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Ten Years of Fashion Design Research Scientometric Analysis of Research: Research Overview, Frontiers and Evolutionary Paths

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Abstract

Background and Aim: Fashion design is a highly creative, interdisciplinary field that covers many aspects such as clothing, accessories, and textiles. Through creative design, material selection, process technology, etc., provide people with unique, beautiful, and practical fashion products and services. There has been a significant surge in research activity in the field of fashion design over the past decade, and by reviewing the data it was found that there is an academic gap in the bibliometrics of Fashion Design. The purpose of this study is 1) To study the research overview of Fashion Design. 2) To analyze the research frontiers of Fashion Design. 3) To analyze the evolution Path of Research Frontiers of Fashion Design.

Materials and Methods: The key steps in retrieval: (1) Select database; (2) Enter "Topic"; (3) Select Document Type; (4) Select Document Language; (5) Enter Document Release Time Scope. Enter Topic="Fashion Design". Document types are article, proceeding paper, and English review from 2014-01-01 to 2022-12-31 for recent research. Book Citation Index-Science and Book Citation Index-Social Science & Humanities were excluded, leaving 1,049 documents. Common scientometric software includes CiteSpace, HistCite, Loet Tools, SciMAT, and VOSviewer. This study uses VOSviewer (version 1.6.19) for visualizing and analyzing scientific literature, helping researchers identify patterns, trends, and relationships in data.

Results: The result of this research is that there are many prolific authors, Countries, and Publishers in this research field. There are three research fronts: "Impact", "Consumption" and "Industry". The evolution path of the research fronts starts from "Clothing Design" in 2014-2018. and "Arts", to "Innovation" in 2018-2019, to "Creativity" in 2019-2020, then to "Technology" and "Sustainability" in 2020-2021.

Conclusion: The quality of articles in the "Fashion Design" research field is generally higher, with more research and very active. Research Frontiers: There are three research fronts: "Impact", "Consumption" and "Industry" The fashion design field's focus on influence, consumption, and industry reflects its increasing emphasis on business and social impact. Evolution Path of Research Frontiers: The evolutionary path of the research frontier ranges from "Costume Design" and "art" in 2014-2018, to "Innovation" in 2018-2019, to "Creativity" in 2019-2020, and then to "technology" in 2020-2021 and "Sustainable development". After 2021, it will be "Impact ", "Consumption" and "Industry". The evolution path of the research frontier reflects the shift in the development direction of the field of fashion design from single design and art to more design and art: diversification and comprehensiveness. From focusing on innovative ideas to technology and sustainable development to market, consumer, and industry development, it reveals the changes and evolution in the field of fashion design in the pursuit of excellence, sustainable development, and social impact.

Keywords: Fashion Design; Scientometric; Overview; Frontiers; Evolutionary Paths

Introduction

Fashion design is a highly creative, interdisciplinary field that covers many aspects such as clothing, accessories, and textiles (Murzyn-Kupisz & Hołuj, 2021). Creative design, material selection, process technology, etc., provide people with unique, beautiful, and practical fashion products and services (Genç, et al, 2018). Fashion design is not only a profession but also an artistic expression and cultural inheritance (Entwistle, J. 2023). It carries the changes of the times, social needs, and individual expression. It is also affected by various factors such as the economy, technology, and environment (Davis, 1994). Fashion design is closely related to fashion trends and market demands (Eckert & Stacey, 2001, December). Designers need to have a keen insight into changes in the fashion market and consumer needs and adjust design directions and strategies promptly (Aage & Belussi, 2013). At the same time, fashion design is affected by cultural and social factors, reflecting the expression and inheritance of different cultural

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backgrounds, values, and lifestyles, and also exerts influence and guidance on culture and society (Griswold, 2012).

The past decade has seen a significant surge in research activity in the field of fashion design, characterized by a range of innovative approaches, groundbreaking discoveries, and transformative insights (Elf, et al. 2022). This period was characterized by a dynamic interplay between tradition and innovation, as designers and researchers alike experienced a changing landscape shaped by technological advances, sociocultural shifts, and environmental concerns (Girard, 2024). Many scholars have conducted in-depth research on the field of fashion design and explored various topics and issues related to fashion design. For example, Lee, et al (2024). they explored the cyclic inclusive fashion design process based on an FEA model for inclusive fashion education. This research finding incorporated the timing of user information, which can significantly impact inclusive fashion design. User-centered Type 1 prioritizes social and symbolic expression as well as functional aspects over other design elements. Type 2 pays more attention to aesthetics, better reflects users' expression needs, and can make more adaptive designs according to different users (Lee, et al. 2024). Deng, et al (2024). Studying CrossGAI: A Cross-Device Generative AI Framework for Collaborative Fashion Design. This study introduces a CrossGAI, a fashion design system that can support multiple designers collaborating on different devices and provide artificial intelligence-enhanced sketching assistance. Elshemy, et al (2024). Employing ultrasonic waves to extract flax seed for textile printing and applying creative fashion designs. The study successfully applied ultrasonic waves to extract flax seeds from linseed shells or whole seeds. Rapid extraction of flaxseed gum and comparison with standard extraction techniques. Due to the large increase in articles about "Fashion Design" in recent years, new methods need to be used for literature analysis to obtain the research overview, research frontiers, and evolutionary paths in this field. Bibliometrics originated in the 1950s and first appeared as a branch in the fields of library science, information science, and scientific research management (Borgman, & Rice, 1992). Its development is mainly influenced and supported by disciplines such as information science, statistics, and computer science (Hood, & Wilson, 2001). In recent years, bibliometrics has been widely recognized and applied in academia (Régibeau & Rockett, 2016). Through quantitative and quantitative analysis of academic literature data, it reveals the structure and dynamics of the academic field and provides important information and references for researchers (Gutiérrez-Salcedo, et al. 2018). The researcher checked relevant data in the field of "Fashion Design" through the Web of Science Core Collection (WoSCC) database and found that "Fashion Design" has had an academic gap in bibliometrics in the past ten years. Therefore, using scientific measurements to study "clothing design" is very useful. necessary.

This study will conduct a scientometric study of "Fashion Design" literature over the past decade, providing insights gleaned from both macro and micro perspectives. The purpose is to understand the research overview, research frontiers, and evolution path of the research field of "Fashion Design". Data were reviewed and organized through the Web of Science Core Collection (WoSCC) database, and data were visualized through VOSviewer. To inform and inspire researchers, practitioners, educators, and industry stakeholders alike.

Objectives

Through the Web of Science Core Collection (WoSCC) database and VOSviewer bibliometric analysis, the following research goals can be achieved:

RO1: To study the research overview of Fashion Design.

RO2: To analyze the research frontiers of Fashion Design.

RO3: To analyze the evolution Path of Research Frontiers of Fashion Design.

