International Journal of Research in Library Science (IJRLS)

ISSN: 2455-104X

DOI: 10.26761/IJRLS.11.3.2025.1951

Volume 11, Issue 3 (July-September) 2025, Page: 355-366, Paper ID: IJRLS-1951

Bibliometric and Altmetric Analysis of the Research Output of IIT Hyderabad

Kush Sibbu[1]; Ramesh B. Kuri[2]

Research Scholar, Dept. of Library & Information Science, Rani Channamma University, Belagavi, Karnataka, India and Assistant Librarian, Indian Institute of Technology Goa, Ponda, Goa, India[1]; Assistant Professor, Rani Channamma University, Belagavi, Karnataka, India[2];

kush@iitgoa.ac.in; rameshkuri.rcu@gmail.com

ABSTRACT

This study aims to analyze the research productivity of IIT Hyderabad through bibliometric and altmetric indicators. Bibliometrics is a traditional metric that measures scholarly impact, while altmetrics are the social attention that supplements the research impact beyond academia. The dataset was extracted from Scopus, a comprehensive bibliographic and citation database for research analysis. Using Scopus, 7,555 publication details of IIT Hyderabad were collected from 2013 to 2022. Moreover, Altmetric Explorer was used to harvest altmetrics from various platforms, utilizing 7,246 DOIs retrieved from Scopus. This study has employed a descriptive research design, adopting a quantitative method. A detailed analysis was conducted using MS Excel, R (Biblioshiny), VOSviewer, and Jamovi, involving the tabulation and visualization of the data. The findings showcased a substantial increase in publications and citation impact. Moreover, it was also observed that its digital footprints had grown across various online platforms. A significant role was played by highly productive authors and influential papers in enhancing the institute's reputation at both national and international levels. The collaboration networks, visualized through co-authorship maps, highlight India's central role and international collaborations, which have enhanced the research quality and global visibility of the institute. The convergence of altmetrics for the assessment reveals that the attention on social media, policy documents, and news outlets has also grown exponentially. Furthermore, it was found that a significant positive correlation existed between citations and the altmetric attention score, suggesting that research receiving social attention tends to have a greater scholarly impact.

.

KEYWORDS: Altmetric, Altmetric Attention Score, Bibliometric, Citation, Digital platform, Indian Institute of Technology (IIT), Institution, Research impact, Research output, Societal impact.

1. INTRODUCTION

The Indian Institutes of Technology (IITs) are among the best engineering institutes in India. Their reputation in India is synonymous with the reputation of Ivy League colleges in the USA. Indian Institutes of Technology are every engineering aspirant's dream college. The inception of IITs was through an Act of Parliament known as the Institutes of Technology Act, 1961; hence, all the IITs are governed by this Act. Each IIT is autonomous under the

Ministry of Education (MoE), Government of India. Therefore, they can develop their curriculum in response to the rapidly changing educational scenario without any bureaucratic obstacles. 23 IITs are functioning across India, with every IIT listed as an "Institute of National Importance" by the Government of India. IIT Hyderabad is one of the 23 premier IITs across India, established in 2008 (About IITs | Council of Indian Institute of Technology, 2025). IIT Hyderabad is a second-generation IIT, established alongside the other seven IITs between 2008 and 2009 (About IITH, 2025).

The Indian Institutes of Technology are crucial to India's research ecosystem, promoting innovations in science and technology that significantly contribute to the country's economic development and societal welfare (Sharma et al., 2024). The IITs, including IIT Hyderabad, are renowned for their academic autonomy, as they have the freedom to design their own curricula and produce research output that often aligns with market demand (Das et al., 2022). In this context, a comprehensive assessment of IIT Hyderabad's research output using bibliometric and altmetric indicators becomes crucial to determine its scholarly impact and engagement beyond traditional citation counts (Sinha et al., 2020). This study aims to assess the research output of IIT Hyderabad, considering not only conventional academic metrics but also broader societal and economic impacts, as captured by altmetrics (Arsalan et al., 2025). By evaluating the institute's publications, citations, and social media mentions, one can gain insights into the research impact, collaboration networks, core research areas and online visibility of IIT Hyderabad (Kuri et al., 2020). This approach enables a more holistic evaluation, shedding light on the actual reach and research impact beyond mere publications (Sharma & Khurana, 2025). Through this assessment, the study aims to identify the institute's strengths and pinpoint areas for improvement in research, enabling policymakers, funders, and other stakeholders to make informed decisions about resource allocation and policy decisions.

2. REVIEW OF LITERATURE

The digital footprint of research institutions has attracted much attention in recent years, particularly as scholarly communication evolves with the advent of digital technologies. This literature review examines the existing literature on the digital presence of academic research, with a particular focus on IIT Hyderabad. The transition from traditional publications to online mentions and the effect of this shift on research visibility and impact are vital in understanding the larger context of academic contributions in the digital age (Sibbu et al., 2024).

