To Assess the Research Output and Scientometric Performance of Faculty Members and Research Scholars in BDU-Affiliated Colleges

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***Abstract*—The present study aims to assess the research output and scientometric performance of faculty members and research scholars in selected BDU-affiliated colleges. The study is based on 260 respondents selected through convenience sampling. Key variables include publication productivity, indexed journal preference, publication diversity, citation visibility, and scientometric awareness. Cluster analysis identified three respondent groups: low, moderate, and high performance clusters. The findings reveal that the majority of respondents belong to the low and moderate categories, indicating the need for stronger institutional support, publication mentoring, and citation awareness programmes to enhance research visibility and academic performance.**

***Index Terms*—Research Output, Scientometric Performance, Faculty Members, Research Scholars, Cluster Analysis, Bharathidasan University Affiliated Colleges**

I. INTRODUCTION

In the present knowledge-driven academic environment, the research output of faculty members and research scholars has become one of the most significant indicators of institutional quality, academic reputation, and intellectual contribution. Higher education institutions are increasingly evaluated based on measurable research indicators such as number of publications, citations, h-index, i10-index, collaborative authorship, and publications in indexed journals. Scientometric techniques provide a systematic and quantitative framework to evaluate these dimensions and to understand the productivity patterns of researchers. Recent higher-education studies confirm that bibliometric and scientometric approaches are effective in assessing institutional and faculty research performance trends.

In the context of Bharathidasan University (BDU)-affiliated colleges, faculty members and research scholars contribute significantly through journal articles, conference papers, book chapters, funded projects, and doctoral research. However, the extent of their research visibility and citation impact varies across colleges and disciplines. Scientometric evaluation helps in identifying publication growth, citation influence, collaborative patterns, preferred databases, and department-wise strengths. Such an assessment is useful for institutional benchmarking, accreditation requirements, ranking improvement, and policy decisions related to research incentives and faculty development. Similar studies in higher education have shown that structured scientometric assessment improves understanding of research productivity and institutional competitiveness.

Therefore, the present study attempts to assess the research output and scientometric performance of faculty members and research scholars in selected BDU-affiliated colleges. The study aims to provide empirical evidence on the present status of research productivity and to classify respondents according to their performance levels.

II. STATEMENT OF THE PROBLEM

Research productivity has emerged as a major benchmark in evaluating the academic effectiveness of higher education institutions. Although faculty members and research scholars in BDU-affiliated

colleges are actively involved in research activities, the actual level of their publication productivity, citation impact, collaboration network, and database visibility remains uneven across institutions. Some colleges exhibit strong research culture with significant Scopus and Web of Science indexed publications, while others face limitations due to inadequate infrastructure, insufficient mentoring, low funding support, and lack of awareness regarding quality journals.

The absence of a systematic scientometric assessment makes it difficult for administrators and policymakers to understand the true research strengths and weaknesses of affiliated colleges. Without such evidence-based evaluation, institutional decisions relating to promotion policies, research incentives, faculty appraisal, and ranking improvement may remain ineffective. Recent scientometric studies on higher education institutions also stress the need for structured performance evaluation models to improve academic productivity.

Hence, there is a strong need to assess the research output and scientometric performance of faculty members and research scholars in selected BDU-affiliated colleges so that suitable strategies may be framed to strengthen the research ecosystem.

III. REVIEW OF LITERATURE

Mahapatra and Sahoo (2022) emphasized that scientometric indicators such as publication count, citations, h-index, and database indexing are essential tools for evaluating academic productivity. Their systematic review highlighted the growing role of quantitative metrics in faculty performance assessment.

See (2026) conducted a bibliometric analysis of higher education efficiency and productivity studies and reported that publication trends, institutional contribution, and citation mapping significantly explain research performance patterns in universities.

Maral (2024) examined the global literature on higher education using bibliometric techniques and found significant growth in higher education research across leading journals, institutions, and countries. The study established the usefulness of scientometric tools in identifying research productivity trends.

Hussain, Matore, and Hamzah (2025) analyzed educator performance evaluation through bibliometric approaches and concluded that research visibility, citation impact, and collaborative authorship are emerging dimensions of faculty performance measurement.