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Conceptual Framework

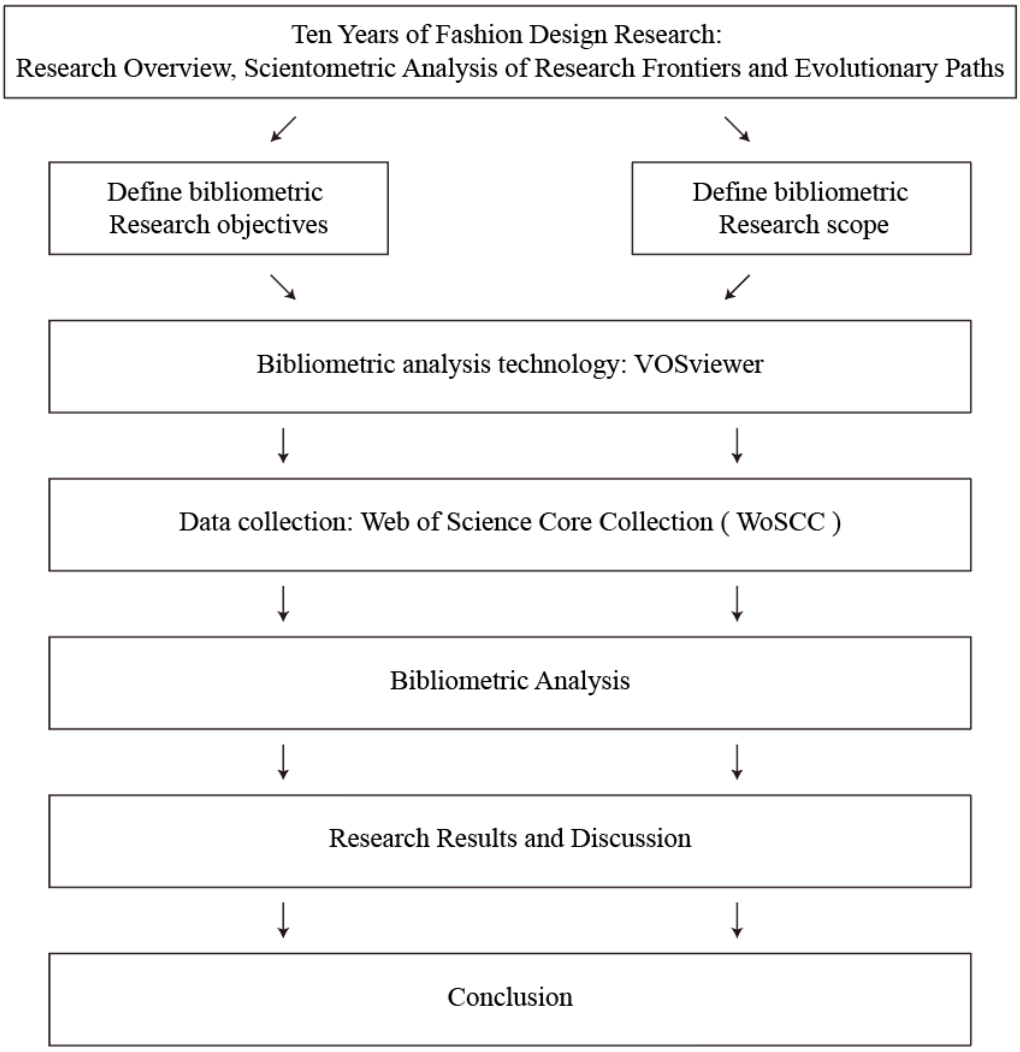

Figure 1 Research Framework
Source: Author, (2024)

This study adopts a bibliometric approach, applying quantitative techniques to bibliometric data. Access scientific databases through the Web of Science Core Collection (WoSCC) to obtain extensive bibliometric data on the topic "Fashion Design" and then use VOSviewer bibliometric software to ensure bibliometric analysis. To achieve this goal, this bibliometric study was conducted based on a scientometric research framework proposed by Donthu, et al (2021), this framework is divided into four steps: Step 1, determine the goals and scope of the bibliometric study; Step 2, select the technique of bibliometric analysis; Step 3, collect data for bibliometric analysis; Step 4, run a bibliometric analysis and report the results (Donthu, et al. 2021). This study is based on this research framework and has been optimized accordingly.

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Methodology

Research Materials

Web of Science Core Collection (WoSCC) is an academic citation retrieval tool developed and maintained by the Institute for Scientific Information (ISI) (Murzyn-Kupisz & Hołuj, 2021). It is one of the world's leading academic literature retrieval and evaluation platforms (Pranckute, 2021). The main features and functions include citation search, document indexing and abstracting, academic evaluation indicators, professional search tools, and interdisciplinary resource coverage (Thompson & Walker, 2015). It is one of the most influential academic literature search platforms in the world, covering many countries and regions around the world (King, 1987). academic journals and conference papers, providing researchers with academic resources from a global perspective (Ellegaard & Wallin, 2015).

Using Web of Science Core Collection (WoSCC) to conduct data search research in the field of "Fashion Design" can provide a comprehensive understanding of the research status and development trends in the field of fashion design, improve the quality and efficiency of research, and provide reliable literature support and data for papers (Lee & Danko, 2017).

This study uses scientometric analysis methods to conduct research, which can objectively evaluate research results, reveal research hotspots and trends, discover research frontiers and evolutionary paths, evaluate research influence and contribution, improve the scientificity and practicality of research, and provide strong support for research support and evidence (Wang, et al. 2020).

Search Method

Table 1 shows several key steps involved in retrieval: (1) Select database; (2) Enter "Topic"; (3) Select Document Type; (4) Select Document Language; (5) Enter Document Release Time Scope. Enter Topic="Fashion Design". There are three types of document types to be searched for in this study: article, proceeding paper, and review. These are the types of documents commonly used in scientometrics. The Document Language is English. The input Document Release Time Scope span is from 2014-01-01 to 2022-12-31, because the research distance in this time interval is not very far away from now, and "Fashion Design" often requires research that is closer to the present, the more relevant it is representative (Ruppert-Stroescu & Hawley, 2014). Finally, Book Citation Index-Science and Book Citation Index-Social Science & Humanities were deleted from the search results, leaving 1,049 documents.

Table 1 Search Method - Search date: April 6, 2024

Database	Search	Number of Documents
WoSCC	Topic = “Fashion Design”	1,633
	And Document Type: Article, Proceedings Paper, Review.	1,551
	And Document Language: English	1,479
	And Document Release Time: 2014-01-01 to 2023-12-31	1,062
	And Deleted Book Citation Index-Science, Book Citation Index-Social Science & Humanities	1,049

Analytical Method

Commonly used software used in scientometrics include CiteSpace, HistCite, Loet Tools, SciMAT, and VOSviewer (Moral-Muñoz, et al. 2020). This study will use VOSviewer as the analysis tool, version 1.6.19. VOSviewer is an open-source software tool for visualizing and analyzing scientific literature data. Developed by Nees Jan van Eck and Ludo Waltman of Leiden University in the Netherlands, it is designed to help researchers discover patterns, trends, and relationships in literature data to better understand the structure and development dynamics of the research field (McAllister, et al. 2022). The main functions and

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features of VOSviewer include network diagram visualization, heat map display, cluster analysis, keyword co-occurrence analysis, and multi-dimensional analysis (Ding & Yang, 2022). As a scientific document analysis and visualization tool, VOSviewer can visualize research data to make it easier for readers to understand and analyze (Tamala, et al. 2022).

