

## ABSTRACT

The growth of the Indonesian capital market, accompanied by an increase in the number of investors, has driven the need for portfolio optimization methods that can enhance returns while managing risk. This study applies the Mean Conditional Value at Risk (mean-CVaR) model with the Modified Particle Swarm Optimization (modified PSO) algorithm to stocks in the IDX30 index using daily closing price data from January 1, 2024, to December 31, 2025. The research stages include return calculation, stock selection based on expected return, Sharpe ratio, and Pearson correlation coefficient. Portfolio weight optimization without short selling (weights  $\geq 0$ ) is conducted using 50 particles and 300 iterations at a 95% confidence level with a risk aversion parameter of  $\lambda = 1$ . The results show that the optimal portfolio consists of 8 stocks, namely INDF, ASII, PTBA, PGAS, MEDC, INCO, ANTM, and BRPT. The objective function value decreases from 0.02333338 to 0.02088653, with convergence occurring around the 150th iteration. The portfolio generates an annual expected return of 15.88% with a risk of 17.25%, a 95% VaR of -1.5776%, a 95% CVaR of -2.1517%, and a Sharpe ratio of 0.5728. The stress test results indicate that the portfolio remains within the CVaR limit despite exceeding the VaR threshold, indicating its ability to withstand extreme risk. The mean-CVaR model and modified PSO are proven to be effective in generating an optimal portfolio.

**Keywords:** Portfolio Optimization, Mean-CVaR, Modified PSO, IDX30, Investment Risk.