Several studies have emphasized the significance of academic institutions' online presence. The work of Noori (2024) examines various strategies for promoting academic work across traditional and emerging platforms. The findings of this study reveal that the research promotion can be enhanced by incorporating digital techniques such as social media engagement and open-access publishing. It also offers valuable insights into boosting the online visibility and impact of scholarly works by employing altmetrics, which help in capturing the societal impact. The role of the social web in enhancing research visibility has recently garnered much attention. The study by Eysenbach (2011) examines the correlation between tweets and citations, revealing a moderate relationship that suggests tweets serve as early indicators of citations.

Furthermore, platforms such as X (formerly Twitter) enable researchers to engage directly with a broader audience, offering them an opportunity to promote their research to the wider society. IIT Hyderabad's unique research output

and digital representation have not been examined extensively in the existing literature. However, the work of Madjarevic & Davies (2015) on higher education institutions provides a framework for exploring how IIT Hyderabad's research can be assessed through its online mentions. The findings of this study indicate that institutions with a detailed digital strategy are better positioned to effectively highlight their research contributions, which is vital for attracting funders, facilitating research collaboration, and enhancing student enrollment.

"Altmetrics" are crucial for understanding the impact of research in the digital space. Altmetrics, also known as alternative metrics, encompass various online indicators, including mentions in social media, news outlets, and policy documents (Priem et al., 2010). Such metrics offer a clearer understanding of research impact, particularly in fields where traditional metrics cannot fully capture the societal relevance of research outputs. The integration of altmetrics in the institutional assessment could provide IIT Hyderabad with valuable insights into the broader implications of its research.

The digital research environment also includes open access and public engagement issues. Piwowar et al. (2019) have highlighted in their study that open access initiatives have enhanced the visibility of research outputs. Their findings suggest that open-access articles are more frequently cited and shared than closed-access counterparts. This finding highlights the importance of adopting open-access policies at IIT Hyderabad to maximize the reach and impact of its research.

In conclusion, the existing literature emphasizes the significance of the digital space in shaping the visibility and impact of research. It will be essential for the reputation of IIT Hyderabad to understand the dynamics of online mentions and their implications as it continues to expand its research portfolio. IIT Hyderabad can enhance its research dissemination strategies and resonate with a broader audience by incorporating open-access initiatives and digital platforms.

3. OBJECTIVES

a) To examine the annual growth rate, cumulative annual growth, relative growth rate, and doubling time of IIT Hyderabad's research output.
b) To identify the top ten most prolific authors.
c) To identify the top ten most influential research publications.
d) To analyze the contribution in terms of the author and the country.
e) To compare the Traditional Citations Vs. Mendeley Readership Counts.
f) To examine the social media attention on various online platforms and measure the correlation between citations and the altmetric attention score.

4. METHODOLOGY

This study has employed a descriptive research design, adopting a quantitative method. A standard and widely recognized method for conducting quantitative analysis. The current study utilized the Scopus database to extract the research output of IIT Hyderabad from 2013 to 2022. The dataset was retrieved using the affiliation search query as AF-ID (60103917) AND PUBYEAR > 2012 AND PUBYEAR < 2023 for IIT Hyderabad. The bibliographic details

of 7,555 publications have been retrieved in CSV format and analyzed using MS Excel, R (Biblioshiny), VOSViewer, and Jamovi. Furthermore, the results were refined to identify the growth & trend of publications and citations, as well as the type of co-authorships and the scientific fields involved. Additional characteristics were investigated, including prolific authors, influential research publications, and international collaborations.

Altmetric Explorer (https://www.altmetric.com/explorer/highlights) was accessed to get the altmetrics dataset during the last week of July 2025. After logging into the Altmetric Explorer landing page, the advanced search query was performed. In the advanced search, there is an option to "*Add Scholarly Identifiers*", where all the DOIs extracted from Scopus were added. Out of 7,555 publications from IIT Hyderabad, as retrieved from Scopus, only 7,246 publications had DOIs, which were used to harvest altmetrics from various platforms. All 7,246 DOIs were added to the provision for scholarly identifiers, and the query was executed.

The search results were retrieved, with a total output tracked 2,662, out of which 1,978 (74.30%) were mentioned on various social media platforms. The total mentions accounted for the period from 2013 to 2022 were 24,646. Descriptive statistics were used to gain insights from the dataset extracted from Scopus and various metrics collected from Altmetric Explorer. Pearson's correlation was used to determine the relationship between traditional citations and the altmetric attention score.

