Mapping the Research Landscape and Impact of a Leading Private University in Eastern India

[1]Kabita Behera, [2]Abhipsa Sahu, [3]Dr. Namita Mahapatra

[1]Library Assistant, Kalinga Institute of Industrial Technology (KIIT) Deemed to be University Bhubaneswar, Khordha, Odisha-751024, India

[2]Library Assistant, Indian Institute of Science Education and Research (IISER), Berhampur, Odisha-760003, India

[3]Dy.Librarian & Faculty, Department of Library & Information Science, Kalinga Institute of Industrial Technology(KIIT) Deemed to be University Bhubaneswar, Khordha,Odisha-751024,India

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ABSTRACT

This study conducts an exhaustive bibliometric evaluation to map the research output of KIIT Deemed to be University during 2015 to 2024 as listed in the Scopus database and aims to investigate the institute's research growth and impact. A total of 13,356 records have been retrieved and studied for the research productivity, citation impact, collaboration patterns, citation inequality, etc. The year-wise analysis of publications shows a notable growth in research productivity with average AGR 22.52. and the CAGR is 21.61% over the period. The article is the most preferred document type, and multi-authored papers (99.18%) significantly dominated the single-authored papers. The study also reveals the highly productive authors by h-index and total citations; the top 10 highly cited papers and their citation inequality using Gini coefficient formula; and extensive collaboration across countries, with national collaboration rates higher than international collaboration. The citation inequality shows high inequality means a few top cited papers received very high citations. Open-access papers get more visibility than closed-access papers; the 813 journals contributing 2131 papers had impact factors in the range of 5 to 10. The co-occurrence of keywords analysis in VOSviewer highlights terms such as machine learning, deep structured learning, cloud computing, and artificial intelligence, which indicate a strong research focus on current trends and technologies. This paper provides a clear overview of the research output of KIIT, with a systematic approach that will have practical implications for researchers and academicians in enhancing research quality and promoting collaboration.

Keywords: Research Productivity; Research Collaboration; Visibility; Impact Factor; Bibliometric; Open Access

INTRODUCTION

Research is very crucial for an academic institution for its long-term credibility and development. Every academician needs to focus on continuous learning, adopting new technologies, and curriculum development, along with prioritizing their research endeavors. Research activity enhances a researcher's reputation in their specific domain, resulting in academic success and societal progress. Citations, research productivity, and collaboration are important qualitative measures for the global ranking of researchers and their affiliated universities, which support long-term academic planning and the introduction of new programs or research centers. Growth in research and development enhances institutions' reputations and attracts students and faculty from different corners of the country and abroad. Research and exploration, knowledge and involvement, integration and creativity, learning and instruction, and outreach and service are the core elements that make a university a top-level institution. An university's "brand" in the domestic and global market place is shaped by its research strength, which influences everything from luring in new investments to retaining faculty and students (Rosowsky, 2022).

In the current era of research-driven development, collaboration is playing a crucial role in solving critical research issues, advancing cultural awareness, enriching research potency, securing research preeminence and knowledge creation, sharing scientific and technological resources, etc. (Bermeo Andrade et al., 2009). As specialization improves general productive efficiency, academic collaborations can enhance the effectiveness of research (Aldieriet al., 2018). National and international collaboration involves cross-institutional and cross-country teams, where they can conduct research & experiments by sharing their ideas, interests, and other relevant information. The results of the research enhance its impact and promote the research, as well as the institutions involved, internationally. Researchers from diverse backgrounds, including cross-national & cross-institutional, engage in a process that can generate a nourishing environment for solving problems and inspiring ideas that would not have been otherwise possible (Yao, 2021). The present study aims to focus on measuring research productivity and quality, thematic trends, citation impact, the importance of subject-wise mapping, emerging research domains, collaboration patterns with national and international organizations, and co-authorship at KIIT Deemed to be University.

The back ground of KIIT Deemed to be University

The Kalinga Institute of Industrial Technology (KIIT) Deemed-to-be University, situated in Bhubaneswar, Odisha, has been a prominent educational hub for higher studies at both national and international levels. KIIT offers professional education (engineering, medical sciences, management, law, biotechnology, etc.) to students from over India and more than 70 countries, also students pursuing undergraduate, postgraduate, and PhD courses are more than 30000 at the university. It has many accreditations and associations from renowned national and international bodies such as NAAC, NBA, AICTE, UGC, the Medical Council of India (MCI), the Bar Council of India (BCI), the Indian Nursing Council (INC), the Accreditation Board for Engineering and Technology (ABET), USA, and the Institution of Engineering and Technology (IET),UK, because of its quality research, innovation, and publications and citations (https://kiit.ac.in/).

In the Times Higher Education (THE) 2026 rating, KIIT University is ranked 184th in Asia and 5th best in India amid government and private institutions and in the 501-600th globally cohort (Teaching: 43, Research Environment: 20.9, Research Quality: 63.5, Industry: 60.6, International Outlook: 45.6). KIIT performs top in India in three categories, such as Industry Integration, International Outlook, and Social Commitment (SDG). In the Impact ranking for SDG 2025, KIIT secured the best rank of 101-200 for SDG4 (quality education), SDG10 (reduce inequalities), SDG16 (peace, justice, and robust organizations),

and SDG 17 (cooperation for the goals). (https://www.timeshighereducation.com/world-university-rankings/kiit-university). It tops in India (Rank 1) for promoting peace & equality. In the QS World University Rankings 2026, the university is ranked in the global range of 1001-1200, 834th in the QS Sustainability ranking , and 294th in Asia in the QS Asian University Rankings (https://www.topuniversities.com/university-rankings). Research is crucial for KIIT to achieve world-class status by creating new knowledge and fostering innovation. Research in emerging fields increases the quality of graduate and doctoral programs offered by KIIT. These instances highlight the need for academics and institutions to focus on high-quality research growth to increase the citation impact. Faculty of the universities must beaware of the ways and means for enhancing research. Through trend analysis, institutions can be aware of their research strengths and weaknesses.

Research initiatives by KIIT University

KIIT University provides faculty members with essential research infrastructure in terms of laboratories, centers, research grants, etc. There are 50+ laboratories,175+centers of excellence, and more than 100 global collaborations at KIIT. The Hydraulic Machine, Internal Combustion Engine, Machine Kinematics & Dynamics Lab, and Meteorology and Instrument Lab are some of the laboratories. The OSDD Centre at Biotechnology, KIIT Technology Business Incubator, Smart Materials, and Quantum Technology are some of the centers of excellence. Moreover, KIIT DU emphasizes visiting international scholars, funding of open-access publications, internal seedfunding, student innovation, and organizing faculty development programs. There are other cells, such as the Technology Transfer and IP Cell (for application/filing of patents) and the Centre of Innovation and Research. National and international seminars and conferences, workshops on scientific writing, and authors' workshops have been organized throughout the year. Around 25 faculty members of KIIT DU ranked among the

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top 2% of scientists worldwide, based on Elsevier/Stanford metrics. Collectively these initiatives facilitate the faculty and research scholars with the best research support system, and cultivating an ecosystem that fosters institutional research productivity.

Objectives

1. Finding out the distribution of publications among different document types.
2. Analyzing the growth pattern from 2015 to 2024.
3. Examiningthe different authorshippatterns andtheir corresponding impact.
4. Evaluation of citation trends during 2015 to 2024.
5. Mapping the subject-wise distribution of research output.
6. Evaluating the open access publication trend and its impact.
7. Identifying the highly productive authors.
8. Ascertaining the top sources of publications, journals with high productivity, and journals with high impact.
9. Identifying national and international collaboration patterns.
10. Identifying the emerging research areas of the institution.
11. Finding out the top 10 highly cited papers and its citation inequality using Gini coefficient
12. Making a comparative analysis of the publication profile from 2015 to 2024 against the pilot study carried out during the period 2000-2013.

