

Penyediaan barang dan jasa memegang peran krusial dalam keberhasilan proyek pengan- daan. Pemilihan vendor memiliki pengaruh yang signifikan terhadap keberhasilan maupun kegagalan suatu perusahaan. Pemilihan vendor yang tidak berdasarkan evalu- asi kinerja vendor yang baik, dapat menyebabkan kualitas barang atau jasa yang rendah, keterlambatan proyek, ketidakpuasan pengguna, serta kerugian material maupun nonma- terial. Penelitian mengenai pemilihan vendor dengan pendekatan *Machine Learning* (ML) sering kali mengabaikan mekanisme seleksi fitur otomatis, padahal mekanisme ini penting untuk meningkatkan akurasi proses evaluasi. Seleksi fitur otomatis berfokus pada fitur-fitur yang relevan, sehingga mampu meningkatkan presisi sekaligus meminimalkan risiko *overfitting*. Untuk menjawab *research gap* tersebut, penelitian ini mengembangkan metode evaluasi vendor dengan menggunakan statistik Chi-square, koefisien *Logistic Regression*, dan *Recursive Feature Elimination* (RFE) guna mengidentifikasi serta meng- eualikan fitur-fitur yang kurang relevan dari proses evaluasi. Performa beberapa algo- ritma *Machine Learning* (ML) kemudian dibandingkan dan diperoleh hasil terbaik dari algoritma *Random Forest* yang dioptimasi menggunakan *GridSearchCV* dan digabungkan dengan tiga metode seleksi fitur (Chi-square, koefisien *Logistic Regression*, dan *Recursive Feature Elimination*). Model ini mencapai akurasi sebesar 98,34%, *precision* 98,28%, *recall* 98,38%, dan *f1-score* 98,33%, unggul secara signifikan dibandingkan algoritma lain seperti *Decision Tree*, *Logistic Regression*, *SVC*, *Gaussian Naive Bayes*, dan *KNN*. Tanpa seleksi fitur, akurasi model hanya mencapai 78,45%, menunjukkan pentingnya pemilihan fitur yang relevan. Penelitian ini memberikan kontribusi signifikan terhadap penyempurnaan prosedur pemilihan vendor dan memperkuat penerapan *Machine Lear- ning* (ML) dalam pengambilan keputusan bisnis. Hasil studi ini menawarkan kerangka kerja evaluasi otomatis yang dapat disesuaikan dengan berbagai skenario pengambilan keputusan di perusahaan.

Kata kunci—Pemilihan Vendor, *Machine Learning*, *Random Forest*, *Decision Support Systems*, *Feature Selection*.

The procurement of goods and services plays a crucial role in the success of procurement projects. Vendor selection has a significant impact on the success or failure of a company. An inappropriate vendor selection may result in poor quality of goods or services, project delays, user dissatisfaction, and both material and non-material losses. Research on vendor selection using Machine Learning (ML) approaches often overlooks automatic feature selection mechanisms, despite their importance in improving evaluation accuracy. Automatic feature selection focuses on relevant features, thereby enhancing precision while minimizing the risk of overfitting. To address this research gap, this study proposes a vendor evaluation method that employs Chi-square statistics, Logistic Regression coefficients, and Recursive Feature Elimination (RFE) to identify and exclude less relevant features from the evaluation process. The performance of several Machine Learning (ML) algorithms was then compared, with the best results obtained from the Random Forest algorithm optimized using GridSearchCV, combined with the three feature selection methods (Chi-square, Logistic Regression coefficients, and RFE). This model achieved an accuracy of 98,34%, precision of 98,28%, recall of 98,38%, and an F1-score of 98,33%, significantly outperforming other algorithms such as Decision Tree, Logistic Regression, SVC, Gaussian Naive Bayes, and KNN. Without feature selection, the model's accuracy dropped to only 78,45%, highlighting the critical importance of selecting relevant features. This study makes a significant contribution to improving vendor selection procedures and reinforces the application of Machine Learning (ML) in business decision making. The results offer a robust automated evaluation framework that can be adapted to various decision-making scenarios within organizations.

Keywords—Vendor Selection, Machine Learning, Random Forest, Decision Support Systems, Feature Selection.