Constructing A Composite Indicator for Measuring the Socio-Economic Development of a Country, Using PCA And Machine Learning Classification Models*

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Abstract

In recent times, composite indicators have become crucial for evaluating the level of progress and development of a country, a process encouraged by the European Union's constant changes in legislation and initiatives. This paper aims to propose a model that evaluates 5 dominant axes of economic performance, through the use of composite indicators, using 83 initial variables, applied to the 27 member states of the European Union. The model consists of four stages: 1. Constructing a set of sub-indicators for each axis, using principal components analysis. 2. Aggregating the set of sub-indicators, using simple weighting. 3. Applying supervised learning models to elaborate predictions based on a classification variable 4. Applying ensemble models for improving the general accuracy of prediction. The study concludes with an integral evaluation of the socio-economic performance of a state, minimizing information loss and assessing the ranking of European countries.

Keywords: composite indicator, socio-economic performance, PCA, machine learning, ensemble models

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