

Review

Knowledge mapping of creative cities research: A visual analysis using VOSviewer and CiteSpace

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Abstract: Creative cities as a study discipline have garnered extensive attention and research in theory and practice as a practical approach to urban revitalization and sustainable development. This study conducted a systematic review of academic research on creative cities. Utilizing the visual analysis tools Citespace and VOSviewer, a comprehensive analysis was performed on 570 relevant articles from the Web of Science database. This study analyzed the most influential publications, authors, journals, institutions, and countries within the sample. The investigation spans various disciplinary domains, including geography, environment, culture, and others. Additionally, an exploration of the structure and characteristics of co-cited references was undertaken to enhance our understanding of the theoretical foundations of creative cities research further. Among these, the focal points of the study encompass urban development, urban policies, and the challenges faced. Finally, through co-occurrence analysis of keywords and examining the evolutionary process, the study forecasted that future trends will focus on the practical application of cities to enhance the urban image and improve urban governance from multi-dimensional perspectives such as creativity-related cultural places, public art, and so forth, exploring novel models of creative cities from case to universal. The results of this study can support scholars in grasping the development trends and exploring focal points.

Keywords: bibliometric analysis; CiteSpace; creative cities; creative industries; cultural heritage; urban space; visual analysis; VOSviewer

1. Introduction

As a new paradigm in urban development, creative cities have garnered extensive attention and in-depth research over the past decade. Many international cities have incorporated creative strategies into their long-term urban planning and policies. Barcelona in Spain successfully revitalized its urban vibrancy and creativity by implementing a plan to transform old industrial areas into artist studios (Coll-Martínez and Méndez-Ortega, 2023). London in the United Kingdom is committed to developing the street art tourism industry as an integral part of urban creative practices, sparking multifaceted impacts on the economy, branding, and symbolic values (Andron, 2018). Shanghai, China, strongly advocates and supports the advancement of the creative and cultural sectors to propel the growth of artistic and inventive pursuits, thus promoting prosperity in innovative activities (He, 2019).

In 2004, the United Nations Educational, Scientific and Cultural Organization (UNESCO) initiated the UNESCO Creative Cities Network (UCCN). The main goal was to centralize the creative and cultural sectors within regional development plans, thus igniting the achievement of sustainable progress (Boonyasurat et al., 2022). The UCCN encompasses seven major creative fields: literature, film, music, crafts and folk art, design, media arts, and gastronomy. In 2011, Graz, the second-largest city in

Austria, was honored as the City of Design. During the application period, over 24,810 individuals were employed in the creative sector, constituting 12.5% of the total workforce and contributing 14% of the total added value (Arandelovic, 2015). Another creative city, Glasgow in the United Kingdom, earned the prestigious title of UNESCO City of Music in 2008 owing to its abundant musical legacy and thriving music culture. In 2015, Glasgow's music tourism was valued at £105 million, supporting 1,141 full-time jobs and attracting 1.4 million live music audiences (Guimarães et al., 2020). By taking art seriously and reshaping the city's identity, the city has successfully attracted more foreign and local investments.

A comprehensive and systematic review of this domain becomes imperative, with an increasing number of successful cases illustrating the impact of creativity on urban development, coupled with the interdisciplinary nature of the creative city field. The study analyzed 570 papers published on the Web of Science database. By examining bibliometric indicators, this research presented the distribution of included literature and the most influential publications, authors, journals, institutions, and countries. Additionally, this study utilized VOSviewer software for data analysis on co-cited references. Finally, employing CiteSpace software for keyword co-occurrence analysis, cluster analysis, timeline visualization, and burst detection, the study delved into the developmental trajectory of creative city research and proposed that future research hotspots tend to tap into the role of inner-city spaces, public art, and cultural heritage to activate new vitality in creative cities.

This study has three contributions. Firstly, it provides a clear depiction of the developmental trajectory of creative city research, aiding scholars in gaining an indepth understanding of the evolution of this field. Secondly, it directly reflects the current state and content of creative city research, making the field more visualized and integrated. This facilitates scholars in accurately identifying popular papers, authors, and journals. Thirdly, through a bibliometric analysis-based exploration of research trends in the creative city domain, it offers valuable references and guidance for future studies.

The following section will conduct a literature review on creative cities. The methodology section provides a detailed overview of the bibliometric approach and data sources. Then follows the results of the bibliometric analysis. Finally, this study gives an interpretation of the conclusions and discusses the limitations.

