

Bibliometric Analysis of Urban Historic Districts in the Context of Urban Renewal

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Abstract: As urbanization accelerates, the protection and regeneration of historic districts face practical challenges such as vitality decline and deterioration of spatial quality. This study is based on a dataset of 4,024 articles from the Web of Science Core Collection, published between 2000 and 2024. Using bibliometric tools like CiteSpace and R, the research systematically analyzes the knowledge framework and evolution of research on urban historic districts. Through keyword co-occurrence network analysis and clustering mapping, this study identifies the core themes and their development process, forming a research framework centered on three key areas: cultural tourism, digital applications, and urban renewal. The findings reveal the research hotspots exhibit a phased evolutionary characteristic of "heritage preservation - revitalization - sustainable development," with innovative technologies such as digital applications and virtual reality reshaping the protection and development models of historic districts. Besides, the knowledge network map has formed three core knowledge clusters centered around the spatial governance, cultural heritage preservation, and place-making, reflecting the interdisciplinary and integrated nature of the research trend. The knowledge network mapping identifies three key clusters: spatial governance, cultural heritage management, and the creation of place atmosphere in historic districts. These clusters reflect the multidisciplinary and interdisciplinary nature of the research. Finally, the study indicates that future development of urban historical districts will focus on the construction of cultural tourism models and the digitalization of historic districts. These directions are expected to be deeply integrated into the institutional framework

of urban renewal strategy. Moreover, the results suggest that the integration of cultural tourism and digital technologies not only revitalizes historic districts but also strengthens the sense of place and cultural identity. This research provides a theoretical basis and practical pathways for the protection and regeneration of historical districts, and it recommends that future studies should focus on assessing the social effects of digital tools and exploring sustainable development paths for historic districts within the context of urban renewal.

Keywords: Urban Historic District; Bibliometrics; Knowledge Mapping; Research Frontiers and Trends

1. Introduction

Historic districts represent comprehensive urban spaces, embodying unique cultural heritage and architectural characteristics that often reflect a city's identity and history. These districts comprise an array of tangible elements, such as buildings and landscapes, as well as intangible elements, including traditional customs and regional culture [1]. Together, these components sustain local customs and collective memory, showcasing a distinctive sense of place. Historic districts typically feature landmark architecture, traditional architectural styles, and social spaces that connect the community with its historical roots [2]. Within these areas, culture transcends its role as a passive component of traditional spaces; instead, its distinct historical context and urban memory actively contribute to spatial regeneration.

In the efficiency-driven urbanization process, many developing countries have undergone rapid growth and transformation, leading to the continuous decline of urban historic districts [3]. The decline of urban historic districts is a multifaceted issue that manifests through

functional recession, population loss, and diminished vibrancy of activities aimed at revitalization[4]. Moreover, the rapid pace of urban renewal has presented significant challenges. Gentrification, rising property prices, and commercialization threaten the social fabric of these historic districts, often displacing long-term residents and traditional businesses[5]. When historical districts undergo excessive modernization or local communities are excluded from the planning process, historical districts risk a loss of cultural authenticity[6]. Specifically, in heritage tourism-led historic districts, some spaces are gradually transforming from residential areas into tourist destinations.

From a developmental perspective, urban renewal policies can bring substantial benefits to historic districts. Positive impacts include economic revitalization, tourism growth[7], and strengthened infrastructure, which enhance public safety and accessibility, thereby protecting cultural heritage while promoting sustainable use. Certainly, tourism not only fosters the physical expansion of historic district spaces but also greatly enriches the districts' tourism consumption spaces, thereby enhancing the consumption potential of these areas and supporting urban development [8]. Following global discussions on architectural consistency and the pressures of tourism within the framework of World Heritage, there is an increasing emphasis on assessing the development of urban historic districts through socio-economic interactions and the concept of "ambience"[9].

It can be inferred that, within the broader framework of urban renewal, the research of historic districts is essential for advancing sustainable urban planning and cultural heritage preservation. Current research indicates that urban renewal processes in historic districts are characterized by three significant changes: the reshaping of cultural identity, the differentiation of social spaces, and the transformation of consumer spaces driven by tourism. Successful regeneration projects necessitate a balance between the restoration of physical spaces and the activation of cultural capital. The key lies in improving the sustainable development of historic districts through the three-dimensional reconstruction of their spatial, functional, and emotional aspects. It is noteworthy that

research indicates that the empowerment of digital technologies presents new development opportunities for historic districts. Virtual reality technology not only facilitates the digital preservation of architectural heritage but also creates immersive cultural experiences[10], further enhancing cultural tourism in historic districts[11]. To effectively address the challenges of urban renewal, it is crucial to implement comprehensive planning and management strategies that can guide the development of historic districts. A bibliometric analysis of historic districts from an urban renewal perspective can reveal current research trends and identify gaps, fostering interdisciplinary dialogue and supporting policymakers and urban planners in balancing heritage conservation with urban development. Therefore, This study aims to promote the sustainable development of urban historic districts by systematically reviewing existing research, summarizing their development process, and providing guidance for future research directions.

