
SCIENTOMETRIC VIEW OF IETE JOURNAL OF RESEARCH

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Abstract

In this study, the research productivity of the "IETE Journal of Research" from 2020 to 2024 is examined. Data taken from the Web of Science database served as the study's foundation. Analysing the scientific contributions of the publication under evaluation is the study's main goal. The number of articles, the distribution of articles by year, the authorship pattern, and the institutions and organisations that contribute the most to the journal are all covered in the analysis. According to the study, a total of 2004 research articles were published in the journal during the study period. The study's findings were visually represented using the VOSviewer tool.

Keywords: IETE Journal of Research, Author Collaboration, Publication Trends, Research Impact

Introduction

Scientometric analysis is a quantitative method used to evaluate research output, citation impact, and publication trends within a specific academic domain. It provides valuable insights into the growth of knowledge, influential contributors, and emerging research areas. The IETE Journal of Research, published by the Institution of Electronics and Telecommunication Engineers (IETE), is a well-regarded journal covering various fields such as electronics, telecommunications, computer science, and allied disciplines.

This study aims to conduct a scientometric analysis of the IETE Journal of Research, examining its publication trends, citation impact, authorship patterns, and research collaborations over a defined period. By analysing bibliometric indicators such as total publications, citations, h-index, most prolific authors, and highly cited papers, this study seeks to understand the journal's role in advancing scientific knowledge.

Furthermore, the analysis will explore the thematic evolution of research topics, geographical contributions, and collaboration networks, highlighting the journal's influence on the global research landscape. The findings of this study will help scholars, policymakers, and academic institutions gain deeper insights into the journal's impact and future research directions.

Review of Literature

Scientometric analysis has emerged as a crucial tool for evaluating the impact and evolution of research across various disciplines. Several studies have explored the significance of bibliometric techniques in assessing journal performance, author contributions, and research trends.

1. Scientometric Studies on Academic Journals

Previous research has extensively analysed the scientometric aspects of reputed journals in fields such as engineering, computer science, and telecommunications. For instance, **Gupta & Dhawan (2017)** examined the publication trends and citation impact of engineering journals indexed in Scopus, highlighting the role of collaboration and international contributions in shaping research productivity. Similarly, **Kumar et al. (2019)** conducted a bibliometric study of IEEE journals, focusing on citation patterns, co-authorship networks, and thematic distributions. These studies emphasize the importance of citation-based metrics in assessing journal influence.

2. Research Trends in Electronics and Telecommunications

The IETE Journal of Research has played a significant role in advancing knowledge in electronics, telecommunications, and allied domains. Several studies, such as **Sharma & Patel (2020)**, have analysed bibliometric patterns in telecommunications journals, revealing trends in emerging technologies like 5G, IoT, and artificial intelligence. These studies demonstrate how bibliometric analysis helps identify evolving research areas and high-impact contributions.

3. Authorship and Collaboration Patterns

Authorship analysis has been a key component of scientometric studies, shedding light on collaboration trends, institutional productivity, and research networks. **Mishra et al. (2018)** explored co-authorship structures in high-impact engineering journals, concluding that international collaborations significantly enhance citation impact. Similar findings by **Reddy & Verma (2021)** suggested that multi-authored papers tend to receive more citations, indicating the benefits of collaborative research efforts.

4. Scientometric Analyses of Indian Journals

Studies focusing on Indian journals, including those published by professional societies like IETE, have provided insights into national research productivity. **Singh & Kaur (2022)** conducted a bibliometric analysis of Indian engineering journals indexed in Web of Science, highlighting growth patterns, citation impact, and research funding trends. Their findings suggest that Indian journals have gained significant recognition in global research networks.

