

# A Bibliometric Analysis of Energy Management Research: A Comparison between Scopus and Web of Science

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**Abstract.** The increasing volume of research on energy management has made bibliometric analysis an essential tool for mapping scientific trends and evaluating research impact. However, bibliometric outcomes are strongly influenced by the choice of the bibliographic database. This study presents a comparative bibliometric analysis of energy management research based on Scopus and Web of Science. Using an identical search strategy and time span, articles and reviews were retrieved from both databases and analysed using the Bibliometrix R-package. The comparison focuses on key bibliometric indicators and the results reveal significant differences between the two databases. These findings emphasize the importance of database selection in bibliometric studies and provide methodological insights for researchers conducting bibliometric analyses in the field of energy management.

**Keywords:** Bibliometrix, R-package, energy management, artificial intelligence.

## 1 Introduction

The increasing deployment of solar energy systems has intensified the need for advanced energy management solutions capable of handling variability and uncertainty in power generation. Traditional control and optimization approaches often struggle to meet the operational requirements of modern energy systems [1]. In this context, artificial intelligence has gained significant attention as an enabling technology for improving forecasting accuracy, system control, and decision-making in solar energy applications [2].

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The growing body of literature at the intersection of artificial intelligence, solar energy, and energy management highlights the need for a comprehensive overview of research trends and impacts. Bibliometric analysis offers an effective approach for mapping the structure and evolution of this research domain [3]. However, bibliometric outcomes may vary depending on the bibliographic database used [4].

This study conducts a comparative bibliometric analysis based on Scopus and Web of Science to explore research trends and evaluate the effect of database selection on bibliometric results.

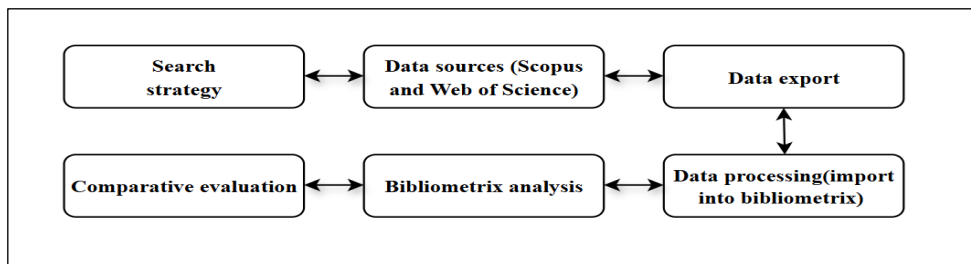
## 2 Methodology

This study adopts a bibliometric research design to analyse and compare scientific production related to artificial intelligence-based energy management in solar energy systems. The analysis is based on two major bibliographic databases: Scopus and Web of Science.

These two databases were selected due to their high-quality scientific publications, and together they provide broad coverage, allowing a general and almost complete view of the study subject.

To ensure comparability, the same search equation (artificial intelligence, solar energy, energy management) and time span (2017-2025) were used to retrieve data from both databases. The datasets were imported into the Bibliometrix R-package, where data cleaning and preprocessing were conducted to ensure consistency in author names, sources, and keywords.

The analysis focused on key bibliometric indicators, a comparative analysis was performed to identify similarities and differences between the two databases and to assess the influence of database selection on bibliometric results [5].



