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A Bibliometric Analysis of Research Output at Panjab University

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Abstract

Measurement of research output of universities has been an area of interest of many researchers. As a result, numerous academic works on this topic have been published in prestigious journals, highlighting the importance of studying the measurement of research output. In this regard, the present study conducts a bibliometric analysis of the research output of select domains of Panjab University to reveal volume trends and provide guidance for researchers. The analysis encompasses all papers published in Scopus between 2002 and 2021. The findings of this study demonstrate noteworthy contributions. Firstly, there has been a substantial increase in the volume of publications over the period of time and most of the publications are in the form of articles. Secondly, Economic and Political Weekly and Journal of Cleaner Production are the most influential journals. Thirdly, the study identifies that "Sharma, M. from University Institute of Applied Management Sciences" is the most prolific author making maximum research contributions. Fourthly, the University Institute of Engineering and Technology has emerged as the most productive department. Lastly, the study highlights a paper titled 'Predicting the growth and trend of the COVID-19 pandemic using machine learning and cloud computing' published in a journal named 'Internet of Things (Netherlands)' that has fetched maximum citations. These insights collectively shed light on the research output of select domains of Panjab University and offer valuable directions for future exploration.

Keywords: Research Output, Bibliometric Analysis, Scopus, Citations, Panjab University

Introduction

Research output undoubtedly reflects the academic wealth of an educational institution, especially universities. Educational institutions can play a prominent role in unlocking novel ideas and fostering innovation and value creation via research output. Secondly, educational institutions can make a significant contribution to society through research by addressing and helping to solve societal, cultural and health issues. The fact became visible in 2020, when the collaborative efforts of Oxford University and AstraZeneca resulted in the successful development of the Oxford/AstraZeneca COVID-19 vaccine, offering widespread protection against the global pandemic. Thirdly, research in the form of articles, book chapters, reviews and projects measures the academic accomplishment of the faculty. Lastly, research plays a significant role in accreditations as well as the funding of the educational institution, which ultimately enables it to attract top talent in terms of both students and faculty. Sheeja et al. (2021) concluded that Indian universities that scored high for research productivity came top in NIRF. These universities were also figured in world university rankings.

Considering the significance of research, it becomes imperative to measure the research output. Research output can be measured either quantitatively or qualitatively. Quantitative measurement or the volume of research, is mainly the interest of the government agencies in order to allocate funds towards universities. Academicians are more interested in assessing

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qualitative measurement of research output as well, hence focusing on citation analysis.

Kumar et al. (2018) measured the research output of Indian Institute Technology (IITs) as it appeared in the Web of Science (WoS) database from 1989 to 2018 to investigate the volume trends, most productive authors and their collaborative attitude with highly cited articles. Gaurav and Negi (2021) evaluated the research productivity of Delhi University based on the data collected from the Scopus database for the period 2011-2020. The study measured the year-wise distribution of publication output, collaborative index, degree of collaboration, collaboration coefficient, modified collaboration coefficient, top-ranked subjects and top-ranked publications based on the collected data. Malaha and Singh (2021) selected the Science Citation Index (SCI) of WoS for selecting top Indian universities in terms of total publications from 2015 to 2019 of the University of Delhi, Banaras Hindu University, Anna University, Jadavpur University and Punjab University to identify the most prolific authors, collaborating countries, collaborating institutions and the impact of their output in terms of citations per paper (CPP) and relative citation impact (RCI). Nagaraja et al. (2017) analysed the research output of engineering colleges affiliated with Vishvesvaraya Technological University in Karnataka by using the WoS core collection database to identify the most prolific authors, and the most preferred journals by the authors in different disciplines.

This study aims to provide a comprehensive overview of the volume, collaborations, journal popularity and citations of the research output of Panjab University in social sciences with specific reference to domains of business, management and accounting; and economics, econometrics and finance. Since business management and accounting are closely related to economics and finance, the two domains have been taken for the study. What sets this study apart from others is its time coverage, spanning from 1981 to 2023.

The remaining sections of the paper are organised as follows: Section 2 provides an overview of the research methodology of the study, outlining the database, search metrics and methods employed. Section 3 presents the study's findings, while Section 4 discusses the study's conclusions, limitations and potential avenues for future research.

Methodology

Database

Selecting an appropriate database to retrieve publications is a crucial decision. Many platforms are available, e.g., Google Scholar Profile, ORCID, Web of Science, Scopus and Microsoft Academic. In this study, the Scopus Database has been selected for the reason that it is a comprehensive database in terms of the number of indexed journals covered across various disciplines. It offers flexibility in search options, allowing for queries based on terms within titles, titles/abstracts, journal names, author names, or affiliations. Also, exporting data from Scopus is relatively easy, which facilitates the data analysis process. The data from the Scopus Database was retrieved on April 4, 2021.