MATERIALS AND METHODS

Fig. 01 illustrates the methodological framework adopted for the bibliometric analysis of the research productivity of Kalinga Institute of Industrial Technology (KIIT) University during the period 2015–2024. The bibliographic data, comprising 13,356 publications, were retrieved from the Scopus database in 11 August 2025. The data collection process involved searching the university's name (Kalinga Institute of Industrial Technology)using the *Search Organization* option in Scopus, followed by the application of relevant filters such as English language , year range 2015-2024, and affiliation was filtered to ensure the accuracy and relevance of the retrieved records. The study adopts a quantitative research approach with a descriptive research design based on the bibliometric method. The collected data were analyzed in terms of research growth, citation impact, authorship patterns, and research collaboration. VOSviewer, a bibliometric visualization and mapping tool, was employed to analyze and visualize the publication and collaboration networks, while Microsoft Excel was used for data organization, statistical analysis, tabulation, and presentation. Furthermore, the Gini coefficient was applied to measure the degree of citation inequality among the ten most highly cited publications. These methodological procedures provided a systematic framework for evaluating the research productivity, scholarly impact, and collaborative research patterns of KIIT University.

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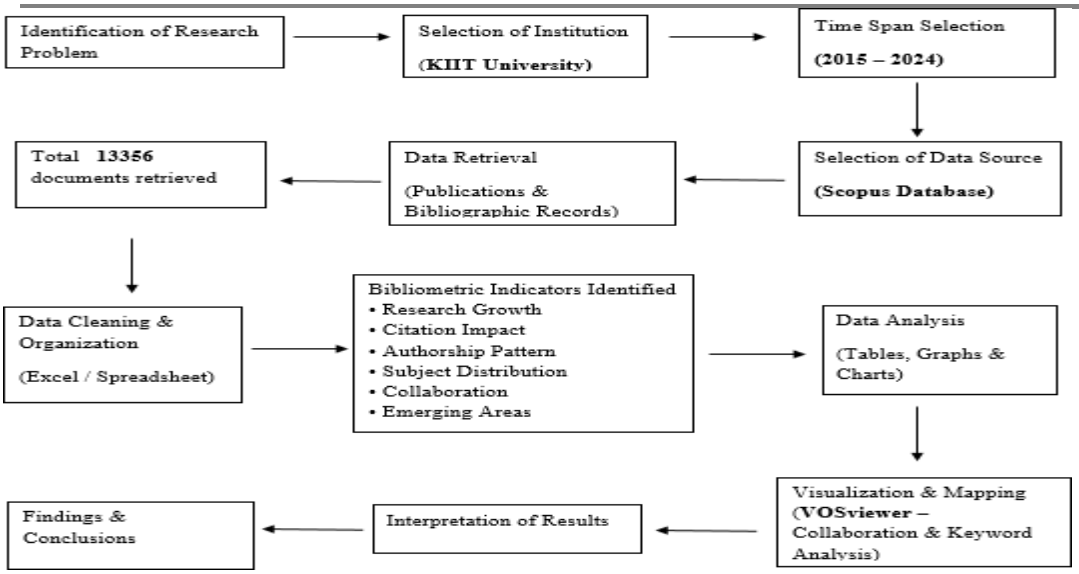


Fig1: Workflow of the Study

REVIEW OF LITERATURE

Verma& Shukla (2019) executed a Scientometric evaluation of research trends on 9,496 research papers in the domain of digital literacy, published between 2008 and2017. Scopus database was used to retrieve data on the top ten countries with the greatest number of publications on digital literacy. After analyzing various Scientometric parameter, the result found, the highest number of documents published was in 2016 (12.99%), the highest annual rate of growth was in 2010 (25.679%), the maximum RGR was 0.795 in 2009, the doubling time was 5.824 in 2017, and the maximum record of CAGR was in 2009 (10.212%). The most productive author was Wolf, M.S., with 65 contributions. The USA was the top contributor with 5770 publications. Jabeen et al. (2015) employed a bibliometric method to analyze the research growth and trends of 18,371 research articles from 40 core journals contributed by library scholars, published between 2003 and 2012. The study concluded that the average self-citation rate was 38.56% and the annual growth rate reached roughly 11.37% in 2009. China's outstanding contribution to collaborative publications was emphasized. The use of bibliometrics to assess publication rates in a field, subject coverage, dominant production forms, levels of international collaboration, and specific publication genres over time is also covered.

Halaweh (2021) did a scientometric study, where he aimed to use the Research Productivity Index (RPI) by measuring universities' research productivity. To assess the potential of RPI, the researcher conducted a case study as an example on the total number of publications produced by AI Falah University in the United Arab Emirates in the years 2017, 2018, and 2019. As a result, only 58 articles have been published by 17 researchers in the past three years. RPI is a tool that university supervisors and other policy-makers can use to evaluate and rank their schools' research productivity. Tyagi (2024) performed a bibliometric study to unveil the research outputs of premier IIMs of India during 2010-2021 using the Scopus database. As a result, the greatest number of publications (32.20%) was produced by IIM-Ahmedabad in collaboration with 125 nations worldwide. Although they showed a favorable trend, the expected values of the cooperative rating (2.64), collaborative coefficient (0.51), and modified cooperative coefficient (0.51) show that the collaborative pattern varies over time. IIMA stands at the forefront in publishing 1,416 documents and gaining the greatest citations (13,636). In the term of international collaboration with IIMs of India, the top five countries are USA, UK, Canada, Germany, and China. Mishra etal. (2022) conducted a bibliometric study to find the growth and advancement of research productivity of Jadavpur University during ten years (2011 to 2020). The research outputs reveal that most publications are by multiple authors, that 2018 had the greatest number of publications, and that engineering disciplines published the largest number of papers. The United States, the United Kingdom, Germany, and Canada are the top countries collaborating with Jadavpur University.

Kanagasundari (2014) supervised the research output of 5 Tamil Nadu State Universities through a study using bibliometrics and scientometrics for the period 2000-2014. The study reveals 25,349 authors contributed 4568

publications; among these, the highest number of papers (1999) was recorded in 2013, whereas the least number of papers was in 2000-2006. Anna University was at the top among the five universities. Dardas et al. (2023) have presented scholarly productivity in the Middle Eastern and Arab region over a 20-year period (2003-2022) through a comprehensive bibliometric analysis. The findings revealed that Iran had the highest number of publications. In terms of citations, average citations per documents, and field-weighted citation impact, the Arab region had lower performance compared to North America and the European Union. Physical Science (60.5%) was the most prevalent subject. There were the strongest international collaboration levels (40.5%) and the lowest national collaboration (24.4%). Dhorali et al. (2025) examined scientometric indicators of top NIRF-ranked universities in Delhi in 2023 for mapping the research productivity. They assessed 5 years of research outputs (2019-2023) of seven institutions and collected the data from the Scopus database for analysis. As a result, Delhi Technological University had the highest number of publications with a CAGR (26.02%) but found the lowest citations per paper. Jamia Millia Islamia leads in citations per paper (13.31) and h-index (111) but is in fourth position according to growth rate. Delhi Technological University leads in the collaborative work (98%). Jamia Hamdard published more papers (36.53%) in open access mode. The highest number of collaborative works (91.07%) was compared to solo work (8.93%) which demonstrates how interdisciplinary research methods or cross-disciplinary partnerships are becoming more prevalent. Aldieri et al. (2018) looked into how internal and external research collaborations affected academic institutions' scientific performance. The study retrieved data from the Scopus database for five European countries: France, Germany, the UK, Italy, and Russia. They find that a university's performance is affected by more external collaboration. Across European research systems, empirical data generally indicate a favorable but context-dependent link between academic success and collaboration.

