

Evolution And Trends In Textile Industry Research: A Comprehensive Bibliometric Analysis

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ABSTRACT

An extensive bibliometric examination of research trends in the textile industry during the previous 120 years, from 1904 to 2024, is presented in this article. Employing a dataset including 16,929 documents from 2,036 distinct sources, the investigation delves into the progression of research output, prominent figures in the area, and developing subjects. An increasing amount of academic and industrial interest in textile research is indicated by the analysis, which shows a steady yearly growth rate of 5.41%. Important conclusions emphasize the importance of environmental issues, especially those pertaining to wastewater treatment and dye usage, as well as the substantial contributions of nations like China and India. The fact that 11.56% of the documents in the survey involve international cooperation further emphasizes the value of cooperation. This bibliometric analysis informs future orientations and industry policy-making by offering insightful information about the history and contemporary state of textile research.

Keywords: Bibliometric analysis, Evolution, Research output, Sources, Textile industry

INTRODUCTION

India's textile industry has a long history dating back to the Indus Valley Civilization, which was known for producing superior cotton textiles (Bhandari, 2020)¹. Despite the difficulties presented by British colonial control, which had a negative impact on local textile manufacturing, this industry has been essential to India's economy for generations, maintaining traditional handloom and weaving traditions (Roy, 1999)². The industry saw a rebirth after independence, making up about 2% of India's GDP and 7% of its industrial output. As a result, it became essential to the country's economic structure (Ministry of Textiles, 2023)³

Employment and Export Contributions

With about 45 million direct jobs and an estimated 60 million indirect jobs, the textile industry is a significant employer (ILO, 2021)⁴. This industry substantially increases India's export revenue, making up about 12% of all exports from the country (Export Promotion Council, 2022)⁵. These numbers highlight the sector's significance from both an economic and a livelihood perspective, as it may support a significant section of the population (Rao & Babu, 2019)⁶.

Key Segments and Their Development

The textile industry in India is extremely diverse, consisting of multiple major segments, each with distinct characteristics and contributions of its own. Textiles made of cotton are widely used, and India is one of the world's top producers of cotton (Cotton Corporation of India, 2023)⁷. India is the second-largest producer of silk in the world, and it is well-known for its Mulberry, Tussar, Eri, and Muga kinds (Central Silk Board, 2022)⁸. The woollen textile market is very limited, although it is well-represented in the north (Wool mark, 2021)⁹. There has been consistent expansion in the man-made textile industry, which includes synthetic fibers like nylon and polyester (Textile Committee, 2021)¹⁰. Because they produce high-value, one-of-a-kind goods, traditional handlooms and handicrafts are still essential for rural employment and cultural heritage (Handloom Export Promotion Council, 2022)¹¹.

Regional Textile Hubs

India's major textile clusters have become important hubs for innovation and production. The knitwear industry and spinning mills are well-known in Tamil Nadu, especially in Tirupur (Krishnan & Jayanthi, 2018)¹². Gujarat has become a prominent center for the production of synthetic and denim fabrics (Gujarat Industrial Development Corporation, 2021)¹³. Maharashtra is important for cotton textiles and clothing, with Mumbai serving as its core (Maharashtra State Textile Corporation, 2021)¹⁴. The handloom and jute textile industries in West Bengal are well-known (West Bengal State Handloom Weavers' Co-operative Society, 2020)¹⁵. The woollen textile and hosiery industries are well-known in Punjab, particularly in Ludhiana (Punjabi University, 2021)¹⁶.

Government Initiatives and Policies

Several initiatives and policies have been introduced by the Indian government to assist and develop the textile sector. The Ministry of Textiles (2021)³ states that the purpose of establishing textile parks is to promote investment and optimize production. Financial support for modernization is offered by the Technology Upgradation Fund Scheme (TUFS) (TUFS Report, 2022)¹⁷. To increase textile exports, a few programs and incentives have been implemented (Directorate General of Foreign Trade, 2021)¹⁸, and improving workforce skills is the main goal of the Integrated Skill Development Scheme (ISDS) (Skill India, 2022)¹⁹.

Challenges Faced by the Industry

The Indian textile sector has many obstacles despite its advantages. India's global market share is being impacted by fierce competition from nations like Bangladesh, China, and Vietnam (WTO, 2020)²⁰. Another major obstacle is the volatility of raw material prices, especially those of cotton (International Cotton Advisory Committee, 2021)²¹. In addition, modernization and improved infrastructure are urgently needed to increase production (Confederation of Indian Textile Industry, 2021)²². Environmental concerns are important issues that require attention, particularly with relation to pollution and water usage (Centre for Science and Environment, 2022)²³.