5. Need for Scientometric Analysis of the IETE Journal of Research

Despite the growing body of bibliometric research, limited studies have specifically analysed the IETE Journal of Research. Given its long-standing contributions to the fields of electronics and telecommunication engineering, a scientometric study is essential to understand its research impact, authorship patterns, and global reach. This study aims to bridge this gap by providing a comprehensive analysis of the journal's publication trends, citation impact, and collaboration networks over a defined period.

Scope and Limitations

Scope

This scientometric analysis focuses on evaluating the research output and impact of the **IETE Journal of Research** over a specified period. The study covers the following aspects:

- **Publication Trends:** Analysis of the number of articles published per year to identify growth patterns.
- **Authorship Patterns:** Examination of single vs. multi-author contributions, co-authorship networks, and institutional affiliations.
- **Research Themes:** Identification of key research areas and evolving trends based on keyword analysis.
- **Geographical Contributions:** Assessment of national and international collaboration patterns.
- **Collaborative Networks:** Mapping of author and institutional collaborations to understand research partnerships.

This study provides insights into the journal's contribution to scientific knowledge, identifies influential research areas, and highlights its impact on the global research landscape.

Limitations

Despite its comprehensive scope, this analysis has certain limitations:

- **Database Dependence:** The study relies on bibliometric data from selected sources (e.g., Scopus, Web of Science, or Google Scholar), which may not capture all publications and citations.
- **Time Frame Restriction:** The analysis is limited to a specific period, which may not reflect long-term trends.
- **Self-Citation Influence:** The presence of self-citations may impact citation metrics, leading to potential overestimation of research influence.
- **Lack of Full-Text Analysis:** The study primarily relies on metadata (titles, abstracts, keywords), which may limit the depth of thematic analysis.
- **Exclusion of Non-English Publications:** If non-English articles exist in the journal, they might be underrepresented in the analysis.
- **Dynamic Citation Trends:** Citation counts fluctuate over time, and findings may change as newer articles receive citations.

Despite these limitations, this study aims to provide a meaningful evaluation of the **IETE Journal of Research** and its impact on the scientific community.

Objectives

The primary objective of this scientometric analysis is to evaluate the research output, impact, and trends of the IETE Journal of Research over a defined period. The specific objectives of the study are:

1. To analyse publication trends – Examine the yearly growth of research articles published in the journal.
2. To study authorship patterns – Identify single vs. multi-author contributions, co-authorship trends, and institutional affiliations of contributing researchers.

3. To explore research themes – Analyse keywords and subject areas to determine prominent and emerging research topics covered in the journal.
4. To evaluate geographical contributions – Assess the distribution of contributions from different countries and institutions, identifying patterns in international collaboration.
5. To map collaboration networks – Investigate co-authorship and institutional collaboration networks to understand research partnerships.
6. To identify highly cited papers and influential authors – Highlight key publications and researchers who have significantly contributed to the journal's impact.

This study aims to provide valuable insights into the journal's role in advancing scientific knowledge and guiding future research directions.

Research Methodology

This scientometric analysis of the IETE Journal of Research follows a systematic approach using bibliometric techniques to evaluate research output, impact, and trends. The methodology includes the following steps:

1. Data Collection

- The study retrieves bibliographic data from Web of Science a reliable indexing database.
- The dataset includes details such as title, authors, affiliations, keywords, abstract, publication year, citations, and references.
- The time frame for analysis is 5 years (2020-2024), ensuring comprehensive coverage of research trends.

2. Data Processing and Cleaning

- Duplicate records and incomplete entries are identified and removed to ensure data accuracy.
- Standardization of author names and affiliations is performed to avoid inconsistencies in citation and collaboration analysis.
- Keywords are refined using text mining and natural language processing (NLP) techniques to extract meaningful research themes.