Maral (2024) also studied the research performance of higher education institutions and found that publication volume, institutional collaboration, and citation indicators strongly influence the overall academic standing of institutions.

IV. NEED FOR THE STUDY

In the present higher education environment, research productivity and scientometric indicators have become important measures of academic excellence. In BDU-affiliated colleges, faculty members and research scholars contribute through publications, citations, and collaborative research; however, their performance levels vary widely. Hence, there is a need to assess their research output, indexed journal preference, citation visibility, and scientometric awareness to identify performance gaps and improve institutional research quality.

V. SCOPE OF THE STUDY

The study is confined to selected colleges affiliated to Bharathidasan University and focuses on faculty members and research scholars only. It covers dimensions such as publication productivity, indexed journal preference, publication diversity, citation impact, and scientometric awareness. The study uses 260 respondents and applies cluster analysis to classify them into low, moderate, and high research performance groups.

VI. OBJECTIVES OF THE STUDY

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VII. RESEARCH METHODOLOGY

The present study adopts a descriptive and analytical research design to assess the research output and scientometric performance of faculty members and research scholars in BDU-affiliated colleges. The study is confined to selected affiliated colleges of

Bharathidasan University, focusing only on colleges chosen based on respondent accessibility and willingness to participate.

The population of the study comprises faculty members and research scholars working in the selected BDU-affiliated colleges. Since the study is limited to selective colleges and accessible respondents, the convenience sampling method has been employed. A total of 260 respondents constitute the sample size for the study.

Both primary and secondary data are used for the investigation. Primary data are collected through a structured questionnaire based on a 5-point Likert scale, covering dimensions such as publication output, citations, collaboration, database indexing, institutional support, and research funding. Secondary data are collected from Scopus, Web of Science, Google Scholar profiles, institutional repositories, NAAC reports, and annual college reports.

For data analysis, statistical tools such as percentage analysis, mean score analysis, rank analysis, correlation, and cluster analysis are proposed. In particular, cluster analysis is used to classify the 260 respondents into homogeneous groups such as high performers, moderate performers, emerging researchers, and low productivity researchers based on their scientometric indicators. This method will provide a deeper understanding of respondent performance segmentation and institutional research behavior.

VIII. ANALYSIS AND INTERPRETATION

TABLE NO.1

Agglomeration Schedule						
	Cluster Combined			Stage Cluster First Appears		
Stage	Cluster 1	Cluster 2	Coefficients	Cluster 1	Cluster 2	Next Stage
241	21	23	2.000	236	211	256
242	10	11	2.000	224	223	247
243	1	3	2.000	238	231	253
244	5	7	2.500	240	227	246
245	15	18	3.667	239	216	251
246	5	8	4.667	244	226	249
247	10	12	5.000	242	222	250
248	13	14	6.000	221	220	254
249	4	5	6.500	230	246	253
250	9	10	7.667	225	247	254
251	15	19	7.750	245	215	255
252	24	25	12.000	210	235	256
253	1	4	16.200	243	249	258
254	9	13	18.000	250	248	257
255	15	20	24.200	251	214	257
256	21	24	35.270	241	252	259
257	9	15	39.500	254	255	258
258	1	9	68.667	253	257	259
259	1	21	123.981	258	256	0

Based on the agglomeration schedule, a sharp increase in the coefficient values is observed in the final stages of clustering, particularly between Stage 258 (68.667) and Stage 259 (123.981). This substantial jump indicates that highly dissimilar clusters are merged at the last stage. According to the standard rule of

hierarchical cluster analysis, the appropriate number of clusters is selected just before the largest increase in coefficient values.

Therefore, the study justifies the selection of three clusters as the most meaningful solution for classifying the 260 respondents. These three clusters represent distinct groups of respondents based on their research output, indexed journal preference, publication diversity, scientometric awareness, and research visibility.

The three clusters may be interpreted as:

- Cluster I – High Research and Scientometric Performers
- Cluster II – Moderate / Emerging Research Performers
- Cluster III – Low Research Visibility Respondents

Further, the selected three-cluster solution can be validated using K-means cluster analysis to obtain more stable and interpretable respondent segments

The Initial Cluster Centers table presents the starting seed values used in the K-means clustering procedure for classifying respondents based on their research output and scientometric performance.