The literature on the Indian textile industry emphasizes the industry's substantial economic contributions and rich historical legacy. Although there are many obstacles in the industry, there is also a lot of room for expansion and change. Prospective developments in sustainability, technology, and infrastructure are anticipated to bolster the industry's worldwide competitiveness, thereby reinforcing its position as a pillar of India's industrial landscape. Given the increasing

need for technical textiles across a range of industries, including healthcare, automotive, and construction, the future of the Indian textile industry seems bright (FICCI, 2021)²⁴. In response to widespread environmental concerns, there is a growing emphasis on eco-friendly products and sustainable processes (Sustainable Apparel Coalition, 2021)²⁵. It is anticipated that the industry would remain relevant and grow as a result of the adoption of digital technology, which will increase efficiency and competitiveness (NITI Aayog,2022)²⁶.

RESEARCH METHODOLOGY

Phase: 1 Collection of Data	
1. Database Selection	Scopus database
2. Keyword Search	Textile Industry
3. Time Frame	1904-2024
4. Data Export	CSV files
Phase: 2 Data Processing	
1. Software setup	R square- Biblioshiny
2. Data import	CSV files
3. Data cleaning	Exempted - Books, Conference proceedings
Phase: 3 Analysis	
1. Descriptive Analysis	
2. Citation Analysis	
3. Co-Citation Analysis	
4. Thematic Analysis	
Phase:4 Visualization	
1. Graphs & Chat	
2. Interpretation	
Phase: 5 Reporting	
1. Documentation	
2. Conclusion	

Purpose of the study

By quantitatively analyzing academic literature and research outputs, bibliometric analysis aims to shed light on a variety of facets of scholarly communication and scientific research. Finding important contributions in a subject, assessing the influence of research publications, authors, institutions, and journals, and spotting research trends are all made easier with its assistance. Furthermore, bibliometric analysis maps scientific collaboration, providing useful information to academic institutions, funding agencies, and policymakers to help them decide what research to prioritize and how much money to spend. Along with identifying new research areas and measuring research performance against colleagues and institutions, it also evaluates the quality of publications. All things considered, bibliometric analysis is an essential instrument for comprehending the dynamics of scholarly communication, directing research administration, and promoting scientific progress.

Research Questions

RQ:1 How has the research output in the textile industry evolved over time, and what are the key trends and patterns in publication activity across different academic and industry journals from 1904 to 2024

cooperation is also demonstrated in the diagram, with contributions from Brazil, Turkey, Pakistan, the United States, Italy, Iran, the United Kingdom, and Germany standing out. Studies on “dye,” “wastewater treatment,” “industrial waste,” “chemical oxygen demand,” and “effluent” highlight the importance of considering the effects of industrial activities on the environment. Overall, this visualization highlights how multidisciplinary and international textile research is, with a special focus on waste management and sustainability.

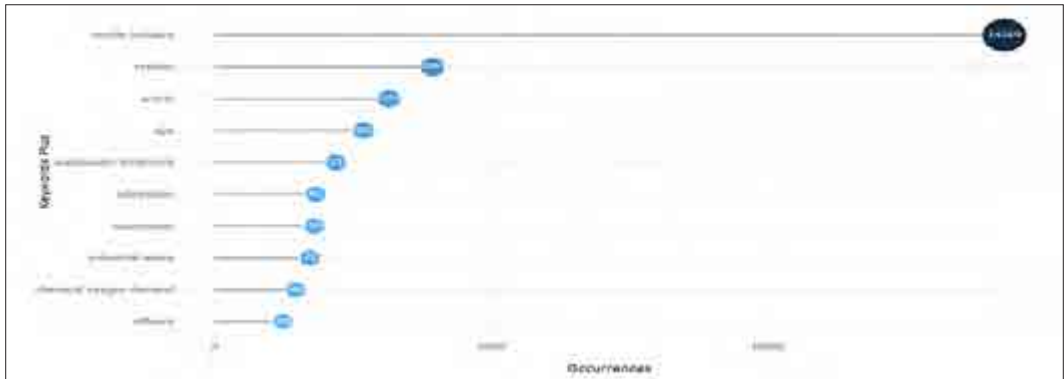


Figure No.: 4

The frequency of particular terms associated with the textile industry and its effects on the environment is depicted in the graph. With 14,269 instances, the term “textile industry” is most commonly used. This is followed by “textiles” (3,941) and “article” (3,156), suggesting a main focus on the textile industry and related studies. The terms “dye” (2,693), “wastewater treatment” (1,219), and “wastewater” (804), which are frequently used in the sector, draw attention to important environmental concerns related to wastewater management and dye usage. The terms “adsorption” (882), “industrial waste” (722), “chemical oxygen demand” (468), and “effluent” (240) are also noteworthy because they all allude to the serious environmental issues and remediation procedures related to pollution from the textile industry.