5. DATA ANALYSIS AND INTERPRETATION

Table 1: Year-wise Growth of Publications and Doubling Time

Year	TP	CAG	AGR	W1	W2	RGR	DT	TC	ACPP
2013	251	251	0	0	5.525	0	0	5776	23.01
2014	388	639	54.58	5.525	6.460	0.934	0.742	7750	19.97
2015	441	1080	13.66	6.460	6.985	0.525	1.320	10640	24.13
2016	473	1553	7.26	6.985	7.348	0.363	1.908	11049	23.36
2017	643	2196	35.94	7.348	7.694	0.346	2.000	31835	49.51
2018	785	2981	22.08	7.694	8.000	0.306	2.268	22064	28.11
2019	898	3879	14.39	8.000	8.263	0.263	2.632	24376	27.14
2020	1054	4933	17.37	8.263	8.504	0.240	2.883	23654	22.44
2021	1215	6148	15.28	8.504	8.724	0.220	3.147	19858	16.34
2022	1407	7555	15.80	8.724	8.930	0.206	3.363	13717	9.75
Total	**7555**							**170719**	**22.60**

TP=Total Publications, CAG=Cumulative Annual Growth, AGR=Annual Growth Rate, RGR=Relative Growth Rate, DT=Doubling Time, TC=Total Citations, ACPP=Average Citation Per Paper

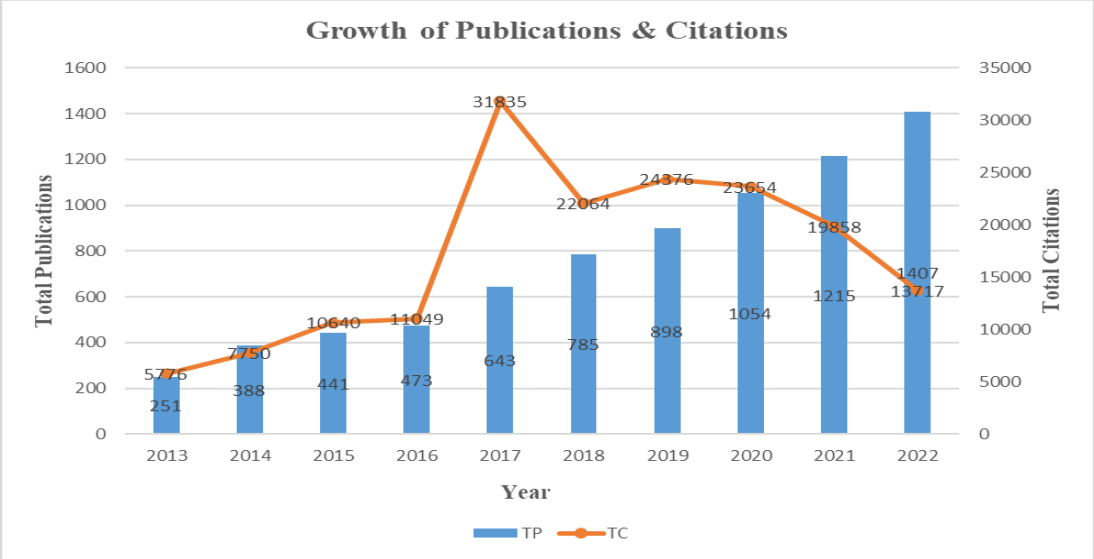

Figure 1: Growth of Publications & Citations

As shown in Table 1, the number of research publications increased steadily from 251 in 2013 to 1,407 in 2022, demonstrating robust overall growth. After peaking at 54.58% in 2014, followed by another significant increase of 35.94% in 2017. However, the growth rate has slowed recently, averaging 15 to 17 per cent per year between 2019 and 2022; the total number of publications continued to increase quickly. The annual growth rate (AGR) and cumulative annual growth (CAG) indicate fluctuations in the growth rate. The greatest AGR of 54.58% in 2014 indicated an early stage of rapid expansion. Relative Growth Rate (RGR) and Doubling Time (DT) indicate how rapidly publications are doubling over time. In 2022, the doubling time (DT) was 3.363 years, up from 0.742 years in 2014, suggesting that although the field is still expanding, the rate of doubling has slowed as the number of publications has increased. The parameters W1 and W2 represent cumulative logarithmic or weighted growth measurements. While the Doubling Time (DT) increased, the Relative Growth Rate (RGR) declined, suggesting that publications are expanding more slowly as the research base increases. The total citations (TC) peaked in 2017 at 31,835, with an average citation per publication (ACPP) of 22.60, indicating that while the number has increased significantly, the citation effect has remained relatively constant. Overall, the findings indicate a steady and long-term increase in research maturity over the years.