Search Metrics

Search metrics include the decision regarding selection of search terms, the time period for the study and the type of publications to be included. It is crucial to use appropriate and comprehensive search terms that capture a wide range of publications related to the topic. Since the present study relates to measuring the research output of Panjab University, the term 'Panjab University' was the appropriate search term. The search term was looked for in the affiliation part of the basic search. The database provides four super groups as subject areas, viz., physical sciences, life sciences, health sciences and social sciences. In social sciences domain, the search has been for business, management and accounting; and economics, econometrics and finance excluding other subjects. A total of 564 publications have been retrieved. 10 publications were removed for being beyond the time period covered under the study. Therefore, all bibliometric indicators were analysed based on these 554 publications.

Table 1: A Synopsis of Data Source and Sample Selection Methodology

Search Database	*Scopus*
Search Words	"Panjab University"
Subject Area	Business, Management, and Accounting and Economics, Econometrics and Finance
Search Period	1981 to 2023
Publications Found	564
Publications Deleted	10
Final Number of Publications Analysed	554

Methods

The aim of the present study was to conduct a performance analysis in order to gain insights into the research productivity of the faculty of Panjab University in the fields of business, management and accounting and economics, econometrics and finance. For the performance analysis various bibliometric indicators like year, volume and type of publications and citation count will be used and research productivity of individuals and institutions will be evaluated.

Findings

Descriptive Analysis

The analysis of data reveals a total of 554 publications authored by 820 individuals. The average number of publications per author was 0.68, with a publication rate of 12.88 per year. Among the publications, 143 are single-authored, while 411 are multi-authored. The study encompassed research contributions from 264 departments across Indian and foreign universities. The analysed publications received a total of 5441 citations from other scholarly works. On average, each publication garnered approximately 9.82 citations, indicating the impact and influence of the research within the field.

Table 2: Descriptive Analysis

Criteria	*Quantity*
Total Publications	554
Authors	820
Average publications per author	0.68
Publication per year	12.88
Single-authored publications	143
Multi-authored publications	411
Total Citations	5441
Average citations per publication	9.82

Performance Analysis

Volume of Publications

Table 3 and Fig. 1 provide an overview of the year-wise publications. The table indicates a consistent upward trend in the number of articles published per year, which means that university teachers are more engaged in scholarly research work and also make findings of research known to the public through publication in quality journals. This increase is more obvious after 2010 when UGC Regulations 2010, were introduced, whereby the publications have been linked to promotions of university and college teachers. That might be one prominent reason for the increase in the number of publications (not documented in the study). Also, an increase in faculty positions can be another reason (not documented in the present study).

Table 3: Volume of Publications

Year	*Number of Publications*	*Year*	*Number of Publications*
1981	1	2009	5
1982	1	2010	13
1990	1	2011	8
1994	1	2012	15
1998	1	2013	24
1999	1	2014	25
2000	1	2015	18
2001	4	2016	25
2002	4	2017	36
2003	2	2018	34
2004	5	2019	66
2005	4	2020	50
2006	3	2021	58
2007	0	2022	58
2008	6	2023	84

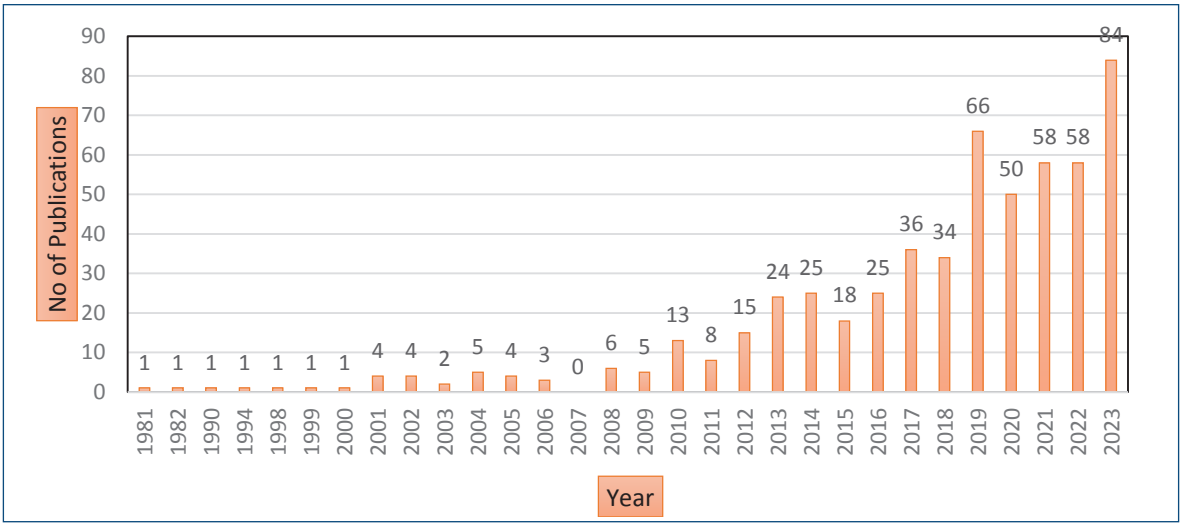

Fig. 1: Volume of Publications

Publication Type

Table 4 and Fig. 2 explain the document type. The findings reveal that most of the publications are in the form of articles (72.02%). This indicates that research articles are the most prevalent form of documentation. Also, a significant portion of the publications consists of book chapters (13.54%), followed by reviews (9.21%). Smaller representation percentages are observed for other document types, including books, editorials, conference papers, notes and short surveys.

