Scholarly Productivity of the University of Engineering and Technology, Lahore over 50 years (1973-2022): A Bibliometric Visualization from the Web of Science

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This study aimed to analyze the scholarly productivity of the University of Engineering and Technology (UET), Lahore, over 50 years, from 1973 to 2022. Data indexed in the Web of Science (WoS) database was used and included information such as document type, year-wise research output, leading authors, significant collaborative organizations, primary international author collaborations, key corresponding author affiliations by country, major funding agencies, and highly cited publications.

For bibliometric visualization, the BiblioShiny and VOSviewer software tools were employed. A comprehensive analysis of 5502 publications across diverse categories, such as research articles, conference papers, abstracts, reviews, editorials and others, was conducted. The UET research productivity displayed a positive trend, with 2022 emerging as the most productive year. Research articles constituted the predominant publication type, showcasing their popularity. Collaboration emerged as a preferred approach among researchers, evidenced by the prevalence of co-authored publications. The majority of the corresponding co-authors were affiliated with Pakistani institutions. The University of the Punjab (PU), Pakistan, was a prominent collaborative partner among all institutes. China was identified as the primary international collaborator for the researchers. Furthermore, the Higher Education Commission (HEC) of Pakistan was seen to be the primary funding agency for researchers at UET. The research domain of "engineering" claimed the most productivity, and "performance" was the most frequently used keyword. This study helps understand UET's research performance in the domains of engineering, science and technology.

Keywords: Scholarly productivity; Research Productivity; UET Publications; Bibliometric Analysis; Web of Science; Bibliometric Visualization; Indexes

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INTRODUCTION

The world is rapidly evolving due to advancements in technological research and innovation. Nowadays, universities are the primary contributors to research, focusing on research activities and technology transfer. They have a mission to increase the transfer of technology to meet the needs of the advanced world (Rasmussen et al., 2006). The academic influence of an institution can be better understood by analyzing its research output. It aids in comprehending the breadth and depth of the academic contributions made by the researchers and faculty of universities in this research era. Scholars worldwide regularly publish research publications (Ali, Aslam, et al., 2021; Aslam, Naveed, et al., 2021; Kappi & Biradar, 2019). The term "bibliometric" has been introduced for measuring research output. Researchers carry out bibliometric analyses to obtain data in statistical form (Naveed, Ali, et al., 2021). Bibliometric studies are conducted to explore the productivity of various kinds of published research, such as articles, reviews, editorial notes, letters, proceedings, etc. Bibliometric analysis helps to calculate citations and other information regarding publications (Aslam, Naveed, et al., 2022; Verma et al., 2020). Academic libraries measure research performance through a bibliometric examination (Ali et al., 2022). Several researchers have used the bibliometric approach to provide information about various journals (Aslam, Ali, et al., 2021; Aslam, Qutab, et al., 2022; Sahu & Parabhoi, 2020). Moreover, various disciplines utilize bibliometric approaches to measure scientific progress (Van Raan, 2005). It is also an effective way to discover academic literature (Lee et al., 2020).

This study has been designed to explore the research output of the University of Engineering and Technology (UET), Lahore, in the domains of engineering, science, and technology. The UET's history dates back to its establishment as the "Mughalpura Technical College" in 1921. In 1923, it was renamed "Maclagan Engineering College" in honor of Edward Maclagan, the Governor of Punjab. The current name, the "University of Engineering and Technology", was adopted in 1972. The university's academic offerings have evolved over the years. In 1947, it began offering BSc degrees in mechanical and electrical engineering, followed by introducing the mining engineering program at the bachelor's level in 1954. Subsequently, in 1962, additional engineering courses such as petroleum and gas, chemical engineering, architecture, metallurgical, and city and regional planning were introduced. The Master's degree program commenced in 1970, encompassing various engineering disciplines such as planning, allied disciplines, and architecture. In the 1970's, a PhD program was introduced. Presently, the university's leading campus houses 26 departments. The university has expanded its reach with four campuses, including the Faisalabad Campus, Kala-Shah-Kaku Campus (now the New Campus), Narowal Campus, and Rachna Campus in Gujranwala. The UET is committed to achieving global competitiveness and leading in research endeavors. The university inspires to

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enhance its global ranking, aiming to climb from the top 300 to aims to enhance its global ranking, climbing from the top 300 to the top 100 universities worldwide (UET, 2023). This study aimed to comprehensively explore the breadth and depth of UET researchers' contribution to the international literature, with a particular reference to the WoS database and their impact on the global stage.