3. Scientometric Analysis

The study employs bibliometric indicators and visualization tools to analyse various aspects of the journal's impact:

- **Publication Trends:** The number of articles published annually is examined to determine growth patterns.
- **Citation Analysis:** Metrics such as **total citations, average citations per paper, h-index, and g-index** are calculated.
- **Authorship Patterns:** The study identifies **single vs. multi-author papers**, leading contributors, and institutional affiliations.
- **Keyword and Thematic Analysis:** The most frequently used keywords are analysed to track evolving research themes and trends.
- **Geographical and Institutional Contributions:** The distribution of publications across countries and institutions is assessed.

- **Collaboration Networks:** Co-authorship and institutional collaboration networks are visualized using tools
- **Highly Cited Papers and Influential Authors:** The most cited research papers and top contributors to the journal are highlighted.

4. Tools and Software Used

- Bibliometric Data Extraction: Web of Science
- Data Processing and Cleaning: Microsoft Excel, Bibexcel
- Visualization and Network Mapping: VOSviewer

5. Interpretation and Reporting

- The findings are interpreted in light of global research trends in electronics, telecommunications, and allied disciplines.
- A comparative analysis is conducted, if applicable, with other journals in the field.
- The study concludes with insights on the journal's impact, research strengths, and areas for improvement.

This methodology ensures a comprehensive and reliable scientometric evaluation of the IETE Journal of Research while addressing key research objectives.

Results And Discussions

Year wise Growth of Publication

Table 1: Year wise Growth of Publication

Year	No. of Articles	Cumulative	%	Cumulative %
2020	76	76	3.79	3.79
2021	97	173	4.84	8.63
2022	233	406	11.63	20.26
2023	846	1252	42.22	62.48
2024	752	2004	37.52	100.00
TOTAL	2004		100.00	

Table-1 shows the year-wise distribution of publication from the marked period of study. The publication output expanded from 76 in 2020 to 752 in the year 2024. Out of 2004 publications, 846 (42.22%) were maximum recorded during the year 2023, followed by 752 constituting (37.52%) of publications were published in the year 2024 and the minimum 76 (3.79%) of publications recorded in the year 2020.

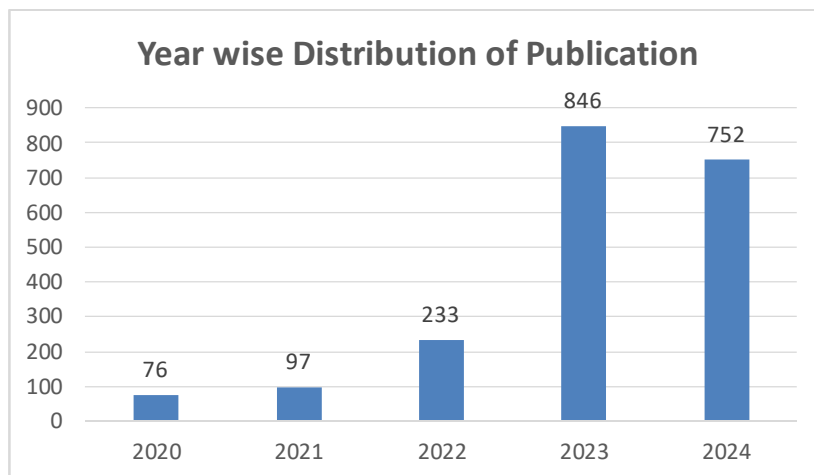


Figure 01

Annual Growth Rate of Publication

Table - 2: Annual Growth Rate of Publication

Year	No. of Articles	AGR
2020	76	0
2021	97	28
2022	233	140
2023	846	263
2024	752	-11
TOTAL	2004	

