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TECHNICAL REPORT

EFFICIENCY MEASUREMENT AND RANKING OF WATER SUPPLY SERVICE USING HYBRID DEA AND PROMETHEE II
(P50M22)

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ABSTRACT

Water is an essential element in maintaining life and needed for rapid socio-economic development not only in Malaysia but also for the whole world. Therefore, efficiency evaluation of water supply services is an important aspect in order to make the whole sector more efficient. Data Envelopment Analysis (DEA) is a linear programming methodology to measure the efficiency of multiple decision-making units (DMUs) when the production process presents a structure of multiple inputs and outputs. However, the problem with the DEA method is that it is lack in discrimination power where it fails to rank the efficient DMUs since all efficient DMUs obtained are with the efficiency score of one. Thus, this study integrates PROMETHEE II into classical DEA to rank the DMUs completely. The aims of this study are to measure efficiency and provide a complete ranking of water supply services in 14 states in Malaysia. The data was collected through the annual report from Malaysian Water Industry Guide (MWIG) for the year of 2017. CCR output-oriented model was used in this study to measure the efficiency score of DMUs. Then, the PROMETHEE II was applied to rank those efficient units. By using the integrated DEA-PROMETHEE II method, the findings proved that the proposed DEA-PROMETHEE II can successfully served complete ranking for all of the DMUs which are the 14 water supply service in Malaysia.