LITERATURE REVIEW

Baskaran (2013) performed a bibliometric analysis of research publications by Alagappa University from 1999 to 2011 and concluded that 2011 was the most productive year. Authorship patterns revealed that co-authorship was more popular than single authorship. Rautaray et al. (2013) conducted a scientometric evaluation of the research output of the Kalinga Institute of Industrial Technology University. They found that three or more authors had produced more co-authorship publications than single authors (Aslam, Ali, et al., 2021). A study was conducted on the research output of the Indian Institute of Technology, Delhi, between 2001 and 2010 (Chaurasia & Chavan, 2014). This bibliometric study analyzed 6109 publications. The most popular document type was journal articles, followed by proceeding papers. On the other hand, reviews were the least popular document type. Sa (2015) reported that the Institute of Minerals and Materials Technology produced the most research publications in India from 2004 to 2013. He found that the Institute had contributed 7.43% of all publications, and Chemistry was the most prolific subject. Journals were the preferred document type; the most repeated keyword was "article".

Anwar (2018) studied Pakistani researchers' contributions from 2008 to 2017 to Library Philosophy and Practice (LPP). The findings concluded that 2017 was the most productive year. Dr. Rubina Bhatti was the most prominent author with the most publications. Gupta and Sonkar (2019) studied the research produced by the University of Mumbai from 2014 to 2018. They concluded that most authors were interested in publishing as single authors. Furthermore, the male authors' contribution was 324 out of the 796 publications analyzed. Kappi and Biradar (2019) reported the research productivity of Kuvempu University, India, and concluded that the research trend was high during 2011-2016. Naseer et al. (2019) conducted a bibliometric research study on communications published in specific informatics journals in 2012-2016 and found 459 records. According to the results, 2016 was highly productive, and the "Max Planck Society of Germany" was the most significant contributor. Multiple authors' publications were the dominant contributions. Ahmad et al. (2020) conducted a bibliometric study to evaluate the research output of the University of the Punjab (PU), one of the oldest universities in Pakistan. The data was recovered from the Scopus database, and it was seen that there had been research progress from the 19th to the 21st century, with the 21st century seeing significantly increased research trends (Doulani, 2021). Single-author publications received fewer citations than multiple-

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author publications (Ali et al., 2022).

Haq's (2020) bibliometric study concluded that "articles" comprised two-thirds of the publications, and "pharmacology" was the highly preferred area in research publications. Hussain and Yar (2021) highlighted Pakistani authors' output in LPP from 2008 to 2020 and observed that 2020 was highly productive. Publications by B. A. Zuberi and M. N. Ansari were prominent in citations, and the Punjab province had the most contributions. Siddique et al. (2021) reported 62 years of research output from the library and information science (LIS) discipline in Pakistan. It was observed that the highest contribution came from the Department of Information Management, PU. This was followed by the second-highest contribution from the LIS Department at the University of Karachi. Various studies have emphasized the importance of bibliometric research in assessing and calculating academic libraries' research topics (Ali, Shoaib, et al., 2021). A recent bibliometric study on desktop research was conducted in Pakistan. The findings found that 2020 was the most fruitful year for desktop research, and many publications were produced through collaboration between American and Pakistani authors (Wahid et al., 2023). Bibliometric analysis and visualization methods have been studied in the literature to evaluate research output at several academic institutions. However, there is still a substantial gap in the context of UET Lahore. So, it is necessary to examine this university's research accomplishments and distinctive research environment using in-depth bibliometric data. This study highlights the research outcomes of this renowned university as indexed in the WoS database.

