Review

Exploring Trends in Intangible Cultural Heritage Design: A Bibliometric and Content Analysis

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Abstract: This paper aims to explore the development of ICHD (intangible cultural heritage design), provide insights into its global trends, and foster its growth and advancement. The objectives are achieved through a mixed-methods approach that combines bibliometric methods and content analysis. This approach allows for a quantitative and qualitative analysis of the scientific literature related to ICHD. The findings of the work include an analysis of the most productive countries/regions, institutions, journals, and authors in the field of ICHD. In addition, it encompasses citation and co-citation analyses, aiding in the identification of influential scholars and esteemed journals within the domain as well as revealing collaborative patterns among researchers. The outcomes and implications for practice include a better understanding of the global trends in ICHD and insights into its growth and development. The research findings carry substantial theoretical and practical significance, leading to proposed avenues for future research. This paper significantly contributes to an enhanced understanding of the global landscape of ICHD, offering invaluable guidance and inspiration to researchers and practitioners alike.

Keywords: bibliometric analysis; content analysis; global trends; intangible cultural heritage design; mixed-methods approach; scientific literature; sustainable development

1. Introduction

The preservation, inheritance, and utilization of ICH (Intangible Cultural Heritage) have emerged as pivotal global agendas, capturing extensive scholarly attention and practical exploration [1–3]. Strengthening the protection, inheritance, and utilization of ICH is crucial for preserving the historical context of mankind, cultivating a sense of national identity, and promoting cultural exchanges and mutual learning [4–6]. According to the research by Ding [4], the utilization of digital technology and advanced computing methods has played a significant role in the precise identification and preservation of ICH, thereby contributing to its protection and sustainable development. The synergistic integration of ICH and tourism has the inherent capacity to stimulate the expansion of the service sector and propel the advancement of a sustainable green economy, as highlighted by the research conducted by Zhao et al. [5]. In the realm of museum exhibitions, the utilization of interactive storytelling and projection mapping has proven instrumental in effectively conveying the essence of ICH [6]. This innovative approach seamlessly intertwines tangible artifacts with intangible cultural heritage through compelling narratives and vibrant visual representations, as exemplified by the research conducted by Bortolotto [6] and Nikolakopoulou et al. [7].

ICHD involves creating products, spaces, and experiences that help preserve and promote living cultural practices, traditions, knowledge, and skills. The meaning of the sentence, as mentioned by Alivizatou-Barakou et al. [8], is that the exploration of the relationship between ICH and design is essential in promoting sustainable development in non-heritage contexts unrelated to heritage preservation. According to Yuan et al. [9]

and Li et al. [10], the integration of ICH with technology, such as augmented reality (AR), has been shown to enhance visitors' learning experiences and contribute to the protection, inheritance, and promotion of ICH. Combining ICH protection with tourism can generate new protection forms, maintain cultural vitality, and empower people with knowledge to ensure ICH's sustainability [11,12]. Furthermore, the Live Transmission approach encourages innovations in traditional handicrafts, aiming to revitalize the economies and cultural identities of traditional craft communities [13].

ICHD endeavors to safeguard, transmit, and sustainably harness ICH through innovative design and the principles of sustainable development. By safeguarding and harnessing ICH through innovative design and sustainable principles, the field of Intangible Cultural Heritage Documentation (ICHD), as highlighted by Lenzerini [14], contributes to global societal, cultural, and economic progress. This commitment ensures the enduring benefits of these cultural legacies for future generations.

There is an evident void in the existing literature when it comes to the summarization of the realm of ICHD. As mentioned by Giliberto and Labadi [15], although there have been case studies and discussions exploring specific aspects of sustainable heritage such as tourism, gender, and natural resource management, further research is needed to achieve a comprehensive understanding of this field. As noted by Tavares, Alves, and Vásquez [16], ICH encompasses the tools, objects, artifacts, and cultural spaces that communities, groups, and individuals recognize as integral to their cultural heritage. The transmission of ICH is a people-centered cultural dissemination that shapes one's morality, character, sentiment, will, ideals, beliefs, values, humanities, artistic taste, thinking mode, wisdom, and practical ability [17,18]. Therefore, it is necessary to further study the current status of ICH and its re-creation through the market [17,19]. Additionally, the field of innovation in entrepreneurial education for ICH inheritance is also worth paying attention to [17]. Although research has been conducted on ICHD, there is still a requirement for a comprehensive synthesis of the discipline, considering diverse perspectives and the implications of sustainable development [20].

In recent years, the number of scientific publications on ICHD has dramatically increased, yet a comprehensive bibliometric and visualization analysis is still lacking to provide insights into the research status. The research topics are scattered, and the research methods and theoretical foundations are not clear enough, which poses challenges to the coherence and systematization of the field. In addition, there is a lack of smooth communication channels among researchers, which leads to limited discussions and exchanges and hinders the formation of organic connections and collective efforts. These challenges also present obstacles for decision-makers, who face difficulties in accurately assessing the prominent research areas and trends within this domain. This, in turn, hinders their ability to develop pertinent policies and ensure the sustainable progress of the field. In addition, the available research on this subject is widely spread among journals in diverse disciplines, creating challenges for the dissemination and exchange of research findings and impeding the formation of a consensus within the broader scholarly community.

This article aims to explore the current state of research on ICHD, further discussing the evolution of research paradigms, tracking research frontiers and hotspots, and providing references and guidance for future practical and theoretical research in this field. In order to bring clarity to the existing research, we developed the following research questions (RQs):

RQ1. How has research in the field of ICHD evolved over time?

RQ2. What are the primary themes and current issues in ICHD research?

RQ3. What are the theoretical and practical implications of our study, and what are the future directions for further research in this area?

In order to accomplish the aforementioned objectives, this article is organized as follows: Section 2 outlines the research methodology, data sources, and software employed in this study. Section 3 presents the results of the bibliometric and content analysis; Section 4 discusses the theoretical and practical implications of our findings and suggests potential

avenues for future research; Section 5 highlights the limitations of this study and concludes with final remarks.

2. Data and Methodology

2.1. Software and Data

To examine the knowledge structure and trends in the research domain, we employed VOSviewer software (version 1.6.18, Centre for Science and Technology Studies, Leiden University, Leiden, The Netherlands) for quantitative analysis of the relevant literature [21,22]. VOSviewer is a practical research tool used for building and visualizing bibliometric networks based on citation, co-citation, co-authorship, or bibliographic coupling relationships [22,23]. It can identify research hotspots and emerging research directions, establish knowledge maps of research fields, and reveal the development and evolution of research themes on the basis of large-scale academic literature data [24].

All articles were searched using the Web of Science (WoS) on April 20, 2023. The search was conducted in a public database; therefore, no ethical approval was required. WoS is the first database to track journal quality and collect important scientific literature since 1900, with over 159 million publications [25,26]. It encompasses a vast collection of academic journals spanning diverse scientific disciplines, establishing itself as an extensive and inclusive academic information platform [27]. Boolean formulas were used in the WoS database to conduct an advanced search of articles related to ICHD [28]. The downloaded publication information includes the title, publication year, authors, country/region, institution, journal, keywords, and abstract, which were downloaded in TXT format.

((((TS = (Intangible Cultural Heritage) AND TS = (Design))) AND LA = (English)) AND DT = (Article))

Indexes: SCI-EXPANDED, SSCI, ESCI, and A&HCI.

2.2. Methodology

This article uses a mixed-methods approach that combines bibliometric methods and content analysis to conduct a quantitative and qualitative analysis of the scientific literature related to ICHD [29]. Bibliographic databases and bibliometric features can be used in combination with bibliometric analysis and content analysis methods to study various research directions, identify trends, and analyze the evolution of topics over time. These methods have been applied in various domains, such as virtual reality in computer science education [30], EEG in neurorehabilitation [31], and policy instruments in prefabricated construction in China [32].

Bibliometric analysis involves the quantitative assessment of scientific publications, including citation analysis, co-citation analysis, and co-word analysis, as highlighted by Yao et al. [33]. This method helps identify influential studies, research hotspots, and collaboration networks among authors, institutions, and countries [34]. Content analysis, on the other hand, is a qualitative research method that involves the systematic examination of textual data to identify patterns, themes, and trends, as outlined by Ren et al. [35]. This approach can be applied to analyze the content of articles, abstracts, and titles to comprehend the research focus in a specific field, as demonstrated in the studies by Scotti Requena et al. [36] and Wu et al. [37].

As an interdisciplinary domain encompassing various research areas [38,39], ICHD holds great research prospects [40]. The rapid growth of ICHD-related scientific publications makes it challenging to conduct a comprehensive literature review using traditional methods. To address this issue, this study employs a mixed-methods approach that combines bibliometric and content analyses to provide an overview of the field's key themes and research directions. By integrating quantitative and qualitative methods, Kumar et al. [41] aim to offer a more comprehensive understanding of ICHD in the existing literature.

3. Results

3.1. Bibliometric Analysis

In this section, we present a comprehensive examination of ICHD-related scientific publications, focusing on the most prolific countries/regions, institutions, journals, and authors. Additionally, we delve into citation and co-citation analyses, illuminating prominent scholars, esteemed journals, and collaborative networks within this domain. This meticulous exploration equips researchers with the tools to identify influential scholars and renowned journals while gaining insights into collaborative patterns. Our findings shed light on the global landscape of ICHD, facilitating the discovery of invaluable guidance for researchers and practitioners alike. Therefore, we pose the first research question: RQ1. How has research in the field of ICHD evolved over time?