Table 4: Publication Type

Document Type	*Number*	*Percentile*
Articles	399	72.02
Books	03	0.54
Book Chapters	75	13.54
Conference Papers	14	2.53
Editorials	03	0.54
Letters	03	0.54
Notes	05	0.90
Reviews	51	9.21
Short Surveys	01	0.18
Total	554	100

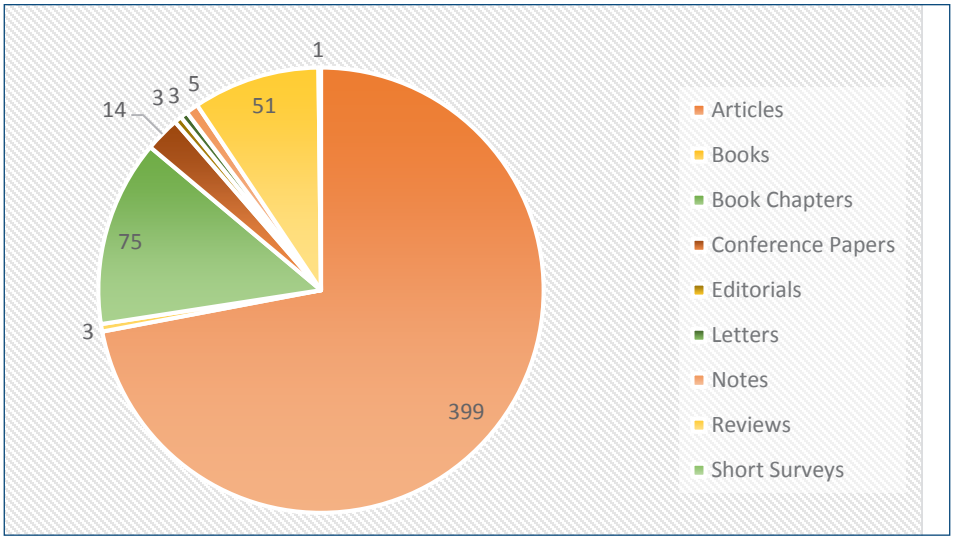

Fig. 2: Publication Type

Most Influential Journal

Numerous journals have published research on business, management and accounting (Scopus Code 1400) and economics, econometrics and finance (Scopus Code 2000). When selecting a journal for publication, authors tend to consider both its relevance to the subject matter and its broad readership. According to Table 5, there are 211 journals involved in publishing the content of authors of Panjab University. Results reflect that out of 211 journals, 135 have published only 01 paper each, while 33 have published 02 papers each. 10 journals have 03 publications each and 11 have 04 publications each over the covered time period. A journal named Benchmarking has been chosen for 05 publications, while Management and Labour Studies, International Journal of Mathematical, Engineering and Management Sciences, Indian Journal of Marketing and Indian Journal of Finance have 06 publications each. There are 07 publications each in Vikalpa and Prabandhan: Indian Journal of Management, 08 in Environment, Development and Sustainability and 09 in the South Asia Research journal.

Table 5 and Fig. 3 reflect the most influential journals within the subject areas of study. Leading the pack is the Economic and Political Weekly with the highest number of publications at 35. Following closely behind is the Journal of Cleaner Production with 31 publications.

Table 5: Most Influential Journals

Name of the Journal/Conference	*Number of Publications*	*Percentage*
Economic and Political Weekly	35	6.32
Journal of Cleaner Production	31	5.60
International Journal of Biological Macromolecules	23	4.15
Journal of Private Equity	20	3.61
The Impact of the COVID-19 Pandemic on People and their Lives: Socio-Political and Economic Aspects	17	3.07
American Journal of Mathematical and Management Sciences	16	2.89
International Journal of Recent Technology and Engineering	14	2.53
Science and Engineering Ethics	11	1.99
Millennial Asia	11	1.99
Journal of Wealth Management	11	1.99