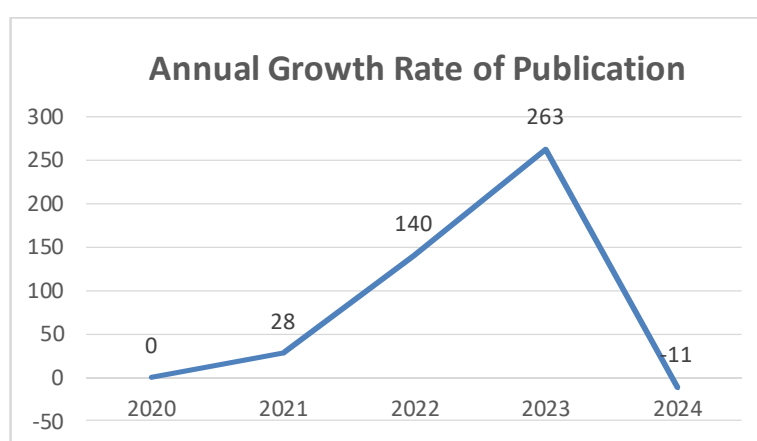


Figure 02

Table -2 and Figure 02 show that the Annual Growth Rate of publication during the period 2020 to 2024. It was found that the maximum of 263 AGR was recorded in the year 2023, followed by 140 AGR during the year 2022 and the minimum -11 AGR recorded in 2024. The

annual growth rate (AGR) is calculated on the formula given by (Kumar and Kaliyaperumal, 2015) and mentioned as below:

$$AGR = (End\ Value - First\ Value) / First\ Value \times 100$$

Relative Growth Rate and Doubling Time of Publication

Table - 3: Relative Growth Rate and Doubling Time of Publication

Year	No. of Articles	W1	W2	RGR (W2-W1)	DT (0.693/RGR)
2020	76	4.33	4.57	0.24	2.84
2021	97	4.57	5.45	0.88	0.79
2022	233	5.45	6.74	1.29	0.54
2023	846	6.74	6.62	-0.12	-5.88
2024	752	6.62	7.60	0.98	0.71
TOTAL	2004	7.60			

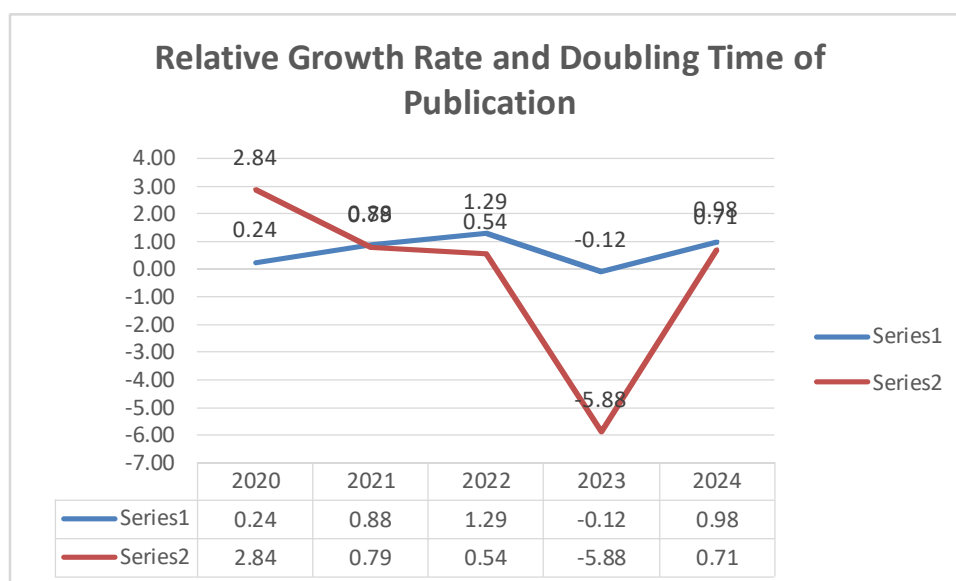


Figure 03

Output of the last five years reveals that the Relative Growth Rate (RGR) and Doubling Time (DT) of the publications during the research period. It was found that the relative growth rate (RGR) from 1.29 in the year 2022 and decreased to -0.12 in the year 2023. At the same time, the doubling time of the publications highest increased to 2.84 in the year 2020 and lowest to - 5.88 in the year 2023.