3.1.1. Description of the Literature Data

From 2007 to 2023, the collected sample files encompassed a wealth of information pertaining to the design of intangible cultural heritage (ICHD). This comprehensive compilation includes essential details such as article titles, publication years, author affiliations, journal publications, abstracts, keywords, references, and citations. The objective of this analysis is to provide a holistic overview of the literature on ICHD, encompassing factors such as quantity and publication years [42]. By presenting a descriptive account of the literature data, researchers can gain a comprehensive understanding of the scholarly output in the field of ICHD, which serves as a foundational basis for subsequent analyses. In the earliest published paper, Adalberto [43] proposed a viewpoint, starting from a three-step pathway (General trend, Specific operational platforms, and The role of science), to infer how to use design as the basic foundation of spatial practice to transform the cultural identity of islands and incorporate ecological identity.

- Annual publications and citations

Figure 1 illustrates the annual publication and citation counts, providing valuable insights into the progression of research in the field. From 2007 to 2013, the initial phase of this study area witnessed limited activity, with only a handful of researchers showing interest. The period between 2014 and 2017 marked a promising stage characterized by growing attention and engagement. Subsequently, from 2018 to 2022, the field entered a phase of significant development, experiencing a substantial increase in research output. Publications during this period accounted for 83.96% of the total. This remarkable surge suggests the rising significance and influence of the field, attracting a larger pool of researchers and funding resources.
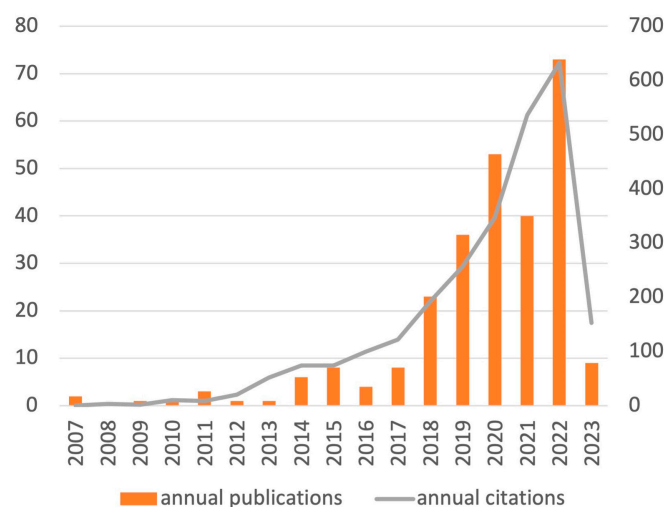

Figure 1. Annual number of publications and citations.

In terms of the number of citations per year, a total of 269 articles were published in this field from 2008 to 2023, with a total citation count of 2585 and an average of 9.61 citations per article. The citation percentage sharply increased from 2020 to 2022, reaching 58.64% of the total citation count. This suggests that the research topic has shown a rapid growth trend in recent years, receiving more attention and citations from scholars.

- Subject areas

Figure 2 shows the top 20 relevant subject areas identified from the publications, with Science Technology Other Topics, Arts Humanities Other Topics, and Computer Science being the top three most frequent research areas. Science Technology Other Topics had 73 publications, covering 27.14% of the total, while Arts Humanities Other Topics and Computer Science had 43 and 39 publications, respectively, accounting for 15.99% and 14.50%, respectively. Additionally, the Web of Science Categories were distributed among Green Sustainable Science Technology (59), Humanities Multidisciplinary (42), Environmental Studies (33), Environmental Sciences (27), Computer Science Information Systems (20), Hospitality Leisure Sport Tourism (15), and Multidisciplinary Sciences (14).
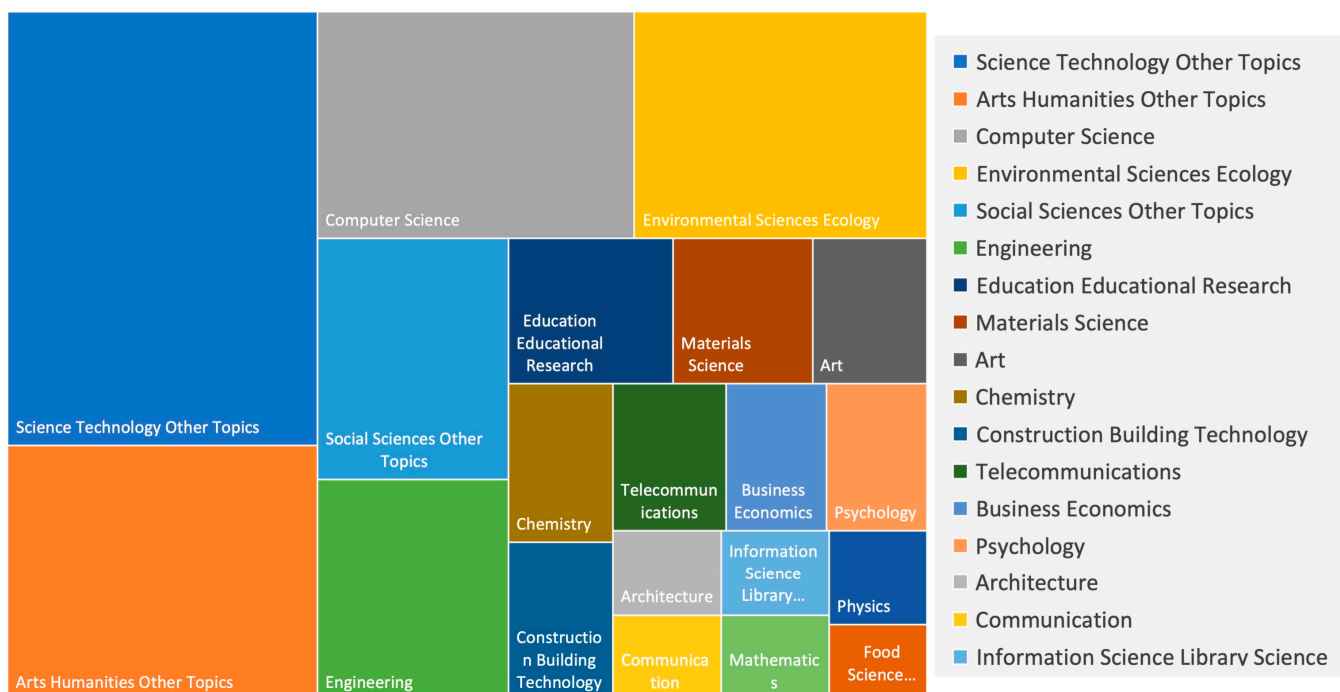

Figure 2. The literature is distributed in various subject areas.

3.1.2. Countries/Regions Distribution Analysis

This analysis aims to explore the geographical distribution and collaborative relationships within the realm of ICHD in order to gain insights into research activities and cooperative networks across different regions. Through this analysis, we can unveil the variations and trends in ICHD research on a global scale, providing researchers with guidance and a profound understanding. Furthermore, this analysis enables us to acquire the latest developments and research achievements in the international arena.

Figure 3a elucidates the volume of scholarly publications originating from diverse regions across the globe, specifically from 72 distinct nations. Unquestionably, China's prolific output, evidenced by 69 published articles, underscores its prominent role and indelible influence in this specialized arena. China, renowned for its abundant and variegated ICH [44], has committed to its preservation since the ratification of the UNESCO Convention for the Safeguarding of ICH in 2004 [45]. Both the Chinese government and the academic community have persistently championed the safeguarding of these unique cultural assets [46,47]. Following closely on the heels of China's substantial contribution, Italy,

Spain, the United Kingdom, and Greece, all noteworthy European nations, appear within the leading decile, demonstrating Europe's extensive and profound research endeavors in this field. The commendable stature of these countries is not merely attributable to their copious ICH but also to their joint conservation initiatives as constituent members of the European Union [48–50]. Interestingly, despite their geographical and cultural distance from Europe, the United States and Australia emerge as the sole non-European nations within the top ten. Their notable prominence attests to the universality of this subject area [51,52], underscoring their invaluable resources and expertise in terms of publication within this domain. The breadth and depth of their contributions affirm the global relevance and cross-cultural significance of the preservation and study of ICH.
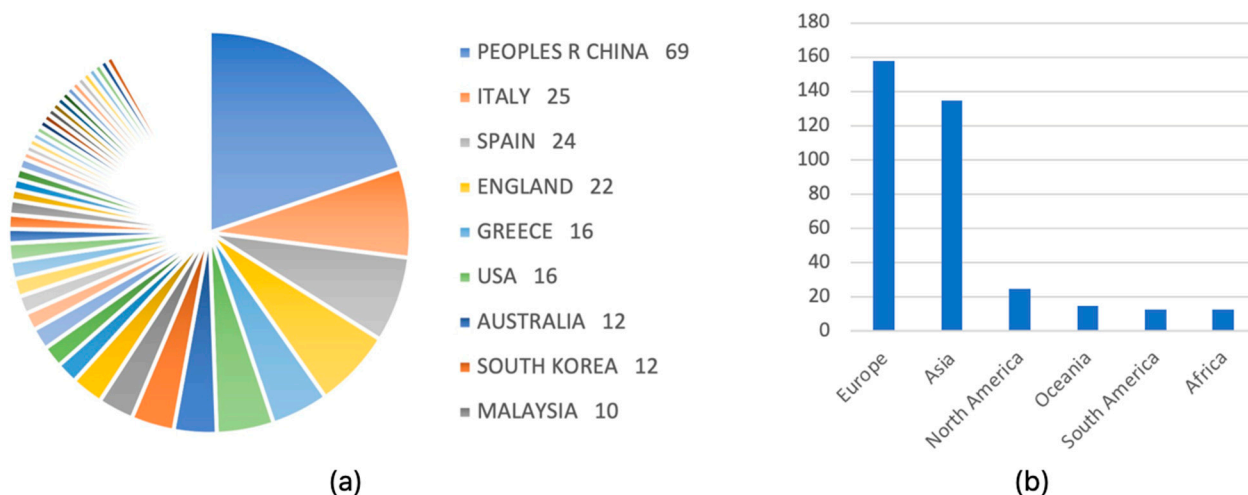

Figure 3. Number of scientific publications. (**a**) Countries/regions distribution. (**b**) Intercontinental distribution.

