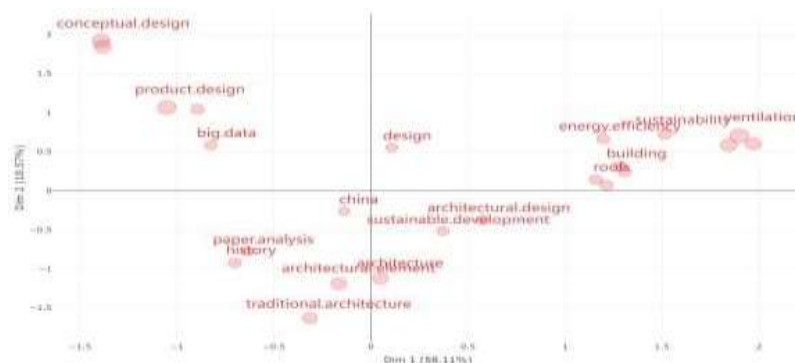


Figure 13, A conceptual model of the use of traditional architectural elements in furniture.

Figure 14 shows a dendrogram, a different style of conceptual structure diagram that uses keywords, similar to what is shown in Figure 13 but formatted differently. This dendrogram illustrates individual groups of terms. The separation between words or groups is indicated by the vertical distance in the diagram. Each branch of the dendrogram denotes a division, segmented accordingly. Words that are far apart represent keywords linked to distinct themes and are rarely included together in the same article.

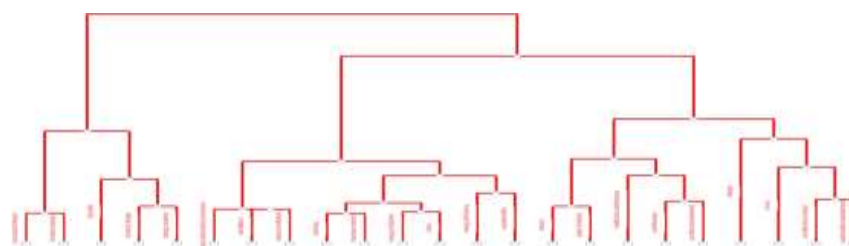


Figure 14, Concept structure tree diagram of the use of traditional architectural elements in furniture subject keywords.

At times, researchers need to quickly identify the most significant terms within their study area. A word cloud offers a visual representation of keyword metadata, highlighting the most frequently mentioned terms at a glance. Figures 15 and 16 display the most commonly used keywords, including the top-ranked author keywords, top-ranked title words, and top-ranked abstract words, respectively. Keywords Plus are derived

future of Chinese furniture design is poised for continual innovation. Trends include the use of eco-friendly materials and the integration of information technology. There is also growing emphasis on creating multifunctional and transformable furniture to meet the diverse needs of modern consumers. The ongoing influence of cultural and spiritual needs on design aesthetics indicates that furniture solutions should be more personalized and expressive (Abyzov & Strelets, 2016). In summary, the evolution of Chinese furniture design demonstrates the dynamic nature of this art form, reflecting both historical traditions and modern influences. As the field continues to evolve, understanding its rich historical and cultural foundation is crucial for designers who aim to create pieces that are not only functional and aesthetically pleasing but also culturally resonant.

Conclusion

The study explores how traditional architectural elements from the rich cultural backgrounds of Lingnan and Guangfu regions can be effectively integrated into new Chinese-style furniture designs, through literature review and case analysis. The research highlights the design concept of "cultural recreation," emphasizing innovation through modern design means and techniques, while respecting and inheriting traditional culture. This approach allows new Chinese-style furniture to convey the aesthetic spirit of traditional architecture and meet the functional needs of modern use (Geng, 1999). Through in-depth analysis of elements such as traditional architectural floor plans, roof structures, and decorative arts, the study demonstrates that these elements can be transformed into sources of inspiration for modern furniture design. For instance, traditional patterns of clouds and natural elements can be reinterpreted and applied in contemporary furniture design, promoting not only the inheritance and development of traditional culture but also fostering interaction and development within the design and cultural sectors. Overall, this research provides practical design cases and methodologies for designers and researchers, offering a new perspective on cultural inheritance and innovation through design activities. For anyone interested in the interaction between traditional culture and modern design, this study holds significant theoretical value and practical implications, indicating that the future of Chinese furniture design lies in its capacity for innovation as well as its respect and integration of tradition.

References

1. Wang, C., & Lu, X. (2011). Analysis of the dilemma of new Chinese-style furniture design. *Furniture & Interior Decoration*, (06), 80-81. <https://doi.org/10.16771/j.cnki.cn43-1247/ts.2011.06.019>
2. Appiah-Kubi, O. P., Jiufang, L., & Zhihui, W. (2021). Historical Overview of the Chinese Traditional
3. Furniture. *Asian Journal of Science and Technology*, 12(05), 11704-11708.
4. Geng, X. (1999). Research and development of chair in modern Chinese style furniture. Beijing Forestry University master thesis.
5. Fang, H. (2008). Foundational work. In X. M. Li (Ed.), *Tongling Yearbook* (p. 55). Huangshan Press.
6. Zhang, X. (2008). *Chinese Furniture: Exploring China's Furniture Culture*. China Intercontinental Press, Beijing.
7. Peng, L., & Chai, W. D. (2017). Houma's transformation and comprehensive reform: "Reform" leads to new development prospects. In Y. Liu (Ed.), *Houma Yearbook* (pp. 296-298). Central Plains Publishing Media Group, Zhongzhou Ancient Books Publishing House, Zhongyuan Media Co., Ltd.
8. Zhu, J. (2013). *Furniture of the Ming and Qing dynasties*. Shanghai: Shanghai kexue ji shu chubans she.
9. Badiu, A., Badiu, I., & Dragomir, M. (2015). Studies regarding the use of reclaimed wood in the manufacture of modern furniture--Part I. *Acta Technica Napocensis-Series: Applied Mathematics, Mechanics, and Engineering*, 58.
10. Qian, Y., & Dai, X. D. (2023). Research on the artistic theme decoration of enamel furniture in the Qing Dynasty. *Furniture & Interior Decoration*, (12), 45-50. <https://doi.org/10.16771/j.cn43-1247/ts.2023.12.009>
11. Abyzov, V. & Strelets, V. (2016). The main directions of furniture design development. Kyiv's National University of Culture and Arts.
12. Wu, D. (2019). Research on the application of Chinese traditional cultural elements in modern furniture design. doi:10.2991/iccese-19.2019.69
13. Ebrahim, R. S. (2020). The role of trust in understanding the impact of social media marketing on brand equity and brandloyalty. *Journal of Relationship Marketing*, 19(4), 287-308.
14. Aria, M., & Cuccurullo, C. (2017). "bibliometrix: An R-tool for comprehensive science mapping analysis."
15. *Journal of Informetrics*, 11(4), 959-975.
16. Li, X., & He, W. (2014). "The role of traditional Chinese architectural elements in contemporary Chinese design." *Journal of Architectural and Planning Research*, 31(2), 83-100.