The Relative Growth Rate and the Doubling Time for publications are calculated by the following equations given by Mahapatra (1985) as follows:

Relative Growth Rate:

$$RGR = W2 - W1 / T2 - T1$$

$$Doubling\ Time: DT = 0.693 / RGR$$

Document wise Distribution of Publication:

Table - 4: Document wise Distribution of Publication:

Type of Documents	No. of Articles	Cumulative	%	Cumulative %
Article	1745	1745	87.08	87.08
Article; Early Access	106	1851	5.29	92.37
Review	73	1924	3.64	96.01
Retraction	37	1961	1.85	97.85
Editorial Material	25	1986	1.25	99.10
Article; Retracted Publication	11	1997	0.55	99.65
Correction	4	2001	0.20	99.85
Correction; Early Access	1	2002	0.05	99.90
Retraction; Early Access	1	2003	0.05	99.95
Review; Early Access	1	2004	0.05	100.00
TOTAL	2004		100.00	

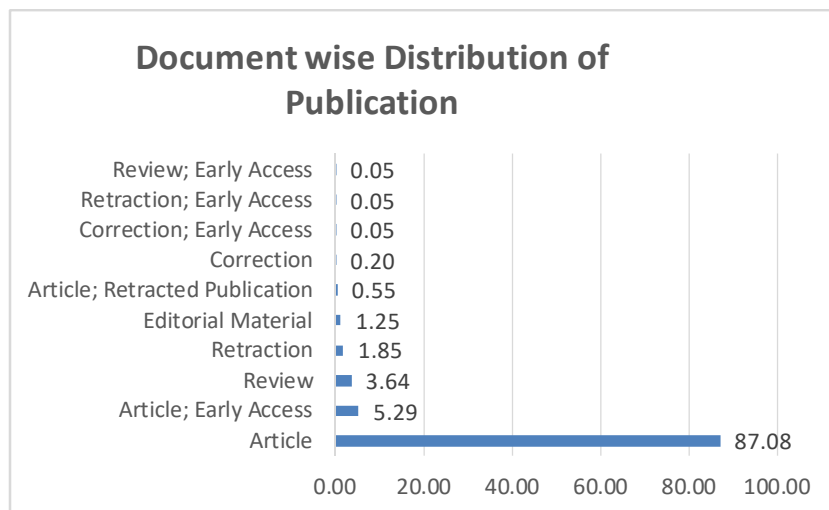


Figure 04

Table-4 & Figure-4 illustrate the document-wise distribution of publications during the period of 05 years i.e, from 2020 – 2024. The maximum 1745 (87.08%) of publications were Article type of documents, which is followed by Article; Early Access and Review type of documents with 106 (5.29%) of Article; Early Access and 73 (3.64%) of Review type of documents. The remaining data like Article; Retracted Publication, Correction, Correction; Early Access, Retraction; Early Access, and Review; Early Access which comes next of document wise distribution of publications as shown in the table-4.

Most Prolific Authors Contribution:

Table – 5: Top 10 Most Prolific Authors

S. No.	Authors	No. of Articles	%
1	Kumar A	57	27.80
2	Koul SK	28	13.66
3	Kumar N	24	11.71
4	Kumar R	18	8.78
5	Kumar M	15	7.32
6	Kumar S	15	7.32
7	Singh S	14	6.83
8	Kumar K	12	5.85
9	Singh AK	11	5.37
10	Kumar D	11	5.37
		205	100.00

Table –5 below reveals the topmost 10 prolific authors for their contributions. It is found that Kumar A contributed the maximum number of articles with 57 (27.80%) publications. The next highest number of publications was published by Kaul S K, Kumar N, and Kumar R with 28 (13.66%), 24 (11.71%), and 18 (8.78%) articles respectively.