2. Materials and Methods

2.1 Research Methods

This study employs CiteSpace and the R(biblioshiny) application as tools for bibliometric analysis. Both approaches target specific knowledge domains, employing diverse, dynamic complex network analysis to reveal the evolutionary processes and structural relationships within the knowledge frameworks of literature studies[12]. On the other hand, the R(biblioshiny) application is a powerful tool for conducting bibliometric analyses, offering a user-friendly interface for researchers to perform complex analyses of bibliographic data. It facilitates the visualization of bibliometric networks, allowing for a comprehensive understanding of the scientific landscape[13]. The integration of these tools enables researchers to conduct a thorough examination of the literature, revealing not only the quantitative aspects of research output but also the qualitative dimensions of knowledge evolution within specific domains[13]. Both CiteSpace and R(biblioshiny) contribute to generating visualized knowledge images that encapsulate the dynamics of research trends, thereby offering a panoramic view of the domain under

study.

As a research method, bibliometrics serves as a critical quantitative tool for analyzing topic progress from macro to micro perspectives. The bibliometric method spans hundreds of publications, providing a reliable, repeatable assessment of a research field's status and offering insights unobtainable through purely quantitative or qualitative approaches. For instance, bibliometric studies have been shown to elucidate the knowledge structure and emerging trends in various fields, thereby guiding future research directions and policy-making[14]. This study rigorously applies bibliometric and quantitative methods, using CiteSpace and R to perform knowledge mapping analysis on relevant literature in the Web of Science database. The analysis includes institutional collaboration networks, keyword co-occurrence, burst detection, and high-frequency term analysis. By comparing changes in high-frequency terms, bursts, and co-occurrence at different stages of historic district renewal research, this study visualizes and contrasts the evolutionary process and structural relationships within the field.

2.2 Data Sources

To ensure the scientific rigor and comprehensiveness of the research data, this study established a dataset derived from publications in the Web of Science Core Collection (WoSCC)[15]. The search within the Web of Science database utilized the following keywords: #1 = ("historical and cultural blocks*" OR "historic districts*" OR "historical blocks*"), and #2 = ("urban renewal" OR "urban regeneration"). The search formula was set as TS = #1 AND #2 AND DOP = (2000-01-01/2024-10-15) AND DT = (Article OR Review Article) AND LA = (English). This search conducted on October 15, 2024, covered literature from 2000 to 2024, including "Articles" and "Review Articles." [15] Initially, 6,830 articles were retrieved. In the subsequent stage, documents not classified as "Article," "Review," or written in "English" were excluded. Additionally, to enhance the focus of the resource extraction, only articles and reviews published between 2000 and 2024 were retained. These documents were imported into CiteSpace for de-duplication and screening, resulting in a final data set of 4,204 valid articles.

2.3 Bibliometric Analysis Process

This study utilized Microsoft Excel, R version 4.3.2 (Biblioshiny package), and CiteSpace version 6.2 R4 to mine, quantify, process, and analyze relevant data, as well as to visualize the reviewed literature. The research integrates traditional visualization methods to provide a comprehensive overview of existing studies on historic districts. To obtain a holistic view of the research field and identify geographical focal points, this study extracted national geographic information using R (Biblioshiny package), clarifying the development trajectory of literature related to historic districts.

The R(Biblioshiny) tool enabled a systematic assessment of articles and documents related to historic districts, highlighting the involved research countries, institutions, influential journals, and prominent authors. For instance, Liang et al. highlight the increasing focus on historic districts and the importance of quantitative studies in understanding spatial development issues, which aligns with the capabilities of R(Biblioshiny) to analyze such data systematically[16]. Additionally, this study employed CiteSpace to capture snapshots of the historic district field based on time series data, providing profound insights into its development trends and evolutionary trajectory[15]. The timeline view employed burst detection for clustering, illustrating the development trends of historic districts across different periods. Moreover, CiteSpace utilized the Log-Likelihood Ratio (LLR) algorithm to extract cluster labels from cited literature, enhancing the analysis of citations and presenting a knowledge base at the research frontier. Finally, drawing on Chen's (2017) insights, this study analyzed the co-citation network of knowledge structures in historic district research, identifying clusters and key nodes. This method effectively extracts critical knowledge nodes from a vast body of literature, providing guidance for future research in the field.