Figure 3b shows the number of scientific publications in this field by continent. The research in this field is mainly concentrated in Europe (158) and Asia (135), with Europe having the highest number of published papers, followed by Asia. Half of the top ten countries with the highest number of publications are European countries.

Figure 4 shows that the VOSviewer software was used to analyze the network visualization of co-authorship relationships between countries/regions. Only countries/regions with a minimum of four articles were included. Among the 21 countries and regions that met the threshold, China is at the center of the research field and has close collaborations with Taiwan and South Korea.

Figure 5 shows that the VOSviewer software was used to analyze the overlay visualization of co-authorship relationships between countries/regions. Initially, countries/regions such as Italy, Canada, and the USA were active in this research field. However, currently, most of the active countries in this field are in Asia, such as China, South Korea, Malaysia, and others. Moreover, the number of articles published by Asian countries is rapidly increasing every year, indicating a trend of catching up with the leaders.

3.1.3. Institutions and Their Collaboration Network Analysis

This analysis aims to explore the pivotal contributions of institutions in the realm of ICHD and unravel the intricacies of their collaborative networks. By scrutinizing institutional dynamics and collaborative patterns, researchers can gain insights into the influential roles played by various institutions in ICHD research, fostering research exchange and knowledge sharing.

Table 1 presents the top 5 most productive institutions. The Polytechnic University of Milan (Italy) and the University of Aegean (Greece) are ranked first with six publications each in terms of TP. Following closely are the Hong Kong Polytechnic University (Hong Kong SAR, China), the Polytechnic University of Turin (Italy), and the University of London

(UK), all with five publications. In terms of TC, the University of London ranks first with 124, followed by the Polytechnic University of Turin with 92.
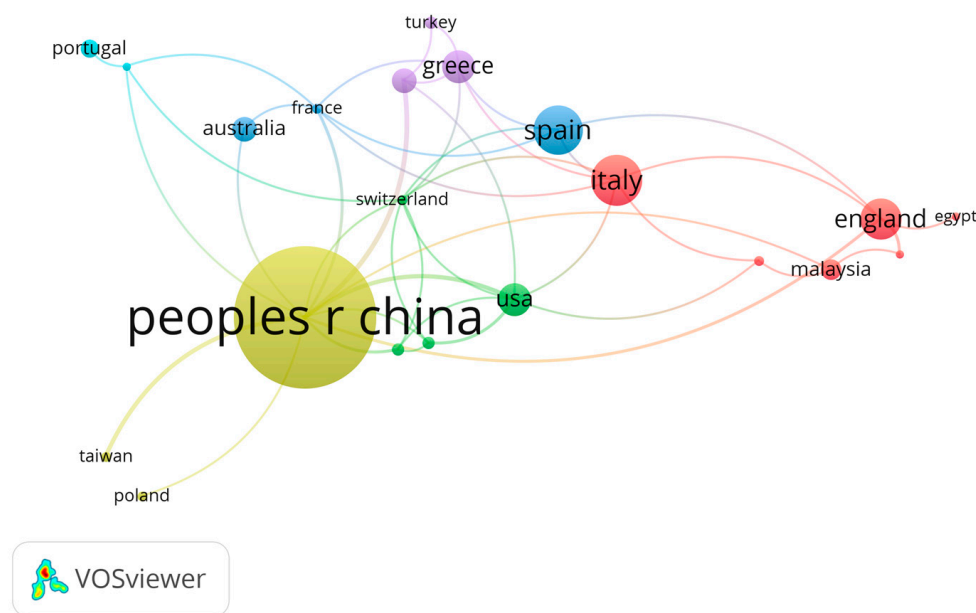
Figure 4. Collaboration network between countries/regions.
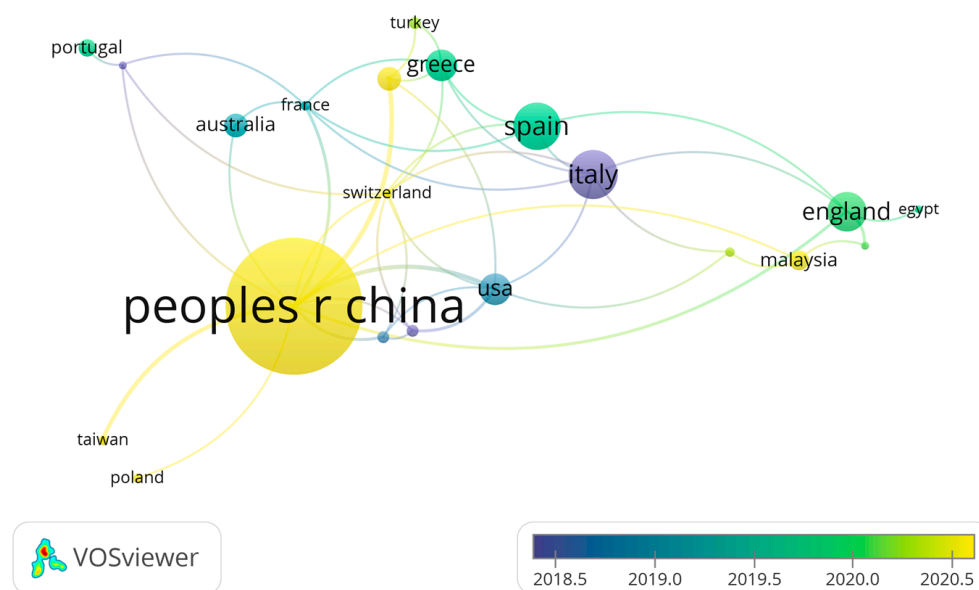
Figure 5. Collaboration overlay between countries/regions.

Based on the bibliographic data, we identified 400 institutions. Figure 6 presents the collaboration network visualization of all the institutions by setting the minimum number of documents per institution at one. The size of the nodes represents the number of articles completed by the corresponding institution, and the nodes are colored dark gray if the authors belong to the same institution and have not collaborated with other institutions. It can be seen that authors tend to seek collaboration within their own institutions.

In the same way, by setting the minimum number of documents per institution at three, we obtained the 11 institutions visualized in Figure 7. Among the most collaborative institutions, Jinan University ranked first with three publications and 67 citation counts and established seven connections with other institutions. Additionally, Hong Kong Polytechnic University was also among the collaborating institutions.

Table 1. The top 5 most productive institutions.

R	Affiliation	Country	TP	TC	TC/TP	H
1	Polytechnic University of Milan	Italy	6	67	11.17	3
2	University of Aegean	Greece	6	41	6.83	4
3	Hong Kong Polytechnic University	Hong Kong, China	5	54	10.80	3
4	Polytechnic University of Turin	Italy	5	92	18.40	3
5	University of London	United Kingdom	5	124	24.80	3

Source: Own elaboration based on WoS database (2023). Note: TP = Total number of papers; TC = Total number of citations; TC/TP = Average Citations per Article; H = H-index.
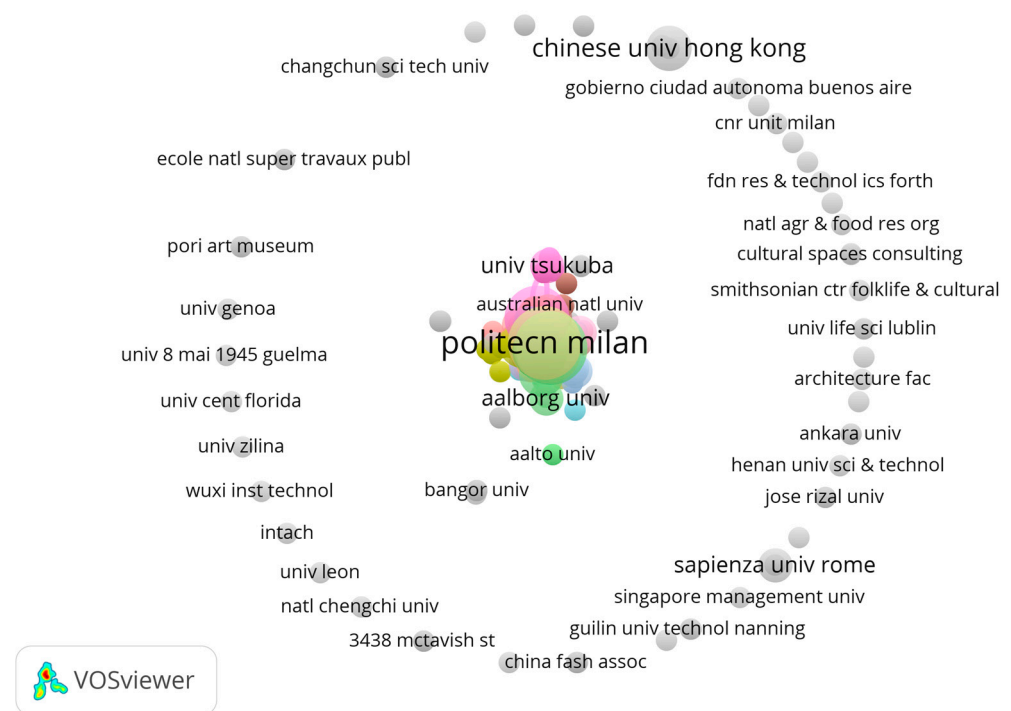

