CAPEX Efficiency and Service Quality Improvement via Tower Sharing in the Indonesian Telecommunication Industry: Optimization Model Using Comparison of Genetic Algorithm and Simulated Annealing Method

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ABSTRACT

Fierce competition, price rivalry among operators, low-profit business, a decrease in ARPU and ROI, as well as an increase in capital expenditure (CAPEX) of telecommunication operators have resulted a higher demand of efficiency in operational activities. The Indonesian telecommunication industry faces a high level of CAPEX for Base Transceiver Station (BTS) tower development, which is considered as an operational challenge. The "single tower, single operator" condition indicates that operational activities in the Indonesian telecommunication industry have not been run optimally

This research aims at proving the connection between capacity and the optimal BTS tower placement via the genetic algorithm method and simulated annealing. Subsequently, this connection will affect CAPEX efficiency and increase service quality.

The significant of this research is in its novel incorporation of the capacity variable, CAPEX location, and service quality. In the previous research, there was only one optimization method while this present study will compare methods and recommend the best method for future study.

This research discovers results in optimum capacity and location determination. The results affect CAPEX efficiency and service quality by increasing CAPEX efficiency but decreasing service quality (coverage view). The simulated annealing method is the greatest method in answering the predicament discusses in this research.

Keywords: Capital Expenditure, Service Quality, Capacity, Location, Optimization, Genetic Algorithm, Simulated Annealing,