2. Literature review

The term "creative city" was first proposed by the renowned British urban scholar Charles Landry in the early 1990s. This concept refers to cities demonstrating creativity and innovation at economic, cultural, and social levels (Landry, 2012). Other scholars have also defined creative cities based on the urban environment and associated industries (Černevičiūtė and Strazdas, 2023). Creativity is not merely a byproduct of cultural discourse; it involves a broader focus on creativity as a productive element. The emphasis on creativity has led to a new understanding of urban culture (Colomb and Novy, 2013). Creative cities go beyond traditional urban strategies, building their development on the foundation of creative cultural activities (Cerisola and Panzera, 2022). The focal point lies in individuals endowed with

creativity and their multifaceted contributions to productivity, thereby propelling the advancement of urban industries and culture. The variety inherent in cities, characterized by open living spaces and rich social connections, serves as a magnet for creative talents (Baycan-Levent, 2010). Therefore, a creative city is characterized by a creative population and favorable conditions for operating arts and cultural industries (Pourzakarya and Bahramjerdi, 2019).

Creativity is not only a concept emphasized at the cultural level; it encompasses advanced notions such as creative economy, creative class, creative industries, and creative clusters, viewing creativity as a new form of energy. Florida (2002b) proposed the creative economy theory, emphasizing that cities' economic growth and prosperity are closely related to innovation and creativity. Creative cities achieve development and innovation by attracting and nurturing creative talents, innovative enterprises, and cultural industries. The creative economy and culture are interdependent and dynamically interact in urban environments (Comunian, 2010; Hall, 2000). The economic prosperity of a city hinges on the participation of the creative class, encompassing a diverse array of imaginative individuals, among whom creative industry workers constitute a mere fraction. Viewed through this lens, a creative city can be construed as a city endowed with the tangible capacity or latent ability to allure the creative class (Florida, 2002a), which will lead to new urban growth and revitalization (Pratt, 2008; Sokół, 2019). Additionally, a creative city is where creative industries concentrate and receive support (Arcos-Pumarola et al., 2023). In 1998, the Brits initiated the notion of creative industries through their "Creative Industries Mapping Document," which categorized economic undertakings involving individual creativity, skills, and talents. The key expectation was to generate wealth and employment opportunities by creating and utilizing intellectual property (Gouvea and Vora, 2018). In a broader sense, the creative industry represents a semantic and symbolic expansion of the cultural industry, manifested in economic, sectoral, and spatial dimensions, becoming the focus of policy interventions and public-private investments (Montalto et al., 2021). The creative cluster refers to groups of creative industry practitioners densely concentrated in a geographical area (Landry, 2012). Their formation is typically influenced by higher education institutions, favorable urban planning, professional knowledge in creative industries, and government policy support (Namyślak, 2020). The formation of creative clusters promotes cultural exchange and innovation, drives economic development and employment growth, and enhances a city's competitiveness and attractiveness, among other benefits (Gutierrez-Posada et al., 2022).

Given the diverse range of topics in the field of creative cities, the current state of research appears chaotic and fragmented. To address this situation, the study employed a comprehensive literature review using bibliometric analysis to systematically outline the landscape of creative city research, aiming to depict a cohesive and integrated picture of the field.

3. Methodology

3.1. Bibliometric analysis

Bibliometric analysis is a comprehensively quantitative approach that researchers

utilize to analyze and expound on published papers. This valuable method also assists scholars in evaluating a specific field of academic research (Small, 1973). This approach involves examining secondary data obtained from digital databases and introducing a systematic, transparent, and replicable review process to enhance the reliability and quality of the review (De Bellis, 2009).

VOSviewer is a bibliometric tool based on network data developed by Eck and Waltman, used for creating, visualizing, and exploring literature relationships. It incorporates items, links, link strength, and clusters (Van Eck and Waltman, 2013). In this study, VOSviewer 1.6.20 software was employed for co-citation analysis to visualize the knowledge structure. Citespace, developed by Chaomei Chen, is a bibliometric analysis tool based on network science and information visualization technologies. This tool extracts and visualizes knowledge structures from extensive literature data to explore the evolution and trends in research fields (Chen, 2006). This study utilized CiteSpace 6.2.R6 software for evolutionary analysis, aiming to explore the development history of the field and predict future research trends.

3.2. **Data**

Web of Science (WoS) is a widely accepted and utilized high-quality digital literature database that has become a standard tool for scholars to retrieve and assess various publications (Thelwall, 2008). WoS covers a broad spectrum, encompassing over 15,000 journals and 79 million classified publications in 256 categories and 150 research fields (Merigó and Yang, 2017). Additionally, WoS provides a set of metadata crucial for bibliometric analysis, including titles, authors, affiliations, countries, keywords, abstracts, references, citation counts, impact factors, and more. Consequently, this study collected publication information from the WoS core database. The core database includes all citations indexed in SCI-Expanded, SSCI, AHCI, CPCI-S, CPCI-SSH, and ECSI from 1900 to the present.

