

ABSTRACT

Indonesia is currently pushing the development of 5G networks as part of the national digital transformation. However, the main challenge faced is the high cost of infrastructure deployment. The infrastructure sharing scheme between operators, especially through the Multi-Operator Radio Access Network (MORAN) model, is a strategic solution to reduce capital expenditure (CAPEX) and operational expenditure (OPEX). This study was simulated over a five-year period (2025–2030) and aims to evaluate the implementation of the MORAN scheme on 5G networks with a 26 GHz spectrum in three areas, namely Mampang Prapatan (dense urban), Beji (urban), and Ciampea (suburban), through technical, economic, and regulatory approaches. From a technical aspect, gNodeB requirements are calculated on capacity and coverage based planning. The results indicate that Mampang Prapatan requires 40 sites (average RSRP: -93.57 dBm and average SINR: 1.45 dB), Beji 37 sites (average RSRP: -92.56 dBm and average SINR: 1.82 dB), and Ciampea 81 sites (average RSRP: -92.4 dBm and average SINR: 1.77 dB). The analysis confirms that the 5G deployment using millimeter wave frequencies is technically feasible in all three regions. From an economic aspect, full infrastructure sharing can reduce CAPEX by up to 66.67%. All operators show improved financial feasibility under the sharing scheme in terms of higher Net Present Value (NPV), increased Internal Rate of Return (IRR), and shorter Payback Period (PP), except in Ciampea, where the combination of high site requirements and limited revenue potential renders the investment economically unviable. Sensitivity analysis reveals that the parameter number of users is the most sensitive factor to investment feasibility, while CAPEX is the least sensitive factor. From the regulatory side, the current policies have supported the implementation of active infrastructure sharing such as MORAN. This study's findings are anticipated to serve as a reference in accelerating the adoption of efficient, equitable, and sustainable 5G networks in Indonesia.

Keywords: 5G, Sharing Scenarios, Multi-Operator Radio Access Network (MORAN), Techno economics, Regulation.