Data Analysis

Distribution of publications across document types

Researchers publish their research findings in diverse document types, such as articles, books, book chapters, conference proceedings, reviews, short surveys, short communications, notes, etc. These document types play a crucial role in exhibiting the research out come in conformity with the targeted audience. The total number of 13,356 publications has been distributed across the different document types as shown in Fig. 2. Articles (research articles & review articles) are the mostpreferreddocument format, with 7144 papers contributing 53% of the total publications, followed by conference papers at 33% (4413) and book chapters at 9% (1228). A total of 69 books were published during this period, accounting for 1% of total productivity. Document types such as data papers, editorials, short surveys, errata, letters, and notes were categorized under ‘Others,’ which constituted 4% (502) of the total publications. This analysis reveals that faculty members primarily disseminate their intellectual output in the form of articles.

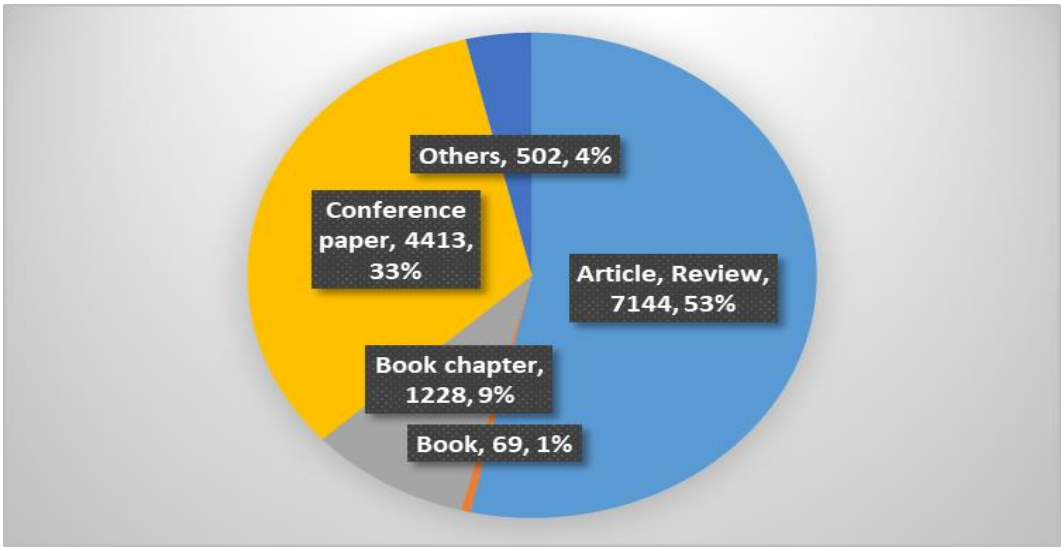


Fig-2: Distribution of Publications among document types

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Analyzing Growth Pattern of Research Productivity during 2015-2024

There is a range of indicators to analyze the growth pattern over a period of time. Here, the authors have applied annual growth rate (AGR), and compound annual growth rate (CAGR) to evaluatethe growth trend of KIIT University. The formulae of AGR and CAGR are as follows:

$$AGR=(\frac{End\ value-First\ value}{First\ Value}) \times 100$$

$$CAGR= [(Ending\ Value/\ Beginning\ Value)^{1/n} -1] \times 100$$

E.g. First value- Nos. of publication in 2015- 432

End value- Nos. of publication in 2016- 547

n- number of year =2016-2015=1

$AGR=\{(547-432)/432\}^{1/1}\times100=(115/432) \times100=26.62\%$

$CAGR=\{(547/432)^{1/1}-1\}\times100=26.62\%$

CAGR over nine years from 2015 to 2024 = $\{(2514/432)^{1/9}-1\} \times100=21.61\%$

Table1-Year-wise Growth of Publications

Years	**TP**	**TC**	**Cumulative Papers**	**AGR (%)**	**CAGR**
2015	432	8605	432		**21.61%**
2016	547	11212	979	26.62	
2017	709	11940	1688	29.62	
2018	1057	16321	2745	49.08	
2019	1054	18360	3799	-0.28	
2020	1195	55527	4994	13.38	
2021	1714	26111	6708	43.43	
2022	1945	20705	8653	13.48	
2023	2189	13057	10842	12.54	
2024	2514	6558	13356	14.85	
Grand Total	13356	188396		**22.52**	

The retrieved data shows that the total number of publications of KIIT University has shown fast growth from 432 in 2015 to 2514 in 2024, which is 482% (4.82 times) in ten years. However, the AGR is found to be fluctuating; it reached its highest in 2018 (49.08%), followed by 43.43% in 2021. A decreasing trend (-0.28%) was observed from 2018 to 2019. The CAGR was found to be 21.61%, i.e. the publication grows at a compounded rate of 21.61% over the 9 years from 2015 to 2024.

Authorship pattern and its corresponding impact

A total of 11,256 authors from KIIT University and its collaborating institutions have contributed 13,356

publications that have received 1,88,396 citations. Out of the total publications, the number of single-authored papers is 324 with 1538 citations, accounting for 2.42% and 0.81% of the total papers and total citations, respectively. multi-authored/collaborative papers contributed the major share of 99.18% (13,032) of publications. The number of single-authored papers is found to be fluctuating, while there is a steady increase in the number of collaborative documents. A substantial number of papers are a result of collaboration. In 2021, the maximum number of single-authored papers, 60 (3.5%), was published, and the greatest number of multi-authored papers, 2481 (98.68%), was published in 2024. The total citations received by both categories were highest in 2020, i.e., 347 (0.62%) for SAPs and 55,180 (99.37%) for MAPs. The average citation per paper for both categories is 4.75 and 14.34, respectively. This indicates that collaborative research attracts more citations.

Table2-Authorship pattern

Year	SAPs (%)	Citations of SAPs	MAPs (%)	Citations of MAPs
2015	14(3.24%)	59(0.68%)	418(96.75%)	8546(99.31%)
2016	24(4.38%)	158(1.40%)	523(95.61%)	11054(98.59%)
2017	15(2.11%)	177(1.48%)	694(97.88%)	11763(98.51%)
2018	27(2.55%)	83(0.50%)	1030(97.44%)	16238(99.49%)
2019	45(4.26%)	311(1.69%)	1009(95.73%)	18049(98.30%
2020	40(3.34%)	347(0.62%)	1155(96.65%)	55180(99.37%)
2021	60(3.5%)	169(0.64%)	1654(96.49%)	25942(99.35%)
2022	32(1.64%)	109(0.52%)	1913(98.35%)	20596(99.47%)
2023	34(1.55%)	85(0.65%)	2155(98.44%)	12972(99.34%)
2024	33(1.31%)	40(0.60%)	2481(98.68%)	6518(99.37%)
Total	324	1538	13032	186858
CPP-4.75			CPP-14.34	

Citation Trend

The evaluation of citation distribution patterns (Table 3) for KIIT University reveals that 12,032 (74%) of the papers received at least 1 citation, and 26% of the publications remained uncited. The highest share of publications (50%) received 1to10 citations and contributed 13.17% of the total citations. The 2nd-highest number of 11.39% of papers received citations in the range of 11 to 20, which constituted 11% of the total citations. Only 160 papers that received high citations ranging between 101 to 12732, accumulated 74,828 citations, accounting for 40% of the total citations. This shows that a small number of significant papers received high citations and high academic visibility, while the majority of papers have average visibility.

Table3-Distributionofcitations

Year	Zero	1 to 10	11to20	21 to50	51 to100	More than100
2015	56	211	58	70	30	7
2016	77	239	85	91	37	18

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2017	86	350	124	100	35	14
2018	149	508	172	156	56	16
2019	161	503	153	166	46	25
2020	204	584	159	149	59	40
2021	362	886	191	187	60	28
2022	410	1078	233	162	53	9
2023	635	1207	196	122	28	1
2024	1324	1052	95	35	6	2
Total	3464	6618	1466	1238	410	160
Total Citation	NA	24825	21463	39210	28071	74822

Subject-wise distribution of research output

The subject-wise distribution of research outputs indicates that engineering tops with the greatest number of papers (5539), followed by Computer Science (4992), and Medicine (1977). Other subjects with more than 1000 publications are Mathematics (1716), Materials Science (1634), Physics & Astronomy (1503), Energy (1276), Biochemistry, Genetics & Molecular Biology (1251), and Decision Sciences (1050). However, the number of papers on Nursing, Dentistry, Health professions, Psychology, and Social Sciences are relatively very low; this indicates that there is a great need for more strategic policy to increase productivity in these fields.



