Information Research Communications, 2025; 2(1):4-10.
https://inforescom.org

Research Article

Ranking and Relative Efficiencies of India's Central Universities through the Lens of DEA

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ABSTRACT

Aim/Background: Universities are the cornerstone of a nation's scientific and technical advancements. This study aims to evaluate the performance efficiency of India's ten central institutions of higher learning using Data Envelopment Analysis (DEA). Unlike traditional methods that use fundamental performance ratios, this research adopts a multi-input, multi-output technique to provide an additional instrument for benchmarking and assessing decision-making units (organizations). **Materials and Methods:** We employed the DEA super-efficiency model to compare the relative efficiency of ten central universities using NIRF data from 2020, 2021, and 2022. Input variables included total number of faculty, students, capital and operational expenditure, while output variables comprised graduates (UG, PG, Ph.D.), placements, publications, and citation count from Scopus and Web of Science. **Results:** According to our data analysis, Jamia Millia Islamia University was the most efficient university among the ten institutions studied. The remaining nine universities demonstrated inefficiency to varying degrees, with efficiency scores fluctuating across the three-year period. **Discussion:** The study reveals significant variations in efficiency scores across universities and over time, highlighting the complex interplay of factors influencing university performance. The inclusion or exclusion of specific input variables significantly affects efficiency scores, emphasizing the importance of considering institutional context when interpreting results. **Conclusion:** DEA provides valuable insights for university management and policymakers, offering a multi-criteria approach for evaluating higher education institutions. This alternative analysis provides a new perspective for improving university standards and rankings, particularly as government funding is tied to efficient resource utilization.

Keywords: Efficiency, Central Universities, Data Envelopment Analysis.

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Received: 08-01-2025;
Revised: 24-02-2025;
Accepted: 18-04-2025.

INTRODUCTION

Universities are the cornerstone of a nation's scientific and technical advancements, and they also offer cutting-edge workforce training, which may have an impact on the caliber of scientific research as well as regional innovation. It has become necessary for a number of decision-makers, including the government, commercial organizations, and society, to monitor and assess the efficiency of higher education institutions due to their crucial role in economic development. To improve the efficiency of universities, a performance measuring tool is required to assess their performance. Because of the distinct characteristics of universities, it is difficult to determine how well they perform. First of all, as with any other non-profit, it is hard to assign monetary values to the inputs and outputs. Second, a university generates various outputs (such as graduates and research papers) from multiple inputs (such as professors and facilities). A variety of methodologies have been employed to assess university performance, with the most prevalent being Stochastic Frontier Analysis (SFA), and Data Envelopment Analysis (DEA), SFA is effective at managing data with some ambiguity; nevertheless, it is difficult to use in situations with many inputs and outputs. DEA, on the other hand, has grown in popularity as a performance monitoring tool for non-profit organizations.

In this paper, we study the relative efficiencies of ten central universities in India with data gathered from the National Institutional Ranking Framework (NIRF) through a methodology known as Data Envelopment Analysis (DEA) which is different from the traditional process of ranking universities as employed by various ranking agencies all over the world.

The National Institutional Ranking Framework (NIRF) used the weight and sum approach to the combined scores of indicators in the NIRF scores, which were ranked by the institutes. This

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ScienScript

DOI: 10.5530/irc.2.1.2

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approach assumes that all indicators contribute independently to the NIRF score in the specified proportions. However, the Data envelopment analysis method that we will employ in this study is different from the traditional process of ranking universities as it is used to measure the relative efficiency of a group of Decision-Making Units (DMUs), in this case, the central universities of India. The DEA model employs the typical input/output ratio to determine efficiency for a particular unit in terms of a formulation of a fractional linear program. The DEA technique asserts that a DMU is considered inefficient if some other DMUs or some combinations of other DMUs create at least the same amount of output with less of the same resources input and not more of any other resources. This is in line with the economic concept of Pareto optimality. In contrast, a DMU is deemed Pareto efficient if the aforementioned is not feasible. In this particular paper, we make use of the "Super-efficiency" model of DEA to assess the relative efficiencies of ten central universities in India.

