# ABSTRACT

Deposit-taking microfinance institutions are vital in providing financial services to low-income individuals and underserved communities. Unfortunately, the fluctuating decrease in DTMFI deposits between 2008 and 2021, as reported by the Reserve Bank of Zimbabwe (RBZ), has negatively impacted the stability and sustainability of the microfinance sector. Accurate financial performance prediction is essential for effective risk management, strategic decision-making, and ensuring the sustainability of these institutions. Therefore, this study aims to develop an advanced machine learning model that is specifically tailored to predict the financial performance of deposit-taking microfinance institutions accurately. This was achieved by using pragmatism, mixed methods and single-case study design to collect and analyse data. Data collected from Success Microfinance Bank was pre-processed by removing duplicates and replacing missing values with column averages. After cleaning the dataset, data was transformed by normalisation, feature scaling, and discretisation of variables. After data preprocessing, the ANN model was developed following the steps: splitting the dataset into train and test sets, selecting relevant features using mutual information regression, training machine learning model, optimisation using grid search method and evaluating model performance using MAE, MSE, RMSE and . The model with the best accuracy was selected for making predictions. A 10-fold cross validation was also done to see model performance on unseen data. The results of the mutual information egression indicated that the top five relevant features were net income followed by quarter, net capital base, total assets and total deposits, and the least significant feature was the year. The r-squared value of the ANN model using default parameters was 0.56, which is greater than the r-squared value of the baseline model. After hyperparameter tuning, the r-squared value improved to 0.78, indicating that the independent variables in the model explain 78% of the variability in the ROA. Such a r-squared value shows that the developed model was relatively good in predicting financial performance of Success Microfinance Bank. Thus, deposit-taking microfinance institutions should adopt the ANN in predicting their financial performance.