Research Objectives

1. UET's publications data was retrieved from the (WoS) database and evaluated to determine:
2. The distribution of document type and year-wise research productivity.
3. The most productive authors and collaborative institutions.
4. Top country collaboration with UET authors and most relevant countries as corresponding authors.
5. Top funding agencies.
6. Top cited publications.

METHODOLOGY

The (WoS) is a renowned bibliographic database for scholarly articles in multiple disciplines. The data from WoS (Core Collection) with the affiliation of UET was retrieved for the "50-year period from 1973 to 2022". The following search queries were used: OO= ("University of Engineering & Technology Lahore") OR OO= ("University of Engineering Technology Lahore") OR OO= ("UET Lahore") OR OO= ("Univ Engn & Technol Lahore") OR OG= ("University of Engineering & Technology Lahore") OR OG= ("University of Engineering Technology Lahore"). 5502 results were recovered from the WoS on January 29, 2023, against these

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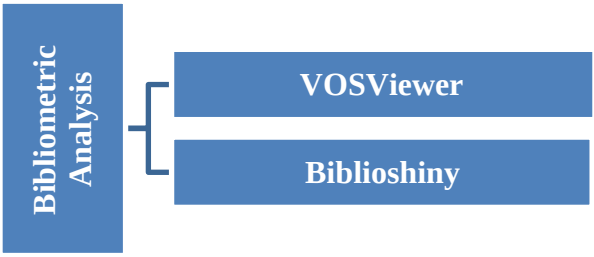
queries. These results covered all types of documents affiliated with UET. The data was analyzed with bibliometric software such as VOSviewer and BiblioShiny. MS Excel was used for tables and graphs (Figure 1).

Figure 1

Bibliometric Data Analysis Tools



RESULTS

General Information

Table 1 provides an overview of the publications retrieved. There were 5502 documents retrieved from the WOS database published during the last 50 years (1973-2022), with an annual growth rate of 4.91. 181248 references were provided in these publications, and 8258 authors contributed towards these publications. There were 126 single-author documents, 69 authors per document, 5.07 co-authors per document, and 16061 keywords used by the authors.

Table 1

General information

Description	Results	Description	Results
Timespan	1973-2022	Keywords Plus (ID)	9170
Sources (Journals, Books, etc.)	1870	Author's Key-words (DE)	16061
Documents	5502	Authors	8258
Annual Growth Rate %	4.91	Authors of single-authored docs	69
Document Average Age	5.93	Single-authored docs	126
Average citations per doc	10.43	Co-Authors per Doc	5.07
References	181248	International co-authorships %	60.61

Document Type

Table2 represent information about the researchers preferred document type or category. The ideal choice of publication among these 5502 documents was an article with 4585 documents (83.333%), followed by proceeding papers (n=671,12.196%) and reviews (n=206,3.744%).

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Table 2

Distribution of document type

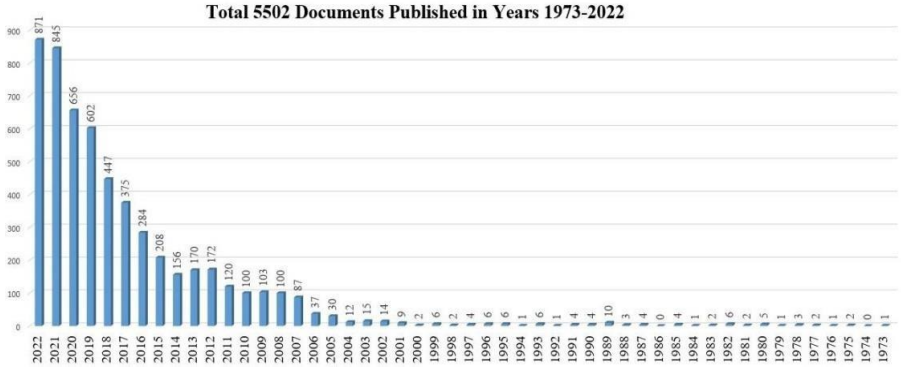
Document Type	Publication (N=5502)	% of 5502	Document Type	Publication (N=5502)	% of 5502
Article	4585	83.333	Book Review	5	0.091
Proceeding Paper	671	12.196	Editorial Material	5	0.091
Review Article	206	3.744	Letter	4	0.073
Early Access	95	1.727	Retracted Publication	4	0.073
Meeting Abstract	25	0.454	Data Paper	3	0.055
Correction	20	0.364	Note	3	0.055
Retraction	7	0.127	Discussion	2	0.036