 Data source
 Web of Science

 Citation indexes
 Web of Science Core Collection (SCI-Expanded, SSCI, AHCI, CPCI-S, CPCI-SSH, ECSI)

 Searching period
 January 1988 to December 2023

 Searching keywords
 TS=("creative city") OR TS=("creative cities")

 Document types
 Article

 Language
 English

 Sample size
 570

Table 1. Summary of data source.

TS = Topic (Searches title, abstract, author keywords, and Keywords Plus).

This study encompasses publications from 1988 to 2023. Utilizing the keywords "creative city" or "creative cities" in the topic field, the research identified 787 publications, encompassing titles, abstracts, and keywords. Subsequently, the study refined the database by filtering records based on document type (articles) and language (English), resulting in a final dataset comprising 570 unique publications. Data collection occurred on 28th December 2023. For record content that is full record and cited references, WoS has a limit on the number of single exports. Therefore, the

570 materials were exported in batches of 500 and 70. The database contents were generated as plain text files and all exported for subsequent bibliometric analysis. This includes authors, titles, publishing institutions, publication years, language, abstracts, keywords, and references. A summary of the data source is presented in **Table 1**.

4. Results

4.1. Descriptive statistics

Through searching and filtering, this study ultimately compiled 570 articles to form the database sample for this study. This sample encompasses 952 authors affiliated with 927 institutions from 129 countries and regions, publishing in 237 journals (see **Table 2**).

Criteria	Quantity
Publications	570
Journals	237
Authors	952
Institutions	927
Countries/Regions	129

Table 2. Descriptive statistics of database.

Figure 1 illustrates the annual distribution of publications in creative city research. Despite occasional fluctuations in individual years, the overall trend shows growth. In general, this development process can be divided into three stages. In the first stage, from 1988 to 2008, the annual number of publications remained stable at less than ten, indicating an initial phase. The second stage, covering the years 2009 to 2017, saw fluctuations in annual publications ranging from 10 to 38, demonstrating significant overall growth and marking a developmental stage in the field. From 2018 to 2023, the third stage witnessed a notable increase in papers, with annual publications exceeding 40, reaching 76 in 2019. This indicates that the field of creative city research is in a fruitful stage.

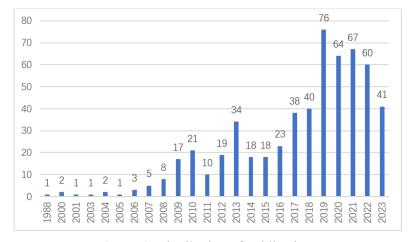


Figure 1. Distribution of publications.

The disciplinary categories reveal the research scope and scholars' academic backgrounds. Creative city research has spanned 61 disciplinary categories. **Table 3** illustrates the top ten disciplinary categories, with urban studies being the largest category in research volume. Other fields, such as geography, environmental studies, regional urban planning, and cultural studies, also hold prominent positions. This indicates a notable characteristic of interdisciplinary integration in the research domain of creative cities. This interdisciplinary integration is highlighted by the collaboration of different fields such as management, ecology, environment, culture, and the arts in the context of sustainable development of creative cities, emphasizing creativity in urban environments with a focus on stimulating the urban economy and vibrant urban life (Chang, 2019).

Table 3. Top 10 subject categories with the highest publications.

Subject category	Publications	Ratio (%)
Urban Studies	211	37.02
Geography	158	27.72
Environmental Studies	129	22.63
Regional Urban Planning	108	18.95
Cultural Studies	55	9.65
Hospitality Leisure Sport Tourism	35	6.14
Environmental Science	34	5.97%
Green Sustainable Science Technology	34	5.97%
Economics	32	5.61%
Humanities Multidisciplinary	29	5.09%

4.2. Analysis of publications

This study extensively examines the top ten most frequently cited publications in creative city-related research on WoS. As shown in **Table 4**, the most highly cited article is "Struggling with the Creative Class," published in the International Journal of Urban and Regional Research in 2005, with 1438 citations. The article posits that a critical characteristic of creative cities lies in the strategic shift from a narrow focus on production to a profound engagement in the consumption and reproduction realms of marketization and commodification. Throughout this process, only cities with open, diverse, vibrant, and cool urban environments can retain creative practitioners, who are a major driving force for urban economic development. Some cities establish and maintain talent communities by organizing various social events and information sharing. The author contends that the usage of creative rivalry's language leads urban areas towards deeper levels of cultural commercialization and native artistic promotion, intending to draw in fresh spectators (Peck, 2005).

Table 4. Top 10 most cited publications.