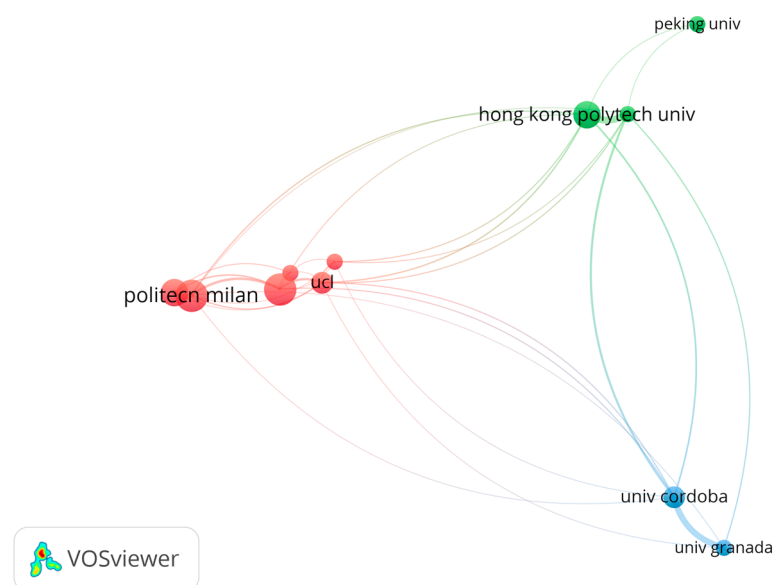**Figure 6.** The collaboration network of all 400 institutions.

Figure 7. The collaboration network of all 11 institutions.

3.1.4. Journals and Authors Analysis

This analysis aims to ascertain the preeminent journals and influential authors in the domain of ICHD, facilitating the identification of significant publishing platforms and esteemed researchers. By scrutinizing the realm of journals and authors, researchers can gain insight into the pivotal publication avenues within the ICHD field and discern influential scholars, providing invaluable guidance for researchers in selecting suitable journals and seeking esteemed collaborative partners.

Table 2 presents key indicators for the top nine journals in the field. From the editorial perspective, it can be observed that MDPI has three journals in the field, with Sustainability and Heritage ranking higher in terms of JQ. In terms of JCI, a new indicator representing a journal's citation count and impact, there is a significant difference among the journals. The ACM Journal on Computing and Cultural Heritage (JOCCH) and Heritage have a relatively high impact in terms of their JCI values. In terms of the JCI Category, the relevant articles are distributed across different fields, and the journals cover a diverse range of fields such as engineering, humanities, psychology, education, and environment, but with a focus on humanities, heritage, and sustainability. In terms of Category Quartile, the journals have different levels of influence in their respective fields, with four of them belonging to Q1, including Heritage, the ACM Journal on Computing and Cultural Heritage, the International Journal of Heritage Studies, and the International Journal of Intangible Heritage. Regarding article output and citation count, there is a significant difference between them, with Sustainability having the highest article output and the International Journal of Heritage Studies having the highest citation count. However, the International Journal of Heritage Studies has the highest Average Citations per Article.

Table 2. The top nine productive journals.

R	Journal	Editorial	JCI	JCI Category	CQ	TP	TC	TC/TP	MCA
1	Journal of Cultural Heritage Management and Sustainable Development	MDPI	0.18	GREEN AND SUSTAINABLE SCIENCE AND TECHNOLOGY(ESCI)	Q4	32	68	2.13	[53]
2	Sustainability	Emerald Group Publishing	0.65	ENVIRONMENTAL STUDIES(SSCI)	Q3	25	207	8.28	[54]
3	Heritage	MDPI	4.12	HUMANITIES, MULTIDISCIPLINARY(ESCI)	Q1	11	21	1.91	[55]
4	Asian Education and Development Studies	Taylor and Francis	0.32	EDUCATION AND EDUCATIONAL RESEARCH(ESCI)	Q3	7	9	1.29	[56]
5	ACM Journal on Computing and Cultural Heritage	National Folk Museum of Korea	4.08	HUMANITIES, MULTIDISCIPLINARY(AHCI)	Q1	6	31	5.17	[57]
6	Frontiers in Psychology	Association for Computing Machinery	1.03	PSYCHOLOGY, MULTIDISCIPLINARY(SSCI)	Q2	6	1	0.17	[58]
7	International Journal of Heritage Studies	Emerald Group Publishing	3.28	HUMANITIES, MULTIDISCIPLINARY(AHCI)	Q1	6	142	23.67	[59]
8	International Journal of Intangible Heritage	Frontiers Media	1.36	HUMANITIES, MULTIDISCIPLINARY(AHCI)	Q1	6	26	4.33	[60]
9	Applied Sciences Basel	MDPI	0.59	ENGINEERING, MULTIDISCIPLINARY(SCIE)	Q2	5	14	2.80	[61]

Note: JCI, journal citation indicator^{TM} (2021); CQ, category quartile; TP, total number of papers; TC, total number of citations; TC/TP, average citations per article; MCA, the most cited articles.

Authors with more than two papers are rare, indicating that, from the author's point of view, the published papers are scattered. Figure 8 shows that The VOSviewer software was used to analyze the network visualization of co-authorship relationships. By specifying the minimum number of publications per author at two, we identified 24 authors out of 726 authors. There is a cooperative relationship among these authors; most of the authors gather together to form small groups, and there are seven small groups with more than two nodes. This suggests that there is a certain degree of collaboration among authors, and some authors have closer collaborations, forming small groups.
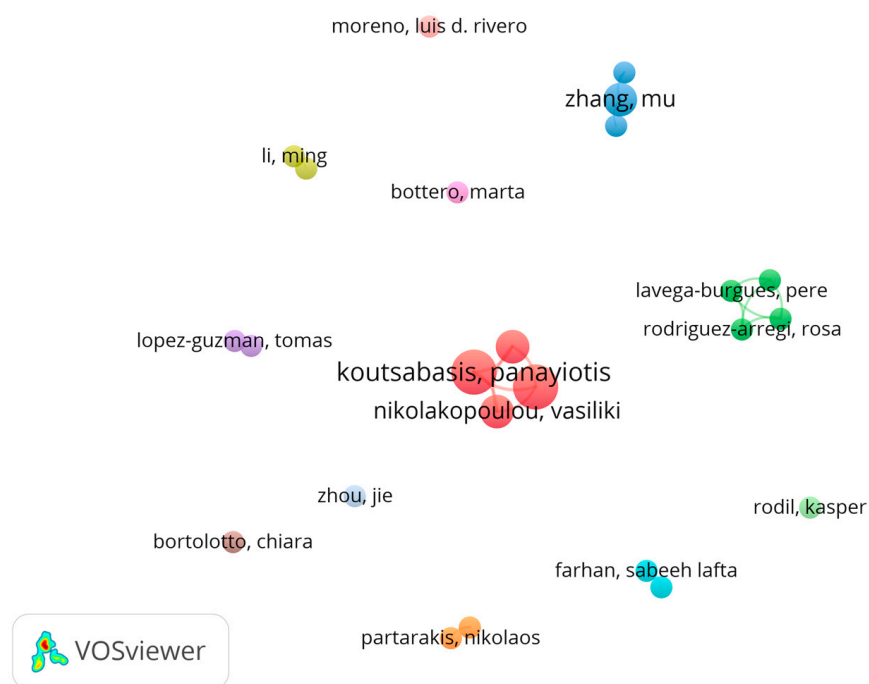

Figure 8. The collaboration network of all 24 authors.

3.1.5. Citation Analysis

This analysis aims to unveil influential scholars, esteemed journals, and collaborative patterns within the realm of ICHD through meticulous citation analysis. By delving into citations, researchers can gain insights into the scholars and journals that hold sway in ICHD research as well as discern collaborative relationships among researchers, thereby further enhancing their understanding of the intricacies of the ICHD domain.

In this section, we conducted a citation and co-citation analysis to identify the most influential authors and journals in the field. We used citation links to measure the frequency of a paper being cited and co-citation links to measure the frequency of two papers being cited together in the same article.

