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Data Envelopment Analysis for efficiency assessment of state universities and selected faculties in Sri Lanka

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Efficiency of public universities is a widely discussed concern which is of significant importance to the well-being and economic prosperity of a developing nation. It is a key performance indicator of an education system which needs to be monitored and improved continuously. Although the efficiency of universities has been widely studied in some countries, no efficiency comparison research has been conducted in the Sri Lankan context. The main objective of this study was to measure the relative efficiencies of the state universities in Sri Lanka from 2017 to 2019 using Data Envelopment Analysis (DEA). Since the universities have different compositions of faculties, the relative efficiencies of Science, Medical and Engineering faculties were separately evaluated. The input variables considered in the DEA models were annual expenditure, academic staff and non-academic staff. The output variables used were graduate output, total enrolments, number of publications in indexed journals, and Webometric ranking. The input-oriented variable returns to scale option in DEA was used, assuming that the inputs can be controlled. A freely available Excel add-in named DEA Solver was used in the analysis. The results of the overall efficiency comparison showed that eight out of fifteen state universities were constantly performing efficiently from 2017 to 2019 while two universities were constantly inefficient during the same period. Overall, 73% of the universities were efficient. The average efficiency scores across all universities from 2017 to 2019 were 0.9681, 0.9707 and 0.9409 respectively. Average efficiency scores of Science faculties for the same period were 0.8127, 0.7928 and 0.8053 respectively. Medical faculty comparison indicated efficiency scores as 0.742, 0.9332 and 0.8126 respectively from 2017 to 2019 while it was 0.9473, 0.9477 and 1 respectively for Engineering faculty comparison. Over the total period, the larger number of non-academic staff has been the main reason for the inefficiency of universities, and the results suggest that it should be reduced in a range from 0.7% to 40%. The number of efficient Science faculties was decreasing from 2017 to 2019. Efficiency comparison of engineering faculties alone indicated that most of them (83%) were efficient whereas only 54% of the medical faculties were efficient according to the comparison. The outcomes of this study are thoroughly based on an analysis performed using the DEA method with a selected set of variables, and owing to the limitations in DEA method, variables and data, the results may not reflect the actual efficiency levels of the universities. However, the study provides an understanding of some inequities in resource allocation and/or utilization among public universities.

Keywords: Efficiency, Input-oriented DEA, University, Faculty, University Performance