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Bibliometric Study: Natural and Engineering Sciences

S. Surekha [1*], S. Sindhu [2], Saravanakumar Veerappan [3], N. Arvinth [4]

[1*] Jr Researcher, National Institute of STEM Research, India.
E-mail: ssurekha9025@gmail.com

[2] Research Analyst, Centivens Institute of Innovative Research, Coimbatore, Tamil Nadu, India.
E-mail: sindhuanbuselvaneniya@gmail.com

[3] Director, Centivens Institute of Innovative Research, Coimbatore, Tamil Nadu, India.
E-mail: saravanatheguru@gmail.com

[4] Research Associate, National Institute of STEM Research, India.
E-mail: arvinthwork@gmail.com

Abstract

Bibliometric analysis is a useful technique for assessing the impact of publishing in the scientific community. It is a statistical assessment of published scientific articles, books, or book chapters. The number of times a research paper has been mentioned by other writers indicates its importance. A bibliometric analysis of the natural and engineering sciences is presented in this work. The journal is an electronic publication that is peer-reviewed and multidisciplinary, with an e-ISSN of 2458-8989. In this study the publication and citation statistics of journals in the natural and engineering sciences from 2020 to 2024 are examined. Research in the physical, biological, and engineering sciences is the main focus in NES Journals. Environmental science, materials engineering, biotechnology, and applied physics include a few of the subjects covered by these journals. Our bibliometric analysis provides scientific research output with evidence-based descriptions and visuals.

Keywords:

Bibliometric, natural, engineering, environment, science, citation.

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Corresponding Author: S. Surekha, E-mail: ssurekha9025@gmail.com

Introduction

Bibliometric analysis is important for judging research impact, offering quantitative metrics that measure the quality and impact of academic contributions. It helps to identify the trends and guides the researchers and policymakers in decision-making. It helps interdisciplinary partnerships and improve collaboration by mapping citation and author collaborations. Bibliometric analysis helps in understanding journal performance, allowing researchers to select suitable venues for publication. It supports the advance technologies and improves the reputation of the researchers.

The aim of the Natural and Engineering Sciences is to understand the natural world and use technologies to solve the engineering problems. This field include biology, chemistry, physics, and several engineering areas. NES address global problems like climate change, sustainable energy, and public health.

Authors often cite articles that have already gained literary significance in their peer-reviewed studies, typically indicated by the number of times those articles have been cited (Bornmann & Daniel, 2009; Kampmann et al., 2015; Moses et al., 2016). It's crucial to remember that an article's citation count may not always reflect the standard of the research and the way it affected the author's or their colleagues work in the fields of natural or engineering disciplines. However, it can influence readership on specific topics, which may lead to conversations, essential practices, discussions, and even more study in that area (Bornmann & Daniel, 2009). As mentioned earlier, citation classics in particular fields and journals have become a widely used method for evaluating the contribution of a journal, article, or author to research (Hui et al., 2013).

In 1945, the Institute for Scientific Information (ISI) started gathering statistics on literary effect and citations. This process is still ongoing. In 1979, this data became electronically available. Web of Science provides the most recent journal citation method and database, called Scopus (Schubert et al., 1989; Moses et al., 2016; Hui et al., 2013; Gondivkar et al., 2018). This database includes nearly 10,000 high-impact journals across various fields, including the arts, humanities, and social sciences. The goal of evaluating the features of these articles was performed with the purpose of determining its importance to natural and engineering sciences. Additionally, variations over time in the quality of the evidence offered in these papers has also been evaluated (Garcia et al., 2019).

Literature Survey

In 2020 study, (Zhao et al., 2020) conducted a bibliometric analysis of environmental engineering journals, for 5,000 publications the average citation count for a paper is 12.5. It shows the growth rate of 15% annually over the past decade, corresponds with growing global concerns about environmental sustainability, indicating that researchers are mainly focused on addressing these issues.

Similarly, Li & Chen, (2021), finding that co-authored publications, 2,300 with an average citation of 15.8, while single-author papers 1,200, which has an average of only 7.3 citations. This analysis shows a 40% increase in co-authored papers over five years.

