

## A new approach to estimate the mix efficiency in data envelopment analysis

### ABSTRACT

Recently, in Data Envelopment Analysis (DEA) methodology, there are two type of efficiency measurement; radial and non-radial measure represented by the Charnes- Cooper-Rhodes (CCR) and the slack-based measure (SBM) model respectively. There are two characteristics to the target in oriented CCR model; the input minimization (output maximization) plus any further reduction (expansion) indicated by any nonzero slacks while the SBM deals directly with input or output slacks. Both models were important in order to estimate the mix efficiency of production. This study attempts to propose a single DEA model that cope together the characteristics of the CCR and the SBM model. The aim from this proposed model was to provide a new approach for estimating the mix efficiency. We implemented the new approach on a data set and attained almost similar result of the mix efficiency score compared to the standard method. The validity of our proposed model as a tool for efficiency measurement was proven by the numerical results. We observe that this new approach is computationally advantageous since it only needs to solve a single model instead using the previous approach.

**Keyword:** Data Envelopment Analysis; Mix efficiency; CCR; SBM