We identified 123 authors from a pool of 726 by setting the criterion of a minimum of 24 citations per author. Figure 9 presents the citation structure, where it is evident that five out of these 24 authors display a less interconnected citation network. This implies infrequent citation relationships among these authors or their respective papers, affirming their autonomous standing within the realm of study.

Utilizing a minimum co-citation threshold of eight, we discerned 37 authors within a pool of 8956. The ensuing co-citation architecture is illustrated in Figure 10, which includes 39 authors segmented into five distinct clusters. Notably, the UNESCO node presents as exceptionally large, while the remaining nodes display comparative uniformity in size, suggesting a well-proportioned citation relationship among these authors or papers. Nevertheless, the prominence or sway of UNESCO stands out substantially, insinuating the organization's pivotal role within this field. Its extensive citations and potent associations with other authors or papers further underscore this importance. Reviewing the total link

strength's average and range (54.27, 4–414), it becomes apparent that the citation strength within the network fluctuates, with certain nodes exhibiting denser citation concentration than others.
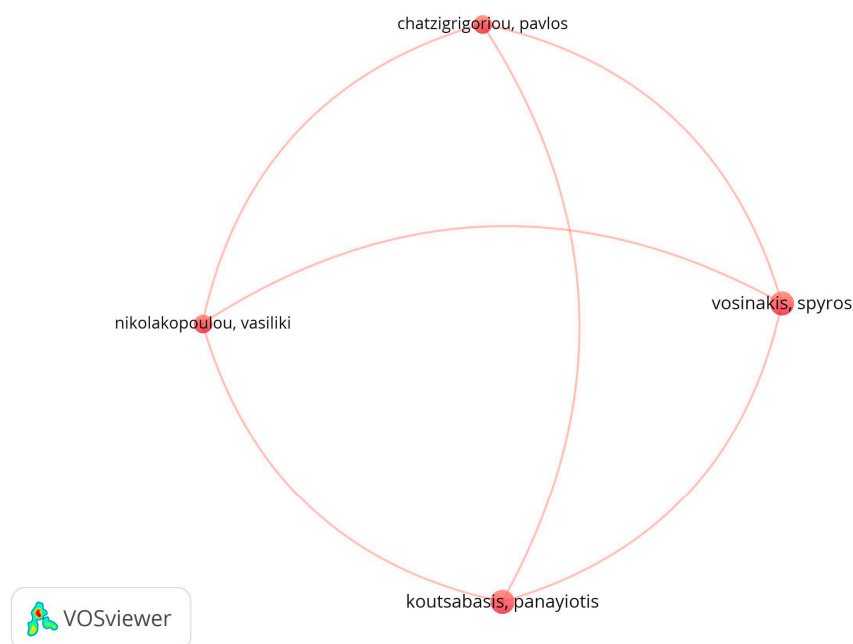
Figure 9. The citation network of authors.
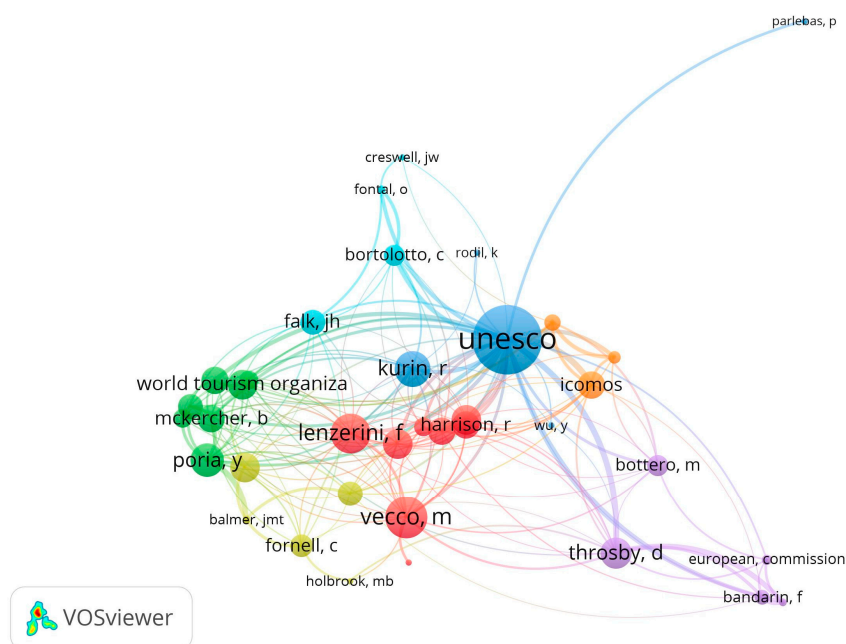
Figure 10. The co-citation network of authors.

As shown in Table 3, Koutsabasis is one of the most influential authors, with four papers written and 30 citations received. The digitalization of non-cultural heritage and the application of digital technology in museums are topics of great interest [7,62]. As shown in Table 4, UNESCO is the most co-cited author in the network of co-citations, with 159 citations from 33 authors and a total link strength of 414. This suggests that researchers in this field widely recognize UNESCO as having high authority and influence in non-cultural heritage protection and management.

Table 3. The top 5 most cited authors.

R	Author	TP	TC	Links	Total Link Strength
1	Koutsabasis, Panayiotis	4	30	3	6
2	Vosinakis, Spyros	4	30	3	6
3	Zhang, Mu	3	67	0	0
4	Chatzigrigoriou, Pavlos	3	10	3	6
5	Nikolakopoulou, Vasiliki	3	10	3	6

Table 4. The top 5 most co-cited authors.

R	Author	Citations	Links	Total Link Strength
1	UNESCO	159	33	414
2	Icomos	22	13	82
3	Throsby, D	20	15	113
4	Vecco, M	20	20	64
5	Smith, L	19	13	49

The citation network of journals is presented in Figure 11a. It is evident that the journals with the most citations include Sustainability, the International Journal of Heritage Studies, and the Journal of Cultural Heritage Management and Sustainable Development. The co-citation network of journals is illustrated in Figure 11b. It is evident that the journals with the highest total co-citations include Tourism Management, Annals of Tourism Research, and Sustainability (Basel).
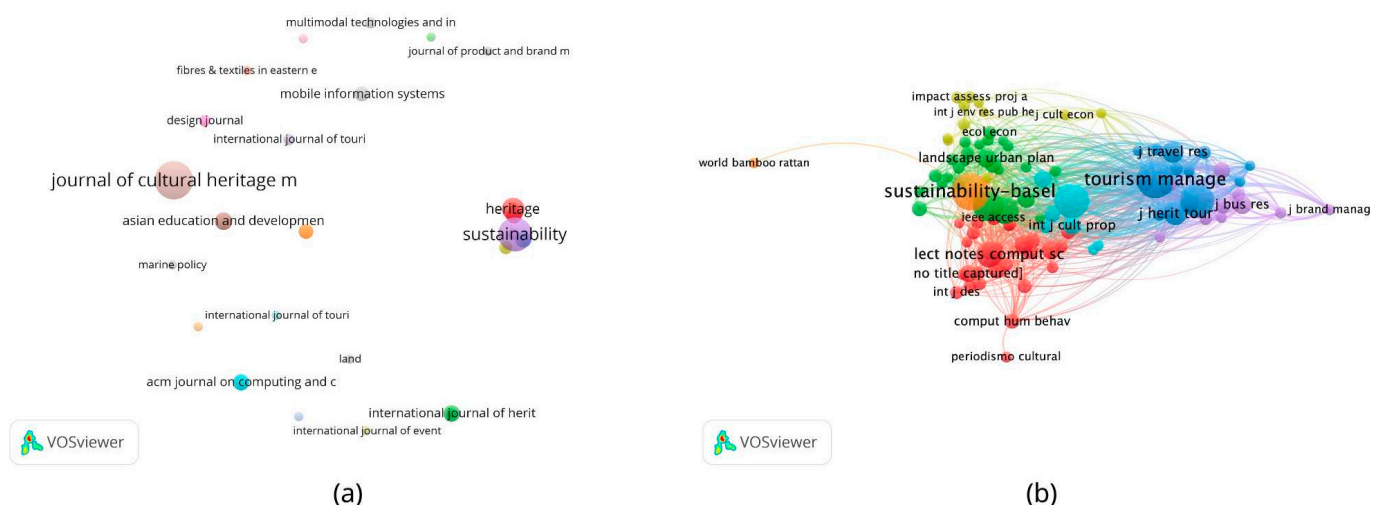

(a)

(b)

Figure 11. Network of sources. (**a**) The citation network of sources. (**b**) The co-citation network of sources.

Based on the above analysis, we recommend that researchers in this field choose journals such as Sustainability, Heritage, the Journal of Cultural Heritage Management and Sustainable Development, the ACM Journal on Computing and Cultural Heritage, the International Journal of Heritage Studies, and the International Journal of Intangible Heritage. These journals have a significant impact in this field, are widely cited, and some are high-impact journals. Publishing in these journals can increase research impact and citation frequency.

3.2. Content Analysis

Insights into the research domain can help visualize the dimensions and evolution of ICHD and identify research gaps and future directions. In this regard, we focus on the second question, RQ2. What are the primary themes and current issues in ICHD research?

Keywords summarize the content of the literature, and high-frequency keywords can reflect the research hotspots in a certain research field during a certain period. We selected a word co-occurrence network analysis based on text data because the nodes are more concentrated and the network density is higher. Based on the Title and Abstract fields in the original text data, we identify keywords and topic words using the full counting method to help understand the topics and content.