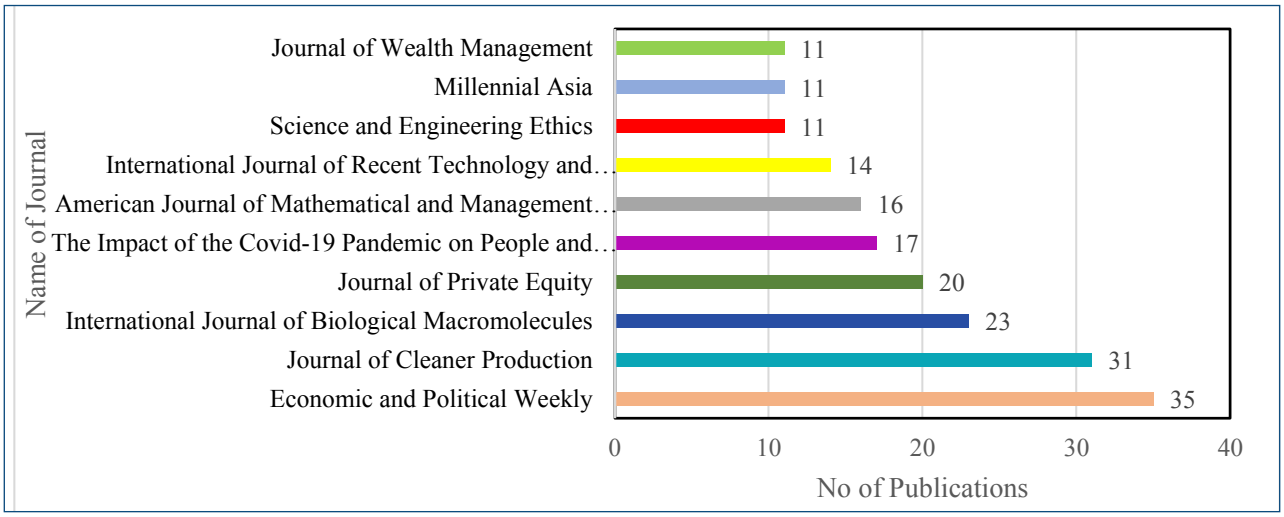

Fig. 3: Most Influential Journals

Most Prolific Author

The data reveals contributions from a total of 820 authors, which include 42 foreign authors from universities in South Korea, the United States, the United Kingdom, Iran, Poland, Pakistan, Canada, etc. Also, there are many authors from colleges, other Indian universities and institutes like Punjab Engineering College, Chandigarh; PGIMER, Chandigarh, Chitkara Business School, Chandigarh University, Gharuan; Lovely Professional University, Jalandhar; IIT Delhi, etc., who have collaborated with faculty of Panjab University in the publications under study. Table 6 highlights the top 10 authors with their number of publications from Panjab University. Sharma, M. from the University Institute of Applied Management Sciences of the University ranks top with 34 publications to his credit, and in 30 out of 34 publications, his name appears as the first author. Sharma S. K**.,** again from the University Institute of Applied Management Sciences, ranks second with 19 publications, out of which his name appears as the first author in 2 publications and the second author in 14 publications, and in the remaining 3 his name appears as the third author. Gill S. from University Business School has 14 publications to her credit with first author in 10 publications. The table also reflects that out of the top 10 authors, 3 are from UIAMS, 3 from the Department of Economics, 2 from UBS and 1 each from the Department of Anthropology and the Department of Environment Studies.

Further, Table 7 reflects the spread of publications by the authors. Most of the authors choose different journals for their publications. The analysis also reflects that most of the authors are consistent in publishing their articles, reflecting even year-wise spread in most of the cases. But in some cases authors publish in different volumes of the same journal. For example, Sharma M has published 18 articles in the Journal of Private Equity and 11 in the Journal of Wealth Management. In all, he has published 34 articles in 6 journals, and his 34 publications are in 12 years, making a yearly spread of 2.83. His maximum (6) publications are in 2014. Sharma S. K. has published 19 articles in 13 journals with a yearly spread of 2.38. Gill S. from University Business School has chosen 11 different journals for her 14 publications. Also her per year publication rate is 1.27. Arora N. and Sharma N. have chosen 7 journals for 12 publications and 5 journals for 11 publications, respectively. Krishan K. has published all his 11 articles in one journal named Science and Engineering Ethics in 4 years with a spread of 2.75 publications per year. Analysis reflects that most of the publications are recorded after 2010, a year of UGC regulations in which publications and promotions were linked. But this is undocumented evidence and could be one of the reasons because the year of publication is also related to the year of joining of the author. Secondly, authors' publications in Scopus journals have been considered in the present study, other publications not being considered.