Publication Years

Figure 2 reveals the year-wise distribution of UET's publications. The maximum number of publications was 871 in 2022, 845 in 2021, and 656 in 2020. Figure 2 shows that the publication ratio increased with time, and the maximum number of publications was recorded in 2022.

Figure 2

Year-Wise Distribution of Publication (1973-2022)



Productive Authors

Table 3 shows the UET's authors' productivity for 2022. The most productive author with the most papers was Muhammad Mujtaba Abbas, who has 19 publications and 106 citations. Ali Raza followed him with 18 publications and 31 citations, and Adnan Aslam with 17 published documents and eight citations.

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Table 3

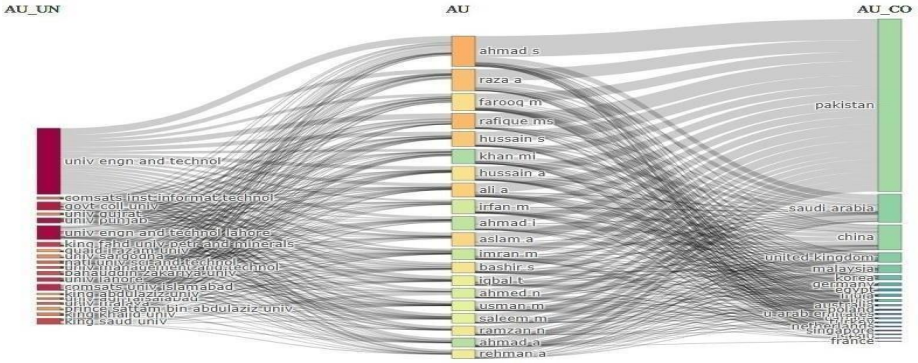
Most productive authors in a year (2022)

Name	Department	Publication (N=5502)	Citation
M. Mujtaba Abbas	Department of Mechanical Engineering	19	106
Ali Raza	Department of Mathematics	18	31
Adnan Aslam	Department of Natural Sciences & Humanities	17	08
Kashif Ishfaq	Department of Industrial & ManufacturingEngineering	16	17
Muhammad Farooq	Department of Mechanical Engineering	15	59

Figure 3 demonstrates the UET authors' productivity. The data is highlighted in small boxes. Each box represents the author's name and research output. Each box is connected to a node with a corresponding country and affiliation.

Figure 3

Three Fields Plot of Author, Affiliations, and Countries



Collaborative Institutions

Table 4 highlights the collaborative work of the institutions under study. Most of the 5502 publications were produced by authors affiliated with two or more universities. It is apparent from the table that PU has been the most collaborative institutions, with 368 publications and 87258 total link strength (TLS). Government College University Lahore collaborated on 236 published documents and 71885 TLS; the University of Lahore collaborated on 223 documents and 50368 TLS.