Fig-3: Subject-wise distribution of research output

Open Access Publication Trends

Open-access publications that help in knowledge discovery and dissemination lead to increased visibility and citation impact, contributing towards the growth of research and development. Table 4 demonstrates the evaluation of OAPs over the last 10 years. The total number of OAPs is 3335, which constituted 24.97% of the total productivity, accumulating 30.46% (57,380) of the total citations. The share of open-access papers

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corresponding to the total publications in an individual year varies from 20.31% in 2016 to 28.41% in 2023. The number of closed-access papers is increasing steadily, except in 2019. The citation share of the open access publications is significantly high in all the years, which slightly declined during 2019-2021. The closed-access papers constituted 75% of the total papers that varied between71.59% (in 2023) to 79.69% (in 2017). The highest number of citations, 43,546 (78.42%), was received in 2020. The citation per paper for OAP is 17.21, which is comparatively higher than that of the closed-access paper (13.07).

Table4:Open access publication with citations

Year	OAPs	Citationsof OAPs	CAPs	Citations of CAPs
2015	97(22.45%)	3762(43.72%)	335(77.55%)	4843(56.28%)
2016	114(20.84%)	4480 (39.95%)	433(79.16%)	6732 (60.04%)
2017	144(20.31%)	3862 (32.35%)	565(79.69%)	8078 (67.65%)
2018	259(24.50%)	6052 (37.08%)	798(75.50%)	10269 (62.92%)
2019	271(25.71%)	5322 (28.99%)	783(74.29%)	13038 (71.01%)
2020	291(24.35%)	11981 (21.58%)	904(75.65%)	43546 (78.42%)
2021	406(23.69%)	7027 (26.91%)	1308(76.31%)	19084 (73.08%)
2022	497(25.55%)	7522 (36.33%)	1448(74.45%)	13183 (63.67%)
2023	622(28.41%)	4846 (37.11%)	1567(71.59%)	8211 (62.89%)
2024	634(25.22%)	2526 (38.52%)	1880(74.78%)	4032 (61.48%)
Total	3335(24.97%)	57380(30.46%)	10021(75.03%)	131016(69.54%)
	CPP-17.21		CPP-13.07	

Highly productive authors & their contribution

Among the total authors, the top 15 authors have contributed 18% (2412 papers) of the total publications that received 13% of the total citations. Five authors are from the School of Computer Engineering, 3 from Mechanical Engineering, 2 from the Schoolof Computer Applications and Electronics Engineering, and 1 each from Biotechnology, Electrical Engineering and Management. Considering the number of publications, Sushruta Mishra is the most prolific author, Mrutyunjay Suar has achieved the maximun h-index of 45, and S.C. Satapathy received the highest 5330 citationsforhis196papers. The cited rate for the publicationsofauthorsvariedbetween 60.99% to 93.71%, It is highest for M. Suar (93.71%). The share of cited papers was more than 90% for Ramanuj Kumar and A.K. Sahoo. The average citation per paper ranged from 2.10 to 28.71 (M. Suar). The citation per paper was the 2nd highest (27.19) for S.C. Satapathy. Similarly,these two authors had received the highest citations of 5330 and 5025, respectively.

Table5-Top fifteen authors

Sl. No.	Author	No of publicatio n	TPC	TC	CPP	h index	HC	CitedRate
1	Sushruta Mishra, ComputerEngineering	206	172	3698	17.95	38	110	83.50

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2	Suresh Chandra Satapathy,Computer Engineering	196	140	5330	27.19	38	431	71.43
3	Prasanta K. Pattnaik, ComputerEngineering	187	124	911	4.87	15	51	66.31
4	Mahendra K. Gourisaria, Computer Engineering	186	145	1827	9.82	22	370	77.96
5	MrutyunjaySuar, Biotechnology	175	164	5025	28.71	45	179	93.71
6	Rabindra K. Barik, Computer Applications	174	145	2044	11.75	25	158	83.33
7	Bhargav Appasani, Electronics Engineering	157	133	2386	15.20	28	108	84.71
8	SudhansuS. Patra, Computer Applications	154	110	626	4.06	13	27	71.43
9	Sarat C. Swain, Electrical Engineering	152	122	974	6.41	18	56	80.26
10	AshokK. Sahoo, Mechanical Engineering	151	137	2528	16.74	30	124	90.73
11	Ipsita Satpathy, Management	141	86	296	2.10	8	25	60.99
12	Manjusha Pandey, Computer Engineering	140	113	1866	13.33	17	445	80.71
13	Ramanuj Kumar, Mechanical Engineering	134	123	2202	16.43	27	89	91.79
14	Purna Chandra Mishra, Mechanical Engineering	134	117	2414	18.01	30	113	87.31
15	Sudhakar Sahu, Electronics Engineering	125	92	879	7.03	16	53	73.60

HC-Highest citation achieved in a single paper

Co-authorship Analysis

The co-authorship analysis among the authors reveals that,1056 authors are such that they share 2 documents in common; 350 authors shared 3 documents, 167 authors shared 4 publications. Fig. 4 displays the co-authorship network among 93 authors sharing 5 documents.

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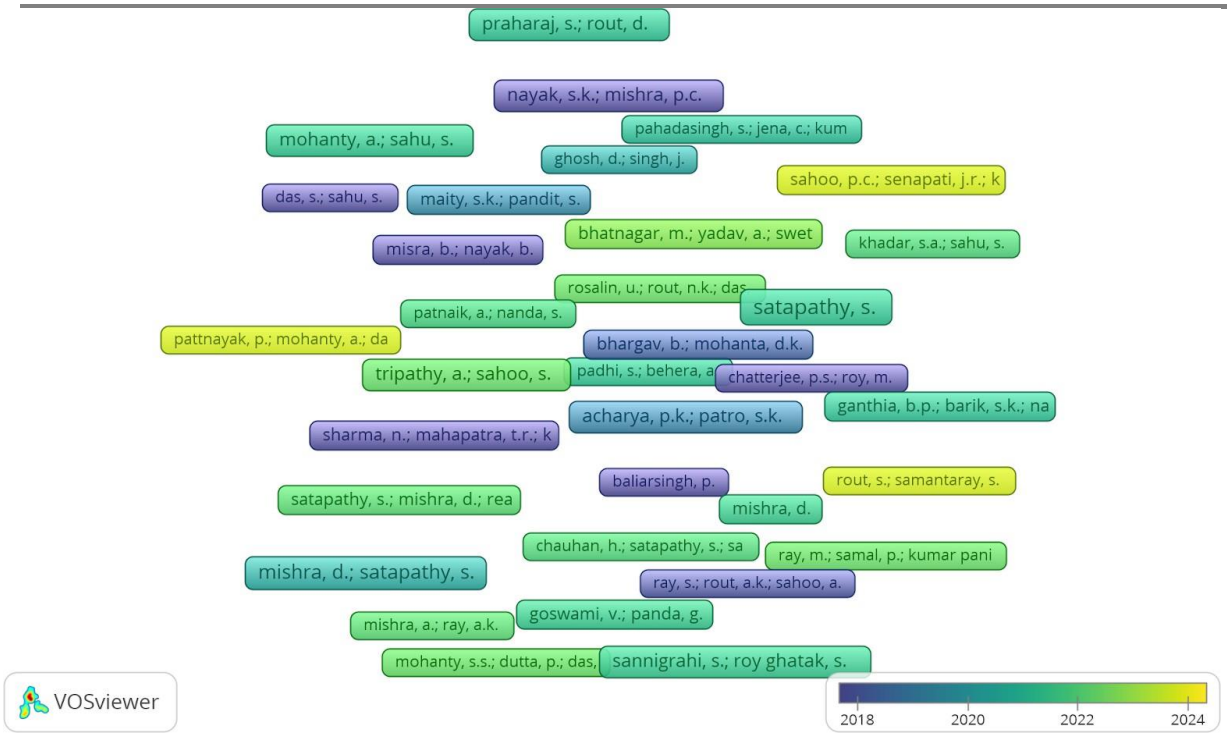


Fig 4-Co-authorship among 93 authors with 5 documents

1. Prominent Sources and top productive journals

Out of the total sources, 5 conference proceedings and 5 book series emerged as the most productive sources. They constituted 15% of the total publications. 7 sources are from Springer publisher, 1 each from IOP Publ. Limited, American Institute of Physics (AIP), and Elsevier. “Materials Today Proceedings” is the most prominent source of publication with 361 papers and its citescore is 6.6.

