

ABSTRAK

Transformasi digital di lingkungan PT. Pos Indonesia KC Lhokseumawe menuntut sistem pengadaan barang dan jasa yang lebih efisien, aman, dan adaptif. Penelitian ini bertujuan untuk mengembangkan sistem pengajuan program kerja berbasis web yang mengintegrasikan teknologi *predictive data analytics* dan *algoritma neural network* guna meningkatkan efisiensi proses pengadaan serta akurasi prediksi anggaran. Sistem dibangun dengan arsitektur *frontend React.js* dan *backend FastAPI*, menggunakan MongoDB sebagai basis data. Model N-BEATS digunakan untuk prediksi anggaran berbasis *time series*, sedangkan *Neural Collaborative Filtering* digunakan untuk merekomendasikan vendor berdasarkan histori interaksi. Hasil evaluasi menunjukkan performa yang baik, dengan nilai *R-squared* sebesar 0,9965 untuk model prediksi anggaran dan *F1-score* sebesar 73,71% untuk model rekomendasi. Sistem ini berhasil menyediakan fitur manajemen pengadaan, prediksi anggaran, dan rekomendasi tender secara terintegrasi, serta diharapkan dapat memberikan kontribusi nyata terhadap efisiensi proses bisnis di lingkungan PT. Pos Indonesia.

Kata Kunci :Sistem Pengadaan, *Neural Network*, N-BEATS, *Neural Collaborative Filtering*, *Forecasting* Anggaran, Rekomendasi Vendor.

ABSTRACT

The digital transformation within PT. Pos Indonesia KC Lhokseumawe demands a more efficient, secure, and adaptive procurement system. This study aims to develop a web-based work program submission system that integrates predictive data analytics and neural network algorithms to enhance procurement efficiency and budget forecasting accuracy. The system is built using a React.js-based frontend architecture and a FastAPI-based backend, with MongoDB as the database. The N-BEATS model is implemented for time series-based budget forecasting, while Neural Collaborative Filtering is employed to recommend vendors based on interaction history. Evaluation results demonstrate strong performance, with an R-squared value of 0.9965 for the forecasting model and an F1-score of 73.71% for the recommendation model. This integrated system provides procurement management features, budget prediction, and tender recommendation, and is expected to make a significant contribution to improving business process efficiency at PT. Pos Indonesia.

Keywords :Procurement System, Neural Network, N-BEATS, Neural Collaborative Filtering, Budget Forecasting, Vendor Recommendation.