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TABLE NO.2

			cluster		
No	Variable Name	Short Code	1	2	3
1	Regularly publish in peer-reviewed journals	PP1	1.00	5.00	4.00
2	Publication output increased over five years	PP2	2.00	1.00	5.00
3	Maintain consistent annual publications	PP3	1.00	5.00	3.00
4	Prefer high-impact journals	PP4	5.00	2.00	3.00
5	Frequently publish in Scopus journals	IJP1	2.00	5.00	1.00
6	Prefer Web of Science journals	IJP2	5.00	1.00	3.00
7	UGC CARE journals important	IJP3	1.00	5.00	3.00
8	Indexing status influences decisions	IJP4	5.00	1.00	3.00
9	Contribute to diverse scholarly outputs	PD1	1.00	5.00	2.00
10	Collaborative research publications	PD2	5.00	1.00	3.00
11	Patents/reports/project publications	PD3	1.00	5.00	3.00
12	Update Scholar/Scopus profile	SA1	1.00	5.00	4.00
13	Monitor h-index and citations	SA2	1.00	5.00	3.00
14	Citation indicators influence planning	SA3	2.00	5.00	4.00
15	Aware of average citations per paper	SA4	5.00	1.00	3.00
16	Publications receive satisfactory citations	IV1	1.00	5.00	4.00
17	Research improved academic reputation	IV2	1.00	5.00	4.00
18	Institution encourages highly cited journals	IV3	1.00	4.00	5.00
19	Citation visibility motivates publishing	IV4	3.00	1.00	5.00
20	Scientometric indicators useful for evaluation	IV5	5.00	2.00	3.00

The table indicates that the respondents are initially grouped into three clusters with distinct response patterns across the 20 variables.

Cluster 1 shows relatively low scores in publication productivity and scientometric awareness variables, while some variables such as journal indexing

influence and collaborative participation display higher starting values. This cluster may represent respondents with selective research engagement and moderate strategic publication behaviour.

Cluster 2 demonstrates consistently high initial scores (mostly 5.00) for variables related to regular publication, research growth, publication consistency, indexed journal preference, profile updating, and citation awareness. This cluster clearly reflects high research performers with strong scientometric orientation and publication visibility.

Cluster 3 shows moderate to high initial values in selected variables such as collaborative publishing, institutional encouragement, and research visibility, while other productivity indicators remain average. This suggests a group of emerging or developing researchers who are gradually strengthening their research output and scientometric performance.

Overall, the initial cluster centers confirm the presence of three distinct respondent segments, namely:

- Cluster 1 – Selective / Low Research Performers
- Cluster 2 – High Scientometric Performers
- Cluster 3 – Emerging Research Contributors

These final centers provide the base for further refinement in the final cluster solution.

TABLE NO.3

			cluster		
No	Variable Name	Short Code	1	2	3
1	Regularly publish in peer-reviewed journals	PP1	2.09	5.00	4.11
2	Publication output increased over five years	PP2	3.09	1.00	4.89
3	Maintain consistent annual publications	PP3	1.36	4.59	3.22
4	Prefer high-impact journals	PP4	4.64	1.56	3.44
5	Frequently publish in Scopus journals	IJP1	2.18	3.69	3.22
6	Prefer Web of Science journals	IJP2	4.18	1.41	2.89
7	UGC CARE journals important	IJP3	1.82	4.59	3.11
8	Indexing status influences decisions	IJP4	4.36	1.41	2.89
9	Contribute to diverse scholarly outputs	PD1	1.45	4.59	2.78
10	Collaborative research publications	PD2	4.27	1.41	2.89
11	Patents/reports/project publications	PD3	1.73	4.59	3.33
12	Update Scholar/Scopus profile	SA1	2.00	4.73	4.00
13	Monitor h-index and citations	SA2	1.73	4.59	3.11
14	Citation indicators influence planning	SA3	2.73	3.35	3.56
15	Aware of average citations per paper	SA4	4.36	1.41	3.00
16	Publications receive satisfactory citations	IV1	1.91	5.00	3.89
17	Research improved academic reputation	IV2	2.18	5.00	4.44
18	Institution encourages highly cited journals	IV3	1.73	4.28	4.56
19	Citation visibility motivates publishing	IV4	3.64	1.44	5.00
20	Scientometric indicators useful for evaluati	IV5	4.55	1.56	2.89

The Final Cluster Centers table presents the mean scores of the 20 research output and scientometric performance variables for the three clusters of respondents.