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Table 4

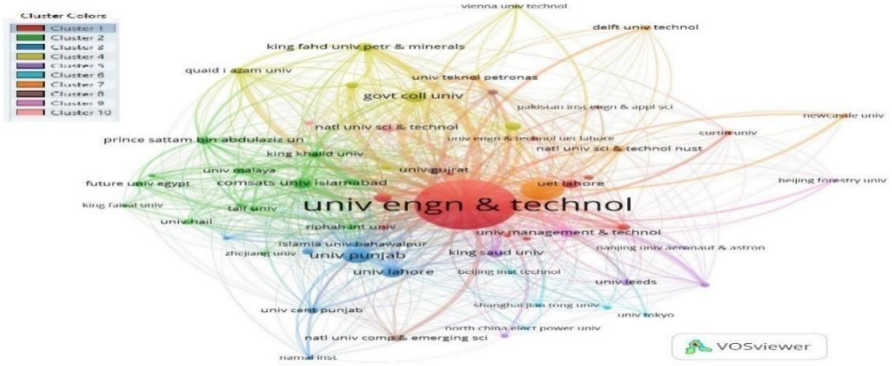
Collaborative institutions

Institutions	Publication (N=5502)	Citations	Total Link Strength
University of the Punjab, Lahore	368	2980	87258
Govt. College University, Lahore	236	1678	71885
University of Lahore, Lahore	223	1696	50368
COMSATS University , Islamabad	204	1269	80644
Bahauddin Zakariya University, Multan	147	2007	55756
King Fahd University of Petroleum & Minerals , Saudi Arabia	147	1952	79782
University of Management & Technology, Lahore	145	1424	55486
King Saud University , Saudi Arabia	124	1431	26954
National University of Science and Technology , Islamabad	120	1437	32177
Prince Sattam Bin Abdulaziz University , Saudi Arabia	87	389	51482

Figure 4 represents the data in circles and nodes, and each circle describes the institution's bibliographic coupling in research publications with UET researchers.

Figure 4

Bibliographic Coupling of Organizations



Top Country Collaboration with UET Authors

Table 5 provides information on collaborative countries and their links to UET authors. The maximum collaborations (n= 905, 16.449%) occurred with China, highlighting the active participation of Chinese researchers in the research activities carried out by the UET researchers. Saudi Arabia is ranked second with 741(13.468%) collaboratively published documents, followed by England with 416 (7.561%) publications.

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Table 5

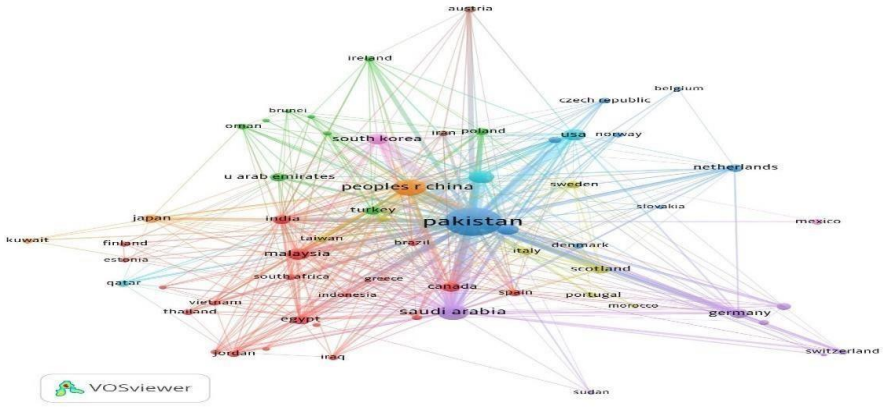
Top Country Collaboration with UET Authors

Countries	Publication (N=5502)	% of 5502	Countries	Publication (N=5502)	% of 5502
China	905	16.449	South Korea	233	4.235
Saudi Arabia	741	13.468	Australia	231	4.198
England	416	7.561	Germany	163	2.963
USA	303	5.507	Canada	158	2.872
Malaysia	263	4.78	Egypt	132	2.399

Figure 5 represents various countries' collaborative work with UET researchers in the form of circles and nodes. Each circle and node describe UET authors' publication trends with other countries worldwide.

Figure 5

Bibliographic Coupling of Countries



Most Relevant Countries by Corresponding Author

Table 6 presents country-wise corresponding authors. Pakistani authors are ranked first as corresponding authors with 3393 publications, followed by China with 571 research publications and the UK with 216 publications.