Rank	Title	Journal	Year	Citations
1	Struggling with the Creative Class	International Journal of Urban and Regional Research	2005	1438
2	Creative Cities: Conceptual Issues and Policy Questions	Journal of Urban Affairs	2006	627
3	Artists, Aestheticisation and the Field of Gentrification	Urban Studies	2003	504
4	Creative Cities and Economic Development	Urban Studies	2000	413
5	Creative Cities: the Cultural Industries and the Creative Class	Geografiska Annaler: Series B, Human Geography	2008	381
6	The Image of the Creative City: Some Reflections on Urban Branding in Turin	Cities	2008	212
7	Rethinking the Creative City: The Role of Complexity, Networks and Interactions in the Urban Creative Economy	Urban Studies	2011	183
8	Pushing the Urban Frontier: Temporary Uses of Space, City Marketing, and the Creative City Discourse in 2000s Berlin	Journal of Urban Affairs	2012	176
9	Risk and Trust in the Cultural Industries	Geoforum	2000	175
10	Struggling for the Right to the (Creative) City in Berlin and Hamburg: New Urban Social Movements, New 'Spaces of Hope'?	International Journal of Urban and Regional Research	2013	166

The second most cited paper, "Creative Cities: Conceptual Issues and Policy Questions", was published in the Journal of Urban Affairs in 2016. The author situates the concept of creative cities within the context of post-Fordist new economies, tracing the connections between these phenomena and the dynamic changes in technology, production structures, labor markets, and locational clustering. The aim is to illustrate how emerging economic frameworks contribute to unique cultural advances in contemporary urban centers. The study highlights the need to seamlessly integrate all social classes into the vibrant fabric of urban life, not only for the city's vitality but also as a catalyst to unleash the imagination of its diverse populations (Scott, 2006). The third most cited paper, published in Urban Studies in 2003, is "Artists, Aestheticisation and the Field of Gentrification". The paper praises the rise of cultural economies and creative cities from the perspective of middle-classification and artists. Creativity in the city, whether in artistic or fashion expressions, is an independent variable driving economic development (Ley, 2003).

The ten most cited publications were published between 2000 and 2013, in the alternating period of the infancy and rise of the field of creative cities research. These articles are based on theoretical research, accompanied by city examples, mainly concerning the creative class, creative economy, creative policies, and creative industries, which have laid a solid theoretical foundation for the development of creative cities. In addition, as culture and creativity share certain similarities, researchers have mostly combined cultural and art industries to explore the economic development and change possibilities of creative cities (Cerisola and Panzera, 2021; Novy and Colomb, 2013).

4.3. Analysis of authors

This study examined the most influential scholars in creative cities in detail. Using the number of published articles as a criterion, **Table 5** presents the top ten scholars, including their names, publication counts, initial publication years, and

citation counts. During the investigation, the scholar with the most publications was Joaquim Rius-Ulldemolins, who has seven papers. While Carl Grodach, Tomas Boren, and Craig Young each published six articles.

Table 5. Top 10 authors with the highest publications.

Rank	Author	Publications	Citations	Year
1	Rius-Ulldemolins, Joaquim	7	29	2019
2	Grodach, Carl	6	330	2012
3	Boren, Thomas	6	168	2013
4	Young, Craig	6	168	2006
5	Comunian, Roberta	5	242	2011
6	Mclean, Heather	5	200	2014
7	Gibson, Chris	4	216	2004
8	Brennan-horley, Chris	4	121	2009
9	Montalto, Valentina	4	88	2019
10	Nuccio, Massimiliano	4	74	2017

Year: year of first publication.

Joaquim Rius-Ulldemolins focuses on cultural sociology and cultural policy, examining Barcelona's local cultural branding in the urban renewal process and Spain's national branding project with its cultural policies. He proposes schemes for generating and governance the cultural policy system in creative cities, dissecting the darker aspects of cultural policies (Rius Ulldemolins, 2014). Carl Grodach focuses on creative industries, urban design, community development, cultural planning, and urban sociology. He identified the dynamic changes in Australia's urban cultural policies and cultural production by conducting international comparative research on the emerging connections between cultural and manufacturing industries (Grodach, 2017). Tomas Boren's research centers on urban and cultural geography, exploring the interaction between urban development strategies, cultural producers, and urban decision-makers. He established networks for creative industry cultural and economic production and studied the socio-political construction of urban creativity in European cities (Borén et al., 2021). Craig Young, an expert in human geography, addresses urban policy issues, particularly policy formulation, and responses in creative cities and cultural utilization (Borén and Young, 2020).

In terms of the research directions of the authors with the most publications, creative cities are prone to merge with other disciplines (such as cultural industries, urban planning, and sociology) and exploit new development possibilities from the discernment. Researchers and new scholars can pay more attention to authors who study urban policy and planning, which tend to evaluate the development effects and possible paths of creative cities from a policy perspective (Rius-Ulldemolins and Díaz-Solano, 2023; Tanghetti et al., 2022).