Cluster 1 records lower mean values in core publication variables such as regular publication, consistency, publication diversity, citation receipt, and profile updating, while showing relatively higher

scores in high-impact journal preference, Web of Science preference, collaborative publishing, and usefulness of scientometric indicators. This cluster may be interpreted as selective or strategy-oriented researchers, who focus on quality-oriented publication choices rather than consistent output.

Cluster 2 shows very high mean scores in regular publication, publication consistency, UGC CARE preference, publication diversity, profile updating, citation monitoring, and research reputation variables. This clearly represents high research and scientometric performers, characterized by strong publication habits, awareness of citation metrics, and high academic visibility.

Cluster 3 reflects moderate to high scores across most variables, especially publication growth, regular publication, profile updating, institutional encouragement, and citation motivation. This cluster may be identified as emerging and developing researchers, who demonstrate growing research engagement and improving scientometric awareness.

Overall, the final cluster solution confirms the presence of three distinct respondent groups:

- Cluster 1 – Selective / Strategic Researchers
- Cluster 2 – High Research Performers
- Cluster 3 – Emerging Researchers

This clustering indicates varying levels of research productivity, indexed journal preference, scientometric awareness, and citation visibility among the respondents.

TABLE NO.4.

Iteration History[a]			
Iteration	Change in Cluster Centers		
	1	2	3
1	2.509	2.589	2.351
2	.435	.000	.420
3	.421	.000	.452
4	.383	.000	.520
5	.000	.000	.000
a. Convergence achieved due to no or small change in cluster centers. The maximum absolute coordinate change for any center is .000. The current iteration is 5. The minimum distance between initial centers is 9.849.			

The Iteration History table shows the refinement process of the three cluster centers during the K-means clustering procedure.

In the first iteration, the cluster centers underwent notable changes, with values of 2.509, 2.589, and 2.351, indicating substantial reallocation of respondents among the three clusters. In the subsequent iterations, the changes gradually decreased, showing that the cluster solution was moving toward stability.

By the fifth iteration, the change in all three cluster centers became 0.000, indicating that no further movement in cluster means occurred. Hence, the clustering process achieved full convergence at the 5th iteration.

The note also states that the maximum absolute coordinate change is 0.000, confirming that the final cluster centers are stable and the respondents are appropriately grouped. Further, the minimum distance between initial centers (9.849) suggests that the three starting clusters were sufficiently distinct, which supports a reliable clustering solution.

Thus, the K-means analysis successfully produced a stable and meaningful three-cluster classification of respondents based on their research output and scientometric performance.

TABLE NO.5.

ANOVA						
	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Regularly publish in peer-reviewed journals	201.678	2	.343	257	587.778	.000

Publication output increased over five years	304.901	2	.273	257	1116.524	.000
Maintain consistent annual publications	234.796	2	.289	257	812.185	.000
Prefer high-impact journals	209.954	2	.454	257	462.776	.000
Frequently publish in Scopus journals	53.920	2	1.782	257	30.262	.000
Prefer Web of Science journals	169.748	2	.374	257	453.888	.000
UGC CARE journals important	169.748	2	.234	257	725.701	.000
Indexing status influences decisions	193.350	2	.266	257	727.575	.000
Contribute to diverse scholarly outputs	217.310	2	.295	257	735.501	.000
Collaborative research publications	181.296	2	.253	257	716.552	.000
Patents/reports/project publications	183.980	2	.292	257	630.239	.000
Update Scholar/Scopus profile	181.333	2	.272	257	666.226	.000
Monitor h-index and citations	181.296	2	.253	257	716.552	.000
Citation indicators influence planning	17.013	2	1.571	257	10.827	.000
Aware of average citations per paper	192.729	2	.235	257	821.460	.000
Publications receive satisfactory citations	221.340	2	.273	257	810.528	.000
Research improved academic reputation	203.759	2	.275	257	740.396	.000
Institution encourages highly cited journals	223.199	2	.356	257	626.318	.000
Citation visibility motivates publishing	260.471	2	.166	257	1571.511	.000
Scientometric indicators useful for evaluation	199.766	2	.273	257	730.995	.000
The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.						

