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A Multivariate Analysis of Socioeconomic and Environmental Global Indicators

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One of the main objectives of every country, whether developed or developing is to achieve sustainable development. Development status is one of the key measurements in identifying the performance of a country. Developed, developing and least developed are the levels of development status measured under different indicators. Therefore, it is highly important to know the related variables or indicators that can describe the development status of a country appropriately. Most of the studies are based on economical, industrial and technological indicators to identify the development status. However, there can be many other indicators that can directly or indirectly impact on the development stages. The aim of this research is to cluster the countries considering socioeconomic and environmental factors. That is, this research attempts to find how several global indicators related to the sustainable development status of a country. This study is considering several socioeconomic and environmental factors namely Gross National Income (GNI) per capita, Literacy Rate (LR), Life Expectancy (LE), Global Peace Indicator (GPI), Pollution Indicator (PI) and Suicide Index (SI). Because of the availability of data, this study is considering data for 90 countries for the year 2018. Due to the presence of correlation between above mentioned indicators, principal component analysis technique was used to construct uncorrelated factor variables. Countries were classified into three clusters based on the above factors using k-means clustering technique. First three components were used in clustering where they account for a proportion 0.94 of the population variance. The results showed that the average GNI, LE and LR values of the first cluster are highest and the average GPI and PI values of the first cluster are lowest with compared to the other two clusters. The average GNI, LE, LR and SI values of the second cluster are lowest and the average PI value of the second cluster is highest with compared to the other two clusters. The above results depict the countries having high gross national income, life expectancy at birth and literacy rate are peaceful where their pollution and suicide rates are high. Hence, this study conclude that it is vital to consider socioeconomic as well as environmental indicators to identify the sustainable status of a country.

Keywords: Sustainable development, Global indicators, Principal component analysis, k-means clustering