Although the system used to rank educational institutions is unquestionably founded on strong principles, it does not provide a more precise understanding of how much resources are utilized in producing outputs. University output is primarily measured in terms of the number of graduates at various levels of undergraduate and postgraduate programs, Ph.D. placements, patents, publications by faculty, and citations in reputed journals meanwhile utilising various input units in the form of capital expenditure utilised for (library, laboratory equipment, engineering workshops, and other expenditure) and operational expenditure (salaries, maintenance, seminars/workshops), funding from projects to produce the said output. This study attempts an effort to evaluate, using Data Envelopment Analysis (DEA), the central university's capability to efficiently utilise input resources (capital, operational expenditure, etc.) to produce output (publications, citations, patents, etc.,).

Conceptual framework: Data Envelopment Analysis (DEA)

DEA is a nonparametric frontier estimation methodology that classifies entities into "efficient" or "performers" versus "inefficient" or "nonperformers." This study uses the super-efficiency (supereff) model of DEA to account for real-time indications of using various input units to produce output efficiently. The technique focuses on real performance, not presuming a specific data distribution. Traditional DEA suffers from tied ranks and discrimination, especially in minimal sample sizes. Andersen and Peterson (1993) introduced the "super-efficiency" approach, eliminating censoring of scores greater than one. This allows researchers to identify and rank effective units in the sample, generating more meaningful correlations and measures of central tendency.

LITERATURE REVIEW

On many facets of NIRF Ranking, some researchers have undertaken studies (Mukherjee,2016; Kumar *et al*., 2021; Nassa *et al*., 2021). The ranking criteria used by NIRF are comparable to those used by global ranking systems such as THE World University and QS ranking (Sheeza *et al*., 2018), while (Srimathi and Krishnamoorthy, 2020) studied on QS Ranking. In recent years, public organisations, as well as commercial enterprises, have become interested in efficient resource allocation. Organisations worldwide are under increasing pressure to increase their performance efficiency to justify the allocation of limited public finances and to draw in more outside funding. In recent years, it has become evident that education quality is of the utmost importance (Hanushek and Woessmann, 2011; Hanushek *et al*., 2013). From the standpoint of public policy, the effectiveness with which educational institutions translate inputs (like expenses) onto outputs (like student accomplishment) is likewise significant and has been the focus of much discussion (Johnes, 2020).

Although there is a wealth of literature on assessment methods and well-known discussions on resource allocation and university structure (Roessner, 2000), scholars and administrators still see a significant need for novel methodologies. Research has examined connections between different indicators of universities using statistical approaches thus far (e.g. Teodorescu, 2000; Fairweather, 2002).

In comparative efficiency studies conducted across the globe in the public sector, the Data Envelopment Analysis (DEA) method plays a significant role (Chalos, Cherian 1995; Odeck 2005). Due to the possibility that DEA results could yield useful data for HEI management, it is being used in the higher education sector. Leitner et al. (2007), Taylor and Harris (2004), McMillan and Datta (1998), Bradley *et al.* (2006), Nazarko *et al.* (2008), Johnes and Johnes (1993), Sinuany-Stern *et al*., (1994) provide some notable examples of DEA use in the field of higher education from around the world. DEA not only makes it possible to identify areas that need improvement, but it also outlines the potential for development in certain areas. Additionally, it enables the resolution of issues pertaining to the positives and negatives of HEIs, the method of funding distribution across HEI organizational units, or the ideal size of these units. One significant benefit of using DEA in higher education settings is that it can evaluate a university's effectiveness from a variety of angles.

Existing studies have highlighted numerous characteristics and indicators that various authorities use to assess universities worldwide. Our extensive review of the literature has presented us with a clear indication that while there have been studies of relative efficiencies of higher education institutions, there exists no study yet to compare the NIRF with an alternative approach

such as the DEA to rank Indian central universities. Therefore, this study seeks to explore the possibility of assessing the relative efficiencies of India's ten central universities.

METHODOLOGY

Data published in NIRF report was used for this study. As part of our methodology, we evaluate the relative efficiencies of ten central universities. Each university's three-year NIRF data sheet was used to get the raw data. i.e. 2020, 2021, and 2022.

