

## ABSTRACT

*Economic growth presents both a challenge and a primary objective for nations amid global uncertainty, aiming to enhance welfare, expand employment, and strengthen competitiveness. International trade involvement, particularly exports, significantly influences economic growth by enabling countries to compete and efficiently exchange goods and services. Exports play a crucial role in creating trade surpluses that drive economic growth. According to Statistics Indonesia (BPS) data from April 2025, the largest deficit in the 2024 trade balance originated from the oil and gas sector, making Indonesia a net importer with oil and gas import volumes exceeding exports. This condition is exacerbated by unstable international oil and gas prices that suppress Indonesia's export values. Fluctuating demand necessitates more accurate inventory planning, making precise forecasting essential for decision-making regarding oil and gas consumption. The Autoregressive Integrated Moving Average (ARIMA) model is frequently used for time series forecasting due to its ability to flexibly identify historical patterns, yet it has limitations in recognizing nonlinear patterns. Neural Networks can identify nonlinear patterns through parallel computation, yielding more accurate predictions. Optimization methods like Adam are required to optimize learning in complex neural networks and accelerate convergence. Time series forecasting with purely linear or nonlinear patterns is rarely encountered. Therefore, implementing a hybrid ARIMA Neural Network model with Adam optimization is expected to enhance prediction accuracy. Results demonstrate that the hybrid ARIMA ([1],1,[8]) – Neural Network(2-4-3-1) model achieves superior accuracy with a MAPE of 6.529951% compared to the ARIMA([1],1,[8]) model's MAPE of 7.203042%. This hybrid approach proves reliable for forecasting Indonesia's oil and gas exports in subsequent periods.*

**Keywords:** *Exports, Oil and Gas, Forecasting, ARIMA, Neural Network, ADAM, Hybrid ARIMA Neural Network Model.*