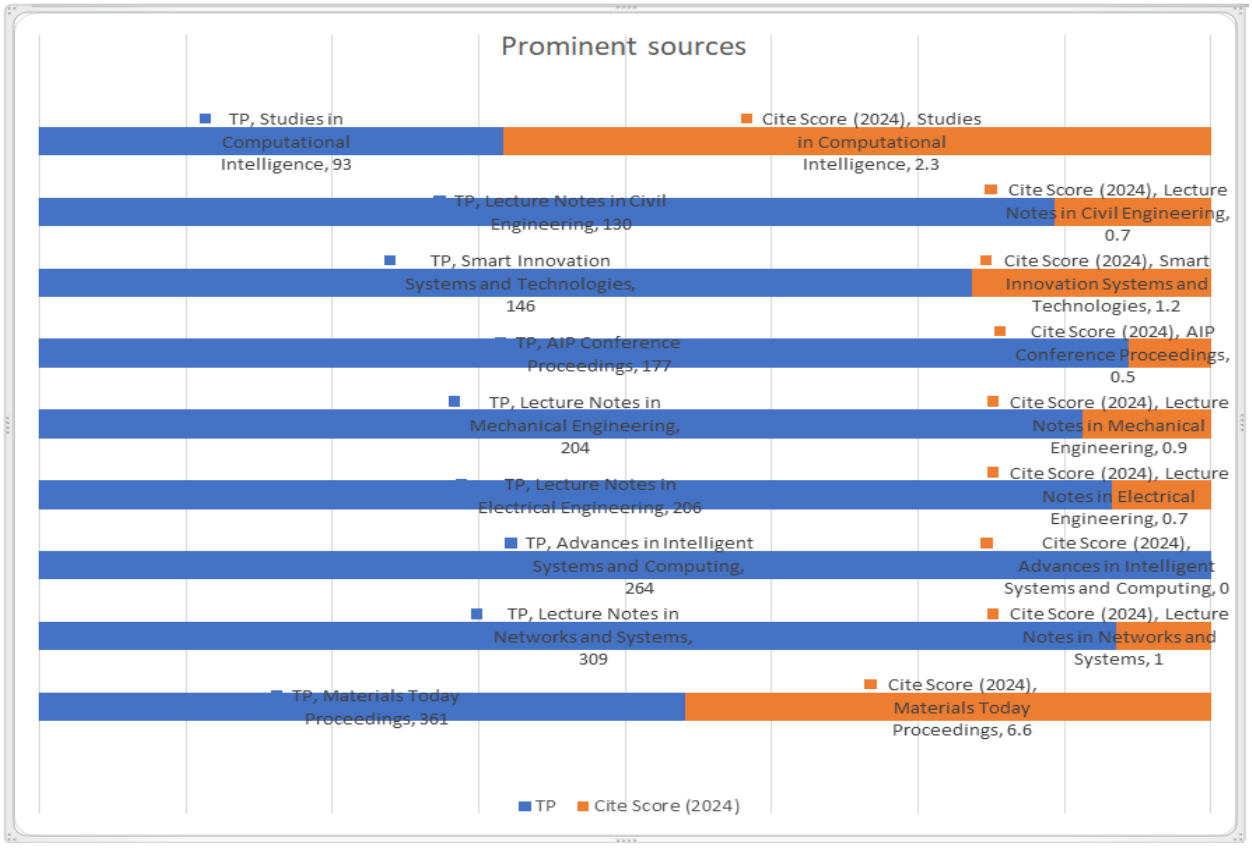


Fig 5- Prominent sources

A total of 7144 articles and reviews were published across 2511 journals. Out of this, 1778 journals have an impact factor in the range of 0.1 to 78.50. The New England Journal of Medicine has the highest impact factor of 78.50 and the highest JCI 23.08, followed by Nature Medicine with IF 50 & JCI 11.30, and IEEE Communications Surveys and Tutorials with IF 46.7 & JCI 10.2. Table 7 revealed that 265 journals have an impact factor of less than 1. The number of journals that have an IF higher than 2 and less than or equal to 5 is 385. The highest number of 813 journals (45.65%, n=1781) have an impact factor of more than 5 and less than or equal to 10. A total of 2131 papers were published in these 813 journals. 732 journals with 2514 publications have no impact factor. Journal citation indicator (JCI) is a normalized citation metric that reveals the performance of a journal in its domain among its peers. JCI value 1 indicates that the performance of the journal is as per world average (JCI=1→world average performance, JCI>1→above world average, JCI<1→ below world average). A total of3553publications were published across 1346 journals have JCI of less than 1, and 2484 publications were published in 715 journals with zero JCI.

Table6-Metrics-wise analysis of journals

Sl. No	**Range of IF 2024**	**No. of Journals**	**No. of Article Published**	**Range of JCI 2024**	**No. of Journals**	**No. of Article Published**
1	IF≤ 1	265	833	JCI ≤ 1	1346	3553
2	1< IF ≤ 2	385	867	1< JCI ≤ 2	373	946
3	2< IF ≤ 5	813	2131	2< JCI ≤ 5	69	151
6	5< IF ≤10	247	666	5< JCI ≤ 10	5	7
11	10< IF	69	133	10< JCI	3	3
27	No IF	732	2514	No JCI	715	2484
Total		**2511**	**7144**		**2511**	7144
Journals with IF		**1779**				
Journals with JCI		**1796**				

As per the number of publications concerned, 2511 journals have published 7144 articles and reviews, ranging from 1 to 183 publications. A total of 1385 (55%) journals contributed 1paper each, 443 journals published 2 papers, and 218 journals contributed 3 publications each.The top ten journals published 617 papers ranging from 35 to 183. Six out of10 journals do not have an impact factor, as demonstrated in Table-7.

Table 7—Top 10 Productive Journals

Sl. No.	**Journal Name**	**Frequency**	**IF (2024)**	**JCI (2024)**
1	Journal of Pharmacy and Bioallied Sciences	183	0.9	0.22
2	Journal of Contemporary Dental Practice	78	NA	NA
3	International Journal of Innovative Technology and Exploring Engineering	62	NA	NA
4	Scientific Reports	53	3.9	1.07

5	International Journal of Mechanical Engineering and Technology	46	NA	NA
6	IEEE Access	45	3.6	0.82
7	Materials Today: Proceedings	41	NA	NA
8	Journal of Advanced Research in Dynamical and Control Systems	38	NA	NA
9	Journal of Materials Science: Materials in Electronics	36	NA	NA
10	Multimedia Tools and Applications	35	3	0.83

Geographical Distributions-Contribution of Countries & Institutions- KIIT University collaborated with the authors from 111countries across all the continents. The highest number of 43 countries from Asia

(including India) produced 1904 publications with 55,779 citations, followed by 29 countries from Europe with 1176 papers that achieved 43,174 citations, 23 countries from Africa contributed 327 papers with 11,687 citations. 6 countries each from North America and South America, and 4 from Australia collaborated with KIIT University. The USA, Saudi Arabia,

and the UK are the leading countries with 653, 362, and 261 papers respectively. Fig.6 shows the co-authorship network between 62 countries, each of which has a minimum of 10 publications.

