

ABSTRACT

Bangkok Mass Transit Authority (BMTA) is a state-owned enterprise which has been served as a major mass transit system in Bangkok since 1976. Private operators have joined the bus services industry since 1976. Currently, 65% of the bus services in Bangkok are operated by the private companies. However, BMTA has faced with losses at the beginning of its operation and still cannot correct its loss-making situation as its expenditures have been increasing at the faster pace than its revenues. BMTA's accumulated loss on September 30, 2008 was 65,532 million baht. Therefore, BMTA cannot improve its service standards.

According to the previous reason of losses of BMTA, it leads to that BMTA cannot improve its operation. However, BMTA can adjust the input factors to the appropriate level by measuring its technical efficiency. Then the aim of this study is to investigate and measure technical efficiency of BMTA during 1989 – 2007 and measure relative efficiency between BMTA and four private operators by using annual data of 2007 under Data Envelopment Analysis (DEA) approach. Four private operators comprise Wangsakarnkij Company, Sahakonsong Thonburi Company, Union Bus Service Group Company; Rangsit zone and the minibuses. This study provides some guidelines about how to, for example, adjust and manage some input and output factors to improve BMTA's profit in the future.

Data Envelopment Analysis (DEA) is a suitable method to measure the efficiency of departments and organizations especially that of the non-profit organization. DEA input-oriented models can be specified as Constant Returns to Scale (CRS) or Variable Returns to Scale (VRS). CRS model has an assumption that firms are operating at the optimal scale. BMTA is operating under government regulations, finance limitations and so on. Therefore BMTA may not be operated at the optimal scale. Because VRS model is appropriate to measure efficiency for all situations whether the industries operate under regulations or in imperfect competition.

The variables of technical efficiency measurement employed include inputs which are the number of buses, the number of officers, the amount of fuel, and outputs which are the number of trips or the number of passengers. The study involves the multi-input and single-output measurement. Each of the two outputs

would be selected separately to measure the efficiency scores with the same set of inputs.

The empirical results employing the number of trips as output show that BMTA's technical efficiency scores under both CRS and VRS models are high whereas the result from CRS model turns to be opposite when number of passengers was used as an output. The number of trips may not be the appropriate output to measure the technical efficiency because they are controlled by Deputy of Land Transport. All operators, including of BMTA and private operators, will try to provide at least 80% of maximum level of number of trips. While the results of the number of passengers as a proxy for output will reflect the real demand rather than the number of trips. The empirical results also show that private operators are technically inefficient.

The technical efficiency scores also show that BMTA could reduce the inputs factors to improve this efficiency and suggest that the capability to locate years and firms which have inefficiency as well as improve them toward the frontier. For example, BMTA during 1989 – 2007, TE score in 2007 is 0.507 under CRS model. This means that BMTA could decrease the level of input factors by 49.3% in given output level.