

ABSTRACT

In line with Bank Indonesia Regulation Number: 23/5/PBI/2021 Concerning the Foreign Exchange Transaction Monitoring System, based on Article 2 which states "Bank Indonesia implements SISMONTAVAR which aims to obtain data and information on foreign exchange transactions against the rupiah directly and immediately (real-time)" Bank Indonesia acts as an Independent State Institution must be able to realize a system that can predict foreign exchange rates in real time.

Technological advances in big data and machine learning have presented new opportunities in analyzing value, especially in predicting exchange rates and import-exports by type of foreign currency in Indonesia. By predicting exchange rates and import-exports by type of foreign currency in Indonesia, valuable guidance can be provided for the formulation and refinement of relevant policies, thus holding significant practical importance. Bank Indonesia as an Independent State Institution requires a technology-based approach to improve accuracy in analyzing and predicting exchange rate movements and import-exports by type of foreign currency as well as formulating policy recommendations.

This study aims to explore how Bank Indonesia makes recommendations and refinements to technology-based policies that can be optimized through big data and machine learning to analyze in accordance with Techno Economic Modeling and predict exchange rates and exports-imports of foreign currencies accurately. By understanding the patterns and trends of exchange rates and exports-imports of foreign currencies. Making policy recommendation formulations for export-import development as well as real visualization in analyzing data.

To achieve these objectives, this study uses machine learning-based data analysis methods and predictive models. The data used includes historical data on exchange rates and export-import of foreign currencies owned by Bank Indonesia, which affect the exchange rate and export-import by taking the seven best types of foreign currencies and their countries of origin: JPY - Japanese Yen, KRW - South Korean Won, SGD - Singapore Dollar, USD - United States Dollar, HKD - Hong Kong Dollar, CNY - Chinese Yuan Renminbi. Through the calculation of the correlation coefficient, the monetary indicators used are determined: BI-Rate, CPI Inflation, Inflation Target, Foreign Exchange Reserves, JISDOR, IndONIA. Machine Learning algorithms are applied such as: SARIMAX and Multiverse LSTM to identify key patterns and predict potential changes that can have an impact on the formulation of recommendations and policy improvements, especially from the perspective of Bank Indonesia. The results of the Machine Learning Algorithm approach in this study are measured to determine the effect of predicting error

values using metrics used to evaluate the performance of the prediction model: MAPE (Mean Absolute Percentage Error) and RMSE (Root Mean Square Error). Formulation of Policy Recommendations with improvements to Bank Indonesia Regulation Number: 23/5/PBI/2021 concerning the Foreign Exchange Transaction Monitoring System against the rupiah article 2.

Keywords: *Foreign Exchange, Exchange Rates, Export-Import, Policy, Machine Learning.*