The ANOVA table shows the extent to which the 20 research output and scientometric performance variables differentiate the three clusters. All the variables record high F-values with significance values of 0.000, indicating that each variable contributes substantially to distinguishing the low, moderate, and high-level research performance clusters.

Among the variables, “Citation visibility motivates publishing” shows the highest F-value (1571.511), indicating that this is the strongest differentiating factor among the clusters. Similarly, variables such as publication output growth, regular publication, publication diversity, citation receipt, and academic reputation also strongly separate the respondent groups.

However, as noted in the SPSS output, these F-tests are to be used only for descriptive purposes, since the clusters were formed specifically to maximize between-group differences. Therefore, the significance values should not be interpreted as formal hypothesis tests but rather as indicators of the relative importance of variables in cluster formation.

Overall, the ANOVA results confirm that all the selected variables meaningfully contribute to the three-cluster classification of respondents based on research output and scientometric performance.

TABLE NO.6.

Number of Cases in each Cluster			
		no.of respondents	Percentage
Cluster	low clusters	99	38
	moderate clusters	90	34
	High level cluster	72	28
Total		260	100

The table shows the distribution of 260 respondents across the three clusters identified through K-means cluster analysis based on research output and scientometric performance.

The Low-Level Cluster consists of 99 respondents (38%), which forms the largest group in the study. This indicates that a considerable proportion of faculty members and research scholars exhibit comparatively lower levels of publication productivity, indexed journal preference, and scientometric awareness.

The Moderate-Level Cluster includes 90 respondents (34%), representing respondents with average research output and developing awareness of citation-based performance indicators.

The High-Level Cluster comprises 72 respondents (28%), indicating that a smaller but significant proportion of respondents demonstrate strong research productivity, publication visibility, and scientometric performance.

Overall, the cluster distribution reveals that the majority of respondents fall under the low and moderate performance categories (72%), while only 28% belong to the high-level research performance cluster. This suggests the need for stronger institutional support, publication mentoring, and scientometric awareness programmes to improve overall research performance in BDU-affiliated colleges.

IX. SUGGESTIONS OF THE STUDY

Based on the analysis, it is evident that a majority of respondents belong to the low and moderate research performance clusters, indicating the need for systematic institutional intervention. Colleges affiliated to Bharathidasan University should strengthen their research ecosystem by organizing regular workshops on publishing in Scopus, Web of Science, and UGC CARE journals. Special training programmes may be conducted on citation management, h-index monitoring, Google Scholar profile updating, and scientometric awareness.

Institutions should also provide research incentives, seed funding, publication support, and mentorship from highly productive faculty members to motivate low and moderate cluster respondents. Encouraging collaborative research, interdisciplinary projects, and conference participation can further improve publication diversity and citation visibility. In addition, administrators may introduce performance-based recognition systems linked to quality publications and citation impact.

X. CONCLUSION

The study concludes that the research output and scientometric performance of faculty members and research scholars in selected BDU-affiliated colleges are distributed across three distinct levels—low, moderate, and high performance clusters. The largest

proportion of respondents falls under the low-level cluster (38%), followed by the moderate cluster (34%), while only 28% belong to the high-level cluster.The findings reveal that variables such as publication growth, indexed journal preference, citation visibility, academic reputation, and scientometric awareness play a vital role in differentiating respondent performance. The presence of a comparatively smaller high-level cluster suggests that while a section of respondents demonstrates strong research productivity, a larger proportion still requires institutional guidance and support.

Overall, strengthening publication mentoring, citation awareness, and research collaboration can significantly enhance the scientometric performance and academic visibility of BDU-affiliated college researchers.

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