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Table 6

Most relevant countries by corresponding author

Country	Publication	Freq.	SCP*	MCP*	MCP*_Ratio
Pakistan	3393	0.617	2105	1288	0.38
China	571	0.104	0	571	1
United Kingdom	216	0.039	5	211	0.977
Saudi Arabia	159	0.029	2	157	0.987
Korea	139	0.025	0	139	1
Malaysia	122	0.022	0	122	1
Australia	120	0.022	0	120	1
USA	114	0.021	7	107	0.939
Germany	68	0.012	2	66	0.971
Canada	66	0.012	1	65	0.985

SCP* = Single Country Publications, MCP* = Multiple Country Publications

Most Productive Sources

Based on specific timeframes, Table 7 illustrates the most productive publication sources. It can be seen that IEEE Access had the highest number of publications (106), followed by Sustainability with 96 publications, and the Journal of the Chemical Society of Pakistan with 85 publications. Universities subscribe to essential sources and provide access to their researchers.

Table 7

Most Productive Sources/Journals

Source/Journal	Publication (N=5502)	Citation	h_index	g_index	m_index	PY_start
IEEE Access	104	1350	19	31	2.375	2016
Sustainability	96	472	11	18	1.571	2017
Journal of the Chemical Society of Pakistan	85	231	7	10	0.194	1988
Energies	67	672	12	23	1.091	2013
Mehran University Research Journal of Engineering and Technology	64	94	5	6	0.385	2011

Most Occurring Keywords

Keywords are the most significant part of a publication because they are associated with the query and indicate the core content of a manuscript (Kaur & Gupta, 2010). Table 8 shows the most frequently used keywords by UET authors in their research publications.

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"Performance" has been the most frequently repeated keyword with 399 occurrences and 1932 TLS, followed by "behaviour" with 229 occurrences and 1035 TLS, and "optimization" with 226 occurrences and 1047 TLS.

Table 8

Most Occurring Keywords

Keyword	Occurrences	Total Link Strength	Keyword	Occurrences	Total Link Strength
Performance	399	1932	Microstructure	111	584
Behaviour	229	1035	Energy	110	466
Optimization	226	1047	Impact	104	437
Model	173	662	Pakistan	102	329
Design	160	470	Simulation	102	384
Temperature	156	779	Water	99	545
Nanoparticles	155	865	Strength	87	402
Mechanical-Properties	131	739	Efficiency	86	435
System	117	345	Systems	83	282
Adsorption	113	733	Removal	82	533

Top Funding Agencies

Table 9 provides information about the top funding agencies that have supported UET authors' research activities. The HEC has been the top funding agency with 412 (7.49%) publications. UET Lahore, as the home institution, is ranked second with 277 (5.03%) publications and the National Natural Science Foundation of China (NSFC) is ranked third in the table with 254 (4.617%) publications.

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Table 9

Top Funding Agencies

Funding Agencies	Publication (N=5502)	% of 5502
Higher Education Commission of Pakistan	412	7.49
University of Engineering and Technology Lahore, Pakistan	277	5.03
National Natural Science Foundation of China NSFC	254	4.617
King Saud University, Saudi Arabia	64	1.163
UK Research and Innovation UKRI	63	1.145
Engineering Physical Sciences Research Council EPSRC	57	1.036
Fundamental Research Funds for the Central Universities	38	0.691
National Research Foundation of Korea	32	0.582
Natural Sciences and Engineering Research Council of Canada NSERC	31	0.563
Taif University, Saudi Arabia	30	0.545

Distribution of Publications by Research Areas

The most productive research areas are highlighted in the publication distribution. Table 10 describes the subject-wise research productivity of UET authors. The results demonstrate that "Engineering" topped in research productivity with 2020 (36.714%) publications, followed by "Materials Science" with 843 (15.322%) publications, and "Chemistry" with 727 (13.213%) publications.