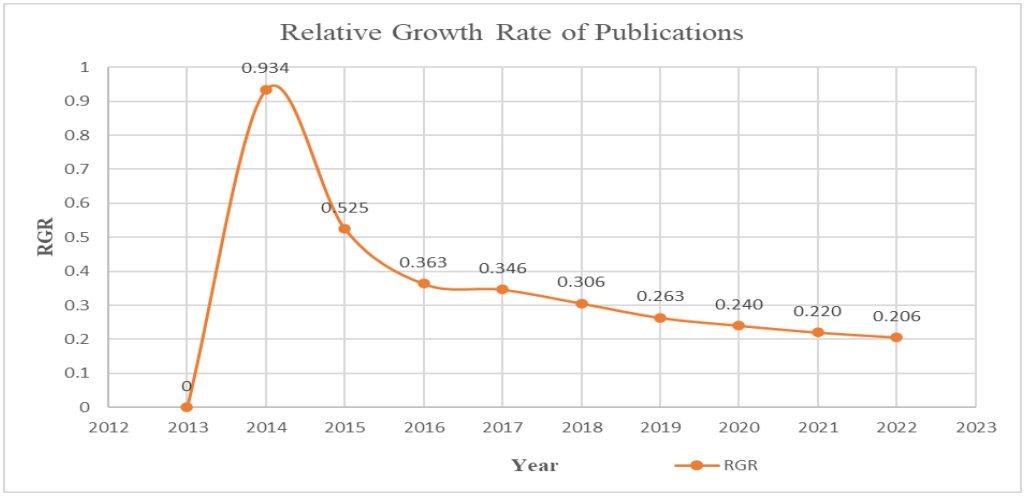

Figure 2: Relative Growth Rate of Publications

The Relative Growth Rate (RGR) analysis provides a compelling narrative of research output evolution from 2013 to 2022, with discrete stages of development. Despite a baseline year of zero growth in 2013, the data shows an exponential spike in 2014, when the RGR peaked at 0.934 (93.4%), marking the dataset's most dramatic growth era. Following this peak, the field experienced a phase of gradual stability from 2015 to 2018, during which time growth rates decreased from 52.5% to 30.6%, indicating a shift from rapid expansion to more sustainable development. The final phase, from 2019 to 2022, demonstrates successful maturity, with RGR regularly stabilizing between 20% and 26%, indicating that the research field has developed a healthy and sustainable development pattern.

Table 2: Top 10 Most Prolific Authors

Authors	TP	TC	h_index	g_index	Fractional frequency	PY_start
DESAI S	290	15969	63	115	29.14	2016
KUMAR R	250	49661	77	222	6.70	2015
KUMAR A	229	18285	51	134	38.28	2013
SANCHEZ E	210	13068	59	106	2.59	2017
MIQUEL R	207	12954	58	105	2.55	2017
SUCHYTA E	206	12626	57	104	2.55	2017
TARLE G	206	12922	58	105	2.53	2017
BROOKS D	205	12897	58	105	2.53	2017
CARRETERO J	201	13106	59	107	2.43	2017
GRUEN D	200	13030	60	107	2.52	2017

The top 10 most prolific authors have extraordinary research productivity and impact, with DESAI S leading with 290 total publications (TP), followed by KUMAR R (250) and KUMAR A (229). Although DESAI S has the most publications, KUMAR R is the most referenced author with staggering 49,661 citations, surpassing the second-highest cited author (KUMAR A, with 18,285 citations). The majority of authors cluster in the 57–63 range, while Kumar R has the best h-index performance (Hirsch, 2005) at 77. KUMAR R's outstanding intellectual impact is revealed by the g-index (Egghe, 2013), which stands at 222, almost twice the average of other top performers. The contribution of authors was assessed using the fractional frequency in bibliometric research to determine the fraction of credit each author receives for their contribution to a paper (Sivertsen et al., 2019). It can be observed that DESAI S contributed the highest number of papers (250) followed by KUMAR R (250) and KUMAR A (229). However, the fractional frequency contribution is highest for the name of KUMAR A (38.28), followed by DESAI S (29.14). This implies that though authors like DESAI S have a staggering contribution of papers, the partial contributions of KUMAR A stand the highest. These authors began their careers mostly between 2013 and 2017. KUMAR A was the first to start in 2013, and DESAI S started in 2016, showing that notable output may be attained in comparatively short periods. The data indicate a distinct correlation between publication volume and citation impact; however, KUMAR R's citation performance implies that quality and influence may surpass purely quantitative measures.