3. Results and Analysis

3.1 Temporal Evolution of Publications

Initially, the search on the Web of Science (WOS) identified 6,830 articles related to historic districts. After filtering out irrelevant documents and removing duplicates, a total of

4,204 documents were recorded, with 177,063 references. The analysis of the retrieved literature revealed that research on this topic spans various disciplines, including engineering technology, economic management, social sciences, and philosophy and humanities, showcasing a broad interdisciplinary approach and deep domain integration. **Figure 1** illustrates the publication timeline over the past 24 years, with a Pearson correlation coefficient of 0.9644, indicating a high degree of correlation in the research data. The vertical axis quantifies the number of publications per year, while the horizontal axis corresponds to the timeline of these publications. From 2000 to 2019, the average annual publication count remained below 100, reflecting a gradual growth phase. Between 2010 and 2018, the annual publication rate fluctuated significantly but showed an overall upward trend, indicating a growing interest among researchers in this field, despite some fluctuations in publication rates due to uncertainties.

Notably, despite the significant global impact of the COVID-19 pandemic in 2019, the number of research articles related to historic districts surged, reaching a record high of 541 articles in 2023[15]. This increase can be attributed to the pandemic's disruptive impact and shifting market demands, which prompted various industries to implement digital tourism strategies. Additionally, the government encouraged traditional tourism to undergo digital transformation and iterative upgrades. As a result, the deep integration of digital technologies with historic districts was facilitated, leading scholars to intensify their focus on the application of digital tourism in historic districts starting in 2019.

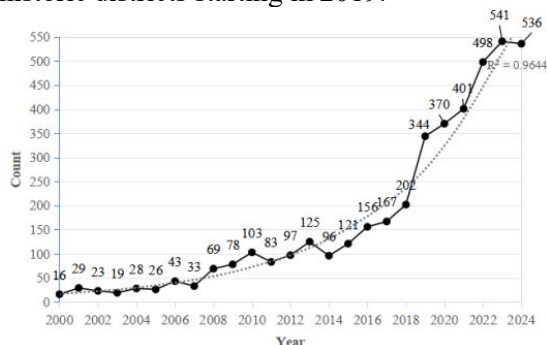


Figure 1. Statistical Analysis of the Annual Distribution of Web of Science Papers on Historic Districts in the Context of Urban Renewal

3.2 Country and Institutional Analysis

3.2.1 Analysis of research trends in various countries

The research using the country module in CiteSpace, to analyzed the publication countries, with the threshold (g-index) set to 25. **Figure 2** displays 117 nodes and 377 links, with a density of 0.0556. Each country's publication volume is represented by node size, where larger nodes indicate higher publication output and smaller nodes indicate lower output[15]. Centrality measures a node's importance, signifying its role within the research network.

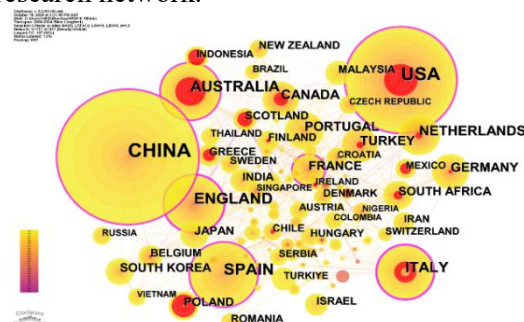


Figure 2. Co-Occurrence Map of the Countries' Cooperation Network Related to Historic Districts in the Context of Urban Renewal Over the Past 24 Years

According to centrality rankings, Italy, the USA, China, England, and Australia rank in the top five (**Table 1**). These countries have a large output in the research of historic districts, occupy an important position in the international scientific cooperation network, and have a strong academic influence. Notably, China not only has the highest publication volume in this field, but its node radius is also relatively large in the network map, indicating a high level of research output and impact. This status suggests that China has become a prominent contributor to studying historic districts and urban renewal, fostering extensive connections and collaborations within the international academic network. This concentration of research activity and collaboration among a few countries reflects a trend of centralized scientific resources and discourse power in the global research landscape.

3.2.2 Analysis of academic impact of research institutions

The research focus and quality of institutions around the world can to some extent, be

reflected through the quantity and impact of their academic publications[17]. **Figure 3** presents a network of relationships among major research institutions, depicted by 592 nodes and 477 links, while **Table 2** further highlights the top ten core global institutions in historic district studies based on publication impact. Overall, research on historic districts within the context of urban renewal is predominantly conducted by institutions centered around universities. The representative organizations include the Chinese Academy of Sciences, the Hong Kong Polytechnic University and the University of Hong Kong. Among these, the Chinese Academy of Sciences stands out as the most significant institution, having published 133 related papers. As early as 2002, this institution began conducting research on urban renewal, remote sensing technology, historic district conservation, and the urban heat island effect in cities like Guangzhou, Shenzhen, and Beijing. Over time, its research focuses gradually shifted toward agricultural heritage resources and the spatial transformation of urban industrial heritage, exploring innovative development paths for historic districts under urban renewal and cultural tourism policies.

