UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

THE MEASUREMENTS OF WATER SERVICE PROVIDER EFFICIENCY IN MALAYSIA BY USING SCALE DIRECTIONAL DISTANCE FUNCTIONS

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ABSTRACT

In Malaysia, the state government is in charge of supplying water supply services where the National Water Services Industry Act was adopted in 2006. Previously, there are many studies on measuring the effectiveness of the water providers by using Data Envelopment Method (DEA). However, conventional DEA does not include the undesirable output in efficiency measurement, the model without the presence of undesirable outputs will have an unfair inaccurate results (Kamarudin et al., 2016). Thus Scale Directional Distance Function (SDDF) model will be applied in this study as an alternative to DEA approach in measuring the efficiency of water supply providers of 14 states in Malaysia. This study determine which state offers the greatest water supply service by utilizing DEA to measure the effectiveness of water supply service providers in Malaysia and to evaluate the effectiveness of Malaysia's water supply while accounting for the undesirable output, that is volume non-revenue water, by using SDDF as an alternative to decide which region has the optimum water supply service. Then, the efficiency result from SDDF method will be compared with another extended DEA model which also considers undesirable output which is Slack Based Measure Undesirable Output (SBM-UO) model. In order to produce a more accurate efficiency score, this SSDF model finds the best way to the frontier for each unit of study and offers several expansion and contraction variables. The result displays that Johor, Melaka, Pulau Pinang, Perak Perlis, Sabah, and Selangor achieve full efficiency of water supply service from both SDDF and SBM-UO model. This indicates that SDDF is applicable to be applied as an alternative method for measuring the efficiency of water service providers in Malaysia.