Rationale for selection of universities

In India, there are 54 central universities currently. The universities selected for this study managed to consistently appear in NIRF's top 100 ranking for the last three years, i.e., in (2020, 2021, and 2022). The universities selected for our study also spread across India from North to South and East to West, serving various demographics of the country. The universities are - Banaras Hindu University, Aligarh Muslim University, Jawaharlal Nehru University, University of Delhi, Jamia Millia Islamia University, North-Eastern Hill University, Tezpur University, University of Hyderabad, Pondicherry University, and Visva Bharati University. The central universities selected are homogeneous because they perform the same task and have similar objectives. All the central universities utilise academic and non-academic staff, capital, and operational expenditure for teaching and research purposes to produce output in the form of graduation outcomes, placements, patents, publications, and citations. Our study's inputs and outputs units are also homogeneous in all ten universities.

Decision-Making Units and Input/Output Variables

Ten central universities formed our DMUs for the study- BHU, JNU, DU, NEHU, TU, JMIU, UoH, AMU, PU, and VBU. We performed Data Envelopment analysis through the "super-efficiency" model using data available from the NIRF datasheet. The input and output units are defined below:

Table 1: NIRF and DEA scores.

Sl. No.	Name of University	NIRF Scores			DEA Scores		
		2020	2021	2022	2020	2021	2022
1	BHU	63.15	64.02	63.2	10.21822	40.21799	5.761673
2	JNU	70.16	67.99	68.47	18.12281	8.275833	8.093912
3	DU	60.1	57.09	58.66	3.542008	3.658725	4.363441
4	NEHU	46.88	44.24	45.44	1.012608	4.122381	3.487248
5	TU	48.77	47.27	47.48	3.318833	3.306085	2.356104
6	JMIU	61.07	60.74	65.91	193.6612	52.73956	43.56656
7	UOH	61.7	59.71	61.71	9.784385	5.393525	3.576456
8	AMU	54.3	58.97	61.43	1.25215	1.393558	2.134589
9	PU	45.82	44.36	44.95	2.911808	4.12065	3.185679
10	VBU	46.84	42.76	40.96	4.748304	50.91762	2.530772

Table 2: NIRF and DEA rank.

Sl. No.	Name of University	NIRF Rank			DEA Rank		
		2020	2021	2022	2020	2021	2022
1	BHU	3rd	3rd	6th	3rd	3rd	3rd
2	JNU	2nd	2nd	2nd	2nd	4th	2nd
3	DU	11th	12th	13th	6th	8th	4th
4	NEHU	49th	59th	66th	10th	6th	6th
5	TU	39th	46th	59th	7th	9th	9th
6	JMIU	10th	6th	3rd	1st	1st	1st
7	UOH	6th	9th	10th	4th	5th	5th
8	AMU	17th	10th	11th	9th	10th	10th
9	PU	58th	58th	68th	8th	7th	7th
10	VBU	50th	64th	98th	5th	2nd	8th

Note: The NIRF scores and ranking above are the ranking published by the Ministry of Education during the past three years whereas, the DEA scores and ranking are based on our analysis of the data during the past three years. The DEA rank is based solely on our analysis of the ten central universities.

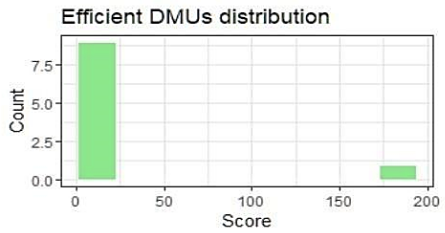

fig 1: efficiency plot 2020

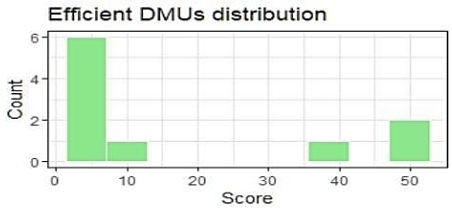

fig 2: efficiency plot 2021

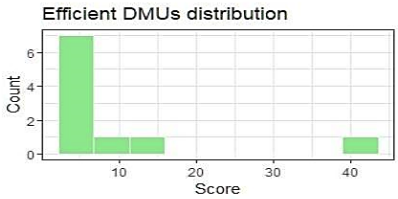

fig 3: efficiency plot 2022

Figure 1: Number of efficient-inefficient DMUs.

