

## **ABSTRACT**

Maritime transportation serves as the primary mode of logistics in Indonesia, considering the country's vast archipelago comprising more than 17,000 islands. Maritime transportation offers the widest range and more cost-effective options for shipping goods compared to air transportation. This condition underscores the importance of improving operational efficiency at ports, which function as central hubs for maritime activities within the logistics chain. One crucial component in the port logistics process is the crane.

Ports employ two main types of cranes, namely Port Cranes, responsible for transferring containers from ships to ports, and Gantry Cranes, used to arrange and position each container within the port area. The budget needed for Crane Operators Fee and risks for the operator are quite high. In this study, we conducted simulations to implement a remote control system (Remote Crane) at the port to have better efficiency and anticipate the risk for operators.

The simulation of Remote Crane implementation at the port was conducted using Cisco Packet Tracer for network simulation and Forsk Atoll for coverage simulation. The simulation results demonstrated adequate network parameters for the service, with an average coverage reaching 182,342.58 square meters, exceeding the requirements of the port area. Additionally, we performed a Techno-Economic Analysis, which indicated favorable results, with satisfactory values for Net Present Value (NPV), Payback Period, and Profitability Index. Finally, we conducted a Sensitivity Analysis, in which the most influential parameter was revenue, and a Cost-Benefit Analysis, indicating annual efficiencies of up to IDR 3,120,000,000 with the implementation of Remote Control Crane.

**Keywords:** Remote Control Crane, 5G, Sensitivity, Cost-Benefit.