Figure No.: 5

The amount of documents about the textile industry that have been published by different sources is shown in the graph. “Textile Asia” is the most prolific source, coming in first place with 406 documents. Their noteworthy contributions to textile research can be seen in the closely followed “Journal of the Textile Institute” (363 documents) and “Textile Outlook International”

(359 documents). Other journals that publish a lot in this sector are “Textile Month” (346), “Colourage” (331), and the “Journal of Hazardous Materials” (329). “Textile Magazine” (285), “Textile World” (259), “Asian Textile Journal” (258), and “Fibres and Textiles in Eastern Europe” (254), among other noteworthy references. Together, these resources highlight important works that add to our understanding of textiles and associated environmental issues.

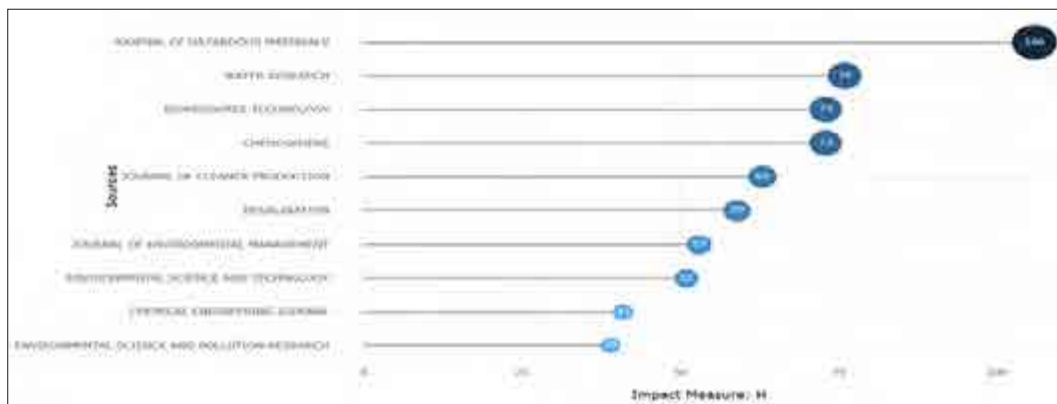


Figure No.:6

The impact metrics (H-index) of several sources pertaining to environmental and hazardous materials research are displayed in the graph. With a high impact score of 106, the “Journal of Hazardous Materials” is ranked first in the field, demonstrating its considerable influence and regular citation. The effect measures of “Water Research” and “Bioresource Technology” are noteworthy next, with measures of 76 and 73, respectively, with “Chemosphere” coming in last. The “Journal of Cleaner Production” (63), “Desalination” (59), “Journal of Environmental Management” (53), “Environmental Science and Technology” (51), “Chemical Engineering Journal” (41), and “Environmental Science and Pollution Research” (39) are further noteworthy periodicals. These prestigious publications play a vital role in distributing research on pollution control, hazardous materials, and environmental management, as evidenced by their significant contributions to the development of both theoretical and applied approaches to these issues.