Table 10

Distribution of Publications by Research Areas

Research Areas	Publication (N=5502)	% of 5502	Research Areas	Publication (N=5502)	% of 5502
Engineering	2020	36.714	Science Technology Other Topics	517	9.397
Materials Science	843	15.322	Energy Fuels	516	9.378
Chemistry	727	13.213	Environmental Sciences Ecology	411	7.47
Computer Science	710	12.904	Telecommunications	317	5.762
Physics	659	11.977	Mathematics	255	4.635

Top Cited Publications

Table 11 highlights the most frequently cited UET publications from 1973-2022. It lists the most frequently cited papers. The top cited article is "Water-Splitting Catalysis and Solar Fuel Devices: Artificial Leaves on the Move" by Joya,

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K.S; Joya, Y.F; Ocakoglu, K; van de Krol, R. with 378 citations. It is followed by "A review on developments in dyeing cotton fabrics with reactive dyes for reducing effluent pollution" by Khatri, A; Peerzada, MH; Mohsin, M; White, M with 342 citations, and "A review on green synthesis of silver nanoparticles and their applications" by Rafique, M; Sadaf, I; Rafique, M.S; Tahir, M.B with 327 citations.

Table 11

Top Cited Publications

Citation	Title	Authors	Journal	Vol. #	Year
378	Water-Splitting Catalysis and Solar Fuel Devices: Artificial Leaves on the Move	Joya, KS; Joya, YF; Ocakoglu, K; van de Krol, R	Angew. Chem.-Int. Edit.	52(40)	2013
342	A review of developments in dyeing cotton fabrics with reactive dyes for reducing effluent pollution	Khatri, A; Peerzada, MH; Mohsin, M; White, M	J. Clean Prod.	87	2015
327	A review of green synthesis of silver nanoparticles and their applications	Rafique, M; Sadaf, I; Rafique, MS; Tahir, MB	Artif Cell Nanomed B.	45(7)	2017
304	CFD applications in various heat exchangers design: A review	Bhutta, MMA; Hayat, N; Bashir, MH; Khan, AR; Ahmad, KN; Khan, S	Appl. Therm. Eng.	32	2012
302	A partitioning strategy for nonuniform problems on multiprocessors	Berger, MJ; Bokhari, SH	IEEE Transactions on Computers	36(5)	1987

DISCUSSION

The literature review has established that various bibliometric studies have been conducted worldwide to determine the research output in different fields of study. However, there has been no study analyzing the research output of UET researchers, which has led to this analysis. The data reported UET researchers' contributions published over five decades from 1973-2022 on the WoS database.

The results have reveal that 5502 publications with UET affiliation were retrieved from the WoS database. Publications were categorized into various document types: articles, abstracts, reviews, editorial content, and proceeding papers. It has been noted that UET researchers have published many research articles. The findings are consistent with other studies that found that the research article document type was the first choice for publishing (Naveed, Aslam, et al., 2021; Shoaib et al., 2021). It has been noted that the research output of UET researchers has increased yearly, with 2022 being the most prolific year. The study findings also indicate that the proportion of research has been steadily rising over time. Additionally, "Muhammad Mujtaba Abbas" from the Department of Mechanical Engineering has been the leading researcher with the most publications in 2022. The Department of Mechanical Engineering at UET

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seems to have been actively engaged in research.

National and international institutions also support research activities (Sabah et al., 2019). Research collaborations with institutions provide opportunities for conducting more research. The results of this study have highlighted that PU is among the top research collaborators. Furthermore, PU collaborates with the (GCU) researchers (Shahzad et al., 2021). In countries with collaborative research, China is the most prominent. The possible reason is that top-tier universities and research institutes have been established in the country due to the substantial investment in research and development, attracting local and foreign talent. With China's emphasis on developing industries and technology, researchers from other countries have come together to collaborate on cutting-edge projects since there is now a common foundation for cooperation (Crijns-Graus et al., 2022). Study results have indicated that Pakistani authors have worked primarily as corresponding authors for research publications. Various funding agencies assist UET with research; the HEC is at the top. Malik et al. (2020) have highlighted that HEC is a significant funding source in Pakistan for research activities. Authors and journals with the highest number of citations are generally considered successful. Thus, selecting a suitable journal for publication is essential (Khan et al., 2021). For the UET researchers, Engineering has been a research area with the highest contribution. Keywords are invaluable for conducting literature searches and accessing relevant data (Asghari & Navimipour, 2018). UET researchers have used many keywords, with "performance" used most frequently.