Table 2 Analytical Method

Research Objectives	Tools	Technique	Contents
Research Profile	WoSCC	Number of Articles published	Author, Institution, Publication, Country (Region)
		Number of Articles, Citations	Overall citations
	VOSviewer	O-Authorship Co-Occurrence O-Citation	Reference: Cluster, Lines
Research Frontiers	VOSviewer	Co-Occurrence analysis	Reference: Cluster, Timeline, Lines
Evolution Path	VOSviewer	Co-Citation analysis	Reference: Cluster, Lines

Results

Research Overview

1. Number of Articles Published

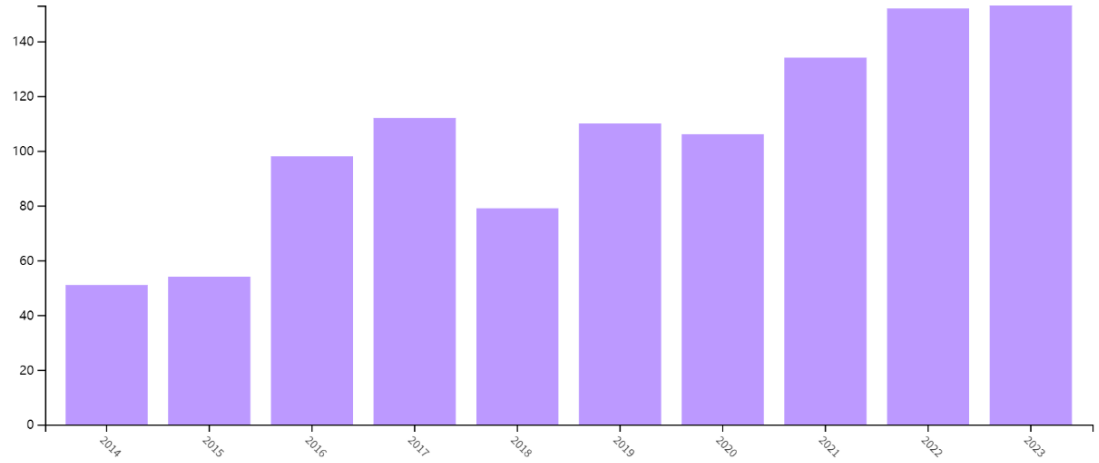

Figure 2 2014-01-01 to 2023-12-31, Fashion Design Research Area Number of Articles Published
Source: Web of Science Core Collection (WoSCC), (2014-2023)

Figure 2 Web of Science Core Collection (WoSCC) database display, 2014-01-01 to 2023-12-31 Fashion Design Research Area Number of Articles Published A total of 1049 articles were published. The number of published articles increased significantly during this period. The most significant year was from 2015 to 2016, which increased from 54 articles in 2015 to 98 articles in 2016, an increase of 44 articles, and a growth rate of approximately 81%. From 2014-01-01 to 2023-12-31, the number of articles published increased from 51 in 2014 to 153 in 2023, an increase of 102 articles, and the growth percentage was 200%. As of now, 2023 has published the most articles, reaching 153 articles.

Table 3 shows the Document Types in the "Fashion Design" research field, the number of publications by high-yield Authors, Countries/Regions, the number of publications by Publishers, and the breakdown of

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the "Fashion Design" research field. Among Document Types, Article has the largest number, reaching 645, and Retracted Publication has at least two. Among the most prolific authors, those who published more than 10 articles were selected. The author who published the most articles was Zeng xY, who published 16 articles. Among Countries/Regions, PEOPLES R CHINA has published the largest number of articles, reaching 293. Taylor & Francis Publishers published the most articles, reaching 293. Materials Science has a maximum of 384 articles in the Research Areas subdivision.

Table 3 Number of Articles Published - Type

Type	Title	Number of publications
Document Types	Article	645
	Early Access	38
	Proceeding Paper	401
	Retracted Publication	2
	Review Article	15
Author	Zeng Xy	16
	Chen Q, Fan JT	15
	Zheng R	14
	Liu KX, Liu XG	13
	Fu BL	11
	Bruniaux P, Chen Y, Montagna G, Wang JP	10
Countries /Regions	PEOPLES R CHINA	357
	USA	182
	ENGLAND	85
	PORTUGAL	60
	SOUTH KOREA	55
Publishers	Taylor & Francis	293
	Atlantis Press	89
	Springer Nature	80
	IEEE	46
	Elsevier	44
	Emerald Group Publishing	43
Research Areas	Materials Science	384
	Business Economics	263
	Engineering	171
	Computer Science	149
	Education Educational Research	132
	Arts Humanities Other Topics	102
	Social Sciences Other Topics	82
	Art	66
	Science Technology Other Topics	50

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2. Citations

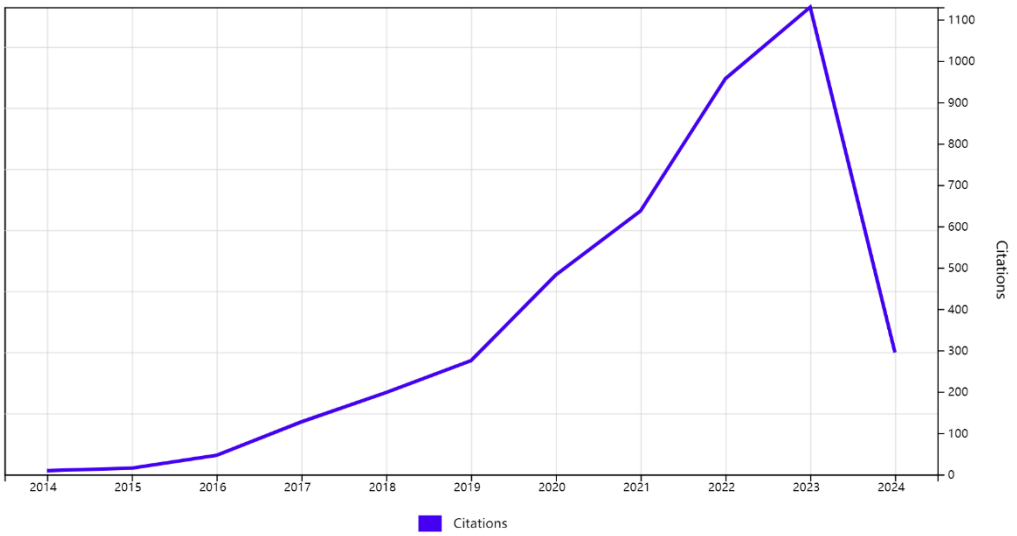

Figure 3 2014-01-01 to 2023-12-31, Fashion Design Research Area Citations
Source: Web of Science Core Collection (WoSCC), (2014-2023)

From 2014-01-01 to 2023-12-31, in the Web of Science Core Collection (WoSCC) database, Citations in the "Fashion Design" research field grew very rapidly. There were only 9 Citations in 2014 and 1,131 in 2023. Among them, the fastest growth in 2022 will be from 637 articles in 2021 to 957 articles. Among them, Chai, et al (2016). Research on Tailorable and wearable textile devices for Solar energy harvesting and simultaneous storage has been cited the most, with 189 citations in 10 years, an average of 21 citations per year. Among the 1,049 documents published in the Web of Science Core Collection (WoSCC) database, the number of Citing Articles is 3,480 times, the number of Times Cited is 4,179 times, the average number of citations per article is 3.98 times, and the H-Index value is 27.