They are distributed into 10 clusters. India, which forms the center of collaboration, has the biggest node and is in cluster 3,along with Australia, Finland, and Ireland, with a total link strength of 4398.

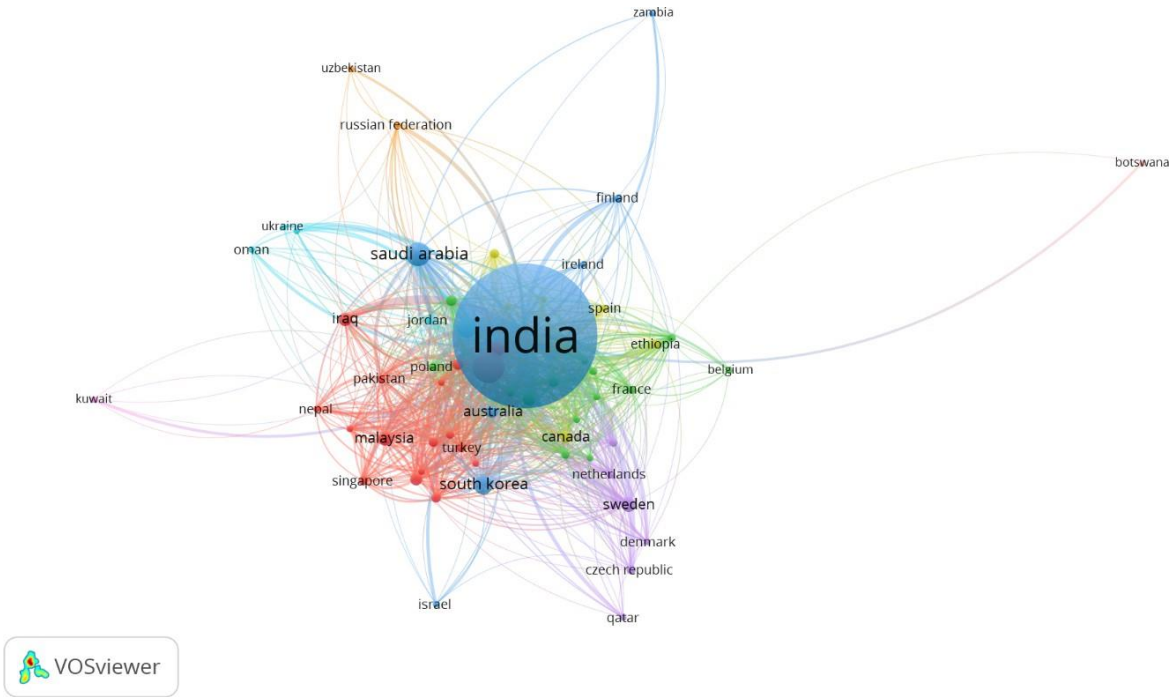


Fig 6- Co-authorship network among 62 countries with 10 publications

Top collaborative institutions

A total of 13,556 papers were contributed by 9844 institutions. The analysis of these papers revealed that 3252 organizations contributed 2 papers each, 1843 organizations with 3 papers, 1251 organizations with 4 papers,

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889 organizations contributed 5 papers each, and a maximum of 50 institutions have contributed a minimum of 10 publications. The top 30 institutions have contributed 29.44% of the total productivity, range of papers between 71 to 462. Among the top 30,the only international organization placed is"King Saud University,"which ranked 29th with

75 papers. Other foreign institutions that contributed significantly were King Abdulaziz University, Saudi Arabia, and Uppsala University, Sweden. Strengthening inter-institutional and cross-national research partnerships contributes to increased citation impact and wider research outreach, according to the evaluation of national and international collaboration patterns.

Table8-Top 30 Collaborative Organizations

Sl.No.	Affiliation	TP	Sl. No.	Affiliation	TP
1	Siksha O Anusandhan DeemedtobeUniversity	462	16	Indian Institute of Technology, Indian School of Mines, Dhanbad	102
2	National Institute of TechnologyRourkela	427	17	UtkalUniversity	90
3	VSSUniversityof Technology,Burla	225	18	Silicon Institute of Technology, Bhubaneswar	90
4	Indian Institute of Technology Kharagpur	169	19	All India Institute of MedicalSciences,New Delhi	89
5	C.V.RamanGlobal University	162	20	FakirMohanUniversity	89
6	InstituteofLifeSciences India	137	21	NationalInstituteof Technology Raipur	87
7	IndianCouncilofMedical Research	135	22	AllIndiaInstituteof Medical Sciences, Bhubaneswar	86
8	CenturionUniversityof Technology and Management	135	23	Birla Institute of Technology,Mesra	85
9	ManipalAcademyof Higher Education	133	24	AmityUniversity	82
10	Indian Institute of TechnologyBhubaneswar	130	25	KLDeemedtobe University	81
11	National Institute of Technology, Durgapur	127	26	Institute of Minerals and MaterialsTechnologyIndia	76
12	ICMR-RegionalMedical Research Centre, Bhubaneswar	117	27	GovernmentCollegeof Engineering, Keonjhar	76
13	International Institute of InformationTechnology, Bhubaneswar	111	28	VelloreInstituteof Technology	75
14	RegionalCentrefor Biotechnology	106	29	KingSaudUniversity	75
15	JadavpurUniversity	103	30	ChristUniversity	71

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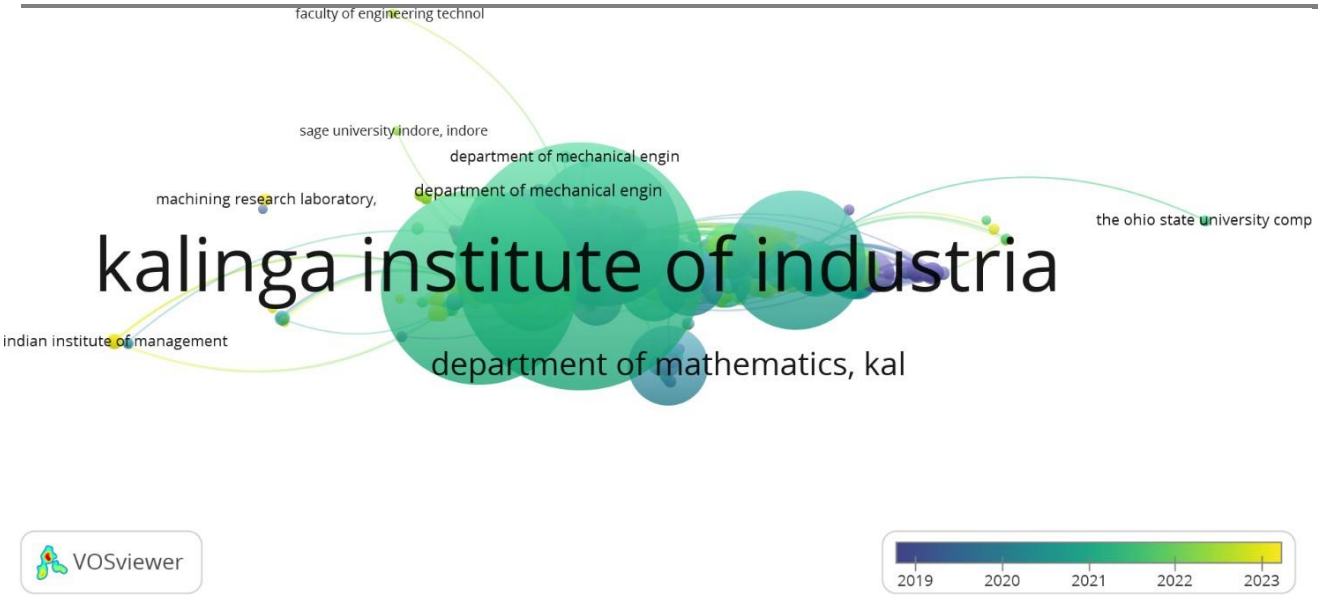