Table 3: Top 10 Most Influential Research Publications

Publications	DOI	TC	TC per Year	Normalized TC
ABBOTT BP, 2017, PHYS REV LETT-a	10.1103/PhysRevLett.119.161101	7274	808.22	146.92
ABBOTT BP, 2017, ASTROPHYS J LETT-a-b-c-d-e	10.3847/2041-8213/aa91c9	3016	335.11	60.92
ABBOTT BP, 2019, PHYS REV X	10.1103/PhysRevX.9.031040	2693	384.71	99.21
ABBOTT BP, 2017, ASTROPHYS J LETT-a-b-c-d	10.3847/2041-8213/aa920c	2552	283.56	51.55
CHATTOPADHAY A, 2018, PROC - IEEE WINTER CONF APPL COMPUT VIS, WACV	10.1109/WACV.2018.00097	1868	233.50	66.46
ABBOTT BP, 2017, PHYS REV LETT	10.1103/PhysRevLett.119.141101	1773	197.00	35.81
ABBOTT BP, 2018, PHYS REV LETT-a	10.1103/PhysRevLett.121.161101	1684	210.50	59.91
ABBOTT R, 2021, PHYS REV X	10.1103/PhysRevX.11.021053	1513	302.60	92.57
ABBOTT R, 2020, ASTROPHYS J LETT-a-b	10.3847/2041-8213/ab960f	1216	202.67	54.18
ABBOTT BP, 2020, ASTROPHYS J LETT	10.3847/2041-8213/ab75f5	1159	193.17	51.64

The Top 10 Most Influential Research Publications demonstrate exceptional scholarly impact, with ABBOTT BP's 2017 Physical Review Letters leading the way with 7,274 citations, followed by the same author's 2017 Astrophysical Journal Letters, which garnered 3,016 citations, highlighting the groundbreaking nature of gravitational wave research. The list shows a strong focus on physics and astronomy, with ABBOTT BP appearing six times and ABBOTT R three times, indicating consistent high-impact research output. Citations range from 7,274 to 1,159 for publications published between 2017 and 2021. Specifically, IEEE conference proceedings (CHATTOPADHAY A, 2018) that represent computer vision research are included. The data demonstrates the long-lasting impact and importance of these research contributions across numerous scientific areas, with an average of 2,139 citations per publication and an outstanding 808.22 citations annually for the top paper. The Normalized Total Citations (Normalized TC), like fractional frequency, were calculated to give equal credit to all contributing authors of the paper. For instance, in a list of n papers, where a = number of contributing authors to the paper and b = total citations received by the paper, the normalized citation count of each article will be b/a, and the normalized total citation will be the sum of the normalized citation count of n papers (Metrics, 2015).