Science Mapping

1. Visualization Charting-Author

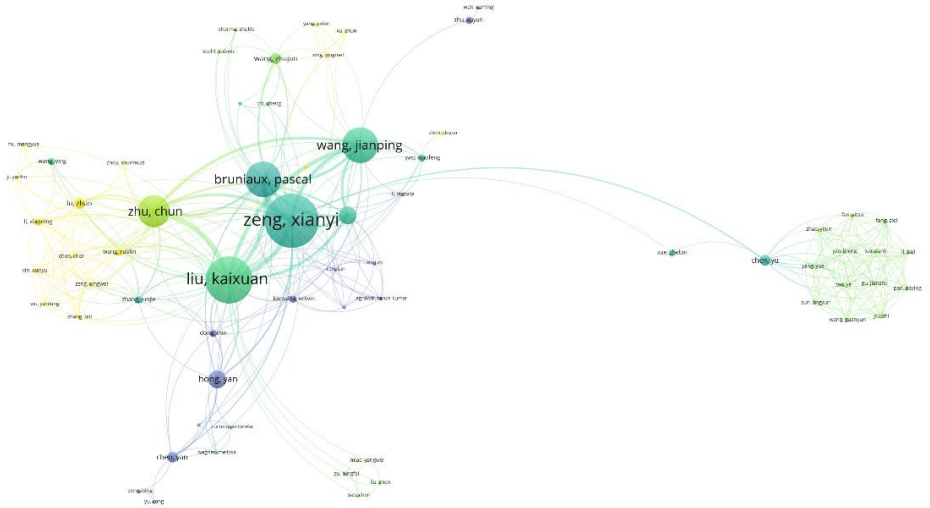

Figure 4 Data Visualization Charting-Author
Source: VOSviewer, (2024)

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By importing data into VOSviewer, 8 clusters were generated. Figure 4 shows that Zeng and Xianyi published the most articles. It can be seen from the connected data that the authors Zeng Xianyi, Liu Kaixuan, Zhu Chun, Bruniaux Pascal, and Wang Jianping are very closely related. It can be seen from the color of the timeline that the yellow area is very dense, which shows that many new people have joined the research field of "Fashion Design" and this research field is very active.

2. Countries / Regions

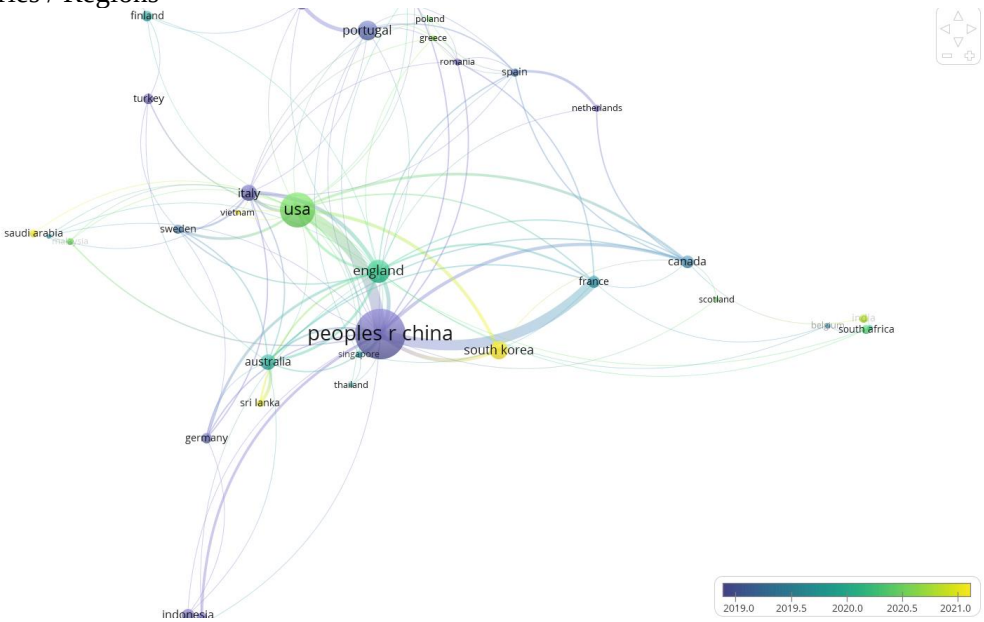

Figure 5 Data Visualization Charting- Countries / Regions
Source: VOSviewer, (2024)

By importing data into VOSviewer, 8 clusters were generated. Figure 5 shows that China has the largest number of posts, followed by the United States and Iran. Through the connecting lines, can find that the lines connecting China, the United States, Iran, and France are very thick, indicating that the research connections between these four countries are very close. As can be seen from the color of the timeline, China's publishing volume is mainly concentrated between 2014 and 2020, the publishing volume in 2020 is mainly concentrated in Iran and the United States, and the publishing volume from 2021 to 2023 is mainly concentrated in South Korea.

3. Publishers

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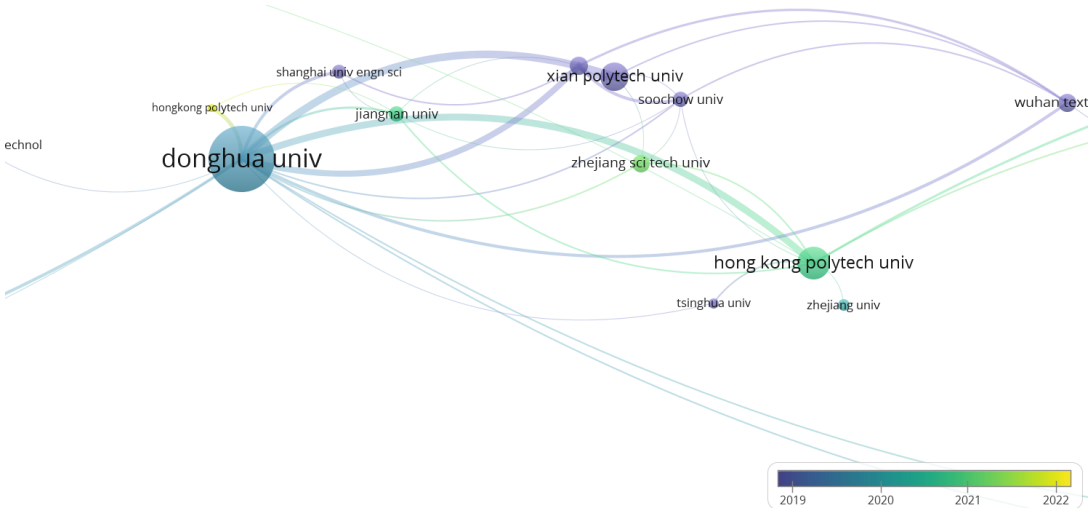

Figure 6 Visualization Charting- Publishers
Source: VOSviewer, (2024)

By importing data into VOSviewer, 6 clusters were generated. Figure 6 shows that Donghua University Publishers published the most articles, followed by Hong Kong Polytech University Publishers. It can be seen from the connecting lines that Donghua University is very closely connected with Xian Polytech University, Hong Kong Polytech University, and Ensait. As can be seen from the color of the timeline, most institutions published articles before 2021. New institutions also published articles after 2022, but they were relatively few.

