Implementation of Quality Education and Rankings of Minority Institutions by Using Peer Weight through DEA Approach

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Abstract— *The aim of this paper is to provide a synthesis of the literature on defining quality in the context of higher education and rankings applied to complex entities described by multiple attributes. Published rankings for Technical Institutions are in great demand but are also highly controversial. This paper explores the quality education and rankings of 19 Minority technical institutions under JNTUH. We present DEA as an alternative tool for ranking the assignment of decision-making units. DEA as a suitable measure to distinguish between efficient and less efficient institutions to rank them according to their performance, and to reveal their improvement capacities.*

Keywords — *DEA, Peer Count, Peer Weight, Technical Institutions, Rankings, Quality Education.*

I. INTRODUCTION

The overall scenario of higher education in India does not match with the global Quality standards. Hence, there is enough justification for an increased assessment of the Quality of the country's educational institutions. Traditionally, these institutions assumed that Quality could be determined by their internal resources, viz., faculty with an impressive set of degrees and experience detailed at the end of the institute's admission brochure, number of books and journals in the library, an ultra-modern campus, and size of the endowment, etc., or by its definable and assessable outputs, viz., efficient use of resources, producing uniquely educated, highly satisfied and employable graduates. This view of determining Quality in higher education, popularly termed as the "value-addition" approach, does not measure the competencies students develop through the courses offered. The competencies are recall, understanding, and problem solving. "Recall" amounts to a competency of gaining knowledge by way of reading, viewing, listening, assimilating, and demonstrating it when required. "Understanding" is comprehension, which requires explanations and vocabulary development, and demonstrating it by giving ideas, predict, and evaluate cause and effect. The competency of "problem solving" can be developed by solving text-book type of problems and the expertise so developed can be used in handling real-life situations. The students should understand and accept these concepts, and the level of competency they are expected to attain should also be defined in consultation with them.

II. QUALITY EDUCATION

High quality and relevant higher education is able to equip students with the knowledge, skills and core transferable competences they need to succeed after graduation, within a high quality learning environment which recognizes and supports good teaching. Quality assurance allows people to have confidence in the quality of higher education. Every higher education institution should have a rigorous system of internal quality assurance, assessed by Quality Assurance Agencies which make external checks. While higher education graduates are more likely to find employment than people with lower levels of qualifications, higher education curricula are often slow to respond to changing needs in the wider economy, and fail to anticipate or help shape the careers of tomorrow.

III Peers of Firms and Slacks Associated with DEA

DEA is based on the assumption of convexity, which states that for any two points are feasible, their convex combination is also feasible. This means that for two observed DMUS lying on the frontier one can prove that their convex combination is feasible and also lies on the frontier. Based on this assumption, DEA compares actual firms to virtual firms that are the weighted combination of actual firms.

IV Peers & Peer Weight

For solving the peers of DMUS input technical inefficient, we use the following linear constraint is

$$\sum_{j=1}^{n} \lambda_j X_{ij} \leq \lambda X_{io}$$

Such that $\lambda_2 x_{i1} + \lambda_2 x_{i2} + \ldots\ldots\ldots + \lambda_n x_{in} \leq \lambda x_{io}$ (i= 1,2 …m)For an inefficient DMU its intensity parameter is $\lambda^*_k = 0$

$DMU_O = DMU_K$

$\lambda^*_j > 0$ for some $j \neq k$

Efficient DMUS are for which $\lambda^*_j > 0$ and are role models. Their practices are best practices for an inefficient $\mathbf{DMU_O = DMU_K}$.

The sum of the peer weights of inefficient DMUS can be calculated by using the following expression

$$\lambda^* = \theta = \lambda_j x_{1j} + \lambda_j x_{2j} + \ldots\ldots\ldots + \lambda_j x_{mj}$$

$$j = 1,2,\ldots\ldots\ldots n$$

V Rankings

Ranking is the only one in the world to assess national higher education systems, and meets a long-standing need to shift discussion from the ranking of the world's best technical institutions, to the best overall systems in each country. Rankings as a benchmark for governments, education institutions and individuals, and the project aims to highlight the importance of creating a strong environment for higher education institutions to contribute to economic and cultural development, provide a high-quality experience for students, and help institutions compete for overseas applicants. Ranks will be allotted based on peer count. The Efficient DMUs will be awarded ranks based on their peer count. Efficient DMU with highest peer count will be awarded first, the next highest will be second as it follows. The present peer count has been ranked in the following ranks.

TABLE

Firm	Peer weights	Peer Count	Ranks
DMU 1	1.000	1	1.5
DMU 2	0.022, 0.388, 0.506	0	
DMU 3	0.044, 0.136, 0.275	0	
DMU 4	1.000	0	
DMU 5	0.610, 0.203	0	
DMU 6	0.534	0	
DMU 7	0.098, 0.439	0	
DMU 8	0.014, 0.508, 0.426	0	
DMU 9	0.147, 0.245, 0.121, 0.051	0	
DMU 10	0.172, 0.776	0	
DMU 11	0.013, 0.116, 0.408, 0.019	0	
DMU 12	0.498, 0.104, 0.227, 0.075	0	
DMU 13	0.164, 0.368, 0.063	0	
DMU 14	0.266, 0.196, 0.119	0	
DMU 15	1.000	1	1.5
DMU 16	0.263, 0.172, 0.113	0	
DMU 17	0.094, 0.184, 0.260	0	
DMU 18	0.114, 0.081, 0.355	0	
DMU 19	0.221, 0.218, 0.051, 0.088	0	

In the Minority Institutions, both G.N.E.C & A.V.C.E.R.C has same peer count i.e. 1, so by taking the average it can be assigned rank as 1.

VI Conclusion

We believe that high quality higher education is essential, and that further safeguards can be put in place to protect it. We do not believe that increased competition automatically leads to a 'race to the bottom' any more than it automatically leads to a 'race to the top' - but the current pace of change means that additional safeguards are needed. These additional safeguards need to be flexible yet robust, and sensitive to the widest definitions of an excellent student learning experience. They also need to adhere to the principles of quality assurance which have served so well so far. The English quality assurance system has evolved over time and adjusted with successive waves of expansion. We are optimistic that it will evolve to meet the new challenges ahead. In this way, we can protect the quality brand, keep our reputation globally and support the considerable investment - both time and money - which students, employers and taxpayers are placing in the higher education system.

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