Keywords Most Preferred for Publication

Table – 6: Most 10 Keywords Preferred for Publication

S. No.	Keywords	No. of Articles	%
1	DESIGN	199	27.41
2	ALGORITHM	113	15.56
3	SYSTEM	86	11.85
4	OPTIMIZATION	63	8.68
5	MODEL	56	7.71
6	CLASSIFICATION	54	7.44
7	PERFORMANCE	50	6.89
8	SYSTEMS	45	6.20
9	IMPLEMENTATION	31	4.27
10	SCHEME	29	3.99
TOTAL		726	100

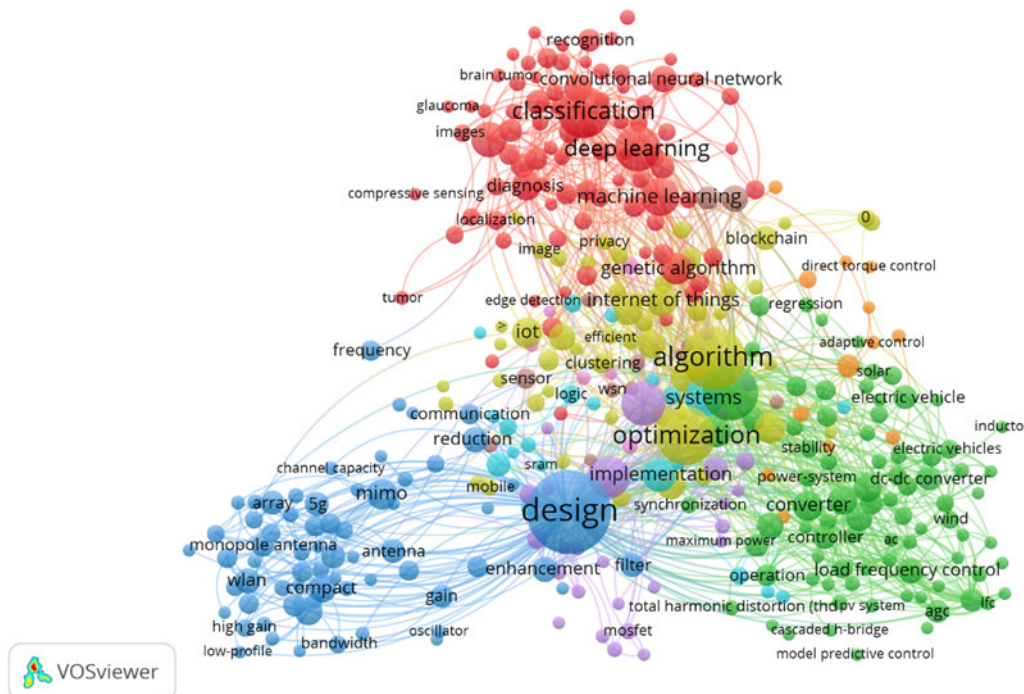


Figure 06

Findings and Conclusion

A total of 2004 contributions during the period of 05 years from 2020-2024 have been identified and analysed the various factors such as Document wise Distribution, Year wise Growth, Relative Growth Rate, Doubling Time, Most Prolific Authors, and Most Preferred Keywords for Publication which has been found output for the above period.

The results of the scientometric view show that among 2004 publications, The maximum number of articles were published during the year 2023 with 846 publications (42.22 %) and the minimum number of publications in the year 2020 with 76 publications (3.79 %). Also, the Annual Growth Rate shows that a maximum of 263 AGR was recorded in the year 2023.

It is found that the Relative Growth Rate from 1.29 in the year 2022 and decreased to -0.12 in the year 2023. At the same time, the doubling time of the publications highest increased to 2.84 in the year 2020 and lowest to -5.88 in the year 2023. Among the most prolific authors, Kumar A with 57 publications.

According to the analysis and evaluation of the research output, it is concluded that for the past 05 years 2004 articles have been published which is too much compared to other publication outputs. So, in the future more research to be needed to explore the publication.

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