4. Keywords Co-Occurrence

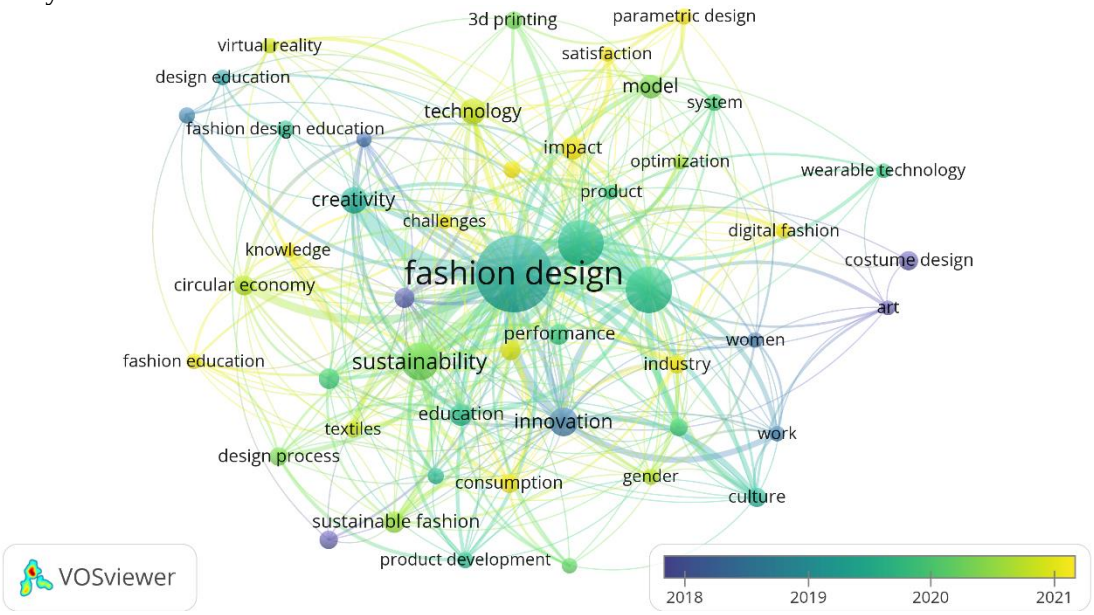

Figure 7 Visualization Charting- Keywords Co-Occurrence
Source: VOSviewer, (2024)

By importing data into VOSviewer, a total of 3905 keywords appeared in 1049 documents. The Minimum number of co-occurrences of a keyword was set to 10, and 48 keywords were selected. 6 clusters were generated. Figure 7 shows that the most frequently occurring keyword is "Fashion Design".

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Considering that the keyword "Fashion Design" appears in the "Fashion Design" research field, it does not have great significance. Therefore, after searching for the keywords "Fashion Design", "Fashion", and "Design", the keyword that appeared the most was Sustainability, reaching 56 times, followed by Innovation, which reached 33 times. This shows that "Sustainability" and "Innovation" are research hotspots in the "Fashion Design" research field. However, there are relatively few research fields in Challenges, knowledge, product, satisfaction, Art, Optimization, and Wearable technology, and have only met the selection criteria 10 times. Judging from the color of the timeline, many new research hotspots have emerged.

5. Research Knowledge Base

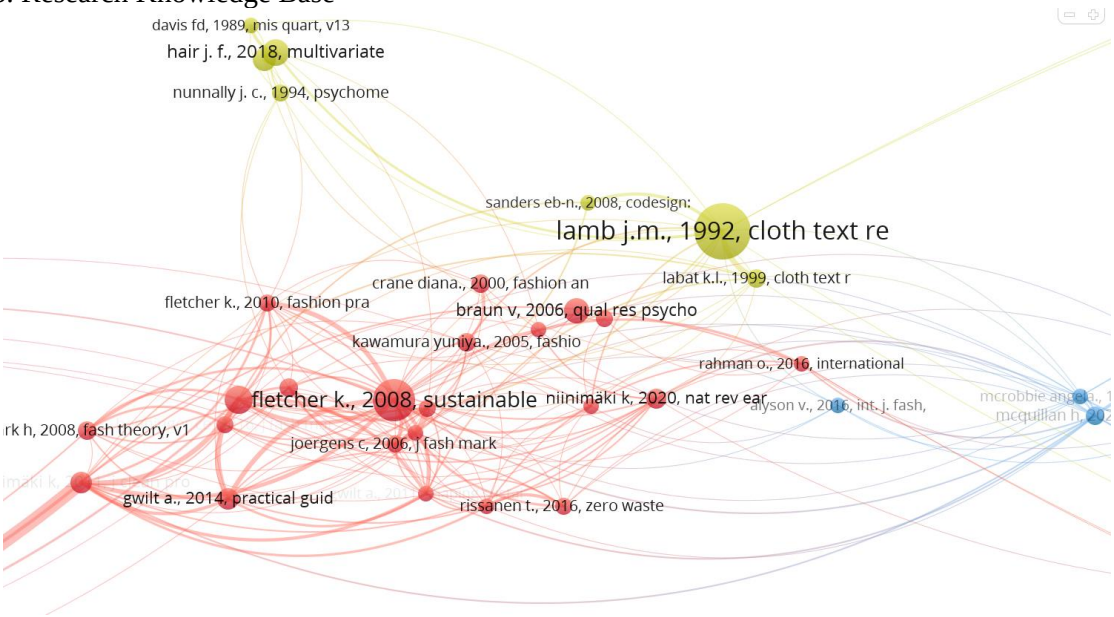

Figure 8 Document Co-Citation Analysis
Source: VOSviewer, (2024)

Document Co-Citation analysis is a network-based analysis method used to study scientific documents. In VOSviewer, Co-Citation analysis is based on the number of times a document and other documents are cited by scholars at the same time. This data determines the high Co-Citation documents It can be understood as the knowledge base for research. By importing data into VOSviewer, using Cited reference data as the premise for analysis, there are a total of 29,816 Cited references. The minimum number of Cited references is set to 10 times. 49 documents were selected, and a total of 5 clusters were generated. Figure 8 shows that the most number of Co-Citations is Lamb & Kallal, (1992). A conceptual framework for apparel design studied by Lamb & Kallal, (1992), reaching 36 times. This study tells the story of encouraging students to think of designing garments for special needs as part of a general design framework, a problem-solving approach that does not distinguish between functional apparel design and fashion design is presented. A model for assessing user needs and wants incorporates functional, expressive, and aesthetic (FEA) considerations. Examples of how the framework has been used in design projects are presented Suggested uses for the FEA model are offered. Followed by Fletcher, (2008). Research on Sustainable Fashion and Textiles. This study is the first to bring together relevant information on the fashion and textile life cycle sustainability Information on lasting impact, practical alternatives, design concepts, and social innovation. Challenges existing ideas about the scope and potential of fashion and textile sustainability issues and draws on ideas from systems thinking, human needs, local products, slow fashion, and participatory design to propose a more diverse engaging, and forward-looking vision and knowledge of materials. From this, it can be determined that the knowledge base of "Fashion Design" is A conceptual

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framework for apparel design and Sustainable Fashion and Textiles.