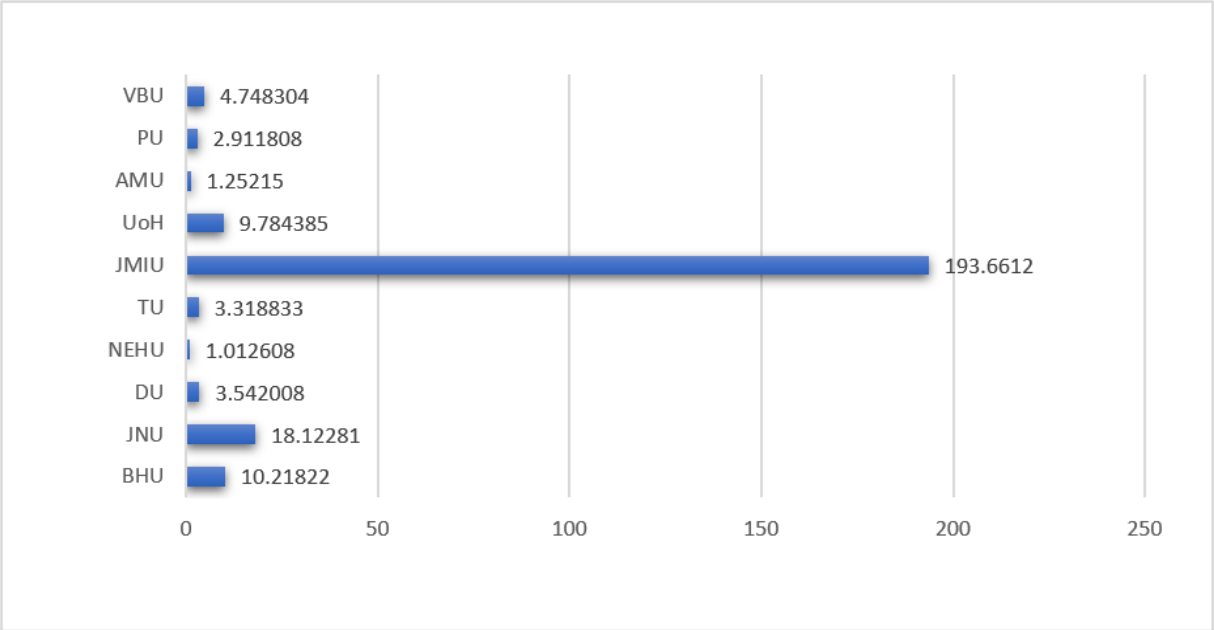

Figure 2: DEA score from NIRF 2020.

Input variables

Total number of faculty, total number of students, males, females, students from within the state and outside the state, economically backward students, and socially challenged students (SC, ST, and OBC), capital and operational expenditure for the previous three years.

Output variables

Number of graduates (UG, PG), and Ph.D., placements, publication, and citation counts from Scopus and Web of Science.

RESULTS

The Data Envelopment Analysis reveals that Jamia Millia Islamia University (JMIU) is the only efficient university in utilising input units to produce output, with nine other central universities inefficient. Table 1 presents the NIRF and DEA scores for all ten universities across the three-year period. In 2020, JMIU ranked 10th, but in 2021, it ranked 6th and in 2022, it ranked 3rd. This growth year on year is the highest JMIU has achieved to date. The super efficiency model of DEA differentiates between efficient and inefficient DMUs, indicating JMIU's higher efficiency than nine other universities. Table 2 provides a comprehensive