Kumar & Singh, (2022) performed a bibliometric analysis of global contributions to renewable energy research, USA leading with 1,200 papers with a total of 3,500 publications, followed by China with 900 and Germany with 600. They observed that 25% increase in contributions from emerging nations like India and Brazil.

Finally, Thompson & Evans, (2021) study say that 1,500 collaborative papers have an average citation of 14.0 among 300 authors. It indicates that collaborative research enhances citation impact, with a 50% higher citation rate for papers. Overall, the literature shows a dynamic development in NES.

Journal Details

Natural and Engineering Sciences (NES) have a wide range of research areas that have fundamental principles with practical engineering applications. This field discuss the challenges in environment, materials science, energy systems, and biological engineering. To protect and improve the natural environment the environmental engineering technologies are used and materials science is used to investigate the properties and applications of advanced materials, including nanomaterials and biomaterials, to improve their performance. Energy management is important because energy demand is increasing and energy efficiency also needs to be improved. Biological principles combined with industrial design are needed to address these challenges in terms of health, agriculture, and environmental protection. NES research focuses on global issues such as climate change, resource depletion and public health. Researchers can access different skills to integrate and develop comprehensive solutions. In summary, NES represents an important area when addressing challenges and provide a sustainable and innovative solutions.

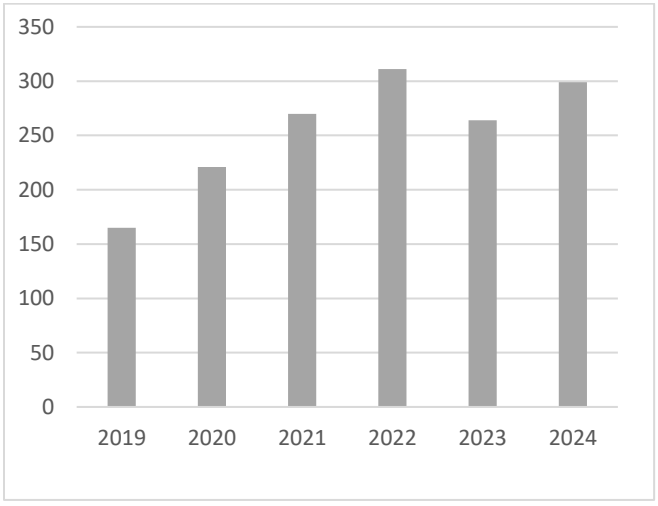

Figure 1. Citation details of NES journal Over 2019 to 2024

Based on the bibliometric data from Google Scholar illustrates the citation score analysis that has been performed on the journal over the duration of the prior six years. As a result of this, we are able to demonstrate that the journal has received the largest number of citations from the year 2022 in comparison to the other years. Table 1 and Figure 1 illustrates the citation details of NES journal over the period of 2019 to 2024.

Citation Details

Table 1. Citation details of NES journal

	All	Since 2019
Citations	1770	1534
h-index	19	17
i10-index	58	45

Table 2. Cited papers in 2024

References	Authors	Field
(Odilov et al., 2024)	Odilov, B. A., Madraimov, A., Yusupov, O. Y., Karimov, N. R., Alimova, R., Yakhshieva, Z. Z., & Akhunov, S. A.	Aquatic Ecosystem
(Kalinin et al., 2024)	Kalinin, O., Gonchar, V., Abliazova, N., Filipishyna, L., Onofriichuk, O., & Maltsev, M.	Economic Security
(Llopiz-Guerra et al., 2024)	Llopiz-Guerra, K., Ruiz, D. U., Hernandez, R. M., Mejia, V. L. V., Nunayalle, J. D. R. J., & Sanchez, K. R.	Environmental Education
(Praveenchandar et al., 2024)	Praveenchandar, J., Venkatesh, K., Mohanraj, B., Prasad, M., & Udayakumar, R.	Air Pollution
(Adolat et al., 2024)	Adolat, R., Feruza, A., Kalandar, S., Javlon, Y., Mashhura, A., Djalaliddin, A.	Waterbirds
(Okan et al., 2024)	Okan, A., & Christian, C.	Marine Waters

In 2024, several papers stood out in environmental research and technology. By (Odilov et al., 2024) and colleagues, using deep learning and the Internet of Things to monitor aquatic ecosystems for biodiversity conservation, achieving 57 citations and it is the most cited paper. Kalinin et al., (2024) and his team examined digital transformation can enhance economic security while promoting environmental sustainability, and it has 15 citations. Table 2 illustrates the citation details of NES journal in 2024. In 2024 research are mainly focused on the environment development.