Co-Authorship of Authors

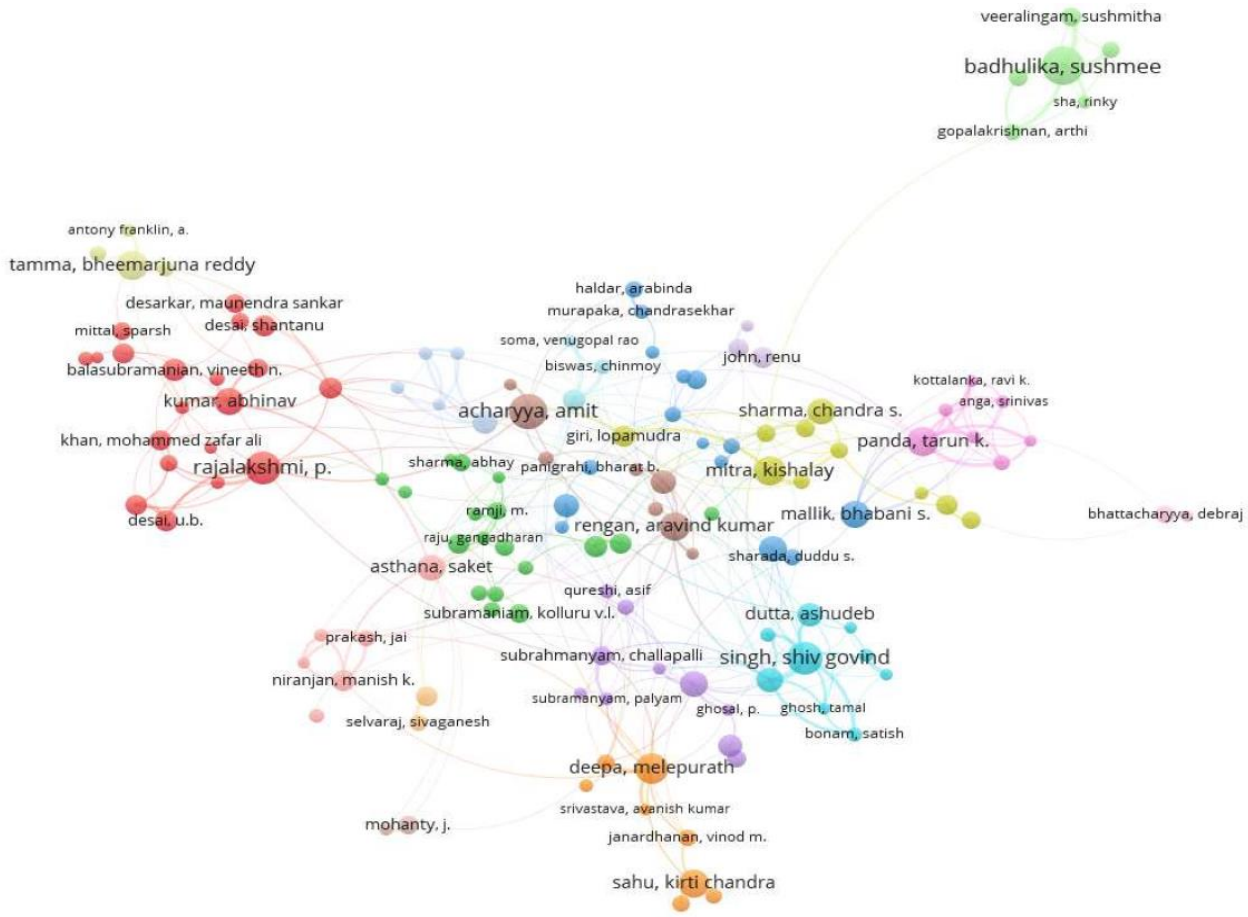

Figure 8: Co-Authorship of Authors

Figure 8 illustrates the co-authorship network of the authors, revealing several clustered groups that highlight closely collaborating authors. Out of 12,176 authors, 176 authors were identified who shared at least 20 publications, received at least 20 citations and had the most collaborative relationships. The collaboration was visualized using a network graph, in which the authors were clustered into 18 distinct groups, each represented by a unique color. The circular nodes represent individual authors, and the size of these nodes is proportional to the strength of their collaboration. Individual authors such as “Badhulika, Sushmee”, “Singh, Shiv Govind” and “Rajlakshmi, P” having larger nodes indicate higher collaborative output and central roles within their clusters. Strong co-authorship ties among the group members are reflected by thicker and more numerous connecting lines. A few clusters, like the one containing “Badhulika, Sushmee”, are more isolated, revealing internal collaboration with fewer external links.

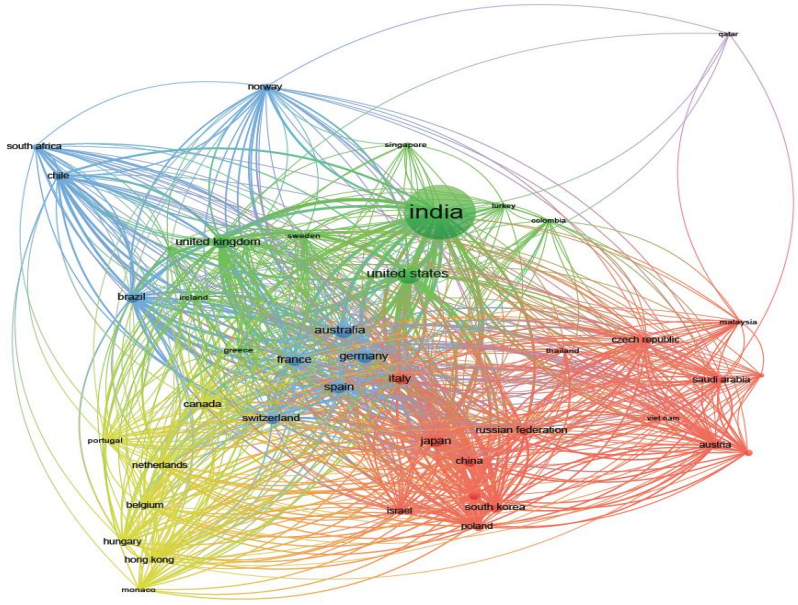

Figure 9: Co-Authorship of Countries

The co-authorship network graph of the countries of IIT Hyderabad reflects a dense and vibrant web of international collaborations. The outstanding collaborative publications of "India" designate it as one of the most prominent and pivotal. The large node size of India reflects a significantly higher number of co-authored works compared to the other countries, indicating a strong domestic research base of IIT Hyderabad. Other key collaborating countries include the United States, the United Kingdom, Australia, Germany, and Japan, all of which are strategically positioned and have multiple connections with India. Various thick lines linking India with these countries indicate robust and frequent co-authorship ties and strong academic relationships. There are five distinct clusters, each with a unique color representing a separate collaborative group. For instance, one cluster includes Asian countries such as China, Japan, and South Korea, while the other is composed of Western nations, including the UK, France, and Germany. The smaller nodes, such as South Africa, Chile, and Qatar, illustrate emerging or less frequent collaborations. Overall, IIT Hyderabad's predominant national leadership and its extensive engagement across a diverse international scholarly community were represented through this network graph.