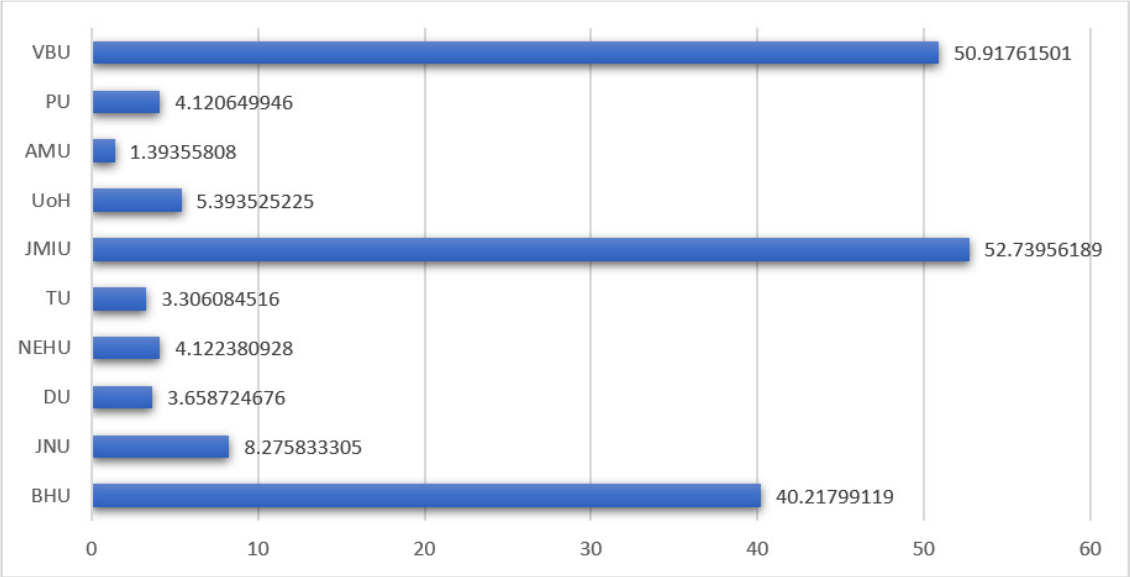

Figure 3: DEA score from NIRF 2021.

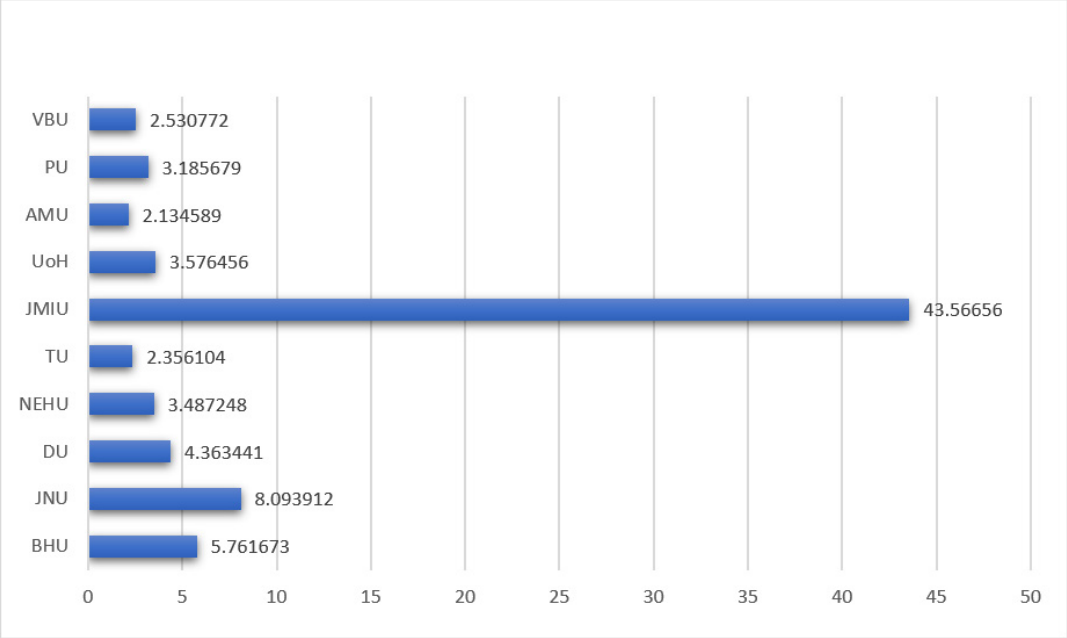

Figure 4: DEA score from NIRF 2022.

comparison of NIRF and DEA rankings, demonstrating the differences between traditional ranking methods and efficiency-based assessments.

The distribution of efficient and inefficient Decision-Making Units (DMUs) across the three years is illustrated in Figure 1, which shows that only one university (JMIU) maintained consistent efficiency throughout the study period. Figure 2 displays the DEA scores from NIRF 2020 data, clearly highlighting JMIU's exceptional efficiency score of 193.6612 compared to other universities. The efficiency patterns for 2021 and 2022 are presented in Figure 3 and Figure 4 respectively, showing the declining trend in JMIU's efficiency scores over time (from 193.66 in 2020 to 52.73 in 2021, and further to 43.56 in 2022), while still maintaining its position as the most efficient university.

