ABSTRACT

In today's digital era, the demand for fast, precise, and reliable access to information, communication, and services continues to increase. Implementing a Software-Defined Wide Area Network (SD-WAN) is an effective strategy for enabling large-scale private network infrastructure. This technology enables data traffic management across various WAN paths in a more flexible and centralized, software-based manner. This research proposes the implementation of SD-WAN methods as a solution to connect the head office and branch networks, utilizing a techno-economic analysis and regulatory analysis approach in XYZ Company at Indonesia. The study aims to address inter-office connectivity challenges by designing a secure, efficient, and scalable network architecture while evaluating both the technical feasibility and financial viability of the proposed solution. From a technical analysis, simulations using PNETlab demonstrate that the SD-WAN configuration performs reliably under various traffic conditions. Quality of service performance metrics, including latency, jitter, anda packet loss confirm the system's ability to deliver stable and efficient communication between sites. From an economic analysis perspective, the solution integrates robust technical performance with strong financial returns. This is evidenced by a positive Net Present Value (NPV) of IDR 974.926.531,95, an Internal Rate of Return (IRR) of 41.28%, a Profitability Index (PI) of 1.95, and a Payback Period (PP) of 2.55 years.From a regulatory perspective, this study identifies gaps in Indonesia's current telecommunications regulations regarding the implementation of private networks. The lack of clear distinctions between commercia and non-commercial private network usage presents a risk of regulatory loopholes and misuse. As such, policy recommendations are proposed to strengthen supervision, redefine classifications, enforce fair obligations, and increase transparency among private network operators.

Keywords: Privat Network, SD-WAN, techno-economy, regulation.