Table 3. Top 10 cited papers in 2023

References	Authors	Field
(Camgözlü & Kutlu, 2023)	Camgözlü, Y., & Kutlu, Y.	Biology
(Ozyilmaz & Bayram, 2023)	Ozyilmaz, A. T., & Bayram, E. I.	Design
(Bozkurt, 2023)	Bozkurt, A.	Groundwater
(Nur et al., 2023)	Nur, G., Barış, B. N., Levent, B., Sazaklıoğlu, B. S., & Ak, E.	Design
(Acar & Yüksekdağ, 2023)	Acar, B. Ç., & Yüksekdağ, Z.	Biology
(Ozyilmaz, 2023)	Ozyilmaz, A. T.	Biotechnology
(Yağlıoğlu et al., 2023)	Yağlıoğlu, D., Doğdu, S. A., & Turan, C. (2023).	Fisheries
(Ergenler & Turan, 2023)	Ergenler, A., & Turan, F. (2023).	Fisheries
(Akyolet al., 2023)	Akyol, O., Çoker, T., Toprak, H. B., & Capapé, C. (2023).	Fisheries
(Çiftçi al., 2023)	Çiftçi, N., Cicik, B., & Ayas, D. (2023).	Fisheries

Table 3 illustrates the citation details of the top 10 cited paper in 2023, "Leaf Image Classification Based on Pre-trained Convolutional Neural Network Models" by (Camgözlü & Kutlu, 2023) with 48 citations. (Ozyilmaz & Bayram, 2023) study on designing a glucose-sensitive biosensor using zinc ferrite nanoparticles has 17 citations. (Bozkurt, 2023) investigation into groundwater zooplankton in Kilis Province with 12 citations, highlighting ecological concerns. The design of the BUSER transcutaneous electric nerve stimulator by (Nur et al., 2023) was cited 11 times. In 2023, maximum research conducted in the Fishery field. It shows that aquatic ecosystems growing in sustainable practices and biodiversity.

Table 4. Top 10 cited papers in 2022

References	Authors	Field
(Yağız al., 2023)	Yağız, E., Ozyilmaz, G., & Ozyilmaz, A. T.	Design
(Akbulut & Yalniz, 2022)	Akbulut, G., & Yalniz, Ş. Ç.	Biology
(Uyan, 2023)	Uyan, A.	Biology
(Özkan & Özkan, 2022)	Özkan, V., & Özkan, A.	Natural Science
(Gümüş et al., 2023)	Gümüş, A. E., Uyulan, Ç., & Guleken, Z.	Biology
(Turan, 2022)	Turan, C.	Fisheries
(Turan et al., 2023)	Turan, C., Ayas, D., Doğdu, S. A., & Ergenler, A.	Fisheries
(Kabasakal & Özbek, 2022)	Kabasakal, H., & Özbek, E. Ö. (2022).	Fisheries
(Ahmed et al., 2023)	Ahmed, I., Bano, A., & Siddique, S.	Marine biology and fish ecosystem
(Menniti & Vella, 2022)	Menniti, M. A., & Vella, A.	Fisheries

In 2022 the Optimization of Graphite-Mineral Oil Ratio with Response Surface Methodology in Glucose Oxidase Based Carbon Paste Electrode Design paper with the most citation count. Akbulut & Çek Yalniz, (2022), the impact of the COVID-19 pandemic on public aquariums in Turkey, in second highest citation count. Uyan, (2022) Study on the potential biomedical uses of lionfishes also have second highest citation count. Table 4 illustrates the citation details of NES journal in the year of 2022. In Fishery field, the maximum research has conducted in 2022 and it shows that aquatic ecosystem is in growing phase.