4.4. Analysis of journals

This study provides a detailed analysis of the number of publications, citation counts, average citations per publication, and the impact factor values of journals

related to creative city research. **Table 6** presents the top ten significant journals in this field. The top three journals with the highest number of published papers are Cities (52 publications), International Journal of Urban and Regional Research (32 publications), and Sustainability (26 publications). Regarding the average citations per publication, the leading journal is the International Journal of Urban and Regional Research (86.50 citations per publication), followed by Urban Studies (77.20 citations per publication) and the Journal of Urban Affairs (74 citations per publication). The top-ranked Cities also has the highest impact factor in 2022, reaching 6.7. Regarding the coverage of research topics, creative city-related studies mainly concentrate on urban and regional planning, cultural economy, and sustainable development. Researchers and new scholars need to pay sustained attention to journals related to the urban category. Journals that focus on economics, policy and planning are on the rise, although the impact factor is not high, but the relevant content is closely related to creative city development.

Table 6. Top 10 journals with the most creative cities research publications.

Rank	Journal	Publications	Citations	Average	IF
1	Cities	52	1725	33.17	6.7
2	International Journal of Urban and Regional Research	32	2768	86.50	3.3
3	Sustainability	26	182	7.00	3.9
4	Urban Studies	25	1930	77.20	4.7
5	European Planning Studies	23	532	23.13	2.8
6	International Journal of Cultural Policy	20	233	11.65	1.8
7	Journal of Urban Affairs	15	1110	74.00	2.1
8	Geoforum	10	366	36.60	3.5
9	Environment and Planning A-Economy and Space	10	260	26.00	4.2
10	European Urban and Regional Studies	10	172	17.20	3.1

IF: impact factor in 2022

4.5. Analysis of institutions

The sample of this study includes data from 927 institutions. Based on the ranking of publication numbers, **Table 7** presents relevant statistics for the top ten institutions in the field of creative cities, including the number of publications, citation counts, average citations per publication, and the country of each institution. Specifically, the University of London in England ranks first in this field, publishing 22 papers and accumulating 1303 citations. The Queensland University of Technology in Australia follows, with 12 papers published and 443 citations. The University of Amsterdam (Netherlands) and the University of Toronto (Canada) are tied for third place, each publishing 11 papers. The University College London, in turn, had the highest average citation rate at 90.56 citations per publication. British institutions continue to dominate in the field of creative cities. There are seven influential institutions in Europe, while the number of institutions in North America is 2. This reflects the leading position of institutions in Europe and North America in this field. It can be seen that research on creative cities has been widely conducted globally, and although there are slight differences in the level of study, researchers can still develop local creative cities

through cooperation with research institutions in Europe and elsewhere and jointly contribute to the creation of high-level sustainable creative cities.

Table 7. Top 10 influential institutions in the creative city research field.

Rank	Institution	Publications	Citations	Average	Country
1	University of London	22	1303	59.23	England
2	Queensland University of Technology	12	443	36.92	Australia
3	University of Amsterdam	11	312	28.36	Netherlands
4	University of Toronto	11	238	21.64	Canada
5	Manchester Metropolitan University	10	379	37.90	England
6	Erasmus University Rotterdam	9	100	11.11	Netherlands
7	University College London	9	815	90.56	England
8	University of Turin	9	100	11.11	Italy
9	York University	8	162	20.25	Canada
10	University of Valencia	8	29	3.63	Spain

4.6. Analysis of countries

The sample of this study includes 129 countries and regions. We analyzed each country's research in the field of creative cities. **Table 8** provides a detailed ranking of the top ten countries regarding publication quantity in this field. The U.S.A. excels, with 83 publications and 3960 citations. It also had the highest average number of citations per article, at 47.71. England and Australia follow closely, with 74 and 50 publications, respectively. Among the top ten countries, the majority are located in Europe and North America, with only Australia and China representing the Asia-Pacific region. This indicates that the field of creative cities receives more attention and research in Europe and North America.

Table 8. Top 10 influential countries in the creative city research field.

Rank	Country	Publications	Citations	Average
1	U.S.A.	83	3960	47.71
2	England	74	2780	37.57
3	Australia	50	1515	30.30
4	Italy	47	1118	23.79
5	Canada	46	1832	39.83
6	China	42	604	14.38
7	Spain	34	422	12.41
8	Netherlands	32	910	28.44
9	Germany	18	602	33.44
10	Portugal	17	169	9.94

4.7. Co-citation analysis of cited references

To comprehend the cited literature's composition and structural characteristics in the creative cities field, this study conducted a co-citation analysis of the cited references. With a threshold of 20 times, 26032 cited references were collected from the sample. Ultimately, 60 references were selected. Subsequently, an academic network in the field of creative city research was constructed through co-citation analysis. The results revealed three clusters, each represented by a different color (see **Figure 2**). The lines in the figure represent co-citation links between the references, with closer relationships indicated by higher citation frequencies. Notably, the most frequently co-cited references include Peck (2005) (cited 194 times), Florida (2014) (cited 186 times), Landry (2000) (cited 122 times).