Table 1. Top 10 Countries in Research Output Related to Historic Districts in the Context of Urban Renewal over the Past 24 Years.

Rank	Country	Freq	Centrality
1	CHINA	1165	0.18
2	USA	736	0.19
3	SPAIN	315	0.13
4	ENGLAND	252	0.21
5	AUSTRALIA	223	0.18
6	ITALY	200	0.22
7	NETHERLANDS	146	0.1
8	CANADA	119	0.06
9	PORTUGAL	95	0.02
10	TURKEY	94	0.07

Following closely behind are The Hong Kong Polytechnic University and The University of Hong Kong, which published 86 and 80 papers respectively. Both institutions, located in Hong Kong, focus on urban renewal and sustainable development research. The research at The Hong Kong Polytechnic University emphasizes urban environmental renewal and the sustainable development of historic districts, with particular attention to policy

agendas and academic frontiers. Their studies delve into the intrinsic links between urban tourism destinations and cultural heritage management. In contrast, the University of Hong Kong focuses on revitalizing urban landscapes and functions, exploring how to achieve more sustainable site planning in the regeneration of historic districts, and analyzing the specific factors behind it by studying redevelopment cases in typical high-density cities such as Hong Kong and Guangzhou. Additionally, Delft University of Technology in the Netherlands primarily investigates the role of stakeholder networks in urban renewal decision-making within urban environments. They focus on the impacts of maintenance, integration, transformation, and redevelopment strategies on historic districts and the urban underground environment. Notably, seven out of the top ten global institutions for paper output in this field are from China, reflecting China's significant investment and global leadership in historic district renewal and sustainable development research.



Figure 3. Co-Occurrence Map of the Institutional Cooperation Network Related to Historic Districts in the Context of Urban Renewal over the Past 24 Years

Table 2. Top 10 Institutions in Research Output Related to Historic Districts in the Context of Urban Renewal over the Past 24 Years

Affiliation	Location	TA
CHINESE ACADEMY OF SCIENCES	CHINA	133
HONG KONG POLYTECHNIC UNIVERSITY	CHINA	86
UNIVERSITY OF HONG KONG	CHINA	80
DELFT UNIVERSITY OF TECHNOLOGY	NETHERLANDS	57
TONGJI UNIVERSITY	CHINA	57
SOUTHEAST UNIVERSITY CHINA	CHINA	53

UNIVERSITY OF CALIFORNIA SYSTEM	USA	50
CHONGQING UNIVERSITY	CHINA	49
UNIVERSITY OF LONDON	UK	49
CAS	CHINA	45

Abbreviations: TA, total number of articles; CAS, INSTITUTE OF GEOGRAPHIC SCIENCES AND NATURAL RESOURCES RESEARCH

3.2.3 Analysis of author contributions

Based on the bibliometric analysis conducted using R (biblioshiny), a total of 136 core authors published more than 4 papers in this field, totaling 693 papers, accounting for 16.48% of the entire dataset. However, the number of high-output core authors is significantly lower than that of low-productivity authors, indicating that an efficient collaborative network among core authors has yet to be established in this area. As shown in **Table 3**, among the top ten authors by publication output, Spanish scholar Greg Richards has the highest average citation rate per paper (121 citations), demonstrating his significant academic impact. His high citation rate underscores his contributions and academic standing in the field. Each of the top ten core authors has published more than eight papers, while those with over fifteen publications are considered leading experts in the domain, including Liu Guiwen (18 publications), Chan, Edwin H.W. (17 publications), and Greg Richards (15 publications). These scholars have substantial academic influence in the study of urban renewal and historic district development, driving theoretical advancements and practical guidance within the field.

Liu Guiwen focuses on the decision-making power of stakeholders and policy significance in the renewal of historic districts in China. The author particularly examines the relationship between developers and residents regarding benefit distribution, aiming to establish an urban renewal model that

addresses district decline while promoting resident well-being and urban sustainability[18]. Chan, Edwin H.W. studies the renewal of aging districts in Hong Kong's high-density urban environment, seeking to enhance social welfare for the elderly through improved public open spaces and by fostering active aging, thereby increasing social interaction. Meanwhile, Greg Richards concentrates on cultural heritage and creative tourism, viewing them as crucial avenues for revitalizing historic districts. He emphasizes the role of tourists' cognition, emotions, and novelty experiences in distinguishing between different contexts and visitor groups. As the demand of visitors for authentic "local" cultural experiences grows, the renewal of historic districts is closely linked to the promotion of cultural tourism.

