

Proposals for the Future Direction of South Korea's Official Development Assistance (ODA)

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Introduction

The scale of South Korea's Official Development Assistance (ODA) budget reached an unprecedented high in 2024. The Ministry of Economy and Finance announced plans to expand the ODA to 6.5 trillion won by 2027. This reflects not only a national but a global trend of annually increasing ODA budgets. However, this numeric increase has been criticized for actually reducing support to the poorest nations and diminishing the effectiveness of aid. Therefore, this study aims to propose directions for the future implementation of South Korea's ODA through data analysis and journalistic research. To this end, two methodologies have been adopted: First, a correlation analysis to identify key variables influencing the size of ODA; and second, clustering to understand the challenges in Korea's ODA and to benchmark suitable policies from other nations.



Feature Selection

We collected a total of 59 datasets for OECD DAC member countries from 2000-2022. Each dataset is a social science data that provides information on the economic, social, and population levels of the country. In addition, we tried to reduce the differences in size between countries by selecting ratios or indices from 1-10, such as GDP per capita, population density, and the share of high-tech in exports, rather than just GDP size, population, or export value.

Using these variables, we conducted a regression to predict net ODA for the following year. We defined the task as feature selection, with the topic "Select the variables that have the greatest impact on ODA scaling".

For data preprocessing, we imputed missing values using predictions from a linear regression model and did robust scaling in that each feature has different units. Mainly, there are three feature selection methods and we used a total of 13 measures as shown below.

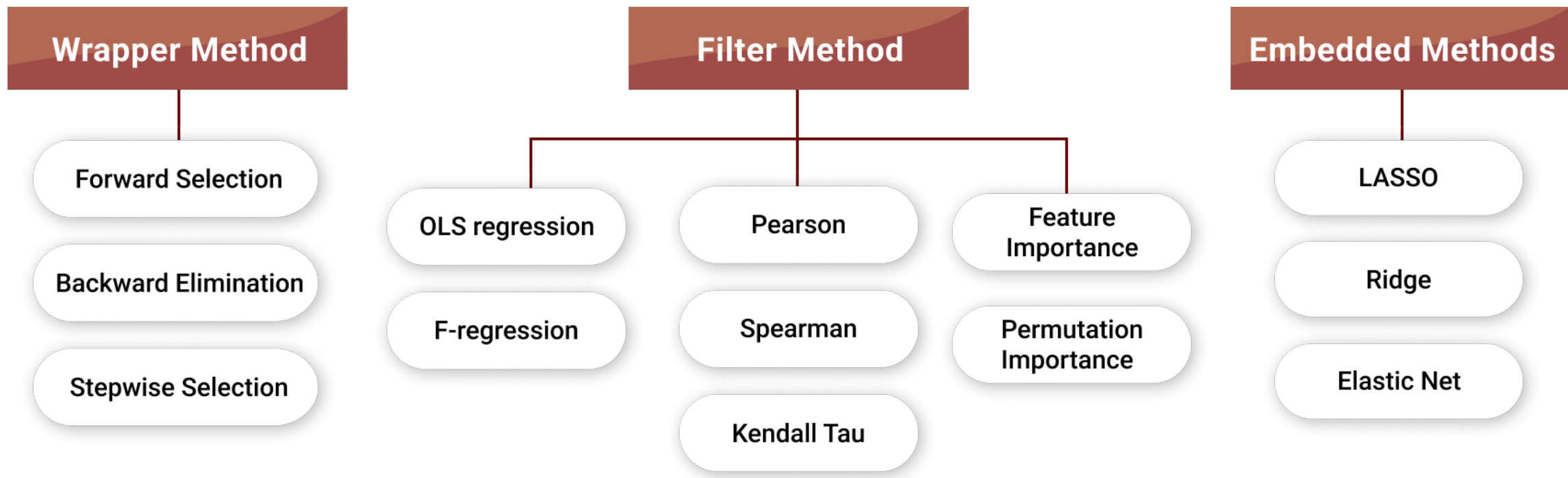


Figure 1. Feature Selection Methods

To select key variables encompassing all methods, the top 3 variables in terms of importance from each method were identified. Additionally, variables that were deemed important in 17 or more out of the 13 methods were cataloged for further analysis. To avoid multicollinearity issues among the 17 selected variables, we conducted heatmaps and VIFs, deleted four highly correlated variables, and finally found that the following 13 variables were highly correlated with the extent of ODA in the following year.

Military spending(% of GDP)	R&D spending(% of GDP)
Medium and high-tech exports (% manufactured exports)	Average wages
GNI per capita	Old-age dependency ratio
Business extent of disclosure index (0-10)	Population density
Gini index	Female survival to 65
Agriculture, forestry, and fishing, value added (% of GDP)	Trade
Tax revenue (% of GDP)	-

Table 1. Selected Features

After applying the Extra Trees Regressor with these variables, we got an MAE of 524.28, MSE of 1311540.30, and R2 of 0.9816.