**Fig. 1.** Methodological framework of the comparative bibliometric analysis

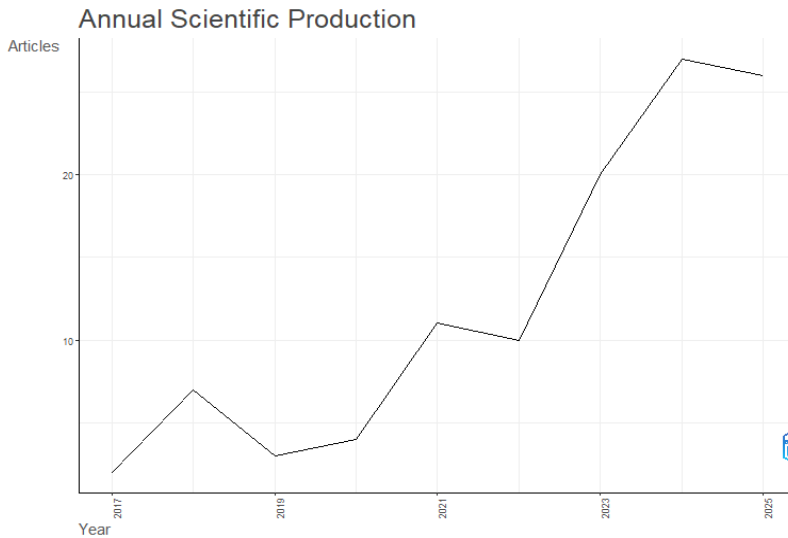
## 3 Results

This section presents the results of the bibliometric analysis conducted on research related to artificial intelligence-based energy management in solar energy systems. The analysis focuses on annual scientific production, sources, authors, and country distribution.

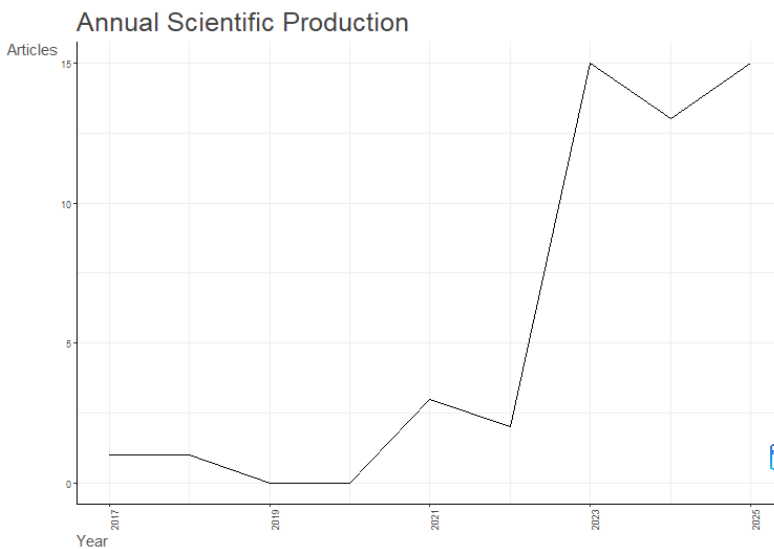
### 3.1 Annual scientific production

The yearly distribution of articles about artificial intelligence-based energy management in solar energy systems is shown in this section. It examines the evolution of scientific output between Scopus and Web of Science and reveals trends in publication growth over time.

The annual scientific production shows a clear growth trend in research related to the field. In the early years, the number of publications remains relatively low. From the mid-period onward, a gradual increase can be observed, followed by a sharp rise in recent years.



**Fig. 2.** Annual scientific production in scopus database



**Fig. 3.** Annual scientific production in web of science database

Scopus displays a higher volume of publications compared to Web of Science, particularly in the most recent years, reflecting its broader journal coverage. Web of Science, while showing fewer publications overall, follows a similar upward trend, suggesting growing scientific interest in the field. The rapid increase in publications in both databases

highlights the emerging importance of artificial intelligence techniques for managing solar energy systems.

### 3.2 Sources

This subsection analyses the most pertinent journals publishing research in the field. It compares source productivity and coverage in Scopus and Web of Science.