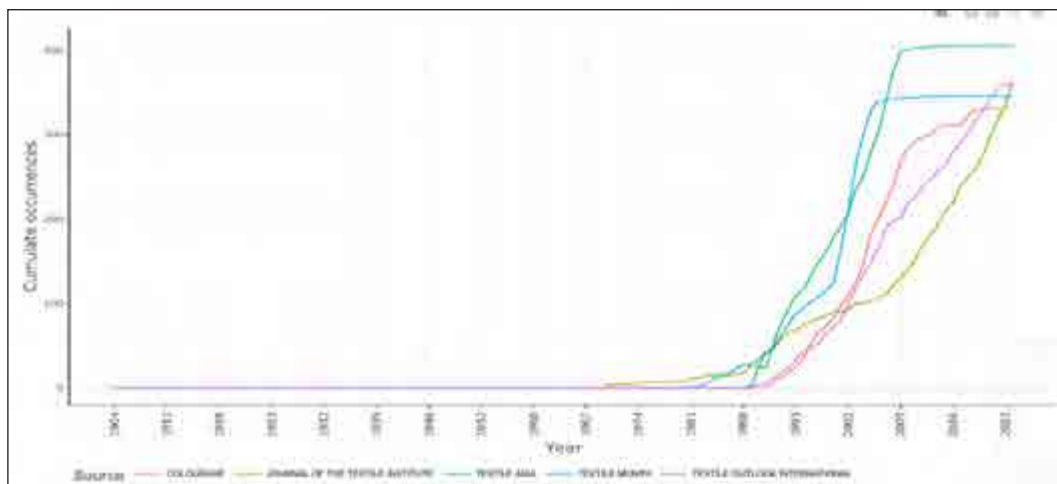


Figure No.:7

The graph shows the total number of times articles about the textile sector from five distinct sources have appeared over a period. COLOURAGE, TEXTILE ASIA, TEXTILE MONTH, JOURNAL OF THE TEXTILE INSTITUTE, and TEXTILE OUTLOOK INTERNATIONAL are some of the sources. The chronology spans the years 1904 through 2023. There is almost little activity at first in any of the sources until about 1975. There is a discernible rise in the frequency of occurrences after 1980, with a notable peak occurring in the late 1990s and early 2000s. The data indicates a rapid rise in published articles from TEXTILE MONTH (in blue) and TEXTILE OUTLOOK INTERNATIONAL (in magenta) over the time under study. These sources exhibit the sharpest increases. Although at a little slower rate, the JOURNAL OF THE TEXTILE INSTITUTE (in green) and TEXTILE ASIA (in cyan) likewise demonstrate a notable increase. Red indicates COLOURAGE, which increases steadily but less sharply than the other three. The quick increase in cumulative events points to increased attention and study of the textile sector in the last several years.

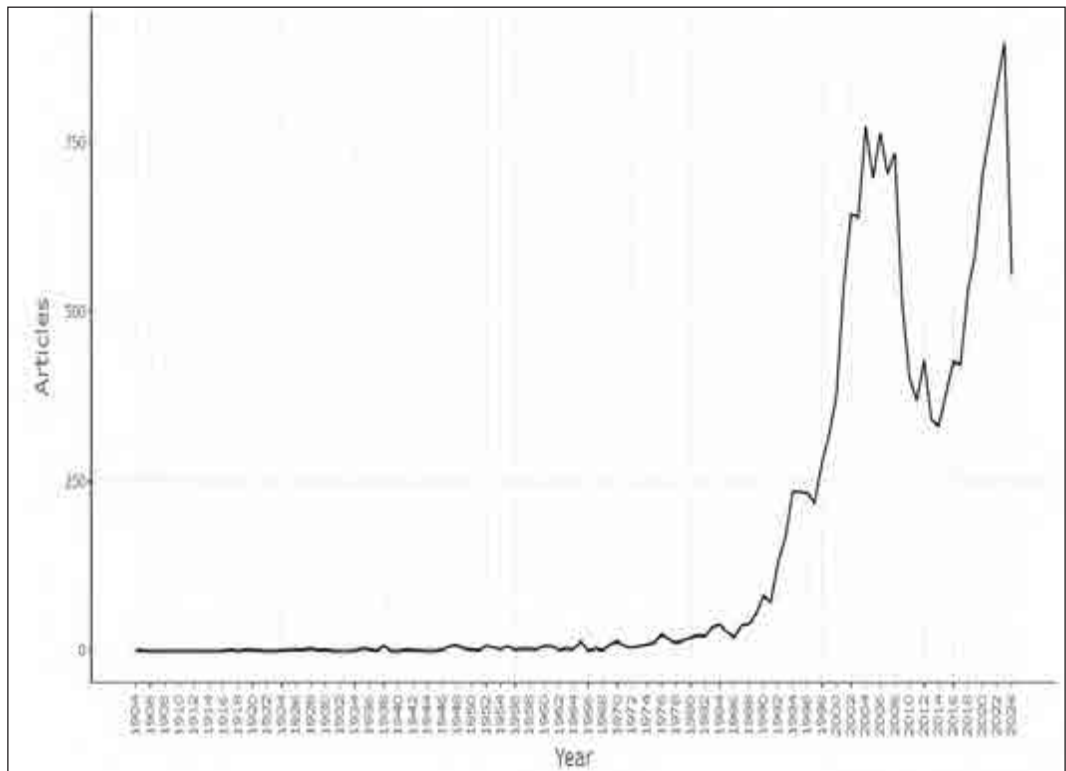


Figure No.:8

The number of articles published annually between 1904 and 2024 is seen in the graph. From 1904 until the late 1970s, there are quite few and steady articles published. There has been a discernible increase in the number of articles published each year beginning in the late 1980s, peaking in the late 1990s. The number of articles rises in the early 2000s and then declines significantly before rising again in the late 2000s and early 2010s. Another peak in the trend is anticipated for 2023. Despite some recent fluctuations in publication rates, this pattern shows an increasing interest in and rise in research output in the textile industry over the previous few decades.

Conclusion

The important sector's notable expansion and changing patterns are highlighted by the bibliometric study of research on the textile industry from 1904 to 2024. The study, which examined more than 16,000 documents, shows that the field is strong and developing, with a wide range of subjects and significant international cooperation. Environmental sustainability is one of the main areas of concentration, especially regarding dye and wastewater management, which reflects the industry's continuous attempts to address ecological difficulties. Leading nations like China and India have made significant contributions, highlighting how important they are to the advancement of textile research. This analysis is a useful tool for scholars, decision-makers, and industry stakeholders since it not only charts the historical evolution and present status of textile research, but also highlights important figures and developing trends. Future studies should keep looking for creative fixes and environmentally friendly methods to increase the textile industry's influence on the world stage.

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