Table 6: Most Prolific Authors

Name of the Author with Affiliation	*Number of Publications*	*1st Author*	*2nd Author*	*3rd Author*	*4th Author*	*5th Author*
Sharma M., University Institute of Applied Management Science, Panjab University in Chandigarh	**34**	30	2	2	-	-
Sharma S. K., University Institute of Applied Management Sciences, Panjab University, Chandigarh	**19**	2	14	3	-	-
Gill S., University Business School, Panjab University, Chandigarh	**14**	10	4	-	-	-
Arora N., Department of Economics, Panjab University, Chandigarh	**12**	12	-	-	-	-
Sharma N University Institute of Applied Management Science, Panjab University in Chandigarh	**11**	6	5	-	-	-
Krishan K., Department of Anthropology (Centre for Advanced Studies in Anthropology), Panjab University, Chandigarh	**11**	3	4	3	-	1
Kansal P., University Business School, Panjab University, Chandigarh	**10**	7	2	1	-	-

Name of the Author with Affiliation	*Number of Publications*	*1st Author*	*2nd Author*	*3rd Author*	*4th Author*	*5th Author*
Mor S., Department of Environment Studies, Panjab University	**10**	3	2	3	1	1
Singh P., Department of Economics, Panjab University, Chandigarh, India	**10**	6	4	-	-	-
Padhi S. P., Department of Economics, Faculty of Arts, Panjab University, Chandigarh, India	**9**	9	-	-	-	-

Table 7: Journal-Wise and Year-Wise Publications of Top 10 Authors

Name of the Author with Affiliation	*Number of Publications*	*Journal-wise Breakup*		*Year-wise Breakup*		*Yearly Spread*
Sharma M., University Institute of Applied Management Science, Panjab University, Chandigarh	34	Journal of Private Equity	18	2010	2	34/12 =2.83
		Journal of Wealth Management	11	2011	2	
		European Journal of Economics, Finance and Administrative Sciences	2	2012	2	
		International Research Journal of Finance and Economics	1	2013	4	
		Real Estate Management and Valuation	1	2014	6	
		Proceedings of the 33rd IBIMA Conference, 2019: Education Excellence and Innovation Management through Vision 2020	1	2015	2	
		-	-	2017	3	
		-	-	2018	3	
		-	-	2019	3	
		-	-	2020	1	
		-	-	2021	2	
		-	-	2022	1	
Sharma S. K., University Institute of Applied Management Sciences, Panjab University, Chandigarh	19	International Journal of Scientific and Technology Research	4	2015	2	19/8 =2.38
		Vision	3	2016	1	
		International Journal of Recent Technology and Engineering	2	2017	1	
		Prabandhan: Indian Journal of Management	1	2019	4	
		International Journal on Emerging Technologies	1	2020	6	
		Business Perspectives and Research	1	2021	1	
		Asia-Pacific Journal of Business Administration	1	2022	2	
		International Journal of Management Practice	1	2023	2	
		International Journal of Logistics Systems and Management	1	-	-	
		Benchmarking	1	-	-	
		Indian Journal of Finance	1	-	-	
		Journal of Work-Applied Management	1	-	-	
		International Journal of Quality and Service Sciences	1	-	-	

Name of the Author with Affiliation	Number of Publications	Journal-wise Breakup		Year-wise Breakup		Yearly Spread
Gill S., University Business School, Panjab University, Chandigarh	14	Vikalpa	3	2005	1	14/12 =1.27
		Managerial Finance	2	2010	1	
		Gender in Management	1	2012	1	
		Corporate Governance (Bingley)	1	2013	1	
		Journal of Entrepreneurship in Emerging Economies	1	2014	1	
		International Journal of Emerging Markets	1	2015	1	
		Indian Journal of Corporate Governance	1	2018	1	
		Journal of Sustainable Finance and Investment	1	2020	1	
		Journal of Family Business Management	1	2021	1	
		Journal of Indian Business Research	1	2022	4	
		Journal of Advances in Management Research	1	2023	1	
Arora N., Department of Economics, Panjab University, Chandigarh	12	Benchmarking	3	2013	1	12/7 =1.71
		South Asia Economic Journal	1	2016	1	
		Contemporary Economics	1	2017	2	
		Modern Indices for International Economic Diplomacy	1	2018	1	
		Economic Papers	2	2020	1	
		Theorizing International Trade: An Indian Perspective	1	2022	3	
		Applied Econometrics	1	2023	3	
		Macroeconomics and Finance in Emerging Market Economies	1	-	-	
		Socio-Economic Planning Sciences	1	-	-	
Sharma N., University Institute of Applied Management Science, Panjab University in Chandigarh	11	Indian Journal of Finance	1	2012	2	11/5 =2.2
		SCMS Journal of Indian Management	1	2019	1	
		Finance India	1	2020	1	
		Review of Applied Socio-Economic Research	1	2022	3	
		Virtual Economics	1	2023	4	
		Journal of Internet Banking and Commerce	1	-	-	
		FIIB Business Review	1	-	-	
		Business, Management and Economics Engineering	1	-	-	
		International Journal of Applied Economics, Finance and Accounting	1	-	-	
		Asian Journal of Business and Accounting	1	-	-	
		Asian Journal of Economic Modelling	1	-	-	
Krishan K., Department of Anthropology (Centre for Advanced Studies in Anthropology), Panjab University, Chandigarh	11	Science and Engineering Ethics	11	2016	4	11/4 =2.75
		-	-	2017	1	
		-	-	2018	2	
		-	-	2019	4	