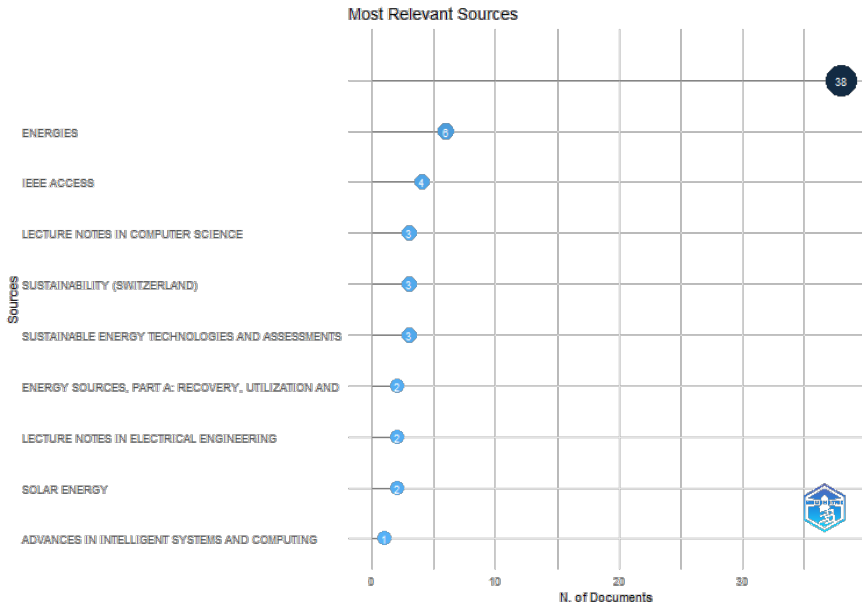


Fig. 4. Most relevant sources in scopus database

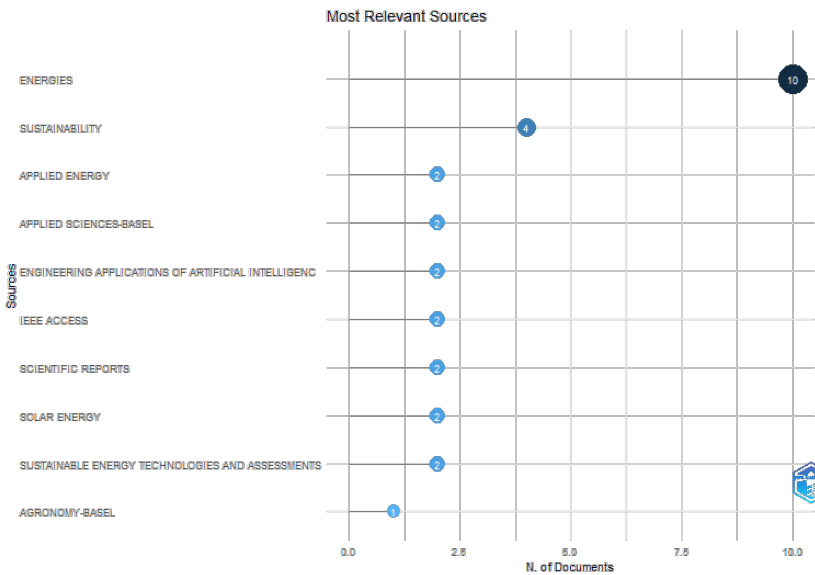


Fig. 5. Most relevant sources in web of science database

The source analysis reveals differences in journal coverage between Scopus and Web of Science. Scopus includes a wider range of sources, covering both high-impact international journals and emerging or regional publications. In contrast, Web of Science exhibits a more selective source profile, with fewer journals but generally higher citation impact. This difference reflects the distinct indexing policies of the two databases.

The results suggest that Scopus offers broader source diversity, while Web of Science emphasizes journal selectivity. These differences influence source-level bibliometric indicators and should be considered when interpreting bibliometric results.

### 3.3 Authors

This section examines author productivity and influence within the field. The most prolific and most cited authors are identified for each database.

In both databases, a small number of authors contribute multiple publications, while the majority appear with one or two documents, indicating a fragmented authorship structure in this research field. Scopus identifies a slightly higher number of prolific authors, suggesting broader author coverage and greater inclusivity of research contributions from diverse regions and institutions. In contrast, Web of Science presents a more limited set of leading authors, reflecting its stricter indexing criteria and emphasis on well-established researchers and high-impact publications.

Overall, the results suggest that Scopus provides greater author diversity, while Web of Science emphasizes selectivity and publication quality. These differences influence author-level bibliometric indicators and should be taken into account when interpreting productivity and impact metrics across databases.