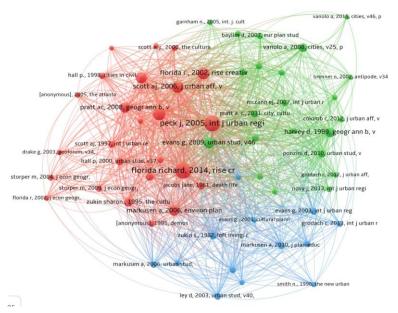


Figure 2. Co-citation of cited references.

The first cluster links creative cities with the creative class and urban development issues. Markusen (2006) conducted a case study of artists, a constituent part of the creative class, to investigate this profession's formation, positioning, and impact on the city. She identified that the creative class plays multifaceted roles in urban economies, contributing significantly to the diversity and vibrancy of the city. Moreover, it can even serve as a political force, guiding societal and urban transformations. According to Pratt (2008), the innovative group assumes a critical role in the creative industry and knowledge-based economy by acting as a key facilitator for novel economic developments in urban centers. The creative class propels urban revitalization and regeneration by exploring spatial and resource opportunities. KrÄTke (2010) critically appraised the creative class concept, asserting that its definition is overly broad and lacks in-depth analysis of distinct professional groups. Simultaneously, he pointed out that the creative class is not the sole influential group contributing to regional economic success. However, he acknowledged their innovative capabilities as economic growth and job creation catalysts.

The second cluster involves research on creative city policies. Evans (2009), through interviews with senior decision-makers on different continents, investigates initiatives, plans, and underlying principles of the public sector in creative cities. Cities implement more extensive urban expansion and regeneration plans through creative districts. Still, the unique and integrated aspects of cities and broader regions regarding accessibility, connectivity, and cultural development must be considered. Peck (2012)

examined the practical operation of creative policies in Amsterdam and traced the impact of these policies on urban governance. Specifically, he addressed how creative policies spread between cities, the effects they generate, and the process of variation between cities. He argues that the expansion of creative policies is synchronized with the intensification of competition between cities and the simultaneous growth of globalization insecurity it produces. In addition, scholars have used case studies to illustrate the effectiveness of policies. McCann (2007), through a case study of Austin, Texas, explores the profound integration of regionalism and urban livability discourse in politics. The plan for enhancing the quality of life in a city or town, known as the urban regional livability agenda, encompasses a purposeful and politically charged effort that targets specific geographical areas. The emergence of creative cities underscores the significant impact of the regional livability dialogue. Vanolo (2008) analyzes how the Italian creative city Turin celebrates culture through urban branding. In this case, the image of the creative city is revitalized through a new slogan, challenging outdated impressions of the city environment.

The third cluster revolves around the challenges that may arise in creative city development. Evans (2003) emphasizes the significance of cultural branding in creative cities. He posits that associating a place with a cultural symbol is an attempt to infuse a place with a creative characteristic. The dissemination of ideas through urban cultural development requires cultural institutions and creative networks, propagating brand images through these networks. Markusen and Gadwa (2010) studied two creative city strategies: one based on designated cultural districts and dispersed natural cultural areas, and the other involving cultural investments targeting tourists and cultural investments serving local services. It is imperative for stakeholders to thoroughly analyze and elaborate on the impacts, risks, and opportunity costs of diverse strategies. This measure is crucial to steer clear of missed opportunities that arise from creative cities. Grodach (2012) explored the discourse and implementation of cultural-economic planning in creative cities, highlighting the significance of attracting mobile talent. However, throughout this process, creative cities still grapple with conflicts between economic and cultural orientations and challenges in balancing traditional culture and the creative economy.

For the co-citation analysis of the cited literature, these publications were issued before 2017, which is in the fast-rising period of the development of the field of creative city research. This indicates that the findings at this stage are the backbone of future creative city research. From the clustering results, activating the city's economic and industrial vitality with the creative city as the theme of urban development has been a favorable way for sustainable urban development (He, 2019). Urban policy is often a double-edged sword for the development of creative cities, which needs to be guided correctly and analyzed objectively (Shen et al., 2023). In addition, the unfavorable impacts generated during the practice of creative cities are also a topic of continuous concern for scholars, such as gentrification, labor market segmentation, and the commodification of creativity(Casals-Alsina, 2023), and only by overcoming these challenges can the city develop smoothly in the long run.

