

**IMPLEMENTASI *TIME SERIES FORECASTING* DENGAN METODE
EXPONENTIAL SMOOTHING PADA SISTEM RESTOK BARANG
KOPERASI SEKOLAH DI SMAN 1 BOBOTSARI**

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ABSTRAK

Koperasi sekolah memiliki peran penting dalam menunjang kegiatan ekonomi di lingkungan pendidikan. Namun, proses pencatatan transaksi dan pengelolaan stok barang yang masih dilakukan secara manual sering menimbulkan kesalahan serta keterlambatan dalam pengambilan keputusan restok. Penelitian ini bertujuan untuk merancang dan mengembangkan sistem informasi kasir berbasis web yang terintegrasi dengan sistem pendukung keputusan (SPK) menggunakan metode *Time Series Forecasting* untuk memberikan rekomendasi jumlah restok barang pada Koperasi SMAN 1 Bobotsari. Sistem dikembangkan menggunakan *framework* Django dengan metode pengembangan *Waterfall*. Algoritma *Single Exponential Smoothing (SES)* diterapkan untuk melakukan peramalan berdasarkan data historis penjualan. Sebelum pengembangan sistem dilakukan, dilakukan proses penentuan nilai alfa optimal berdasarkan data penjualan selama enam minggu. Data tersebut diolah menggunakan metode *Single Exponential Smoothing (SES)* dan dievaluasi menggunakan *Mean Absolute Percentage Error (MAPE)*. Hasil perhitungan menunjukkan bahwa nilai alfa terbaik adalah 0,1, yang menghasilkan tingkat kesalahan peramalan terkecil. Hasil pengujian menggunakan metode *Blackbox Testing* menunjukkan bahwa seluruh fungsi sistem berjalan sesuai kebutuhan pengguna. Aplikasi yang dikembangkan dapat mempermudah pengelola koperasi dalam mencatat transaksi, memantau stok barang, serta memperoleh rekomendasi restok secara otomatis dan akurat.

Kata Kunci: *Single Exponential Smoothing, Time Series Forecasting.*

**IMPLEMENTATION OF TIME SERIES FORECASTING USING THE
EXPONENTIAL SMOOTHING METHOD IN THE SCHOOL
COOPERATIVE RESTOCK SYSTEM AT SMAN 1 BOBOTSARI**

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ABSTRACT

School cooperatives play a vital role in supporting economic activities within educational environments. However, manual transaction recording and inventory management processes often lead to errors and delays in restocking decisions. This study aims to design and develop a web-based cashier information system integrated with a Decision Support System (DSS) using the Time Series Forecasting method to provide restock quantity recommendations for the SMAN 1 Bobotsari Cooperative. The system was developed using the Django framework and the Waterfall development method. The Single Exponential Smoothing (SES) algorithm was applied to forecast product restocks based on historical sales data. Prior to system development, an optimization process was carried out to determine the best alpha value using six weeks of sales data. The data were processed using the Single Exponential Smoothing algorithm and evaluated with the Mean Absolute Percentage Error (MAPE) metric. The results showed that the optimal alpha value was 0.1, which produced the lowest forecasting error. Testing with the Blackbox Testing method confirmed that all system functions operated according to user requirements. The developed application facilitates cooperative managers in recording transactions, monitoring stock levels, and obtaining restock recommendations automatically and accurately.

Keywords: *Single Exponential Smoothing, Time Series Forecasting.*