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MODIFIED RUSSELL NETWORK MODEL FOR DETERMINING MALAYSIA WATER SUPPLY SERVICES PERFORMANCE

(Model Rangkaian Russell Terubah Suai untuk Menentukan Prestasi Perkhidmatan Bekalan Air Malaysia)

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ABSTRACT

A black-box analysis of Data Envelopment Analysis (DEA) has been widely used to measure water supply services performance. It is a single process, which does not take into account the internal structure of the operation. However, in the production of water supply services, rather than a black-box analysis, the operation can be expressed into a two-stage network process and therefore can be analysed using Network Data Envelopment Analysis (NDEA). Furthermore, the Network Russell (NR) model is one of many other models in NDEA. A modified NR model is introduced in this study, which incorporated an undesirable output factor and will be called Network Russell with Undesirable Output (NR-OU) model. The NR-OU model has been tested on data of water supply from 14 states in Malaysia and the results provide information about the stages or processes in the operation that needs more attention in order to improve the Malaysian water supply services performance.

Keywords: black-box analysis; network data envelopment analysis; network Russell with undesirable output; Malaysian water supply services

ABSTRAK

Analisis kotak hitam dalam Analisis Pengumpulan Data (DEA) telah digunakan secara meluas untuk mengukur prestasi perkhidmatan bekalan air. Ia merupakan proses tunggal (tidak berangkai) yang tidak mengambil kira struktur dalaman bagi sesuatu proses. Namun begitu, dalam pengeluaran bagi perkhidmatan bekalan air, operasi itu boleh dinyatakan sebagai proses rangkaian dua peringkat dan boleh dianalisis menggunakan Analisis Pengumpulan Data Rangkaian (NDEA). Selanjutnya, model Russell Rangkaian (NR) merupakan satu daripada model-model NDEA yang lain. Suatu model NR terubah suai telah diperkenalkan dalam kajian ini, yang menggabungkan faktor output tidak diingini dan digelar sebagai model Russell Rangkaian dengan output tidak diingini (NR-UO). Model NR-OU ini telah diuji ke atas data pembekalan air daripada 14 negeri di Malaysia dan keputusannya telah memberikan maklumat tentang peringkat-peringkat atau proses-proses di dalam operasi yang memerlukan lebih perhatian untuk menambah baik prestasi perkhidmatan bekalan air di Malaysia.

Kata kunci: analisis kotak hitam; analisis pengumpulan data rangkaian; Russell rangkaian dengan output tidak diingini; perkhidmatan bekalan air Malaysia

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