Table 4: Traditional Citations Vs. Mendeley Readership Counts

Year	TP	TC	Mendeley Readership Counts
2013	251	5776	2188
2014	388	7750	3888
2015	441	10640	5655
2016	473	11049	9587
2017	643	31835	14004
2018	785	22064	11581
2019	898	24376	17692
2020	1054	23654	14225
2021	1215	19858	16226
2022	1407	13717	14522
Total	**7555**	**170719**	**109568**

The table displays three important measures based on data from 2013 to 2022: Mendeley Readership Counts, TP, and TC. Over this period, TP steadily climbed from 251 in 2013 to 1407 in 2022. Starting at 5776 in 2013, reaching a peak of 31,835 in 2017, and then falling to 13,717 by 2022, TC exhibits a more inconsistent pattern. Additionally, Mendeley Readership Counts, which indicate the number of times publications were viewed or saved on Mendeley, increased from 2,188 in 2013 to a peak of 17,692 in 2019, before levelling off at 14,522 in 2022. Overall growth and participation in these indicators over the course of the decade are reflected in the sums for the full period, which are 7,555 for TP, 1,70,719 for TC, and 1,09,568 for Mendeley Readership Counts.

Table 5: Social Media Attention on various online platforms

Year	News mentions	Blog mentions	Policy mentions	Patent mentions	X mentions	Facebook mentions	Wikipedia mentions	Google+ mentions	Reddit mentions	Q&A mentions
2013	2	0	0	1	40	7	0	0	0	1
2014	1	4	0	2	54	4	0	0	0	0
2015	31	7	1	5	97	9	1	2	0	0
2016	73	22	5	5	191	20	3	4	0	1
2017	573	114	7	4	4329	134	125	36	5	4
2018	529	142	5	10	1960	63	67	23	1	1
2019	202	85	6	19	1496	46	45	3	2	3
2020	1168	209	7	34	2623	60	73	0	5	3
2021	934	180	9	50	3496	45	61	0	9	7
2022	454	97	22	67	3210	38	68	0	13	2
Total	**3967**	**860**	**62**	**197**	**17496**	**426**	**443**	**68**	**35**	**22**

Table 5 presents data on various types of mentions across media and platforms from 2013 to 2022. It tracks the yearly counts of mentions in news, blogs, policy documents, patents, and several social media and online platforms, including Facebook, Wikipedia, Google+, Reddit, and Q&A sites. The number of references has increased noticeably over time, especially in the "X mentions" category, which saw a sharp rise from 40 in 2013 to a peak of 4,329 in 2017, before fluctuating in the following years. A general upward trend is also evident in news mentions, which peaked in 2020 at 1,168. There have been slower but consistent rises in other categories, such as blog mentions, policy mentions, and patent mentions. Social media mentions increase, albeit somewhat erratically, on sites such as Wikipedia and Facebook. With a total of 3,967 mentions for news, 860 for blogs, 62 for policy, 197 for patents, 17,496 for X, 426 for Facebook, 443 for Wikipedia, 68 on Google+, 35 for Reddit, and 22 for Q&A mentions, the mentions across all categories show widespread and increasing engagement over the course of ten years.

Table 6: Correlation between Citations and AAS

Correlation Matrix

		Citations	Altmetric Attention Score
Citations	Pearson's r	—	
	df	—	
	p-value	—	
Altmetric Attention Score	Pearson's r	0.786 **	—
	df	8	—
	p-value	0.007	—

Note. * p < .05, ** p < .01, *** p < .001

Table 6 presents the correlation analysis between Citations and AAS, indicating a strong positive and statistically significant correlation ($r = 0.786$, $p = 0.007$). It signifies that papers with higher altmetric attention scores tend to receive more citations. The results are meaningful; however, due to the small sample size ($df = 8$ implies $n = df + 2 = 10$ observations), they should be interpreted with some caution.

DISCUSSION AND CONCLUSION

The analysis of IIT Hyderabad's research output, using bibliometric and altmetric indicators, offers meaningful insights into both scholarly influence and the broader societal engagement. Over the past decade, IIT Hyderabad have showcased substantial growth in publication numbers and citation impact, while also increasing its digital footprint across various online platforms. The steady rise in the annual publications and consistent citation rates highlights a maturing research ecosystem at the institute. A pivotal role has been played by highly productive authors and influential papers in establishing IIT Hyderabad's reputation on the national and international stage.

The collaboration networks, visualized through co-authorship maps, highlighted India's centralized role, with strong partnerships established with countries such as the United States, the United Kingdom, Australia, Germany, and Japan. These collaborations enhance the research quality and global visibility of the institute. Moreover, the addition of altmetrics for the assessment reveals that the attention on social media, policy documents, and news outlets is growing exponentially. Furthermore, the significant positive correlation between traditional citations and the altmetric attention score suggests that research receiving social attention also tends to garner scholarly impact.