3.2.1. Theme Hotspot Analysis

The objective of the theme density analysis is to identify the research hotspots within the domain of ICHD. VOSviewer employs the visual representation of similarities (VOS) methodology to detect and visually position different clusters on a map, effectively mapping each keyword within the analysis.

We use the theme density of keywords to identify research hotspots. Figure 12 presents a theme density visualization of 269 documents. The network of nodes and edges reveals the presence of diverse and significant themes within scientific publications related to ICHD, indicating a high level of research interest. However, upon examining the occurrences, it is evident that terms such as "culture", "experience", "technology", and "practice" hold prominent positions, with "experience" and "technology" closely interconnected. Additionally, other terms like "area", "project", "city", "building", "community", "museum", and "management" frequently appear throughout the documents. This suggests that ICHD should be recognized as an interdisciplinary research field where scholars have conducted in-depth investigations into various aspects. Furthermore, there is a particular interest in exploring avenues that provide enriched experiences and employ technological applications.
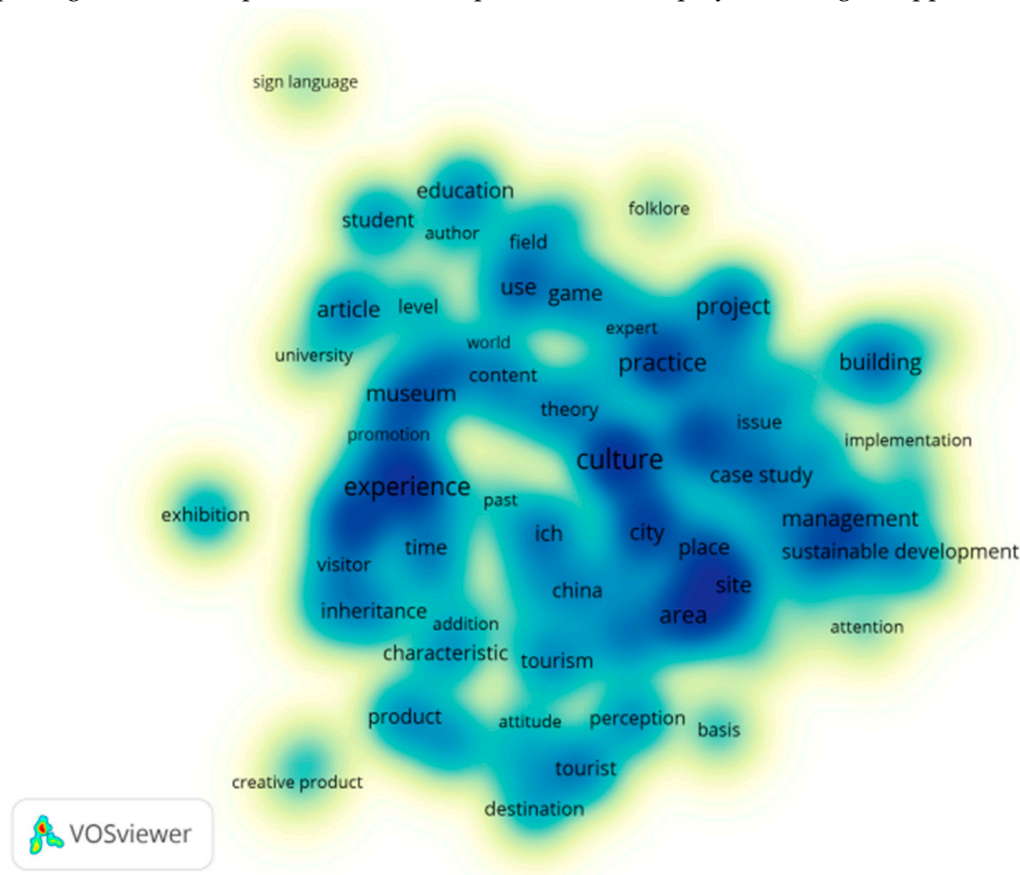

Figure 12. The theme density of the keywords.

3.2.2. Theme Evolution Analysis

This analysis aims to track the development and changes of research topics in ICHD over time. By incorporating the time dimension into our analysis, we gain a deeper under-

standing of the evolution of themes and knowledge structures. This analysis helps identify the shifting research foci, emerging trends, and trajectory of scholarly investigations.

VOSviewer allows us to incorporate the time dimension by overlaying the visualization of keywords, enabling us to track the evolution of research topics and assess the development and changes in knowledge structures. Figure 13 displays the time scale corresponding to nodes of different colors, and we further evaluated the evolution of the most frequently used keywords during the periods of 2018–2019, 2019–2020, and 2020–2021 to understand the evolution of topics. The results show that research topics have undergone significant changes. Initially, scientific literature focused on core topics such as conservation management and policy research, with an emphasis on international and local community perspectives. Later, culture, cultural heritage, cultural identity, and innovation became the focus, and multiple research perspectives and methods were used for in-depth analysis. Recently, based on previous research, the focus has shifted to practical applications, with an emphasis on utilization and conservation, involving the education industry, sustainable development, tourism, and technological changes. The research scope is also constantly expanding and beginning to impact related fields and industries.
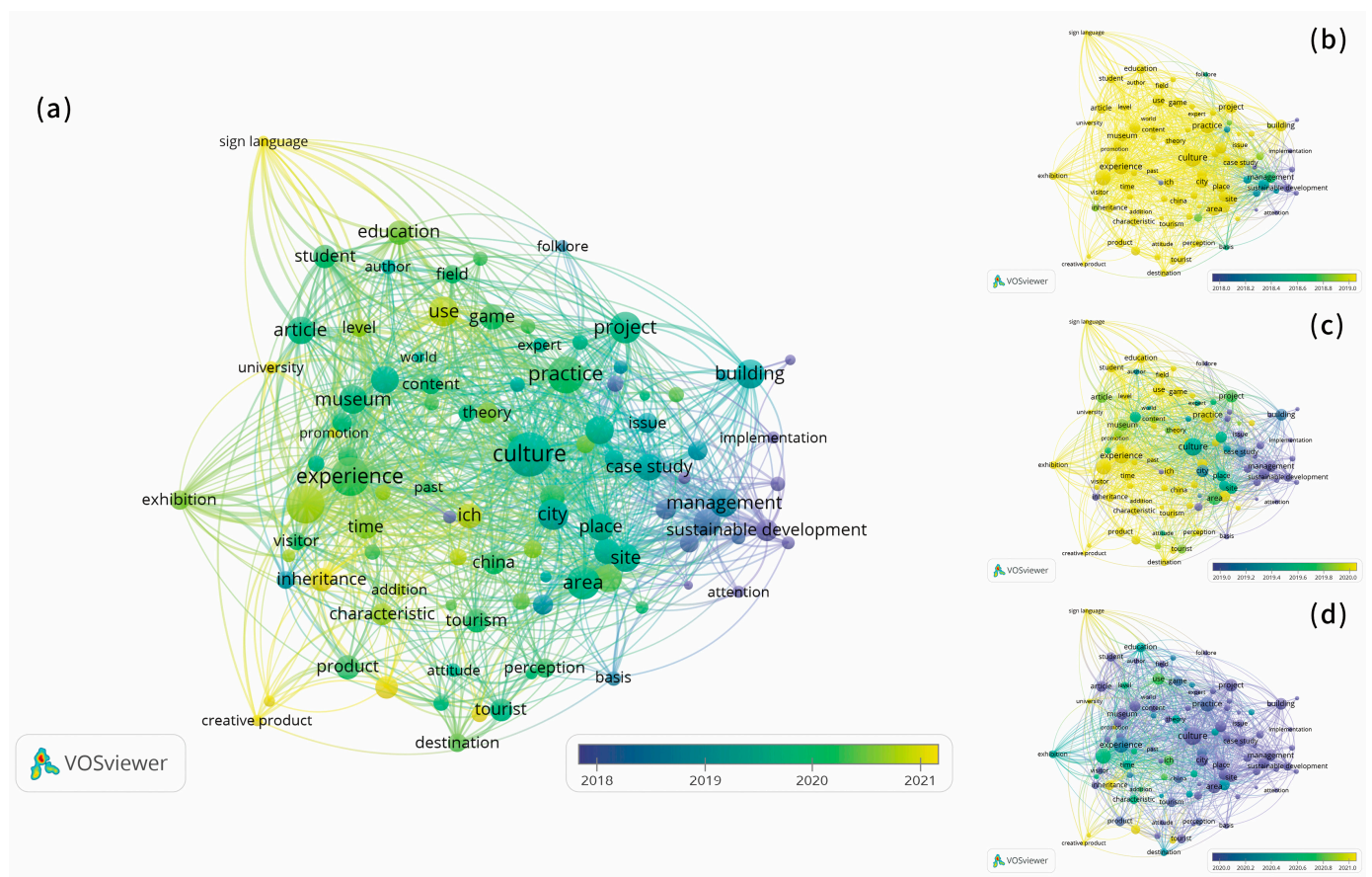
Figure 13. The theme overlay of the keywords. (**a**): 2018–2021; (**b**): 2018–2019; (**c**): 2019–2020; (**d**): 2020–2021.