Research Frontier

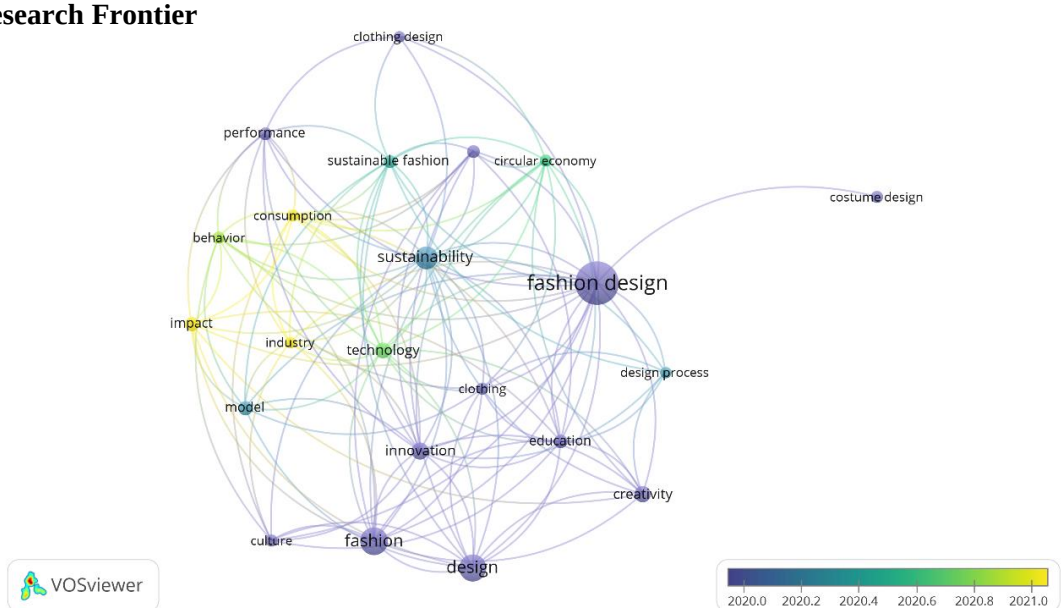

Figure 9 Research Frontier - Keywords Co-Occurrence
Source: VOSviewer, (2024)

In VOSviewer, by analyzing the frequency and timeline of Keywords Co-Occurrence, the closer the time is, the higher the frequency can represent the research frontier in this research field (Dong, et al. 2021). By importing data into VOSviewer, a total of 3905 keywords appeared in 1049 documents. The minimum number of keyword occurrences is set to 15 times, and 22 keywords are selected. Considering that the data of the keyword "Fashion Design" appearing in the "Fashion Design" research field is of little significance, so "Fashion Design" and "Fashion" are ignored, and the "Design" keywords. A total of 4 clusters are generated. The closer the timeline is to the yellow color on the right, the closer the time distance is. Figure 9 shows that there are three research fronts, namely "Impact", which reached 22 times, and then "Consumption", reaching 16 times, and then "Industry", reaching 15 times.

The Evolution Path of Research Frontiers

By analyzing the research frontiers of multiple periods through Document Keywords Co-Occurrence, the Evolution Path of Research Frontiers in this field can be derived.

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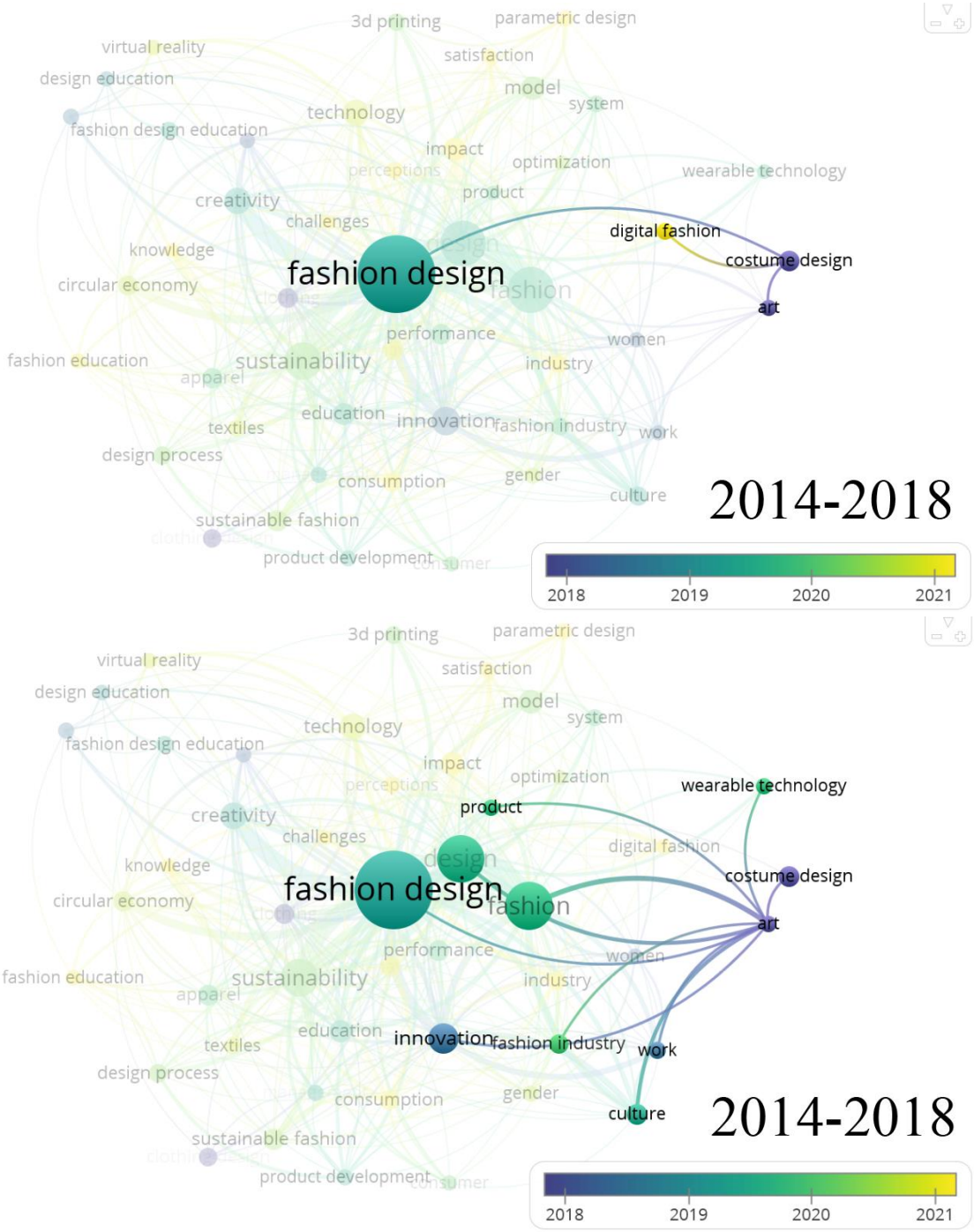