Clustering

The purpose of the clustering method is to examine ODA performance by comparing the size of ODA by country and various indicators, and to analyze the characteristics of countries by dividing them into groups.

1. Clustering 1

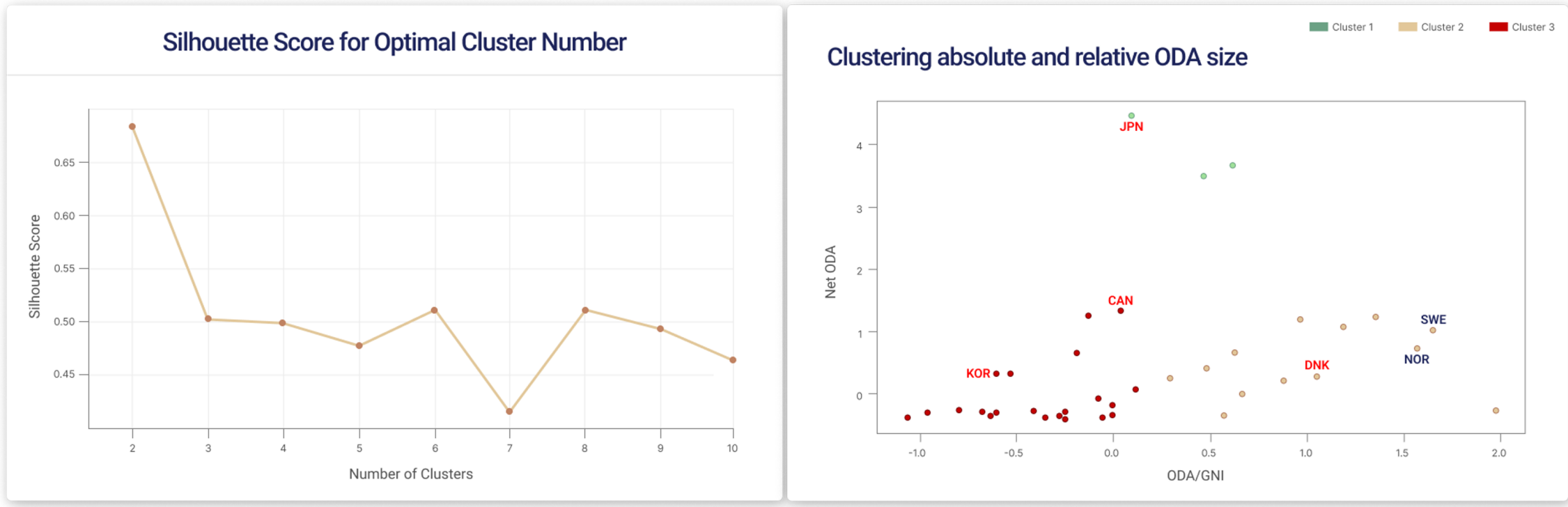


Figure 2. Clustering in 39 countries using Net ODA and ODA/GNI

By clustering ODA/GNI (% of gross national income), which represents the relative size of the ODA budget, and NET ODA (GRANT Equivalent Perspective, Million US dollars), which represents the absolute size of the ODA

Clustering

budget, about 40 countries are divided into several clusters, and we analyzed the characteristics of each cluster to select countries for policy reference.

We used the latest(2022) indicators provided by OEDA Data. We wanted to reduce the impact of outliers, so we applied a robust scaler, hierarchical clustering (Complete Link), removed USA and Germany, which turned out to be outliers, and determined k using Silhouette Score's Elbow Method.

- Cluster 1 (Japan, France, United Kingdom): The ODA/GNI is moderate but above the DAC average of 0.36%, and the size of Net ODA is large compared to other countries. Japan, which is geographically and culturally close to Korea, was chosen to represent this cluster.
- Cluster 2 (Denmark, Norway, Sweden, etc.): It is mainly composed of Nordic countries, and while their ODA volumes are not large, they are far ahead in the ODA/GNI. Denmark, which consistently exceeds the UN's ODA/GNI standard of 0.7% and has a similar Net ODA size to Korea, was chosen to represent this cluster.
- Cluster 3 (Korea, Canada, Hungary, Chinese Taipei, etc.): It is mainly composed of Eastern European countries and Asian countries. They are similar in size to Cluster 2 but with lower performance in ODA/GNI. Korea falls into this cluster, underperforming countries with a small ODA/GNI but large Net ODA (Cluster1) and countries with a small Net ODA but large ODA/GNI (Cluster2).

2. Clustering 2

To select countries for policy reference, clustering was conducted considering more complex variables than previous results. This is the clustering result that takes into account 12 variables, including the amount of ODA by sectors (health, war, education, etc.) and CPA, the amount that the recipient countries can actually manage. These are collectively referred to as 'ODA-related variables'.