In addition, edge nodes may also vary in different time periods, indicating changes in research breadth and depth. The emergence of new nodes means that the research scope is further expanding, requiring researchers to continuously explore new knowledge and promote learning. The layout of nodes and networks may also differ, leading to changes in clustering and the framework structures of topics. Therefore, researchers need to re-examine the correlations between topics, promote knowledge reconstruction, and integrate innovation. It is worth noting that the frequency and impact of research topics may also

vary over different time periods, which will directly affect the overall framework and direction of research topics.

3.2.3. Theme Cluster Analysis

The purpose of this analysis lies in its ability to unveil the interrelationships and underlying structures among different themes within the research domain. Through the clustering analysis of keywords, it provides a profound and comprehensive understanding of the entire field of ICHD. By conducting meticulous examinations of the literature within each cluster, one can gain profound insights into the evolution of the field, serving as a guiding compass for further research and practical applications.

By setting the minimum number of co-occurrences of keywords to 20, we obtained Figure 14. A total of 51 keywords were identified. These words were classified into four large clusters (red, green, blue, and yellow): Cluster 1: Management and Sustainable Development of Cultural Heritage (Red). Cluster 2: Protection and Transmission of ICH (Green). Cluster 3: Museum Management and Visitor Experience (Blue). Cluster 4: Education and Academic Research (Yellow).

Figure 14. The theme network of keywords.

The analysis identified four main themes that encompass all the knowledge concepts related to ICHD during the study period (2007–2023). These four themes are considered the focal points of the field and can provide valuable insights. By conducting a comprehensive literature review of articles within each cluster, we can gain a better understanding of how the topics in this field have evolved over the past decade.

- Management and Sustainable Development of Cultural Heritage

As exemplified in Table 5, it becomes apparent through the examination of Links, Total Link Strength, and Occurrences that this cluster of research exhibits a profound preoccupation with cultural heritage and the nuances of cultural concepts. From the Avg. pub. Year, it is evident that the number of related studies increased rapidly from 2015 to 2020 and is on an upward trend, but decreased in 2021. This indicates that although the research topic is active, the pace of development has slowed, and researchers need to update their theories and expand their research paths.

Table 5. The typical keywords of cluster 1.

Typical Keywords	Links	Total Link Strength	Occurrences	Avg. Pub. Year
heritage	50	5304	363	2019.2039
approach	50	3167	184	2019.0924
culture	50	2644	138	2019.4275
element	50	1814	112	2020.2321
role	50	1554	70	2018.6
practice	50	1497	102	2020.0784
city	48	1445	74	2019.2027
project	50	1397	78	2019.7308
community	49	1360	87	2019.2414
management	44	1280	64	2018.6562
area	49	1223	86	2019.7209
sustainable development	46	1177	43	2015.7674
building	40	1101	68	2019.1471
sustainability	47	1057	50	2020.1
landscape	45	1030	60	2018.3167
originality value	48	1023	49	2020.1429
place	49	932	59	2019.4746
case study	49	908	58	2019.1379
resource	49	896	52	2019.8077
conservation	48	850	49	2018.0612
identity	49	773	53	2019.434
unesco	48	597	37	2018.2973
order	46	529	33	2018.2424

To understand the correlation of high-frequency words in cluster 1, we selected them as the research objects. As shown in Appendix A, Table A1, it indicates that there is a positive impact mechanism among these six variables. The correlation between heritage and culture, as well as sustainable development and management, is the strongest. This provides important clues for understanding the internal mechanisms of the research topic. The high correlation between heritage and culture indicates that the study and understanding of cultural heritage cannot be separated from the consideration of cultural attributes. The high correlation between sustainable development and management indicates that the realization of the concept of sustainable development depends on the effective implementation of daily management. The high correlation between approach and other variables indicates that the choice of research methods has an important impact on research outcomes.

- Protection and Transmission of Intangible Cultural Heritage

As exemplified in Table 6, the astute examination of Links, Total Link Strength, and Occurrences unveils the focal point of this cluster—a profound exploration of the application of digital technologies in the realm of safeguarding iICH. It concurrently underscores the paramount significance of ICH preservation for cultural identity and legacy transmission. Based on the Avg. pub. Year, it is evident that the average year of publication for the keywords falls within the range of 2019–2021, signifying its position as a vibrant and cutting-edge research domain. Relevant research is in a stage of rapid development, requiring a large amount of theoretical accumulation and technological innovation.

To understand the correlation between the high-frequency words in Cluster 2, the high-frequency words were selected as the research object. As shown in Appendix A, Table A2, the vast majority of the correlation coefficients are positively correlated, indicating that there is a positive impact mechanism between variables. The strongest correlation is between technology, protection, and model. This provides important clues for understanding the internal mechanisms of the research topic and indicates that the use of technological means has a significant impact on the protection effect. The high correlation between the model and other variables indicates that the selection and optimization of theoretical models are crucial to research outcomes.

Table 6. The typical keywords of cluster 2.

Typical Keywords	Links	Total Link Strength	Occurrences	Avg. Pub. Year
intangible cultural heritage	50	3555	236	2020.5975
technology	50	1957	106	2020.6132
model	50	1511	105	2020.3048
protection	50	1366	63	2020.2857
knowledge	50	1155	63	2020.5079
product	48	1139	80	2020.75
inheritance	42	840	47	2021.9787
time	48	839	48	2020.4792
ich	47	815	54	2020.7407
effect	48	744	45	2021.0444
china	46	671	46	2020.0652
country	47	599	35	2020.0286
cultural identity	46	510	25	2019.88
dissemination	46	420	28	2020.75
digital technology	42	393	24	2020.1667
authenticity	39	354	18	2020

- Museum Management and Visitor Experience

As exemplified in Table 7, the discernible analysis of Links, Total Link Strength, and Occurrences reveals that this cluster revolves around the operational aspects and visitor experiences within museums. It encompasses a breadth of topics ranging from exhibition curation and visitor services to the design of immersive cultural encounters, exemplifying its specialization within the realm of museum research. Based on the Avg. pub. Year, it is discernible that the keywords have an average publication span between 2018 and 2020. However, there has been a decline in recent discussions pertaining to this subject matter, resulting in a reduced frequency of keyword citations. Furthermore, notable variations in individual contributions have been observed.

Table 7. The typical keywords of cluster 3.

Typical Keywords	Links	Total Link Strength	Occurrences	Avg. Pub. Year
addition	44	330	18	2020.6667
exhibition	36	1096	36	2020.4444
experience	50	2162	112	2020.1786
museum	42	1194	67	2019.806
music	45	678	30	2018.8333
tourist	47	663	45	2019.8222
visitor	45	889	31	2020.0323

To understand the correlation of the high-frequency words in cluster 3, high-frequency words were selected as the research objects. As shown in Appendix A, Table A3, there is a positive influence mechanism among the variables. Among them, the correlation between tourists and music is the strongest, reaching a complete correlation. This indicates a close relationship between visitor visits and music performances, and they may be influencing factors for each other. The exhibition is highly correlated with other variables, indicating that exhibition activities play an important role in museum operation and visitor experience.

- Education and Academic Research

As exemplified in Table 8, the discerning evaluation of Links, Total Link Strength, and Occurrences reveals the thematic essence of this cluster, which revolves around academic research and innovation. Encompassing domains such as scholarly paper composition, analysis of influential factors, and innovative design, it signifies its niche within the realm of higher education and academic inquiry. From the Avg. pub. Year, it can be known that the average publication year of the keywords is from 2019 to 2020. Currently, researchers studying this direction are not active.

Table 8. The typical keywords of cluster 4.

Typical Keywords	Links	Total Link Strength	Occurrences	Avg. Pub. Year
article	48	1039	63	2019.8095
author	46	472	22	2019.3182
factor	48	690	37	2020.3514
innovation	46	601	35	2019.8571
student	40	940	48	2020

To understand the correlation between the high-frequency words in cluster 4, we selected them as the research objects. As shown in Appendix A, Table A4, there is a very strong positive impact mechanism between the variables. The correlation between "article" and "student" is the strongest, approaching perfect correlation, indicating a close relationship between paper writing and students, which may be mutual influencing factors. "Factor" is also highly correlated with other variables, indicating that the identification and analysis of influencing factors are crucial to the research topic.

4. Discussion

A bibliometric and content analysis provides a comprehensive assessment of research on ICHD and its evolution over time. A summary of the main findings for RQ1 and RQ2 is provided in Table 9.

Table 9. Summary of the main findings.

RQ	Objective	Methods	Findings
1	Publications and Citations by year	Analysis of Publications and Citations by year.	Publications and citations have grown exponentially in recent years.
	Publications by Subject Areas	Analysis of Publications by Subject Areas.	Focus on sustainable science and technology, comprehensive humanities, environmental research, etc.
	Publications by countries/regions	Firstly, an analysis of the number of publications by country/regions and Intercontinental. Then, use network visualization and overlay visualization of co-authorship analysis in VOSviewer.	Mainly European and Asian countries, of which China is the largest output country.
	Publications by Institutions and their collaboration network	First, analyze what institution the publication comes from using the Bibliographic coupling analysis method in VOSviewer. Then, network visualization is performed by setting different minimum numbers of documents for an organization's parameters.	Polytechnic University Of Milan, University Of Aegean, and Hong Kong Polytechnic University are the top-producing institutions in this field. There is also some level of collaboration between institutions, but they tend to collaborate more internally.
	Publications by Journals and authors	First, we will analyze the journals with the highest number of published articles. Next, we will use the collaborative relationship network analysis method in VOSviewer to show the cooperative relationship between authors.	Research articles related to this field are published in various journals in different fields. Journals under the MDPI publishing house have a significant influence in this field. The researchers in this field are relatively dispersed, and although there is some collaboration, the degree of collaboration is not high.
	Citation analysis	Using VOSviewer, first, analyze the citation and co-citation structures. Then, analyze the authors with the highest citation and co-citation counts. Finally, analyze the resources with the highest citation and co-citation counts.	Based on the analysis, there is a certain degree of knowledge dissemination and exchange, but overall, it is not very tight.