Overall, the sustainable development of historic districts relies on the synergistic effects of urban renewal, cultural tourism, and creative tourism. By integrating these key factors, the attractiveness of historic districts can be enhanced, local economic development can be stimulated, and the growing demand of modern tourists for authentic cultural experiences can be met. Besides, the perspective of environmental behavior provides a deep understanding of tourists' emotions, cognition, and experiences, revealing the intricate relationship between environmental design and visitor psychology. The tourism experience in historic districts goes beyond merely engaging with physical space; it is also tightly linked to tourists' emotional responses and cognitive processes. Future research can explore the impact of various forms of tourism on the renewal of historic districts, particularly how environmental factors shape tourists' cognitive and emotional reactions. This would contribute to both theoretical and practical innovations, ensuring the long-term preservation and sustainable development of historic areas.

Table 3. An Analysis of the Top 10 Authors in the Field of Historic District Studies within the Context of Urban Renewal.

Authors	TD	TC	AC	H i	PY_start	Institution	Country
Liu, Guiwen	18	483	27	13	2014	Chongqing University	China
Chan, Edwin H.W.	17	777	46	13	2008	Hong Kong Polytech Univ	China
Richards, Greg	15	1811	121	10	2006	Autonomous Univ Barcelona	Spain
Zhuang, Taozhi	12	241	20	6	2019	Delft Univ of Technology	Netherlands
Garcia-villaverde, Pedro M.	9	291	32	7	2015	University of Cordoba	Spain
Walle, Alf H.	9	7	1	1	2010	Galen University	USA

Yung, Esther H.K.	9	318	35	7	2014	Hong Kong Polytech University	China
Karman, Ozan	8	381	48	8	2008	Singapore ETH Centre	Singapore
Martinez-perez, Angela	8	306	38	8	2015	Univ Castilla La Mancha	Spain
Turk. Sevkive Sence	8	100	13	5	2010	Istanbul Kent Univ	Turkey

Abbreviations: TD, total number of documents; TC, total local citations (this refers to the citation in the data set); AC, average citations; H i, H index; PY s, published year started.

3.3 Keywords Co-occurrence Analysis

Keywords are crucial elements in research papers, encapsulating the core themes and focus of the study. This study employs keyword co-occurrence analysis through CiteSpace to conduct a visual analysis of key terms in significant research literature on historic districts from 2000 to 2024. A table of high-frequency keywords (**Table 4**) is generated, where "frequency" denotes the

Table 4. Statistics on the Top 30 Keywords in the Research Literature Related to Historic Districts

Districts					
Keywords	Fre	Centrality	Keywords	Fre	Centrality
urban renewal	876	0.14	community	106	0.14
cultural tourism	681	0.11	China	104	0.11
historic district	481	0.13	experience	103	0.01
digital management	170	0.05	sustainable development	103	0.07
update model	169	0.03	redevelopment	101	0.05
environmental impact	167	0.04	historic buildings	94	0.03
cultural heritage	160	0.06	historical memory	93	0.01
protection policy	152	0.05	perceptions	91	0.02
tourism	152	0.07	quality	76	0.01
heritage protection	147	0.12	heritage tourism	75	0.04
gentrification	135	0.03	atmosphere	74	0.06
virtual reality	129	0.13	urban regeneration	73	0.14
authenticity	122	0.06	framework	72	0.02
regeneration	120	0.05	performance	71	0.05
satisfaction	118	0.02	place attachment	70	0.02

As shown in **Table 4**, the top 30 high-frequency keywords in the study of historic districts have appeared more than 70 times, revealing the research hotspots in this field. Among these, three keyword groups “urban renewal, community, urban revitalization,” “historic districts, virtual reality,” and “cultural tourism, China” exhibit centrality values of 0.14, 0.13, and 0.11, respectively, indicating their significant presence in the relevant literature. Furthermore, research related to urban communities, protective policies, digital technologies, and urban spaces is steadily increasing, resulting in a series of high-frequency keywords. Based on the analysis of the keyword co-occurrence clustering map (**Figure 4**), there is a significant overlap among the various keyword clusters. This indicates a phenomenon of collaborative research related to historic districts.

count of occurrences of each keyword in the reviewed literature, and "centrality" reflects the importance of the keyword within the network. Centrality is a metric that indicates the likelihood of a keyword's co-occurrence with other keywords, with higher values suggesting a greater probability. Nodes with a centrality value exceeding 0.1 are classified as key nodes. Keywords exhibiting both high frequency and centrality are often indicative of emerging research frontiers in the field[19].

Additionally, the development trajectory of the research primarily focuses on three key nodes: “historic districts,” “cultural tourism,” and “urban renewal.”

