

## **ABSTRACT**

*The Surabaya-Java region is the study's primary area of interest since 5G technology may be applied there and will benefit the Indonesian economy. The Urban Macro propagation model is used in this study to analyze the coverage of the 5G network in Uplink (UL) and Downlink (DL) Outdoor to Outdoor (O2O) Non-Line of Sight (NLOS) situations. The economic viability of the project is discussed in this analysis using pessimistic, moderate, and optimistic scenarios. The scenario is based on the anticipated development in the 5G user base utilizing a bass growth model methodology for the performance period of 2021–2030. Economic analysis employing the Capital Expenditure (CAPEX), Operational Expenditure (OPEX), Net Present Value (NPV), and Internal Rate of Return (IRR) metrics is used to assess the viability of New Radio's 5G network planning in Surabaya. The first scenario's techno-economic results for moderate on the UL NLOS side produced an output value of the NPV of Rp. 173,942,792,965.032 and an IRR value of 69.10%, while the DL NLOS NPV produced an output value of Rp. 179,528,315,975.332 and an IRR value of 73.21%. The UL NLOS pessimistic scenario is Rp. 4,880,302,626 with an IRR of 3.17% and a DL NLOS of Rp. 12,717,050,188 with an IRR of 8.08% in the optimistic scenario of Rp. 292,226,403,359.41 with an IRR of 110.46% and a DL NLOS of Rp. 297,135,298,870 with an IRR of 115.68%. The three scenarios demonstrate that the pessimistic scenario has the lowest NPV and IRR of all the possibilities. The three scenarios demonstrate that the pessimistic scenario has the lowest NPV and IRR of all the possibilities. In light of the fact that all three scenarios can generate cumulative NPV and IRR during the performance period until 2030, which can be utilized as a guide for projecting the 5G NR network in Surabaya, they are all realistic.*

*Keywords: 5G NR, CAPEX, OPEX, NPV, IRR*