Overall, IIT Hyderabad's course reflects a balanced approach towards both scholarly rigor and societal outreach. While traditional bibliometric measures establish foundational research impact, altmetrics reveal the extent of engagement and relevance beyond academia. In the future, to maximize its digital footprint, policymakers, administrators, funders, and other stakeholders may consider adopting open-access practices and strategic digital dissemination through digital repositories and preprint servers. Additionally, the administrators shall strengthen interdisciplinary and global collaborations by establishing joint research projects with leading international universities to further enhance the quality of research output. Furthermore, they may also develop a comprehensive digital communication strategy to publicize major research findings through media and online platforms, thereby increasing public awareness and engagement. Lastly, they may also consider incentivising high-impact publications and those with high societal engagement.

REFERENCES

[1] *About IITH*. IIT Hyderabad. https://www.iith.ac.in/about/aboutiith/

[2] *About IITs | Council of Indian Institute of Technology*. https://www.iitsystem.ac.in/about

[3] Arsalan, M. H., Mubin, O., Al Mahmud, A., Khan, I. A., & Hassan, A. J. (2025). Mapping Data-Driven Research Impact Science: The Role of Machine Learning and Artificial Intelligence. Metrics, 2(2). https://doi.org/10.3390/metrics2020005

[4] Das, A., Mandal, N., Rath, D. S., & Das, S. (2022). Trendline of Open Access Publication by Indian Institute of Technology (IITs) Researchers in India. *Journal of Information and Knowledge*, *59*(6), 399–409. https://doi.org/10.17821/srels/2022/v59i6/168621

[5] Egghe, L. (2013). Theory and practise of the g-index. *Scientometrics*, *69*(1), 131–152. https://doi.org/10.1007/s11192-006-0144-7

[6] Eysenbach, G. (2011). Can Tweets Predict Citations? Metrics of Social Impact Based on Twitter and Correlation with Traditional Metrics of Scientific Impact. *Journal of Medical Internet Research*, *13*(4), e123. https://doi.org/10.2196/jmir.2012

[7] Kuri, R., Singh, K., Singh, M., & Patil, S. (2020). *Assessment of Research Productivity of Indian School of Business (ISB), Hyderabad, India*. https://digitalcommons.unl.edu/libphilprac/4656/

[8] Madjarevic, N., & Davies, F. (2015). *Altmetrics in Higher Education Institutions: Three Case Studies*. https://doi.org/10.15200/winn.145768.82305

[9] *Metrics*. (2015, February 9). ADS News, Blogs, and Help Pages. https://ui.adsabs.harvard.edu/help/actions/analyze

[10] Noori, A. (2024). Maximizing the Reach and Impact of Scholarly Research Beyond Publication. *Journal of Social Sciences - Kabul University*, *7*(2), 215–241. https://doi.org/10.62810/jss.v7i2.54

[11] Piwowar, H., Priem, J., Larivière, V., Alperin, J. P., Matthias, L., Norlander, B., Farley, A., West, J., & Haustein, S. (2019). The state of OA: A large-scale analysis of the prevalence and impact of Open Access articles. *PeerJ*, *6*:e4375. https://peerj.com/articles/4375

[12] Priem, J., Taraborelli, D., Groth, P., & Neylon, C. (2010). *Altmetrics: A manifesto*. http://altmetrics.org/manifesto

[13] Sharma, K., & Khurana, P. (2025). *Self-Citations in Academic Excellence: Analysis of the Top 1% Highly Cited India-Affiliated Research Papers* (No. arXiv:2503.13460). arXiv. https://doi.org/10.48550/arXiv.2503.13460

[14] Sharma, K., Nagori, A., Manya, Dubey, M., & Khurana, P. (2024). *Quantitative Analysis of IITs' Research Growth and SDG Contributions* (No. arXiv:2411.15451). arXiv. https://doi.org/10.48550/arXiv.2411.15451

[15] Sibbu, K., Asjola, V., & Kuri, R. (2024, October 22). Bibliometric and Altmetric Assessment of Scientific Research Productivity of NIT Surathkal during 2011-2020. *Knowledge Management in Higher Education Institutions*. International Conference on Knowledge Management in Higher Education Institutions (ICKHI 2024), Jaipur. https://doi.org/10.22541/au.172961986.64345917/v1

[16] Sinha, P. K., Sahoo, S. B., Gajbe, S. B., Chakrabory, K., & Mahato, S. S. (2020). Altmetrics Research Progress: A Bibliometric Analysis and Visualization. *Journal of Scientometric Research*, 9(3), 300-309. https://jscires.org/article/384

[17] Sivertsen, G., Rousseau, R., & Zhang, L. (2019). Measuring scientific contributions with modified fractional counting. *Journal of Informetrics*, *13*(2), 679–694. https://doi.org/10.1016/j.joi.2019.03.010

[18] The jamovi project (2022). *Jamovi*. (Version 2.3) [Computer Software]. Retrieved from https://www.jamovi.org

---