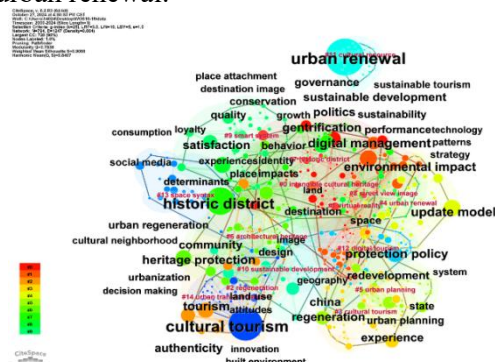


Figure 4. Co-occurrence Map of Keyword Clusters Related to Historic Districts within the Context of Urban Renewal over the Past 24 Years

In studies related to the theme of historic

districts, key terms include “experiences identity,” “social media,” “urban regeneration,” “land use,” “cultural neighborhood,” “heritage protection,” and “urbanization.” Research indicates that balancing the preservation and development of historic districts presents a significant challenge for urban planners in the context of rapid urbanization. Effective solutions to this issue may involve policy making, social participation, the application of social media, and the development of cultural tourism. These initiatives not only sustain the continuity of historic districts but also enhance their vibrancy and appeal, contributing to sustainable development.

Under the theme of cultural tourism, relevant keywords include “tourists,” “attitudes,” “authenticity,” “historical memory,” “place attachment,” “design,” “China,” “redevelopment,” “experience,” “atmosphere,” and “image.” Currently, research on tourism of historic districts primarily focuses on the authentic experiences of tourists, aiming to integrate local culture with tourism activities, and explore optimal tourism models and cultural communication strategies. Relevant studies also explore how the integration of historic districts enhances tourists' perceptions and emotional responses, while identifying design strategies to improve the tourism experience and further elevate the image and appeal of historic districts. On this basis, the cultural tourism experience in historic districts is not only related to the perception of physical space but is also closely tied to tourists' emotional attachment, historical memory, and the shaping of spatial atmosphere. Cultural tourism highlights the connection between atmosphere and tourists' emotions, focusing on how spatial layout, visual elements, and emotional cues can enhance the overall tourism experience.

Finally, closely related to the theme of urban renewal, key terms include “sustainable tourism,” “sustainable development,” “digital management,” “environmental impact,” and “renewal models.” These findings indicate that, within the context of urban regeneration, sustainable development has become a central issue, particularly in the protection and revitalization of historic districts. Striking a balance between the preservation of traditional culture and the integration of modern urban

functions has become a key challenge in urban renewal. Sustainable tourism plays an important role in this process. The sustainable reorganization of tourism areas is essential for preserving historical heritage and enhancing urban identity[20]. The application of digital technologies has promoted the development of sustainable tourism management, enhancing cooperation between local communities and other stakeholders to collectively advance the realization of sustainable tourism[21]. Simultaneously, Digital technologies have been instrumental in providing systematic, efficient, and precise management of architectural heritage within historic districts. Thus, the renewal of historic districts is not only a physical transformation of space but also the result of a comprehensive consideration of cultural, social, economic, and environmental sustainability factors.

3.4 Critical Themes for Historic District

Keyword clustering is a sophisticated process that employs algorithms to derive insights from complex datasets by aggregating and classifying significant items within intricate networks. The work of Kumar and Singh emphasizes the importance of keyword clustering in revealing insights from large datasets, particularly in environments characterized by diverse and complex data types[22]. CiteSpace utilizes modularity values (Q-values) to assess mapping quality, where a Q-value greater than 0.3 typically indicates a significant and reasonable community structure. In this study, the Pathfinder algorithm with a one-year time slice was adopted to analyze the literature data of approximately 24 years, with the G-index ($k=25$) as the calculation criterion. This method aids in identifying highly cited literature, reflecting key themes and changes within the research field. The logarithmic likelihood ratio (LLR) algorithm was adopted for clustering, and the modularity Q value was 0.7854, indicating the existence of a significant clustering structure. The weighted average contour S value is 0.9132, indicating that the network has strong homogeneity and high reliability. Extract the top 15 largest keyword clusters with contour values of $S > 0.8$, and create a timeline visualization of the keyword clusters. In **Figure 5**, the size of the circles represents the frequency of keyword co-

occurrences. The red solid circle represents the keywords that quickly gain prominent status in a short period of time, while the yellow-orange outline represents the keywords that maintain an important position for a longer period of time.