LIMITATIONS

We have limited this study to just ten central universities. In our test for efficiency, we have encountered some lapses concerning the outcome of the results as some input variables with zero (0) have been shown to positively increase the efficiency of some universities, which is contradictory by nature. Hence, we have omitted four input variables from NIRF 2020, where zero is found to have a higher positive value to the result. We have also taken an

average for NEHU's input variable of economically backward as data for 2021 and 2020 were missing.

DISCUSSION

Our analysis of the relative efficiencies of central universities demonstrates the variable impact of different input factors on overall efficiency. While Jamia Millia Islamia University (JMIU) demonstrates the highest efficiency, its performance declined between 2020 and 2022. Interestingly, JMIU's efficiency score decreased from 193.66 in 2020 to 52.73 in 2021, and further to 43.56 in 2022 (see Appendix -Table 1 & 2). This decline suggests that even the most efficient university's performance can fluctuate, possibly due to changes in resource allocation, policy shifts, or other internal or external factors.

As shown in Figures 2-4, the efficiency scores varied significantly across the three years, with JMIU consistently outperforming other universities despite its declining efficiency trend. The graphical representation in these figures clearly demonstrates the substantial gap between the most efficient university (JMIU) and the remaining institutions

Further investigation into the specific reasons for this decline could provide valuable insights for JMIU and other institutions. In contrast, other universities showed different patterns, with efficiency scores varying across the three years. This highlights the complex interplay of factors influencing university performance, including institutional characteristics, resource availability, and strategic priorities. The variations in efficiency scores across universities and over time suggest that there is no one-size-fits-all approach to achieving optimal performance. Each university must carefully consider its unique circumstances and challenges to identify the most effective strategies for improvement.

We found that the inclusion or exclusion of specific input variables significantly affects the efficiency scores. For instance, JMIU's high efficiency in 2020 was linked to low spending in "Other Expenses." The addition of this variable dramatically increased JMIU's efficiency score, indicating that even seemingly minor input factors can have a substantial impact on overall efficiency. Similarly, JNU's efficiency was influenced by the number of students from "Economically Backward" regions. This finding highlights the importance of considering equity and access in evaluating university performance. Universities that effectively support students from disadvantaged backgrounds may exhibit higher efficiency due to the positive impact of diversity on learning outcomes and research productivity. These findings underscore the sensitivity of DEA results to the selection of input and output variables and the importance of considering the specific context of each university when interpreting the results. Researchers and policymakers should exercise caution when comparing efficiency scores across institutions, ensuring that they account for differences in institutional missions, student populations, and resource constraints.

Furthermore, our analysis indicates a strong correlation between research publication productivity and citation impact, which in turn influences university rankings. This finding aligns with previous research that has emphasized the importance of research excellence in enhancing university reputation and attracting funding. The contribution of the top 10% most productive authors significantly boosts publication output, demonstrating that high research output is a key driver of efficiency. This suggests that universities that prioritize and support their most productive researchers are likely to achieve higher levels of overall efficiency. However, it is also important to recognize the value of all faculty members and to create a supportive environment for research at all levels.

CONCLUSION

This study used Data Envelopment Analysis to evaluate the relative efficiencies of ten central universities in India. Our findings indicate that Jamia Millia Islamia University was the most efficient university. JMIU's consistent efficiency over the past three years, and its high rankings in both national (NIRF) and international rankings (Times Higher Education), highlights its commitment to academic excellence and its ability to effectively translate inputs into outputs. The university's success can be attributed to a variety of factors, including its strong faculty, diverse student body, and focus on research and innovation. However, nine other universities demonstrated inefficiency, with Tezpur University and Aligarh Muslim University being the least efficient. These universities may benefit from a closer examination of their resource allocation strategies, academic programs, and research activities to identify areas for improvement.