4.8. Keyword analysis

The study conducted a co-occurrence analysis of keywords in the sample using CiteSpace software to reveal the hotspots and potential future research topics in creative cities. The research manually merged some conceptually similar keywords but differed only in singular and plural forms, ultimately obtaining 471 keywords. **Table 9** lists 29 high-frequency keywords that appeared more than 20 times. According to **Figure 3**, this study can intuitively observe that keywords such as policy, economy, politics, geography, and industry are located on larger central nodes, further confirming their significance.

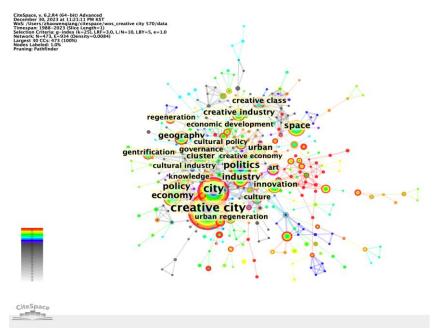


Figure 3. Co-occurrence of keywords.

Table 9. High-frequency keywords.

Keywords	Frequency	Keywords	Frequency
Creative city	326	Gentrification	31
City	196	Culture	30
Politics	99	Knowledge	29
Economy	75	Urban regeneration	29
Policy	70	Cultural policy	27
Space	69	Regeneration	26
Industry	62	Cultural industry	26
Geography	53	Economic development	26
Urban	45	Creative economy	25
Creative industry	43	Cultural economy	24
Innovation	42	Image	23
Cluster	40	Tourism	22
Creative class	36	Community	21
Governance	33	Place	20
Art	33		

Through the application of cluster analysis to keywords, the study excluded categories that encompassed a smaller quantity of publications. Consequently, we derived nine distinct clusters (see Figure 4), each comprising publications ranging from 27 to 75. Cluster 0 emphasizes the impact of culture-led urban revitalization projects on creative cities (Evans, 2005; Bertacchini et al., 2022). Cluster 1 focuses on community development and urban management measures in creative cities (Jinliao et al., 2022; Murdoch et al., 2015). Cluster 2 involves the effects of urban facilities and location choices (He et al., 2018). Cluster 3 investigates the impact of artistic creativity on economic and cultural policy planning (Zheng, 2021). Cluster 4 is concerned with the sustainable development of the creative economy in creative cities and the influence of favorable environments on cultural vitality (Comunian, 2010; Štreimikienė and Kačerauskas, 2020). Cluster 5 examines the impact of the creative industries on the economy and policy (Evans, 2009; Liang and Wang, 2020). Cluster 6 highlights the importance of creative place-making (Tan and Tan, 2023). Cluster 7 centers on the influence of cultural policy on creative city development (Rius-Ulldemolins et al., 2022; Sirois, 2021).

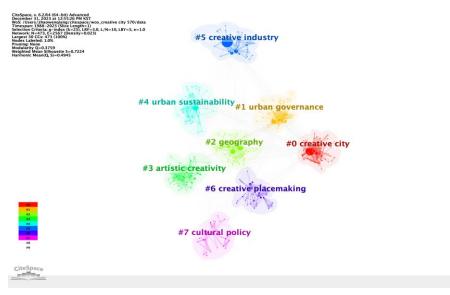


Figure 4. Clusters of the keywords.

The timeline view is primarily employed to depict the relationships between clusters and the evolution process of keywords within a cluster. Nodes represent terms with high-frequency counts, and lines indicate the co-occurrence strength between nodes. As shown in **Figure 5**, Cluster 0 (creative city), Cluster 1 (urban governance), Cluster 2 (geography), Cluster 4 (urban sustainability), and Cluster 5 (creative industry), all consist of multiple large nodes and strong links, indicating that research on the development of creative cities is robust and in a healthy state of development. From an evolutionary perspective, the exploration of creative cities originated within city studies, subsequently emerging with the rise of the creative industries. Recently, it has evolved into disparate investigations within various specialized domains. The lines between clusters also reflect their closeness, illustrating that clusters do not exist in isolation.

Keyword citation bursts refer to a significant increase in the citation frequency of

a specific keyword during a certain period. This aids researchers in quickly identifying the hotspots and emerging directions in a research field. We analyzed the top 20 keywords with the most robust citation bursts in the creative city domain and sorted the results in chronological order from the start of the burst. The blue bars in **Figure 6** represent the temporal range of keyword variations, while the red bars indicate the years of keyword bursts. Specifically, the keyword cultural industry was a hotspot in creative city-related studies from 2000 to 2011, experiencing its most prolonged period of bursts. Subsequently, the keyword creative class underwent a burst of attention for nine years.