According to the study objectives, UET researchers have published 4585 articles (83.333%) out of 5502 analyzed. 2022 has been the most productive year, with 871 publications. The bibliometric study reveals that in 2022, the amount of research has grown dramatically (Ejaz et al., 2022). The reasons include publication trends, interest towards research, the accessibility of communication and teamwork made possible by technology, and enhancement of research incentives and facilities, including labs, equipment, and resources. Bibliometric analysis shows that research has increased every year during this time frame.
Muhammad Mujtaba Abbas, with UET affiliation, has had 19 publications and received 106 citations in 2022. PU, on the other hand, leads in the race for institutions'' collaboration at the national and international levels with 368 publications and 87258 TLS. Collaborations with other countries were found throughout the research process. China has been the most collaborative country, with 905 (16.449%) publications. Furthermore, Pakistani authors have often worked as corresponding authors with 3393 such publications.

Research funding agencies provide significant opportunities for researchers. The statistics conclude that HEC has been the top organization providing this opportunity, with 412 HEC- funded publications (7. 49%).The paper entitled “Water-Splitting Catalysis and Solar Fuel Devices: Artificial Leaves on the

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Move" by Joya, K.S; Joya, Y.F; Ocakoglu, K; van de Krol, R., published in the journal "Angew. Chem" International Edition, has been the most cited article with 378 citations. Regarding the distribution of subject areas in research productivity, "Engineering" topped the list with 2020 (36.714%) publications out of 5,502. The frequently used keyword by the UET researchers has been "performance", with 399 occurrences. The Journal "IEEE Access" has been the most productive source, with 104 publications.

The findings of the bibliometric analysis about aspects such as trendiest document type, highly productive year of publications, highly cited documents, productive authors, collaborative organizations, country collaboration, corresponding authors, most productive sources, commonly used keywords, and subject-wise research publications will facilitate scholars to get accurate information about UET research activities.

Implications of the Study

This bibliometric study holds several significant implications. By examining citation information and bibliometric indicators, this study sheds light on how UET's research outputs have impacted the academic community and the broader academic sphere. Furthermore, this analysis aids in identifying the university's primary research fields and areas of expertise, offering valuable insights for future funding decisions and strategic planning. The networks of cooperation between the university and other organizations and scholars provide insights into successful collaborations and areas of potential improvement. They also help determine research trends while assessing the effectiveness of research output, including the quantity of highly cited publications and distribution of citations. The study's outcome encompasses enhancing the university's research environment, fostering collaborations, and guiding decision-making processes that support the institution's growth and influence in the academic and research domains.

Limitations of the Study

This bibliometric study has several research limitations. Firstly, it focuses exclusively on one engineering institution and relies solely on data from the WoS database. This research approach might not have captured the entirety of the university's research outputs. Secondly, it is essential to acknowledge that particular articles, especially those in new or unconventional formats, might not have been indexed in the WoS, potentially leading to underestimating the university's research output. Additionally, the study's findings are specific to the research output of UET Lahore and might not be generalizable or directly applicable to other institutions.

Recommendations

The following recommendations are presented:

1. The UET has shown significant research output on the WoS. The university

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should support faculty and researchers in their ongoing research efforts, while HEC should continue to allocate funding for research sustainability.

2. All departments within UET and its allied campuses should align their research efforts with current trends, aiming to gain recognition for their publications both nationally and internationally.
3. Universities in Pakistan should actively encourage global collaboration across all academic levels to enhance the quality and impact of research worldwide.

CONCLUSION

This bibliometric study provides valuable insight into the research output of UET Lahore, spanning the years from 1973 to 2022. This analysis reveals a remarkable upward trajectory in publications and citations, reflecting the institution's consistent commitment to increasing its research output over the years. Notably, this study underscores the collaborative efforts with other educational institutions, highlighting a productive synergy. Moreover, this bibliometric visualization underscores the paramount importance of research as a keystone of academic excellence and innovation at UET Lahore. It is an invaluable source for the university's administrators, researchers, faculty and stakeholders. It facilitates an in-depth assessment of research performance and is a foundation for informed decisions shaping UET's future endeavors.

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