Table 9. *Cont.*

RQ	Objective	Methods	Findings
	Theme hotspot analysis	By using VOSviewer, a co-occurrence network analysis of textual data was conducted to obtain the topic density of keywords.	The research interest is high and is increasingly following new technologies and concepts, but the research coverage needs to be expanded.
2	Theme evolution analysis	By using VOSviewer to analyze the co-occurrence network of terms in textual data, we have obtained a superimposed view of the main topics of the keywords in different time periods.	The research topics in this field have shifted from protection management and policy studies to culture, cultural heritage, cultural identity, and innovation, and then to practical utilization and industrial development. This adjustment process involves a shift from macro to micro perspectives and a greater focus on practical applications.
	Theme cluster analysis	From the VOSviewer software, a co-occurrence network analysis was conducted on the text data, and key themes, networks, and clusters of keywords were identified. A selection of high-frequency words from the clusters was used to build the basic data for correlation analysis. The Pearson correlation coefficient was calculated using the Pearson correlation analysis method to examine the significance of the correlation coefficients between variables.	Four clusters are identified. Cluster 1: Management and Sustainable Development of Cultural Heritage; Cluster 2: Protection and Transmission of ICH; Cluster 3: Museum Management and Visitor Experience; Cluster 4: Education and Academic Research.

Here, we focus on RQ3: What are the theoretical and practical implications of our study, and what are the future directions for further research in this area?

From a theoretical standpoint, our study offers a comprehensive overview of the knowledge domain in ICHD research, thereby enhancing our comprehension of its present state and future trajectories. By using bibliometric and content analysis methods, we identified the hotspots, evolutions, and clusters of research topics, providing theoretical references for researchers to choose research directions. Furthermore, we explored the underlying mechanisms of influence within different topic clusters, laying the foundation for understanding the interactions within each cluster.

From a practical standpoint, our research outcomes can offer research concepts and topic references for scholars in this domain. Additionally, our findings can aid policymakers in optimizing resource allocation and enhancing the real-world influence of research outcomes. Furthermore, we identified deficiencies within the research domain, which can guide scholars in advancing knowledge reconstruction and disciplinary innovation.

This paper discusses the development trends in the field of ICHD. Our findings provide some inspiration for those studying ICHD. For example, expanding the research time frame and adopting a longer-term development perspective to understand the overall characteristics of the research field; selecting different research methods to test results and increase research credibilities, such as expert interviews and empirical research; focusing on a particular topic cluster; conducting an in-depth analysis of key concepts; research path selection; and future development direction; guiding researchers in developing research plans; and promoting relevant theoretical and technological innovations. Additionally, we explored the roles of different disciplines, countries, and institutions in the knowledge production and dissemination process, identifying their influencing factors.

5. Conclusions

Despite the burgeoning corpus of scientific literature on the topic of ICHD, an all-encompassing bibliometric and visual analysis providing insights into the state of research in this domain remains conspicuously absent.

Employing bibliometric methodologies, we conducted a thorough analysis of 269 pertinent publications sourced from the Web of Science database spanning from 2007 to 2023. Our examination first scrutinized the yearly and disciplinary dispersion of the publications, followed by a citation analysis that unveiled the influential scholars, academic journals, institutions, and nations that hold considerable sway in the field. Subsequently, we carried out theme and content scrutiny to decipher prevalent keywords and trace their evolutionary trajectory.

The findings of our study hold considerable theoretical and practical implications for the field of ICHD. We proffer a more nuanced understanding of the global trends in this sphere and provide sagacious insights instrumental to its growth and progression toward sustainable development.

While our study offers noteworthy insights into the field of ICHD, it is not without limitations. For instance, the relatively short period of our study, attributable to the brief availability of scientific publications in this field, has constricted the scope of our findings. Moreover, our reliance on the Web of Science database, although a pertinent source, overlooks the potential wealth of information housed in other databases. Consequently, future research endeavors should aim to broaden the time frame, amalgamate data from multiple databases, employ a blend of research methodologies, and consider regional variations to derive more comprehensive, in-depth, and credible conclusions.

Appendix A

Table A1. Cluste one high-frequency keyword correlation coefficient table.

Correlation Coefficient/ *p* Value	Heritage	Culture	Sustainable Development	Management	Approach	City
heritage	1 (0.000 ***)					
culture	0.943 (0.001 ***)	1 (0.000 ***)				
sustainable development	0.694 (0.084 *)	0.894 (0.007 ***)	1 (0.000 ***)			
management	0.724 (0.066 *)	0.912 (0.004 ***)	0.999 (0.000 ***)	1 (0.000 ***)		
approach	0.972 (0.000 ***)	0.995 (0.000 ***)	0.844 (0.017 **)	0.866 (0.012 **)	1 (0.000 ***)	
city	0.768 (0.044 **)	0.937 (0.002 ***)	0.994 (0.000 ***)	0.998 (0.000 ***)	0.897 (0.006 ***)	1 (0.000 ***)

Note: The table above shows the Pearson correlation coefficient matrix among the variables that were calculated through Pearson correlation analysis. In the table below, the significance of the correlation coefficients was tested at a significance level of 0.05. ***, **, and * represent the significance levels of 1%, 5%, and 10%, respectively.

Table A2. Cluste two high-frequency keyword correlation coefficient table.

Correlation Coefficient/ *p* Value	Intangible Cultural Heritage	Technology	Protection	Model	Cultural Identity	Knowledge
intangible cultural heritage	1 (0.000 ***)					
technology	0.942 (0.001 ***)	1 (0.000 ***)				
protection	0.853 (0.015 **)	0.978 (0.000 ***)	1 (0.000 ***)			
model	0.881 (0.009 ***)	0.988 (0.000 ***)	0.998 (0.000 ***)	1 (0.000 ***)		
cultural identity	0.586 (0.166)	0.823 (0.023 **)	0.923 (0.003 ***)	0.9 (0.006 ***)	1 (0.000 ***)	
knowledge	0.803 (0.030 **)	0.956 (0.001 ***)	0.996 (0.000 ***)	0.989 (0.000 ***)	0.953 (0.001 ***)	1 (0.000 ***)

Note: The table above shows the Pearson correlation coefficient matrix among the variables that were calculated through Pearson correlation analysis. In the table below, the significance of the correlation coefficients was tested at a significance level of 0.05. ***, ** represent the significance levels of 1% and 5%, respectively.

Table A3. Cluster three high-frequency keyword correlation coefficient table.

Correlation Coefficient/ *p* Value	Addition	Museum	Visitor	Exhibition	Experience	Tourist	Music
addition	1 (0.000 ***)						
museum	0.913 (0.011 **)	1 (0.000 ***)					
visitor	0.961 (0.002 ***)	0.99 (0.000 ***)	1 (0.000 ***)				
exhibition	0.93 (0.007 ***)	0.999 (0.000 ***)	0.995 (0.000 ***)	1 (0.000 ***)			
experience	0.716 (0.109)	0.939 (0.006 ***)	0.881 (0.020 **)	0.923 (0.009 ***)	1 (0.000 ***)	0.822 (0.045 **)	
tourist	0.986 (0.000 ***)	0.968 (0.002 ***)	0.994 (0.000 ***)	0.978 (0.001 ***)	0.822 (0.045 **)	1 (0.000 ***)	1 (0.000 ***)
music	0.984 (0.000 ***)	0.97 (0.001 ***)	0.995 (0.000 ***)	0.98 (0.001 ***)	0.828 (0.042 **)	1 (0.000 ***)	1 (0.000 ***)

Note: The table above shows the Pearson correlation coefficient matrix among the variables that were calculated through Pearson correlation analysis. In the table below, the significance of the correlation coefficients was tested at a significance level of 0.05. *** and ** represent the significance levels of 1% and 5%, respectively.

Table A4. Cluste 4 high frequency keyword correlation coefficient table.

Correlation Coefficient/ *p* Value	Article	Factor	Innovation	Student	Author
article	1 (0.000 ***)				
factor	0.986 (0.000 ***)	1 (0.000 ***)			
innovation	0.976 (0.001 ***)	0.999 (0.000 ***)	1 (0.000 ***)		
student	0.999 (0.000 ***)	0.992 (0.000 ***)	0.985 (0.000 ***)	1 (0.000 ***)	
author	0.962 (0.002 ***)	0.994 (0.000 ***)	0.998 (0.000 ***)	0.973 (0.001 ***)	1 (0.000 ***)

Note: The table above shows the Pearson correlation coefficient matrix among the variables that were calculated through Pearson correlation analysis. In the table below, the significance of the correlation coefficients was tested at a significance level of 0.05. *** represent the significance levels of 1%.

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