The efficiency scores reveal important policy implications for higher education in India. Low-efficiency institutions may suffer from inefficient resource allocation, inadequate infrastructure, or a lack of focus on research and innovation. These institutions should strive to optimize their operations, enhance their academic offerings, and create a more supportive environment for faculty and students. Efficient institutions, on the other hand, effectively leverage inputs to generate substantial outputs, demonstrating the importance of strategic planning, effective management, and a commitment to quality. Specifically, our study highlights that financial resources and research outputs significantly impact a university's relative efficiency. Universities with adequate funding and a strong research focus tend to achieve higher levels of overall performance.

DEA provides valuable insights for university management, aiding in understanding university rankings, faculty productivity, and the effectiveness of resource allocation. This study demonstrates the value of DEA as a tool for evaluating and improving performance in the higher education sector. The multi-criteria approach offers advantages for authorities managing public funds and for the universities being evaluated. By providing a

comprehensive assessment of university performance, DEA can help policymakers make informed decisions about resource allocation and identify areas where targeted interventions are needed. DEA results can guide HEIs in optimizing their operations and resource allocation, enhancing their competitiveness, and contributing to the overall development of the higher education system. This alternative analysis of university efficiency provides a new perspective for improving the standard and ranking of universities, especially as government funding for these institutions is tied to efficient resource utilization. By promoting greater efficiency and accountability, this comparative efficiency study can drive improvements in research and education quality, optimize the allocation of public funds, and enhance HEI management.

While this study has some limitations, such as the focus on a limited number of central universities and the reliance on NIRF data, it reveals significant differences in the efficiencies of the ten central universities. Several universities have the potential for efficiency improvement by adopting best practices, investing in infrastructure, and strengthening their research capabilities. The DEA results should be interpreted cautiously, with a thorough understanding of the data and the context. Future research could expand the scope of the analysis to include a larger sample of universities, incorporate additional input and output variables, and explore the factors that contribute to efficiency differences across institutions.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

The dataset related to this study is available at Mendeley Data- "DEA (Indian central universities data)", Mendeley Data, V1, doi: 10.17632/9cvx58jmns.1.

REFERENCES

Andersen, P., & Petersen, N. C. (1993). A procedure for ranking efficient units in data envelopment analysis. Management Science, 39(10), 1261-1264. https://doi.org/10.1287/mnsc.39.10.1261

Bradley, S., Johnes, J., & Little, A. (2006). The measurement and determinants of efficiency and productivity in the FE sector in England, Lancaster University Management School Working, Paper 2006/036.

Chalos, P., & Cherian, J. (1995). An application of Data Envelopment Analysis to public sector performance measurement and accountability. Journal of Accounting and Public Policy, 14(2), 143-160. https://doi.org/10.1016/0278-4254(94)00015-S

Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the efficiency of decision making units. European Journal of Operational Research, 2(6), 429-444. https://doi.org/10.1016/0377-2217(78)90138-8

Cook, W. D., Liang, L., Zha, Y., & Zhu, J. (2009). A modified super-efficiency DEA model for infeasibility. Journal of the Operational Research Society, 60(2), 276-281. https://doi.org/10.1057/palgrave.jors.2602544

Fairweather, J. S. (2002). The Mythologies of Faculty Productivity. The Journal of Higher Education, 73(1), 26-48. https://doi.org/10.1080/00221546.2002.11777129

Hanushek, E. A., Link, S., & Woessmann, L. (2013). Does school autonomy make sense everywhere? Panel estimates from PISA. Journal of Development Economics, 104, 212-232. https://doi.org/10.1016/j.jdeveco.2012.08.002

Hanushek, E. A., & Woessmann, L. (2011). The economics of international differences in educational achievement. In E. Hanushek, S. Machin, & L. Woessmann (Eds.),Handbook of the economics of education, 3 (pp. 89-200). North-Holland. https://doi.org/10.1016/B978-0-444-53429-3.00002-8

Huang, M.-H. (2012). Opening the black box of QS World University Rankings. Research Evaluation, 21(1), 71-78. https://doi.org/10.1093/reseval/rvr003

Johnes, G. (2020). Economic approaches to school efficiency. In S. Bradley & C. Green (Eds.),The economics of education: A comprehensive overview (2nd ed.) (pp. 479-489). Academic Press/Elsevier. https://doi.org/10.1016/B978-0-12-815391-8.00035-5