Fig. 7—Co-authorship network among 93 organizations with a minimum of 50 documents

Co-occurrence of significant keywords-

Three types of keywords can be derived from Scopus Indexing database, author keywords, indexed keywords, and system-generated keywords based on the frequency of occurrence of words in the text. In the set of 13,356 papers, a total of 32,209 author keywords were used. Out of these 7551 keywords occurred twice, 3809 keywords appeared thrice, and so on. 139 keywords are such that they occurred a minimum of 100 times each and they formed three thematic clusters (Fig. 8). Cluster 1 (Red) has 78 items with 733 occurence, total link 101 and total link strength is 2673 followed by cluster 2 (Green) with 36 items that occurred 840 times, with 104 collaborative links and total link strength of 6016; Cluster 3 (Blue) with 25 items with 757 occurrences, 100 collaborative links and TLS 5218. Some of the most significant keywords are machine learning (544 times, TLS-520), deep learning(352 times, TLS-380), Covid 19 (207 times, TLS-97), cloud computing (176 times,TLS-114), classification (168 times, TLS-203), optimization (152 times, TLS-52), artificial intelligence (136 times, TLS-130), etc. It is evident that mostoftheresearchworksarecentered on the latest technologies; besides this, COVID-19 is also found to be one of the prominent topics.

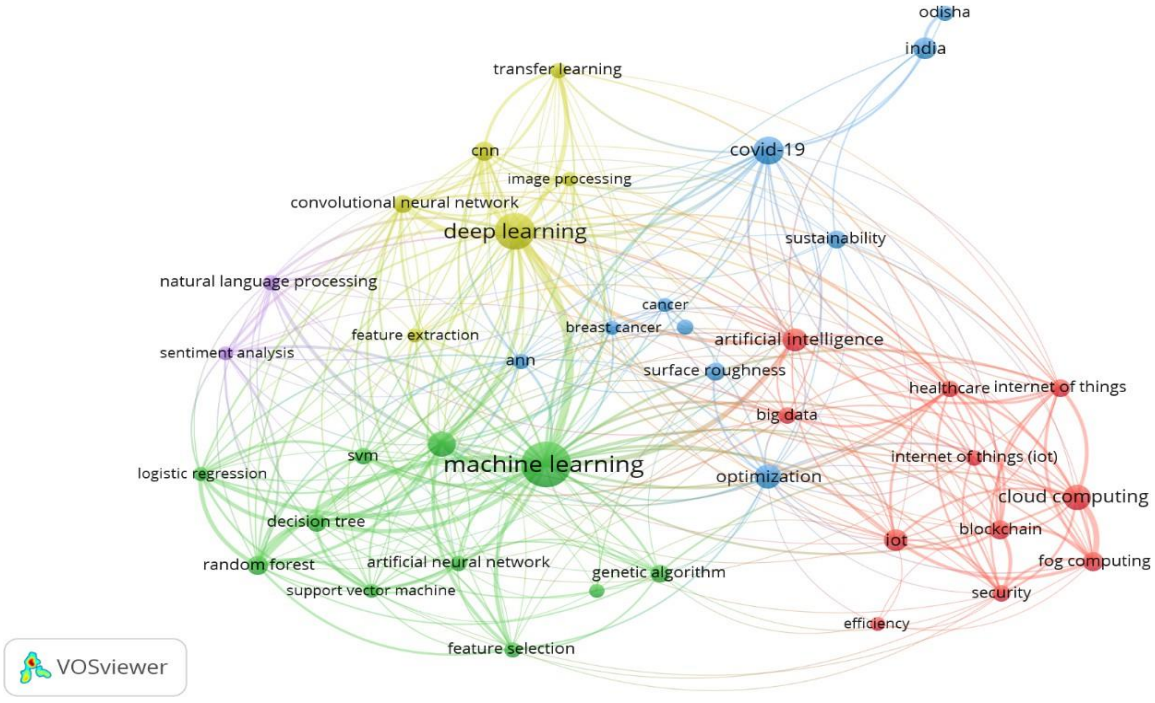


Fig.8-Co-occurrence networks of 139 significant keywords

Highly cited top tenpapers-

Table 9 listed the top ten papers that received the highest citations published between 2015 to 2024. Two papers were published in each of the years 2015 and 2019. The total citations are 8731, with a minimum of 873 citations.

Table9-Top ten highly cited papers

Sl. No.	Authors	Total Authors	Title	Year	Sourcetitle	Volume	Issue	Cited by
1	Chanakya N Kundu, Biotechnology	2292	Guidelines for the use and interpretationof assays for monitoring autophagy (4th edition)1	2021	Autophagy	17	1	2012
2	Tripathy,SurajKumar,School of Applied Sciences,	5	Green synthesis of metallic nanoparticlesvia biological entities	2015	Materials	8	11	1091
3	Hassija, V., Computer Engineering	10	Interpreting Black-Box Models: A Review on Explainable Artificial Intelligence	2024	Cognitive Computation	16	1	963
4	Adhya, TapanKumar,School of Biotechnology	21	Global change pressures on soilsfromland use and management	2016	Global Change Biology	22	3	813
5	Yogesh Kumar, Department of Gastroenterology and Hepatology, Kalinga Institute of Medical Sciences	112	Acute-on-chronic liver failure: consensus recommendation s of the Asian Pacific association for the study of the liver (APASL): an update	2019	Hepatology International	13	4	761
6	Taunk, K.; De,S.;Verma,S.; Swetapadma, A.; Computer Engineering	4	Abriefreviewof nearest neighbor algorithm for learning and classification	2019				732
7	Singh, U.P., Electronics Engineering	3	Copper indium galliumselenide basedsolar cells-A review	2017	Energy and Environmental Science	10	6	669
8	Sahoo, T.R.	2	Adsorption processes for the removal of contaminants fromwastewater: The perspective role of nanomaterials and nanotechnology	2020				585
9	Bahadure, NileshBhaskarrao; Ray, ArunKumar, Electronics	3	Image Analysis for MRI Based Brain Tumor Detection and Feature ExtractionUsing BiologicallyInspired	2017	International Journal of Biomedical Imaging	2017		563

	Engineering		BWT and SVM					
10	Parhi, Pankaj Kumar,School of Applied Sciences	5	Waste Printed CircuitBoards recycling: An extensive assessment of current status	2015	Journal of Cleaner Production	94		542

Out of the160 highly cited papers each with a minimum of 100 citations, the top10 was listed in table 9.These papers were published across 7 distinguished publishers that included 6 reviews,

2 articles, 1 book chapter, and 1 conference paper. One review and one book chapter were published by Elsevier, 1 review and 1 article were published inSpringer,similarly,1reviewand 1 article were published in Wiley. MDPI, Taylor Francis, and IEEE each had one review article, and one conference chapter was published by IEEE. All the papers were collaborative papers; the number of authors per paper ranges from 3 to 2292. It was observed that the paper on Medical Sciences had a comparatively larger number of collaborators. The content analysis of these papers sheds light on the high-quality research by the faculty with societal impact. Thesubjects are Medicine, Technology, Environmental Sc, and Biology have highly cited papers. The 1st paper (Kundu, 2021) presented a set of rules for researchers to choose and interpret methods to examine autophagy and related processes. The second paper (Tripathy, 2015) studied how nano biotechnology, created by the merging between nanotechnology and biology, incorporated the use of biological entities; moreover, it gave an summary of current trends in integrating nanoparticles via biological entities and their capable applications, and so on.

