



Textiles Research, 1869-2022: Journals and Disciplinary Structures

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From simple weaving technologies dating back thirty thousand years to novel technical applications in various fields, textiles have been an integral part of humanity and a major global industrial complex (Kadolph & Marcketti, 2017). Continuously on the forefront of innovation, research on textiles has grown to be increasingly multidisciplinary and its development followed various trajectories. In this bibliometric study, we visualize a large collection of research documents related to textiles to understand the structure of the research landscape and its development over time. We also visualize 200 largest journals that contribute to the field of textiles and analyze disciplinary clusters.

Over 65 thousand research documents were downloaded in December, 2021 from Microsoft Academic, using Microsoft Academic API and VOSviewer. The search query identified documents that contained the word “textile” either in the article title or the article abstract. To avoid duplicates, only primary documents with DOI were downloaded. Inclusion of DOI makes it possible to limit the document search to scientific literature, such as journal articles and conference papers. Our search query produced a collection of 65,494 textile research documents published between 1869 and 2022. The Microsoft Academic was discontinued in January 2022, however, our collection was downloaded and stored as a JSON file. First, we used the VOSviewer software to create a citation map that shows 200 journals that are most relevant to the topic of textiles. These journals are frequently cited by the documents in our collection (Figure 1).

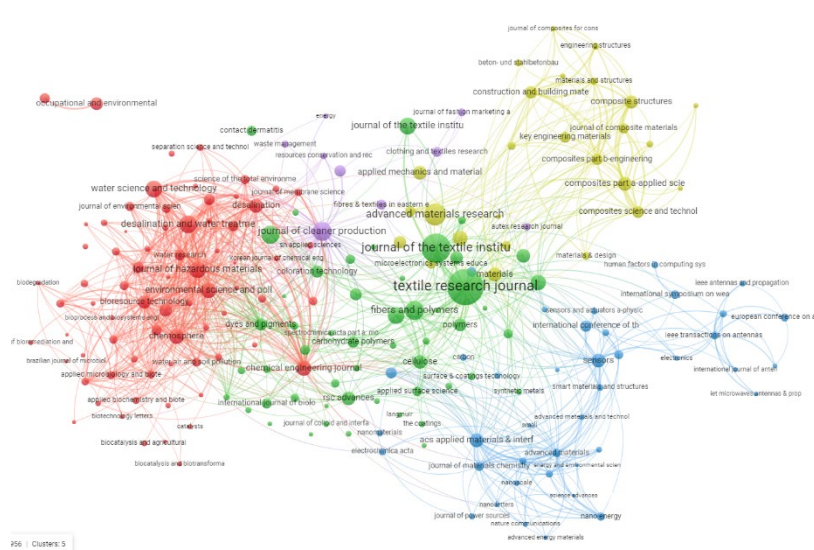


Figure 1. Citation map of journals most relevant to textiles.

In contrast, the Textile Research Journal and the Chemical Engineering Journal do not demonstrate the same strength of connection. Same-colored clusters show related fields of study that tend to cite each other. Journal clusters are groups within which documents cite each other. Links connect related journals, the thicker the line, the stronger the citation connection. The map (Figure 1) models a solution of five journal clusters, which we label: (1) textile chemistry and engineering (red cluster), (2) fundamental and general textiles research (green cluster), (3) smart textiles (blue cluster), (4) advanced textiles and composites (yellow), and (5) sustainability (purple cluster).

Second, we used the citation map of journals as the basis for the overlay map that shows average normalized citations for textile-related articles in each journal. The total number of citations received by all documents published by a source is displayed. Because older documents tend to have more citations, normalization controls for the recency of publications. This map helps to

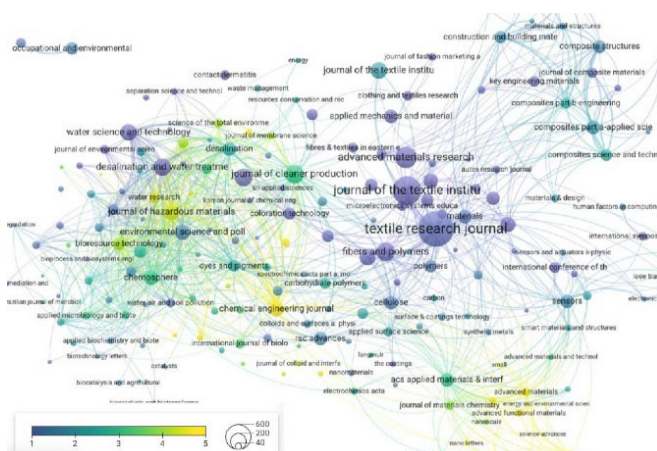


Figure 2. Average normalized citations for textile-related articles.

directly compare journals from different disciplines on how often, on average, their textile research was cited. Documents published in journals overlaid in yellow (Figure 2) have been cited more, on average, than documents published in darker-colored (blue-green) journals. Chemical Engineering Journal and Nano Technology are examples of two journals that receive the most citations. Documents from the Textile Research Journals are cited less, on average, than journals focused on advanced materials and chemistry. This is indicative of the significant innovations and advancements in textile applications throughout the years resulting in textiles research published in more focused or newly established journals.

Third, we created an overlay map that shows the average publication year for all documents that represent a given journal. Figure 3 is a screenshot from the map showing that the average publication year for Textile Research Journal is 1988. Based on the analysis, it is one of the oldest continuously publishing journals in our map.

Our analysis paints a vivid picture of the multidisciplinary nature and progress of the textiles research landscape. The method allows for further examination of the field, for example, more in-depth examination of its developmental trajectories, connections between specific research areas, and impact factor and document-based explorations. This analysis reveals the broad scope as well as detailed structure of the textiles research. Such analysis can offer opportunities for identifying and facilitating future research (Ha-Brookshire & Hawley, 2014).

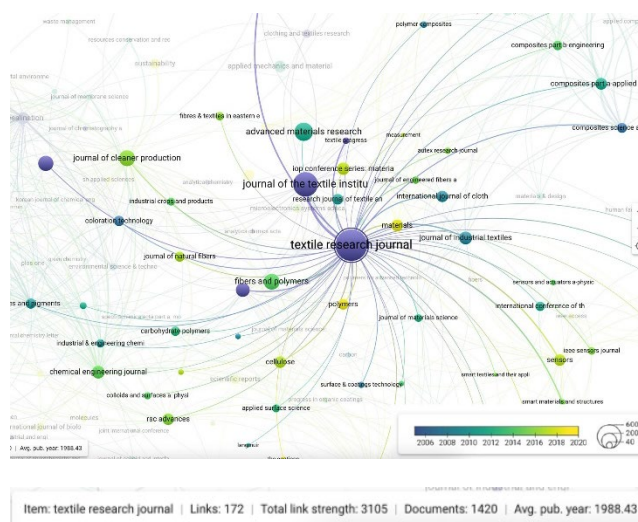


Figure 3. Average publication year for Textile Research Journal.

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