Based on the results of the keyword clustering timeline, research on historic districts primarily revolves around three main themes: “cultural tourism,” “digital applications,” and “urban renewal.” Specifically, keywords from clusters #0 (intangible cultural heritage), #6 (architectural heritage), #7 (historic district), and #11 (cultural resource) indicate that researchers focus on topics such as cultural commodification, cultural neighborhoods, urbanization, urban planning, abandoned industrial buildings, visitor experiences, and creative industries. These keywords reflect a deep academic interest in the cultural environment of historic districts, emphasizing not only the protection and utilization of cultural and architectural heritage but also exploring their functional transformation and value reconstruction in modern society.

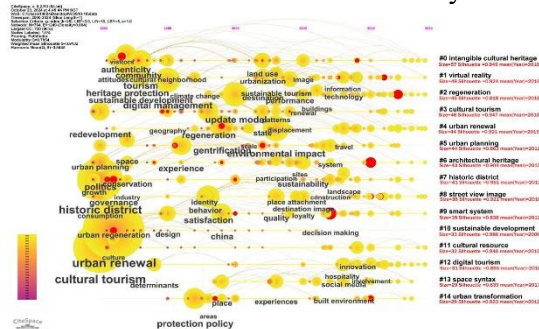


Figure 5. Time Sequence Plot of Keyword Clustering in Research on Historic Districts within the Context of Urban Renewal

Cluster #1(Virtual Reality), #8(Street View Images), #9(Smart Systems), and #12(Digital Tourism) encompass keywords such as COVID-19 tourism, digital management, digital technology, pandemic response, online engagement, memorable experiences, cultural tourism, urban renewal, experiential value, internet usage. These keywords highlight the crucial role of digital technology in the renewal of historic districts, particularly during the COVID-19 pandemic. Digital technologies have significantly transformed cultural experiences and urban renewal efforts, particularly in historic districts. For example, digital platforms can create safe and accessible environments for learning about history, thus

enriching the cultural experiences of tourists[23]. Digital advancements have not only preserved the physical integrity of historic districts but also significantly enriched the information available to visitors, thereby enhancing their engagement and enjoyment[24]. In conclusion, the interplay between digital technologies and urban renewal efforts in historic districts is profound. Additionally, clusters #2 (Regeneration), #3 (Cultural Tourism), #4 (Urban Renewal), #5 (Urban Planning), #10 (Sustainable Development), #13 (Space Syntax), and #14 (Urban Transformation) encompass various research fields and keywords, including update model, built environment, protection policy, built environment, forced relocation, housing displacement, abandoned industrial buildings, innovation districts, risk assessment. These research themes focus on exploring and addressing the challenges of renewing, planning, and revitalizing historical cultural districts while emphasizing the balance between cultural heritage preservation and modernization needs amidst rapid urbanization. The objective is to promote sustainable cultural tourism and urban environments through the renewal and repurpose of buildings and cultural heritage in older urban areas, ultimately enhancing living conditions and fostering innovative spaces.

From a temporal line perspective, the earliest cluster to emerge is #10 (Sustainable Development), which began in 2006. Keywords associated with this cluster include “China,” “area-based regeneration,” “green retrofitting,” and “urban regeneration.” Research interest in this topic persisted for nearly a decade, peaking in 2015, indicating a significant scholarly focus on the sustainable development and green renewal of historic districts during this period, resulting in preliminary outcomes. In contrast, clusters related to “digital tourism” and “digital technology” formed later, starting in 2016. Although there had been sporadic studies prior to this moment, no substantial trend emerged, suggesting that the application of digital technology in historic districts gradually became an emerging hotspot, gaining broader attention and application in recent years. Overall, research themes concerning historic districts—such as cultural heritage conservation, digital applications, and urban

renewal—have increasingly become central issues in academia, establishing a relatively mature research network and collaborative relationships. As research deepens, these themes play a crucial role in the protection and development of historic districts, fostering advancements in both digitization and sustainability within the field.

4. Discussion

This study combines bibliometric tools and systematic review methods to review and analyze the key features, hot topics, cutting-edge trends, and future development directions in historic district research over the past 24 years. The core objective of the study is to explore the develop of the historic district field, uncover the current research landscape and limitations, and provide a theoretical framework and methodological guidance for future research. The findings indicate a significant increase in peer-reviewed research on urban historic districts, particularly in China and USA, which together account for 45.2% of the total publications in the field. This phenomenon highlights the growing academic contribution and research leadership of China and the Americas in this domain.

In recent years, research output from traditional European and American countries, such as Spain, the United Kingdom, and Australia, has also increased. This is closely related to these countries' strong research institutions, economic power, and rich experience in urban planning and historic district preservation. Notably, over the past two decades, China has introduced policies and regulations related to urban planning, historical and cultural district protection, and heritage restoration. For example, the "Urban Double Repair" policy proposed in 2013 emphasizes the importance of protecting and restoring old urban areas and cultural heritage during the modernization process, promoting urban renewal. This has provided abundant policy support and practical experience for academic and urban planning research on historic districts. Future research in China is likely to continue growing, especially in the intersection of urban renewal and historical cultural heritage protection.