Table 10-Citation in equality of highly cited papers using Gini coefficient:

Sl. No	**Title**	**Rank (i)**	**Citation (x) (low to high)**	**Weighted value (i*xi)**
1	Waste Printed Circuit Boards recycling: An extensive assessment of current status	1	542	542
2	Image Analysis for MRI Based Brain Tumor Detection and Feature Extraction Using Biologically Inspired BWT and SVM	2	563	1126
3	Adsorption processes for the removal of contaminants from wastewater: The perspective role of nanomaterials and nanotechnology	3	585	1755
4	Copper indium gallium selenide based solar cells- A review	4	669	2676
5	A brief review of nearest neighbor algorithm for learning and classification	5	732	3660
6	Acute-on-chroni c liver failure: consensus recommendation s of the Asian Pacific association for the study of the liver (APASL): an update	6	761	4566
7	Global change pressures on soils from land use and management	7	813	5691
8	Interpreting Black-Box Models: A Review on Explainable Artificial Intelligence	8	963	7704
9	Green synthesis of metallic nanoparticlesvia biological	9	1091	9819

	entities			
10	Guidelines for the use and interpretationof assays for monitoring autophagy (4th edition)1	10	2012	20120
Total			8,731	57,659

Here, i-position or rank of articles

n- number of articles = 10

xi-citations (in ascending order)

i*xi –weighted value used to measure inequality

Ginni= [2 ∑(ixi) / n∑xi] – [n+1/n]

G= (2*57659 / 10*8731)- (11/10)

G= 1.3208-1.1

G= 0.221

Ginni Value Range

0- Perfect equality

0 to 1- Increasing degree of inequality as the value approaches 1

1- Perfect inequality

So, here the result found that Ginni Coefficient indicates a relatively low degree of citation inequality among the ten selected publications.

The Gini coefficient was employed to measure the degree of citation inequality among the ten most highly cited publications of KIIT University. The ten selected publications received a total of 8,731 citations, with individual citation counts ranging from 542 to 2,012. The calculated Gini coefficient was 0.221, indicating a relatively low degree of citation inequality among these highly cited publications. This suggests that citation distribution within the selected group is comparatively less unequal, although variations in citation counts are evident. The publication titled "Guidelines for the use and interpretation of assays for monitoring autophagy (4th edition)" received the highest number of citations (2,012), followed by "Green synthesis of metallic nanoparticles via biological entities" with 1,091 citations. In contrast, "Waste Printed Circuit Boards recycling: An extensive assessment of current status" received the lowest number of citations (542). Overall, the findings indicate that although certain publications have achieved comparatively higher citation impact, citations are not extremely concentrated in a single publication within the selected group.

Comparative analysis between the findings of the current study against the 2013 study-

A comparison was made between the productivity status of KIIT University in 2015-2024 against the earlier pilot study carried out by Rautaray & et.al. in 2013. The previous study analyzed the research productivity of KIIT for the time period 2000 to February 2013. The results of the study revealed that the total papers during the study was 361, with an average of 28 papers per year. At present, greater emphasis is given to research and publication metrics for any institute, KIIT University is no exception to that. With the advent of access to increased number of e resources and funding support from the University, this study carries it's relevance to make a qualitative comparison between the previous study. In the initial year of 2015, the total publication was 432, which grew steadily to 2514 in 2024. Similarly ,the number of citations increased which reached at highest (55,527)in2020.The average growth rate was found to be 22%. The citation per paper for the current study (14.10) is 8-fold higher than that of the impact during 2000 to 2013, i.e., 1.73. The share of single-authored papers, which was 5.26% in the previous study, has declined to 2.43% revealing the increased collaboration among the researchers. The number of countries also increased from 28 to 111 during the 12-year period (2013 to 2024). Veena Goswami, who emerged as the top author in the earlier 2013 study, ranked 10th among the top female authors but was not placed among the top 15 contributors in the current study. However, M. Suar, who ranked 6th in the earlier study, is placed at 5th, maintaining a consistency in terms of publication productivity.

The USA is established as the all-time top collaborative partner of KIIT DU. Among the subject-wise distribution of papers, the strengths and weaknesses remain the same. The larger number of papers contributed in Computer Science and Engineering, whereas, Dentistry, and Psychology are some of the areas where the contribution is very low. The citation inequality of highly cited papers was also shown in the current paper.

RESULTS

The present study used the Scopus database to obtain data on KIIT University publications to determine the research outputs, current research trends, and scholarly impact over the period 2015-2024.In the resulting statistics, the analysis of document types shows that the researchers of KIIT preferred mostly research articles, followed by conference proceedings and other document types for their publication, which indicates a strong inclination towards peer-reviewed scholarly disseminations. The year-wise growth analysis shows a significant increase in research productivity from 2015-2024 except for the year from 2018 to 2019, where a decreasing trend (-0.28%) was observed. The CAGR was found to be 21.61%, i.e. the publication grows at a compounded rate of 21.61% over the 9 years from 2015 to 2024. In the authorship patterns, the result reveals thatout of 13356 publications, the single-author paper (SAP) contributed 2.42% and the multi-authored paper (MAP) contributed 99.18%. It shows a clear dominance of multi-author publications, highlighting a growing culture of collaboration. MAP receives a higher citation impact compared to SAP. The subject-wise distribution reveals that Engineering discipline tops with the highest number of papers (n=5539). Additionally, the study shows that in comparison to closed-access publications, open-access publications have a positive impact on citation and research visibility. Among the highly productive authors, the study highlights that Sushruta Mishra(Computer Engineering)is the most profilic author,

Mrutyunjay Suar (Biotechnology) has the highest h-index (45), and S.C. Satpathy (Computer Engineering) received the highest citations (5330). The highest number of articles (2514) was published in the journal that has no IF, and the lowest number of articles (133) was published in the journal with IF>10, which indicates that low IF publishing dominates over high IFpublishing. KIIT University demonstrated extensive global collaboration, partnering with 42 Asian countries, 29 European countries, 23 African countries, 6 North & South American countries, and 4 Australian countries. In leading national collaborative institutions, Siksha O Anusandhan ranked top with 462 publications. Moreover, the collaborative landscape is largely driven by national partnerships rather than international ones. The publication on medical sciences was found to have a relatively larger collaboration. The keyword analysis shows that the most frequently used terms are "machine learning," "deep learning," "cloud computing," and "artificial intelligence," which enhances clarity, feasibility, and guidance for further research or content creation. This study made an analysis of the top 10 highly cited papers, in which the result shows that a total of 160 works earned at least 100 citations, and together they have produced 74828 citations, or 40% of all citations. In the citation inequality of highly cited papers, Gini coefficient value shows a relatively low degree of citation inequality among the ten selected publications. The content analysis of these publications revealed that the authors from Medicine, Technology, Environmental sc., and Biotechnology have excellent research with societal and sociological implications. The current assessment of KIIT University's research productivity may therefore be encouraging for scholars/faculty/researchers who prefer transparency and accountability, and policy makers may find it useful to evaluate and enhance research management at KIIT University.

DISCUSSION

This demonstrates the substantial development of research productivity and scholarly impact of KIIT Deemed to be University within the scope of the present study. The increasing number of publications illustrates the development of the research environment at KIIT, its interdisciplinary character, and importance of international collaboration. The domination of highly cited publications and international collaboration reveals the contribution of KIIT scientists into scientific communication. The demonstrated patterns indicate the essential role of strategic research programs, research facilities, and academic policy in the improvement of research visibility. This study contributes to the better understanding of research administration and activities of academic libraries.

CONCLUSIONS

The goal of this study is to analyze the published research done by faculty of Kalinga Institute of Industrial Technology Deemed to be University and the impact of the research. This study utilizes bibliometrics to assess research publication, research citation, and research collaboration. This data supports the development of research plans and policies. The results identify new opportunities and research new policies and practices to strengthen research. This study also provides a benchmark for institutional performance of research, measuring the level of research done. This study also provides bibliometrics as an example of a research planning, organizational tool that examines the research environments. The model used in this study is applicable to other institutions of higher education and will provide research performance measures. This study helps to establish sustainable academic development and research management in higher education.

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