Identifying Risk through Customer Transaction: XGBoost Technique in Supply Chain Finance

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Abstract

Supply Chain Finance (SCF) is a type of supplier finance which enables the supplier to serve their receivables early than the actual payment date, thereby freeing up its working capital and also benefits buyer as the buyer can obtain short term credit at lesser cost. Delayed payments by buyers pose a significant threat to supply chain stability. Thus, identifying potential supplier liquidity is crucial. This work addresses this issue by developing a finance risk prediction model using XGBoost and examined by customer transaction behavior. The single and hybrid models are constructed for a comparative analysis over their performance using receiver operating characteristic curve (ROC), area under the ROC curve (AUC), and F1-Score. Feature importance and partial dependence plots (PDPs) is applied to interpret the model's predictions. The model's effectiveness and accessibility are further explored by a web-based tool, enabling users to directly interact with the model and obtain personalized risk predictions. The single models that are to be implemented are XGBoost, Random Forest (RF), Gradient Boosting Decision Tree (GBDT), and LightGBM. Hybrid models are made by combining these single models with Linear Regression (LR). Among all the above-mentioned models, the XGBoost model to demonstrate superior performance, effectively predicting potential risks and uplifting managerial payment practices. This clear understanding is revolutionizing risk management strategies and foster more robust supply chains. This study opens new paths for future exploration of practical models for financial risk assessment within SCF.

Keywords: Supply chain stability, Delayed Payment, Buyer transaction behavior, Financial risk prediction, XGBoost model.

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