Table 5. Top 10 cited papers in 2021

References	Authors	Field
(Kutlu & Camgözlü, 2021)	Kutlu, Y., & Camgözlü, Y.	Biology
(Aydın et al., 2021)	Aydın, M., Ağaoğlu, A., & Barış, Ö.	Biotechnology
(Doğdu et al., 2021)	Doğdu, S. A., Turan, C., & Depci, T.	Biology
(Tülay Çağatay et al., 2021)	Tülay Çağatay, I., Özbaş, M., Yılmaz, H. E., & Ali, N.	Biology
(Yalman et al., 2021)	Yalman, E., Federer-Kovacs, G., & Depci, T.	Natural Science
(Veysi & Salari-Aliabadi, 2022)	Veysi, M. M., & Salari-Aliabadi, M. A.	Ecology
(Bayhan, 2023)	Bayhan, Y. K.	Fisheries
(Tharik et al., 2021)	Tharik, M., Saraswathi, S., & Arumugam, K.	Biology
(Ergüden, 2021)	Ergüden, S. A.	Freshwater biotechnology
(Yağlıoğlu & Turan, 2021)	Yağlıoğlu, D., & Turan, C.	Marine Biology

Table 5 illustrates the citation details of NES journal in 2021, (Kutlu & Camgözlü, 2021) study on detecting COVID-19 from X-ray images using deep convolutional neural networks, have 28 citations. Aydın et al., (2021) on azo dye decolorization using four psychrotolerant Bacillus species, with 4 citation count. Doğdu et al., (2021) study on the extraction and characterization of chitin and chitosan from the invasive crab Charybdis longicollis, also have 4 citations. In 2021, maximum research conducted in the field of Biology, to provide information about health.

Table 6. Top 10 cited papers in 2020

References	Authors	Field
(Lemenkova, 2020)	Lemenkova, P.	Geology
(Turan et al., 2020)	Turan, C., Gürlek, M., Dağhan, H., Demirhan, S. A., & Karan, S.	Biology
(Tohma & Kutlu, 2020)	Tohma, K., & Kutlu, Y.	Education
(Özdilek et al., 2020)	Özdilek, Ş. Y., Kırbeci, S., Yalçın, S., Altın, A., Uzatıcı, A., Tosunoğlu, M., ... & Sönmez, B.	Fisheries
(Tuncer et al., 2020)	Tuncer, S., Koç, H. T., & Erdoğan, Z.	Fisheries
(Karaca & Cihan, 2020)	Karaca, B., & Cihan, A. C.	Biology
(Akbora, 2020)	Akbora, H. D.	Fisheries
(Yilmaz & Demirhan, 2020)	Yilmaz, S., & Demirhan, S. A.	Fisheries
(Çetinkaya, 2020)	Çetinkaya, S.	Biology
(Aydalga et al., 2020)	Aydalga, S. C., Doğan, S., & Özkurt, A.	Education

Table 6 illustrates the citation details of NES journal in 2020. Lemenkova, (2020) study on GMT-based geological mapping has the highest citation and followed by Turan and his teams, study on First clinical case of the venomous Lessepsian migrant fish has the second highest citation count. In 2020 many research are focused on Fishery, it shows that aquatic ecosystem is in developing phase.

Conclusion

Our bibliometric analysis the most cited articles in natural and engineering sciences and offers both quantitative and qualitative evaluation. It also offers insights into scientific research, supporting the generation of evidence-based descriptions and visualizations of research output in the fields of natural sciences and technology. This analysis in natural science and engineering illustrate performance patterns and the impact of research. Overall, this Journal of Natural Engineering Sciences literature highlights the critical role of research in solving challenges. From 2021 to 2024, there was an increase in publications and citations and collaboration, especially in environmental science and biotechnology. In further research, the NES is an important area for researchers. This study provides valuable information for future research and funding strategies by visualizing citation networks. It highlights the importance of working together to develop sustainable solutions that meet the needs of communities.

Author Contributions

All Authors contributed equally.

Conflict of Interest

The authors declared that no conflict of interest.

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