Meanwhile, the bibliometric analysis of this study reveals a strong intersection between research on historic districts and various topics

such as urban renewal, cultural tourism, virtual reality, and environmental sustainability. These findings strongly support early insights from some review studies, particularly those focusing on the digital management of historic districts and methods of preservation and renewal. Based on these findings, the study identifies several potential research directions for developing urban historic districts within the context of urban renewal. Firstly, Future research could prioritize the protection and utilization of cultural heritage through appropriate design and spatial planning. Through keyword co-occurrence and thematic knowledge mapping analysis, it is evident that cultural tourism, digital applications, and urban renewal have become the central issues in current historic district research, gradually evolving into key directions for both academic discussion and practical implementation. Early studies primarily focused on how the rise of cultural tourism presents opportunities and challenges for the development of urban historic districts.

Secondly, as urban renewal accelerates and digital management tools mature, the protection and development of historic districts face new opportunities and challenges. The integration of digital technology with cultural tourism presents significant potential for revitalizing historic districts. This assertion is supported by a growing body of research that highlights how digital tools enhance visitor engagement and improve the overall tourism experience. Maietti's research demonstrates how digital tools, including 3D modeling and cloud computing, offer new opportunities for sustainable engagement with cultural heritage, thereby improving the management and preservation of historic sites[25]. Recent advancements, such as digital heritage modeling, demonstrate that “enhancing the integration of virtual reality technology with cultural tourism can increase visitor engagement” and deepen cultural identity in historic districts, thereby promoting sustainable tourism. These topics play a crucial role in the protection, development, and regeneration of urban historic districts. Particularly in the context of globalization and modernization, balancing the preservation of historical heritage with urban development has become a focal point of global attention.

Finally, the study reveals that research on

historic districts also involves an in-depth exploration of urban renewal paradigms. It calls for a reevaluation of the role of historic districts in modern society, emphasizing a shift towards a human-centered and community-oriented approach. The concept of “value reconstruction” supports a human-centered approach to renewal, ensuring that historic spaces remain relevant and adapt to contemporary needs. Researchers such as Wen argue that successful renewal projects should not only preserve the historical significance of a locality but also cultivate a sense of belonging among residents.

5. Conclusion

This study conducted a systematic bibliometric analysis of 4,204 English academic papers related to historic districts, revealing the research trends and development trajectory in this field. The analysis shows that historic districts have garnered widespread attention across multiple disciplines, particularly in the contexts of cultural tourism, digital applications, and urban renewal. Although the potential benefits of historic district development within these contexts have been extensively discussed, empirical evidence supporting these claims remains limited, highlighting the need for further research to validate these potentials and expectations.

In the study, most of the literature emphasizes that the conservation and development of historic districts cannot be separated from the organic integration with cultural tourism. In the context of modern cities, balancing the preservation and renewal of historic districts has become a significant challenge for contemporary urban planners. Research indicates that during the development of urban historic districts, combining local cultural resources with tourism not only enhances the visitor experience and authenticity but also creates an ideal model for the sustainable development of historic districts. Meanwhile, digital technology has gradually emerged as a new trend in the management and application of historic districts. Around the world, historic districts are actively exploring new models such as digital districts, digital management, and digital tourism. Digital applications are increasingly becoming a core direction for the future development of historic districts.

In summary, the contributions of this study can

be summarized in three main aspects. First, it systematically reviews the fundamental attributes and related concepts of historic districts in modern cities, clarifying the core issues and research framework in this field. Second, through a literature review based on Web of Science databases, it reveals the evolution, key developments, and potential future directions of historic district research, with particular emphasis on the rapid growth of cultural tourism and the application of digital technologies in historic districts. Finally, this study adopts a systematic literature review approach to summarize the directions, models, and policy orientations of historic district renewal in the context of urban regeneration, providing valuable recommendations for the better preservation and development of these districts. By uncovering new findings and offering unique perspectives in the field, this research also identifies gaps that have not been adequately explored in current studies, laying the foundation for future in-depth development of knowledge in this area.

Looking ahead, researchers should expand the linguistic and geographical scope of the historic district research literature, with an emphasis on strengthening cross-cultural and cross-regional comparative studies. Additionally, collecting and analyzing more empirical evidence, particularly in systematic comparative research, to validate the potential advantages of digital technologies and cultural tourism in the preservation and development of historic districts, will be a key task for future studies. Future research should also focus on the multiple functions and meanings of historic districts in diverse social, cultural, and environmental contexts, aiming to construct a more comprehensive and diverse theoretical framework. This will provide deeper theoretical support and practical guidance for the sustainable development of historic districts.

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