Name of the Author with Affiliation	*Number of Publications*	*Journal-wise Breakup*		*Year-wise Breakup*		*Yearly Spread*
Kansal P., University Business School, Panjab University, Chandigarh	10	Journal of Asia Business Studies	3	2005	1	10/8 =1.25
		Journal of Indian Business Research	1	2008	2	
		Journal of Marketing Theory and Practice	1	2011	1	
		Electronic Business in Developing Countries: Opportunities and Challenges	1	2013	1	
		Indian Journal of Marketing	1	2014	1	
		International Journal of Hospitality and Tourism Systems	1	2017	1	
		Asia-Pacific Journal of Innovation in Hospitality and Tourism	1	2018	2	
		Vision	1	2023	1	
Mor S., Department of Environment Studies, Panjab University, Chandigarh	10	Environment, Development and Sustainability	4	2015	1	10/7 =1.43
		Journal of Cleaner Production	6	2016	1	
		-	-	2017	1	
		-	-	2018	1	
		-	-	2019	3	
		-	-	2020	2	
		-	-	2021	1	
Singh P., Department of Economics, Panjab University, Chandigarh	10	Global Political Economy: A Critique of Contemporary Capitalism	4	2017	1	10/4 =2.5
		Indian Journal of Economics and Development	1	2020	1	
		Indian Journal of Labour Economics	1	2021	6	
		Environment, Development and Sustainability	1	2023	2	
		World Review of Political Economy	1	-	-	
		Changing Contours of Indian Agriculture Investment, Income and Non-farm Employment	1	-	-	
		Studies in Political Economy	1	-	-	
Padhi S.P., Department of Economics, Panjab University, Chandigarh	9	Indian Journal of Labour Economics	3	2004	1	9/7 =1.28
		Foreign Trade Review	1	2015	2	
		Review of Political Economy	1	2018	1	
		Journal of Economic Issues	1	2019	1	
		Journal of Post Keynesian Economics	1	2020	2	
		PSL Quarterly Review	1	2021	1	
		International Journal of Emerging Markets	1	2022	1	

Most Productive Department

The results reveal that a total of 264 departments and institutes are involved in 564 publications under study. Out of these, 59 departments/centres/regional centres are from Panjab University. Since the study focuses on the research output of Panjab University, other institutes have been excluded while ascertaining the most productive department in the fields of business, management and accounting and economics, econometrics and finance. The results also reveal that the University Institute of Engineering and Technology, Panjab University, Chandigarh, ranks top with 75 publications, followed by the University Business School with 56 and the Department of Economics with 30 publications. Table 8 gives the department-wise publications of the top 10 departments of the university.

Table 8: Most Productive Department

Sr. No.	Name of Department	Number of Publications
1	University Institute of Engineering and Technology, Panjab University, Chandigarh	75
2	University Business School, Panjab University, Chandigarh	56
3	Department of Economics, Panjab University, Chandigarh	30
4	University Institute of Applied Management Sciences, Panjab University Chandigarh	26
5	Department of Statistics, Panjab University, Chandigarh	24
6	Department of Microbiology, Panjab University, Chandigarh	18
7	Dr. S. S. Bhatnagar Institute of Chemical Engineering and Technology, Panjab University, Chandigarh	15
8	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh	14
9	Department of Biotechnology, Panjab University, Chandigarh	14
10	Department of Environment Studies, Panjab University, Chandigarh	13

Distribution of Publications by Number of Authors

Table 9 highlights the distribution of publications in terms of the number of authors involved. Out of a total of 554 publications, 25.81% are single-authored, whereas the remaining 74.19% have been written in collaboration. Specifically, 32.67% of the publications involve two authors, 24.37% involve three authors and 9.21% have been written by four authors.

Collaborative research promotes the learning experience, widens the scope of research and leads to better research works. It has been observed that collaborative studies receive more citations. In the present study also, 23 out of the 25 highly cited papers are the result of collaborative efforts, further supporting this claim. The analysis also reflects that collaborations for publications are not only inter-departmental but also inter-university and inter-nation. A total of 42 foreign authors from universities of South Korea, the United States, the United Kingdom, Iran, Poland, Pakistan, Canada, Hong Kong, the Russian Federation, the Czech Republic, Malaysia, Turkey, South Africa, Australia and Viet Nam have collaborated for the publications under study.

Table 9: Distribution of Publications by Number of Authors

Number of Authors	Number of Publications	Percentage
Single Author	143	25.81
Two Authors	181	32.67
Three Authors	135	24.37
Four Authors	51	9.21
Five Authors	27	4.87
Six Authors	09	1.63
Seven Authors	04	0.72
Eight Authors	04	0.72
Total	554	100

Citation Analysis

Citations against any research paper refer to the count that paper has been quoted by other authors in their publications, hence reflecting the impact of a publication. Out of a total of 554 publications, 358 papers have received citations, amounting to a cumulative count of 5,441 citations.