Johnes, G., & Johnes, J. (1993). Measuring the research performance of UK economics departments: An application of Data Envelopment Analysis. Oxford Economic Papers, 45(2), 332-347. https://ideas.repec.org/a/oup/oxecpp/v45y1993i2p332-47.html. https://doi.org/10.1093/oxfordjournals.oep.a042095

Kumar, A., Singh, K., & Siwach, A. K. (2021). NIRF India rankings 2020: Analyzing the ranking parameters and score of top 100 universities. DESIDOC Journal of Library and Information Technology, 41(5), 385-390. https://doi.org/10.14429/djlit.41.5.16452

Leitner, K.-H., Prikoszovits, J., Schaffhauser-Linzatti, M., Stowasser, R., & Wagner, K. (2007). The impact of size and specialisation on universities' department performance: A DEA analysis applied to Austrian universities. Higher Education, 53(4), 517-538. https://doi.org/10.1007/s10734-006-0002-9

McMillan, M. L., & Datta, D. (1998). The relative efficiencies of Canadian universities: A DEA perspective. Canadian Public Policy / Analyse de Politiques, 24(4), 485-511. https://doi.org/10.2307/3552021

Mitra, A. (2015). Public spending in higher education in India. Higher Education for the Future, 2(1), 71-91. https://doi.org/10.1177/2347631114558191

Mukherjee, B. (2019). Ranking Indian universities through research and professional practices of National Institutional Ranking Framework (NIRF): A case study of selected central universities in India. Journal of Indian Library Association, 52(4). https://www.ilaindia.net/jila/index.php/jila/article/view/87.

Nassa, A. K., Arora, J., Singh, P., Joorel, J. P. S., Trivedi, K., Solanki, H. K., & Kumar, A. (2021). Five years of India rankings (NIRF) and its impact on performance parameters of engineering institutions in India. DESIDOC Journal of Library and Information Technology, 41(2), 116-129. https://doi.org/10.14429/djlit.41.02.16674

Nazarko, J., Komuda, M., Kuźmicz, A. K., Szubzda, E., & Urban, J. (2008). The DEA method in public sector institutions efficiency analysis on the basis of higher education institutions. Badania Operacyjnei Decyzje, 4, 89-105 (in Polish).

MoE, National Institute Ranking Framework (NIRF). (n.d.). https://www.nirfindia.org/2020/UniversityRanking.html

Raman, S. (2019, January 30). Interim Budget 2019: What Govt needs to do to boost higher education bodies. Business Standard. https://www.businessstandard.com/article/interim-budget-2019/budget-2019-what-govt-needs-to-do-toboost-higher-education-institutions-119013000149_1.html

Reddy, K. S., Xie, E., & Tang, Q. (2016). Higher education, high-impact research, and world university rankings: A case of India and comparison with China. Pacific Science Review B, 2(1), 1-21. https://doi.org/10.1016/j.psrb.2016.09.004

Roessner, D. (2000). Quantitative and qualitative methods and measures in the evaluation of research. Research Evaluation, 9(2), 125–132. https://doi.org/10.3152/147154400781777296

Sinuany-Stern, Z., Mehrez, A., & Barboy, A. (1994). Academic departments efficiency via DEA. Computers and Operations Research, 21(5), 543-556. https://doi.org/10.1016/0305-0548(94)90103-1

Srimathi, H., & Krishnamoorthy. (2020). Review on NIRF. Journal of Critical Reviews, 7(4), 259-262. https://doi.org/10.31838/jcr.07.04.48

Taylor, B., & Harris, G. (2004). Relative efficiency among South African universities: A data envelopment analysis. Higher Education, 47(1), 73-89. https://doi.org/10.1023/B:HIGH.0000009805.98400.4d

Teodorescu, D. (2000). Correlates of faculty publication productivity: A cross-national analysis. Higher Education, 39(2), 201-222. https://doi.org/10.1016/j.techfore.2016.03.029

Tone, K. (2001). A slacks-based measure of efficiency in data envelopment analysis. European Journal of Operational Research, 130(3), 498-509. https://ideas.repec.org/a/eee/ejores/v130y2001i3p498-509.html. https://doi.org/10.1016/S0377-2217(99)00407-5.

Cite this article: Gayang FL, Ravikumar S. Ranking and Relative Efficiencies of India's Central Universities through the Lens of DEA. Info Res Com. 2025;2(1):4-10.