Combined Structural Equation Modeling – Artificial Neural Network Model for Predicting Customer Loyalty

M. Arbi Hadiyat[*,1]

[1] Industrial Engineering, University of Surabaya
*Corresponding author: arbi@staff.ubaya.ac.id

Customer loyalty becomes considerations by service providers to be maintained for reducing the churn rate. Many researches proposes factors that are significantly influencing customer loyalty, and apply them for prediction on it. Based on mathematical models, loyalty prediction methods are developed and involve new approaches including machine learning.

This research aim is predicting customer loyalty using the combination of structural equation model (SEM) and artificial neural networks (ANN). The methodology starts by applying SEM for selecting statistically significant factors affect the loyalty. The linear SEM model ensures this relationship by fulfilling statistical hypothesis and fulfilled assumptions. Once selected factors are found, these factors are treated as inputs for ANN modeling. ANN is selected because of its ability in nonlinear modeling for enhancing its prediction. ANN then learns the relationship between those inputs and the loyalty in real time as any additional observation recorded in. Based on trained ANN, prediction of customer loyalty based on input factors could be done.

Case study is taken at a Hotel by asking 130 customers. SEM inputs includes tangibles, facility, and staff attitudes, meanwhile loyalty scores becomes output. Combination of SEM-ANN has successfully predicts the customer loyalty and bring up chance for improvement strategies.

Keywords: *SEM, ANN, loyalty, prediction*