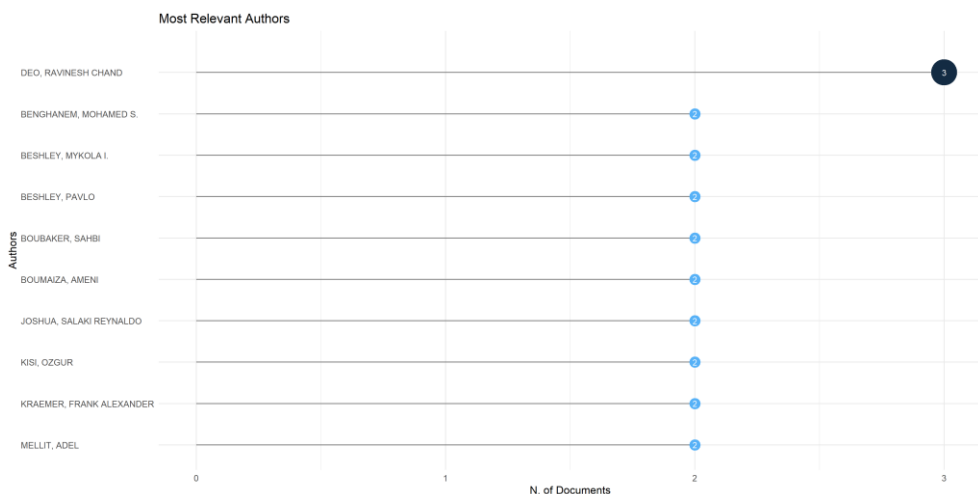
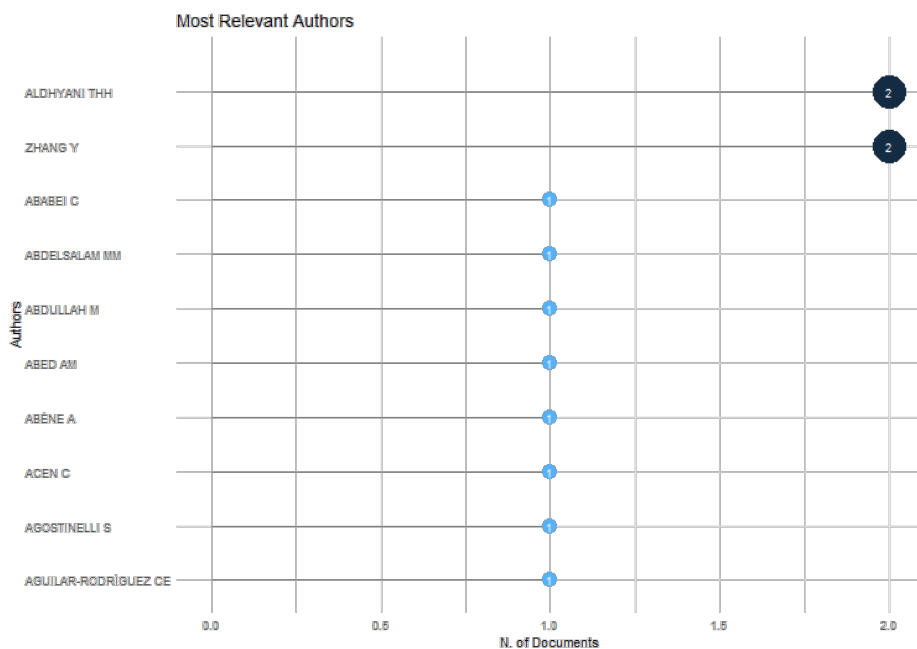


Fig. 6. Most relevant authors in scopus database



**Fig. 7.** Most relevant authors in web of science database

### 3.4 Countries

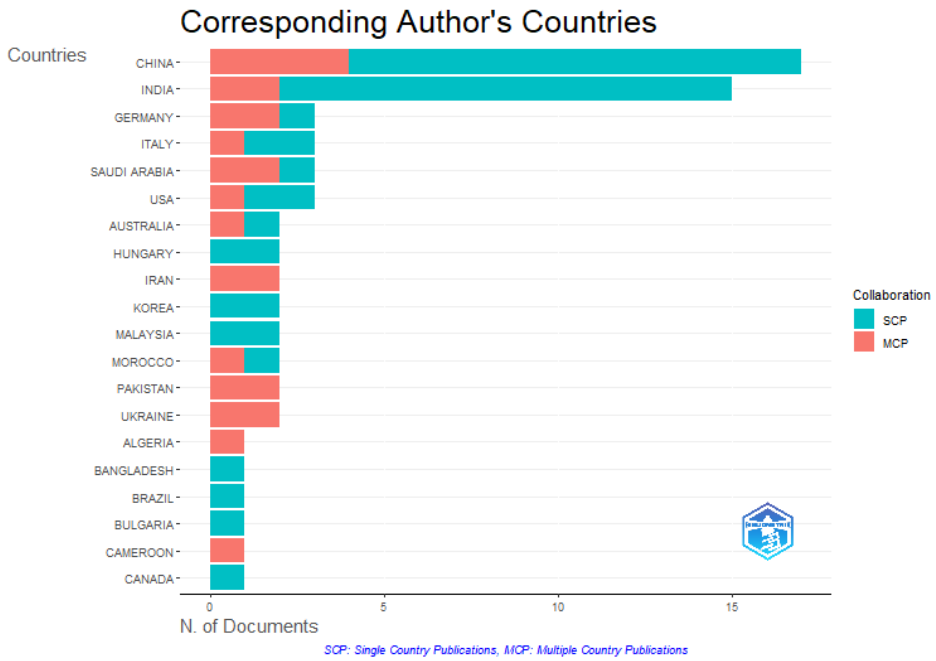
The geographical distribution of scientific output is examined in this subsection. It highlights the most productive countries and compares international research contributions between the two databases.