Figure 10 2014-2018 Keywords that appear most frequently
Source: VOSviewer, (2024)

By importing data into VOSviewer, using Document Keywords Co-Occurrence analysis set the minimum number of keyword occurrences to 10 times, and 48 keywords were selected. Generate 6 clusters. The judge is based on the color of the timeline. Figure 10 shows that there are two research fronts from 2014 to 2018, namely "Costume design" and "Art". The number of keywords appearing is 16 and 10 times respectively.

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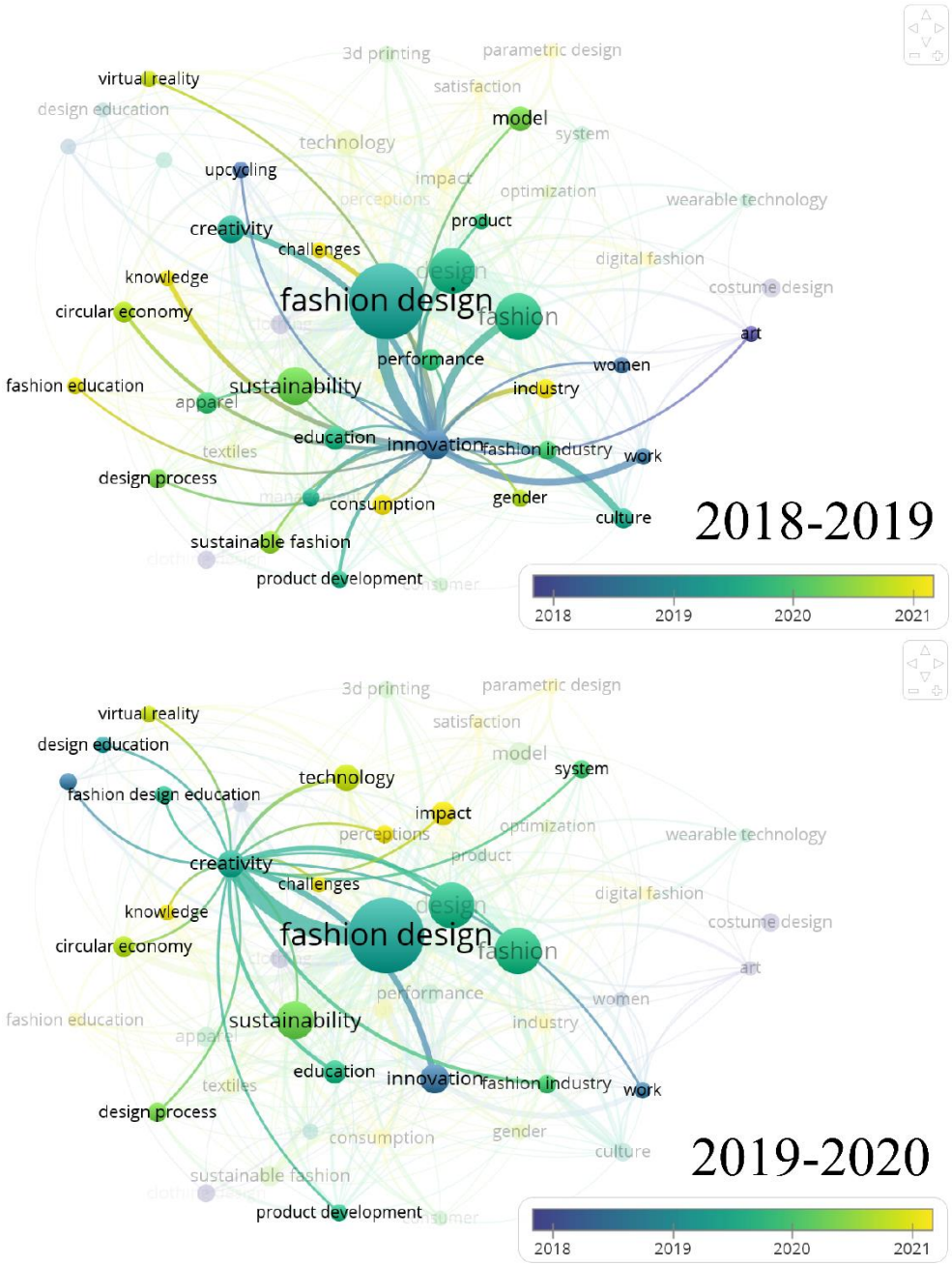

Figure 11 2018-2020 Keywords that appear most frequently
Source: VOSviewer, (2024)

Figure 11 shows that one research frontier in 2018-2019 is "Innovation", and the keyword appears 33 times. One research frontier from 2019 to 2020 is "Creativity", with the keyword appearing 29 times.

