UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

EFFICIENCY MEASUREMENT AND RANKING OF MALAYSIAN WATER SUPPLY SERVICE USING HYBRID DEA AND TOPSIS

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ABSTRACT

Water is vital supporting resource for sustainable development of social, health and economics part of human being. Measuring the efficiency of water supply service is very important as the demands of water supply are increasing as the year passes due to the growing in population. Improving the efficiency of water supply service is also an economically viable way for water preservation. The studies of the water service performance measurement have been widely conducted by earlier researchers primarily using Data Envelopment Analysis (DEA). DEA has been established as an effective method to measure relative efficiency of homogeneous entities which are known as decision making units (DMUs). The main advantage is that DEA has the ability to manage multiple inputs and outputs. However, standard DEA has some disadvantages and one of them is not being able to discriminate and rank those efficient units. Standard DEA can only classify DMUs into two categories generally named as efficient and inefficient units and consequently, not being able to provide full ranking of DMUs. Ranking the water service provider are necessary and important for every state so that necessary changes can be made in making future improvements. The Method for Order Preference by Similarity to Ideal Solution (TOPSIS) is a standard decision-making approach with multiple characteristics that are commonly used for decision-making. The advantages of the TOPSIS method are it is easy to be practiced and it allows the best alternative criteria to be attained in a simple mathematical form. This paper proposed a hybrid approach based on DEA-TOPSIS techniques to overcome the problem of complete ranking which arise in standard DEA in evaluating the efficiency and ranking of the 14 state of water service provider in Malaysia.The full ranking obtained from Hybrid DEA-TOPSIS findings were then compared to another ranking method, which is the Super Efficiency method. It shows that for both approaches, there are 9 DMUs with the same rank value which shows the availability of the proposed method in providing full ranking for Malaysian water service provider.