The analysis of corresponding author countries highlights clear differences in geographical coverage and collaboration patterns between the two figures. In both cases, research output is highly concentrated in a small number of countries, with China and India consistently dominating the publication landscape.

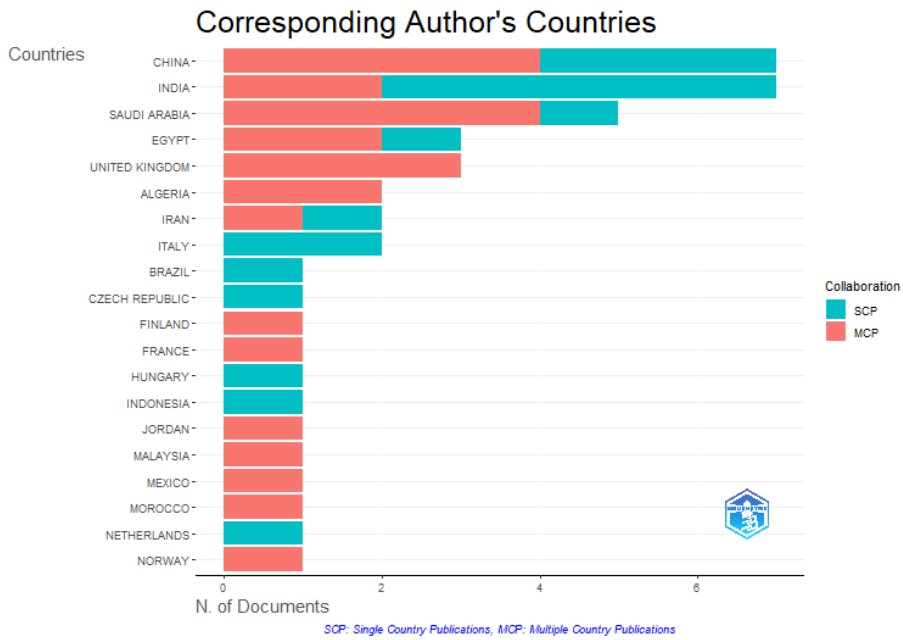
However, figure 8 is characterized by a stronger dominance of single-country publications (SCP), suggesting that research output is largely driven by domestic collaborations. In contrast, figure 9 shows a relatively higher proportion of multiple-country publications (MCP), reflecting greater international collaboration across regions.

Additionally, figure 8 includes a broader mix of developing and emerging countries with smaller contributions, while figure 9 places more emphasis on European and Middle Eastern countries, indicating a shift in regional representation.

Overall, the comparison suggests that while both datasets exhibit country-level concentration, figure 9 reflects a more internationally collaborative research profile, whereas figure 8 emphasizes nationally driven research output. These differences should be considered when interpreting country-level bibliometric indicators and collaboration trends.



**Fig. 8.** Corresponding author’s countries in scopus database



**Fig. 9.** Corresponding author’s countries in web of science database

## 4 Conclusion

This study provided a comparative bibliometric analysis of research on artificial intelligence–based energy management in solar energy systems using Scopus and Web of Science. The results revealed a strong growth in scientific production over recent years.

The comparison highlighted notable differences between the two databases. Scopus showed higher publication volume and broader journal and geographic coverage, whereas Web of Science exhibited a more selective structure. These differences influence key bibliometric indicators related to productivity, sources, authors, and countries.

The findings demonstrate that database selection plays a critical role in shaping bibliometric outcomes and interpretations. Overall, this study offers methodological insights for future bibliometric research and contributes to a better understanding of the scientific landscape at the intersection of artificial intelligence, solar energy, and energy management.

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