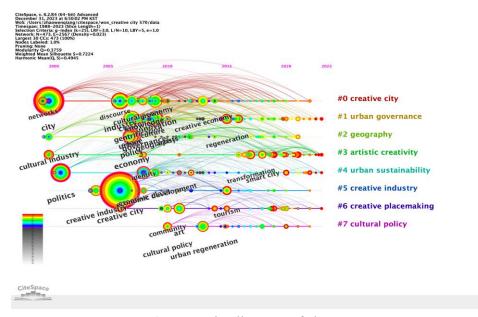


Figure 5. Timeline map of clusters.

As can be seen from **Figure 6**, the creative cities keyword burst presents 2 stages. In the first stage before 2020, the burst keywords are related to urban governance and urban development, such as creative class, industry, economy, and politics. Researchers focus on the basic operating factors of the city, and through macroanalysis, understand the roles and functions of different sectors and industries in the process of creative city development, with a view of finding an effective path for creative city construction.

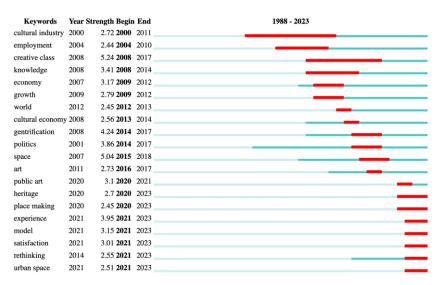


Figure 6. Top 20 keywords with the strongest citation bursts.

In the second stage, after 2020, there is an explosive growth of keywords related to public art, heritage, urban space, experience, model, and satisfaction. In this phase, research centers on the feasibility analysis of specific creative city practices attempt to develop and expand the connection of creativity in different fields, and focuses on the study of the external environment of the city and the internal participation of residents. In creating new paradigms and models of creative cities, it maximizes their economic and social value. This suggests that future research emphasizes integrating creativity and multiple new models, utilizing historical heritage and public art to promote economic development (Choy and Tan, 2019; Suhartanto et al., 2019). Yang et al. (2023) found that the emergence of creative industries in metropolitan areas is capable of reshaping the operational blueprint of the city hub. Additionally, this industry's inflow of talent, capital, and knowledge bolsters the geographical arrangement of the city. Parker and Khanyile (2022) argue that public art can shape branded spaces, contributing to implementing the discourse surrounding creative cities. This process effectively showcases how urban renewal provides a platform for creative endeavors for the audience. Casals-Alsina (2023) delved into the Barcelona model's cultural policies and urban regeneration. This model prioritizes the growth of cultural and creative sectors, alongside enhancing access to cultural events and amenities. Still, it also faces challenges such as excessive commercialization and environmental sustainability. Exploring the effects of different types on urban practice and interaction with humans will promote the development, implementation, and refinement of creative cities.

5. Conclusions

While the development of the creative city research field started relatively late, it has gradually attracted increasing attention and scrutiny from scholars as urban applications and practices have improved. This study employs bibliometrics to analyze the development of creative city research from 1988 to 2023. Based on 570 articles obtained from WoS, this study identified significant publications, authors, journals, institutions, and countries. The field of creative city research spans multiple disciplines,

with scholars and publishers distributed across different countries. The collaboration among researchers from various institutions and countries has led to an increasing focus on the study of creative cities, accompanied by a continuous deepening of research depth. Subsequently, an analysis of the co-citation network revealed scholars emphasize the political, economic, social, cultural, and environmental changes brought about by creative cities to urban development, as well as the potential issues of development imbalance and fairness that governments and citizens need to address in the process of creative city development. A review of research on creative cities facilitates further exploration of theoretical and practical research on creative cities, thereby providing favorable conditions for the sustainable development of cities. Finally, the study made predictions about research trends and hotspots through keyword analysis. It is anticipated that future research on creative cities will emphasize the integration of theory and practice. This will involve creating different evaluation dimensions to measure the actual effectiveness of implementing creative city strategies, with particular emphasis on the experiences and satisfaction of individuals within the urban context. Additionally, urban planners and policymakers will make full use of the creatively rich spaces within cities to continually promote the guiding role of public art and cultural heritage, maximizing their creative value. This has significant implications for establishing and developing models of creative cities.

Although this study provides a comprehensive framework for studying the field of creative cities, it is essential to acknowledge certain limitations in our research. Firstly, our study sample exclusively covers the WoS core database and does not include other research databases such as Scopus. Research on creative cities in other databases may be equally outstanding and possess unique characteristics. Secondly, to ensure consistency of publications, our data sample is limited to articles. Future research could expand the sample to include other types of data, such as conference papers, working papers, and book reviews, among others. Thirdly, this study collected data using creative city as the sole keyword, but due to interdisciplinary content, it encompasses other concepts. Future research could incorporate additional keywords such as creative economy, creative class, and creative industries to explore the directions and hotspots in creative cities more extensively.

Conflict of interest: The author declares no conflict of interest.

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