Table 10 reveals that a small fraction, 9 papers (2.51%), have more than 100 citations each. These 7 highly cited papers contribute to a total citation count of 1.489 (27.37%). Additionally, 22 papers have garnered citations

ranging between 50 and 100, accounting for a total count of 1,483 citations (27.26%).

In contrast, 257 publications (58.82%) have a total of 897 publications, reflecting the majority of the publications have received less than 10 citations each.

Table 10: Citation Analysis of Publications

Number of Times a Paper Cited	*Number of Papers*	*Percentage of Papers*	*Total Citations*	*Percentage of Citations*
>100	09	2.51%	1489	27.37%
>50 ≤ 100	22	6.15%	1483	27.26%
>20 ≤ 50	33	9.22%	1038	19.08%
>10 ≤ 20	37	10.33%	534	9.81%
≤ 10	257	71.79%	897	16.48%
Total	**358**	**100**	5441	100

Table 11: 25 Highly Cited Publications

Sr. No.	*Title*			*Scopus Metrics*
				Citations
1	Predicting the growth and trend of COVID-19 pandemic using machine learning and cloud computing	Tuli S.; Tuli S.; Tuli R.; Gill S. S.	Internet of Things (Netherlands)	327
2	Emissions of air pollutants from primary crop residue burning in India and their mitigation strategies for cleaner emissions	Ravindra K.; Singh T.; Mor S.	Journal of Cleaner Production	203
3	Application of agro-waste rice husk ash for the removal of phosphate from the wastewater	Mor S.; Chhoden K.; Ravindra K.	Journal of Cleaner Production	170
4	Prospects of biopolymer technology as an alternative option for non-degradable plastics and sustainable management of plastic wastes	Kabir E.; Kaur R.; Lee J.; Kim K.-H.; Kwon E.E.	Journal of Cleaner Production	163
5	The potential of green synthesized zinc oxide nanoparticles as nutrient source for plant growth	Singh J.; Kumar S.; Alok A.; Upadhyay S. K.; Rawat M.; Tsang D.C.W.; Bolan N.; Kim K.-H.	Journal of Cleaner Production	152
6	Mannans: An overview of properties and application in food products	Singh S.; Singh G.; Arya S. K.	International Journal of Biological Macromolecules	134
7	Utility of laccase in pulp and paper industry: A progressive step towards the green technology	Singh G.; Arya S. K.	International Journal of Biological Macromolecules	124
8	Nanosilica extraction from processed agricultural residue using green technology	Mor S.; Manchanda C. K.; Kansal S. K.; Ravindra K.	Journal of Cleaner Production	113
9	Testing for second-order stochastic dominance of two distributions	Kaur A.; Prakasa Rao B. L. S.; Singh H.	Econometric Theory	103
10	Trend in household energy consumption pattern in India: A case study on the influence of socio-cultural factors for the choice of clean fuel use	Ravindra K.; Kaur-Sidhu M.; Mor S.; John S.	Journal of Cleaner Production	93
11	Consumer ethnocentrism: CETSCALE validation and measurement of extent	Bawa A.	Vikalpa	90
12	E-waste generation and management practices in Chandigarh, India and economic evaluation for sustainable recycling	Ravindra K.; Mor S.	Journal of Cleaner Production	87

Sr. No.	Title			Scopus Metrics
				Citations
13	System analysis of municipal solid waste management in Chandigarh and minimization practices for cleaner emissions	Ravindra K.; Kaur K.; Mor S.	Journal of Cleaner Production	80
14	Effects of powder size of interface material on selective hybrid carbon microwave joining of SS304–SS304	Bagha L.; Sehgal S.; Thakur A.; Kumar H.	Journal of Manufacturing Processes	77
15	Nanofluids assisted environmental friendly lubricating strategies for the surface grinding of titanium alloy: Ti6Al4V-ELI	Singh H.; Sharma V. S.; Singh S.; Dogra M.	Journal of Manufacturing Processes	74
16	Deadline constraint heuristic-based genetic algorithm for workflow scheduling in cloud	Verma A.; Kaushal S.	International Journal of Grid and Utility Computing	71
17	L-Cysteine functionalized bagasse cellulose nanofibers for mercury(II) ions adsorption	Bansal M.; Ram B.; Chauhan G. S.; Kaushik A.	International Journal of Biological Macromolecules	71
18	Voluntary disclosures of intellectual capital: An empirical analysis	Singh S.; Kansal M.	Journal of Intellectual Capital	70
19	Management of the agricultural biomass on decentralized basis for producing sustainable power in India	Singh J.	Journal of Cleaner Production	68
20	Biofuel from rice straw	Sharma A.; Singh G.; Arya S. K.	Journal of Cleaner Production	68
21	Simultaneous extraction of lignin and cellulose nanofibrils from waste jute bags using one pot pre-treatment	Ahuja D.; Kaushik A.; Singh M.	International Journal of Biological Macromolecules	67
22	Extraction and functionalization of bagasse cellulose nanofibres to Schiff-base based antimicrobial membranes	Bansal M.; Chauhan G. S.; Kaushik A.; Sharma A.	International Journal of Biological Macromolecules	65
23	Impact of landfill leachate on the groundwater quality in three cities of North India and health risk assessment	Negi P.; Mor S.; Ravindra K.	Environment, Development and Sustainability	62
24	Approach to ecofriendly leather: Characterization and application of an alkaline protease for chemical free dehairing of skins and hides at pilot scale	George N.; Chauhan P. S.; Kumar V.; Puri N.; Gupta N.	Journal of Cleaner Production	61
25	NiO nanodisks: Highly efficient visible-light driven photocatalyst, potential scaffold for seed germination of Vigna Radiata and antibacterial properties	Chaudhary S.; Kaur Y.; Jayee B.; Chaudhary G. R.; Umar A.	Journal of Cleaner Production	58