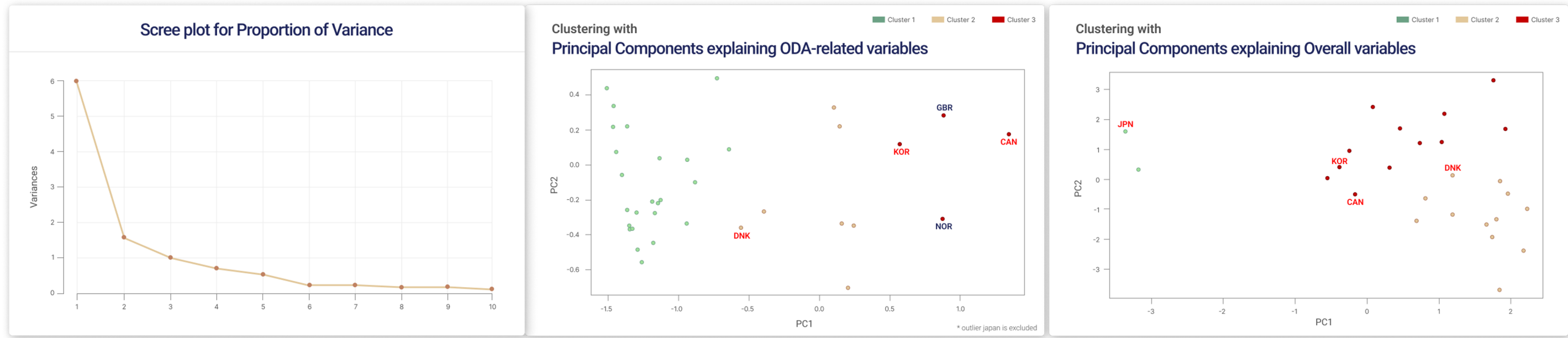


Figure 3. Screeplot and PC clustering explaining ODA-related variables

We can find the elbow point at k=2 in the Scree plot. It has 80% explanatory power even though it has reduced 10 dimensions to 2 dimensions using PCA. For outlier countries(USA and Japan), it has been removed to ensure smooth clustering. As a result, Canada, the United Kingdom, and Norway were in the same cluster as Korea. Denmark and Japan were in different groups. The last clustering was executed by incorporating variables that were identified as having a statistically significant impact on the calculation of the ODA amount, as established in the previous analysis. They are collectively referred to as 'Overall variables'. A total of 25 variables were considered, and again, it was reduced to 2 dimensions. In a series of results, we selected Canada, which has been grouped into the same group with Korea several times, Denmark, and Japan, which have been included in different groups, as reference countries for Korean policy.

Policy Journalism

In 2022, South Korea ranks 16th out of 30 member states in terms of aid, with an ODA/GNI ratio of 0.17% (compared to the recommended 0.7%). In addition, country programmatic assistance (CPA) and aid to Least Developed Countries are declining, highlighting the fragmentation of aid to improve ODA quality and allocation. In order to solve the problems in Korea's ODA operation method, we looked at the policies of Canada, Japan, and Denmark based on the cluster results.

Japan	Denmark	Canada
<ul style="list-style-type: none">- Promotion of the unification of ODA implementation agencies (JICA)- Spread the Japanese-style development model (the management strategy that allowed rapid growth after World War II)- High percentage of loans (instead of grant, mostly in loan form)- Main aid area: Southeast Asia (securing a market for Japanese goods)	<ul style="list-style-type: none">- Promotion of the unification of ODA implementation agencies (DANIDA)- Generous nationality on ODA (Nordic model, socioeconomic justice, welfare, social democratic emphasis on reducing inequality)- Select and focus, grant aid ratio is nearly 100% (to implement less ODA scale as efficiently as possible)- Main areas of aid: Africa (no relation to Denmark's usual interests, just for the poorest countries)	<ul style="list-style-type: none">- Technological similarity of Canada and Korea (Both have similar values for military spending, R&D spending, medium and high-tech exports, and average wages indicator)- One agency, Global Affairs Canada (This is responsible for both soft loans and grants (accounting for 72% of the ODA budget in 2022))- A biennial report to Parliament on the Government of Canada's international assistance (This consolidates a comprehensive assessment of policy direction and results)

Conclusions

While Canada, Japan, and Denmark manage their ODA under a single agency, Korea's MOFAT and MOSF manage Grants and Loans, respectively. This leads to fragmentation and inefficiency, so a single agency should be in charge of ODA, with a single perspective from planning to evaluation. Denmark has the best ODA in terms of indicators, but it is difficult to accept due to the different public sentiment, culture, and geographical features of ODA with Korea. Therefore, it is necessary to take advantage of Canada and Japan's policy, which has the same culture as Korea, and make practical improvements, and ultimately aim for Denmark's ODA. As a specific policy, we propose that Korea's ODA should aim to ensure efficiency in aid distribution and management through the alignment of executive agencies, secure transparency through annual reports, and suggest an increase in the ODA/GNI ratio.

References

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