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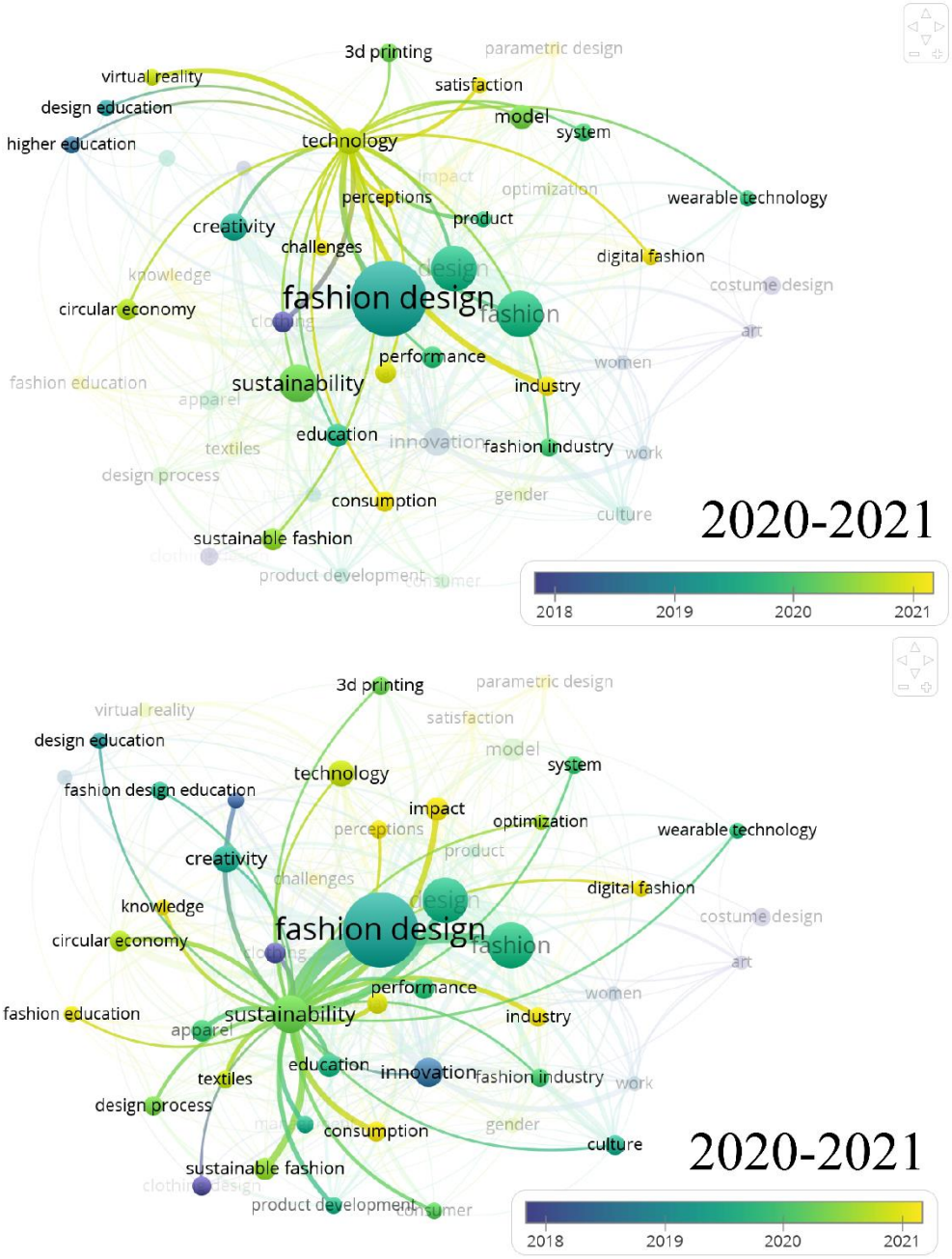

Figure 12 2020-2021 Keywords that appear most frequently
Source: VOSviewer, (2024)

Figure 12 shows that there are two research fronts in 2020-2021, namely "Technology" and "Sustainability", and the keywords appear 28 times and 56 times respectively.

In summary, the evolution path of research frontiers ranges from the research frontiers of "apparel design" and "art" in 2014-2018, to the research frontiers of "innovation" in 2018-2019, to "creativity" in 2019-2020, and then Evolving into "Technology" and "Sustainability" in 2020-2021. After 2021, it will turn to the research frontiers "influence", "consumption" and "industry".

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Discussion

Research Overview

Research Overview focuses on the number of published documents, subdivided into high-yield Document Types including Article and Proceeding Paper, and high-yield Authors include Zeng Xy, Chen Q, Fan JT, Zheng R, Liu KX, Liu XG, Fu BL, Bruniaux P, Chen Y, Montagna G, Wang JP, high-yield Countries/Regions include PEOPLES R CHINA and the USA, high-yield Publishers include Taylor & Francis, and the proportion of Research Areas, the highest is Materials Science with 384 articles, followed by Business Economics with 263 articles. The study found that the H-Index value of the "Fashion Design" research field is 27. In summary, the quality of articles in the "Fashion Design" research field is generally higher, with more research and very active.

Research Frontiers

Research frontiers reflect the fashion design field's emphasis on commercial and social impact. The field of fashion design is increasingly aware of the importance of commercialization to its development. At the same time, it also reflects the focus on consumers in the field of fashion design. Understanding consumer preferences, needs, and behaviors is critical to designing products that meet market needs.

The focus on industry shows the fashion design field’s concern for industry development trends and future directions. Understand the structure, operation, competition, etc. of the industry to make better decisions and planning.

To sum up, the fashion design field’s focus on influence, consumption, and industry reflects its increasing emphasis on business and social impact.

Evolution Path of Research Frontiers

The evolution path of research frontiers reveals the development trends and focus shifts in the field of fashion design in the past 10 years. From Design to Innovation and Creativity During the period from 2014 to 2019, the research frontier gradually shifted from focusing on the art of fashion design to innovation and creativity. This shows that during this time, the focus in the field of fashion design began to shift from traditional design techniques to more innovative and creative directions. In 2020-2021, the research frontier develops further, focusing on technology and sustainability, reflecting the growing focus on new technologies and sustainability issues in the field of fashion design. The use of technology and sustainable practices have become important issues in fashion design. After 2021, the research frontier begins to focus on influence, consumption, and industry. This shows that the field of fashion design is beginning to pay more attention to issues related to the market, consumers, and industry development. The evolution path of the research frontier reflects the transformation of the development direction of the field of fashion design from single design and art to a more diversified and comprehensive one. From focusing on innovative ideas to technology and sustainable development to market, consumer, and industry development, it reveals the changes and evolution in the field of fashion design in the pursuit of excellence, sustainable development, and social impact.

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Conclusion

This study studied Ten Years of Fashion Design Research: Research Overview, Scientometric Analysis of Research Frontiers and Evolutionary Paths and reached the following conclusions:

Research Overview: The quality of articles in the "Fashion Design" research field is generally higher, with more research and very active.

Research Frontiers: There are three research fronts: "Impact", "Consumption" and "Industry" The fashion design field's focus on influence, consumption, and industry reflects its increasing emphasis on business and social impact.

Evolution Path of Research Frontiers: The evolutionary path of the research frontier ranges from "Costume Design" and "art" in 2014-2018, to "Innovation" in 2018-2019, to "Creativity" in 2019-2020, and then to "technology" in 2020-2021 and "Sustainable development". After 2021, it will be "Impact ", "Consumption" and "Industry". The evolution path of the research frontier reflects the shift in the development direction of the field of fashion design from single design and art to more design and art: diversification and comprehensiveness. From focusing on innovative ideas to technology and sustainable development to market, consumer, and industry development, it reveals the changes and evolution in the field of fashion design in the pursuit of excellence, sustainable development, and social impact.

Recommendation

Technology integration: Explore the integration of advanced technologies such as artificial intelligence, virtual reality, and 3D printing in the clothing design process. Investigate the potential applications of these technologies in enhancing design creativity, optimizing production processes, and creating personalized consumer experiences in the fashion industry.

Sustainability Initiatives: Further research into sustainability initiatives and practices in fashion design. Examining sustainable material sourcing, eco-friendly manufacturing processes, and circular economy models to promote environmental stewardship and social responsibility in the fashion industry.

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