Table 11 provides insights into the 25 highly cited publications. The paper titled "Predicting the growth and trend of the COVID-19 pandemic using machine learning and cloud computing", authored by Tuli S.; Tuli S.; Tuli R.; Gill S. S., published in the Internet of Things (Netherlands), has received 327 citations. Another noteworthy paper is "Emissions of air pollutants from primary crop residue burning in India and their mitigation strategies for cleaner emissions," published in the Journal of Cleaner Production, which has fetched 203 citations. It has also been observed that 12 out of 25 highly cited papers have been published in the Journal of Cleaner Production. Another observation is that 07 publications out of 25 relate to nano-technology, which reflects the emerging significance of the topic.

Conclusions, Limitations and Future Research

Research publications capture not only the academic progress of an institute but also measure the professional development levels of the faculty. Also, research output is one of the key performance indicators (KPIs) for crucial decisions such as promotion, grants and recruitment. Hence, the present study has been undertaken, which is a bibliometric analysis of research output of Panjab University to uncover the volume trends, most popular journal, most productive department and prolific authors. The scope of the study has been restricted to publications in two broad fields: business, management and accounting; and economics, econometrics and finance. Findings of the study indicate that over a span of 43 years, from 1981 to 2023, 564 researches have been generated by 820 authors, which have been published across 211 journals. The volume of publications has shown a rising trend, with the highest number of publications (84) recorded in the year 2023, and 2019 recorded the second highest of 66 publications. The majority of publications, 399 out of 554 (72.02%), are in the form of articles, but quite a large number, 75 publications, are in the form of book chapters. These publications have a spread across 211 journals. Among these journals, the journal named Economic and Political Weekly has 35 publications, followed by 31 publications in the Journal of Cleaner Production.

Faculty from the University Institute of Engineering and Technology, Panjab University, Chandigarh, has authored the maximum number of publications (75), followed by the University Business School, Panjab University, Chandigarh, with 56 publications and the Department of Economics, Panjab University, Chandigarh, with 30 publications.

The most prolific author has been Sharma M., from the University Institute of Applied Management Science, Panjab University Chandigarh, who has 34 publications to his credit during the period 2010 to 2022, making the spread of 2.83 publications per year. Out of his 34 publications, he appears to be the 1st author in 30 publications. Out of the 820 authors involved in all the publications, 601 authors have authored only one publication each. Also, 134 out of the 554 publications have been published by a single author; the majority of publications reflect collaborative research work. It has also been observed that most of the highly cited publications (23 out of 25) are collaborative research.

Out of the 558 papers, 358 have received citations, and the total count of citations is 5441. A small percentage of papers, 2.51% of the cited papers, have fetched 27.37% of the total citations. The paper titled "Predicting the growth and trend of the COVID-19 pandemic using machine learning and cloud computing", has received a maximum count of 327 citations.

Although the study highlights the valuable insights on the volume trends, popular journals and the most productive department in terms of publication and many other aspects, yet it has a few limitations and suggests potential avenues for future research. One limitation is that only two domains in the social sciences group of the Scopus database, namely business, management and accounting; and economics, econometrics and finance have been considered in the study, restricting the scope of the study. Secondly, publications of the authors published in other journals which are not Scopus indexed have not been considered, which might affect all the research indicators and change the research findings. Another limitation is the study's temporal scope of 43 years, which might not capture recent developments; hence, it would be beneficial for future studies to consider shorter timeframes or conduct periodic bibliometric analyses to provide a more up-to-date and comprehensive overview of the research landscape.

Future research could also adopt a wider view incorporating other domains in social sciences or make a comparative study of research in different domains like physical sciences, life sciences, health sciences and social sciences. Furthermore, a comparative study of the different universities can provide better vision of the research topic. Overall, future research should strive for a comprehensive and inclusive approach by incorporating comparative analysis and larger domains.

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