Methodology and Approach for Case Study

1. Exploration and Pre-processing Techniques

1. Loading and merging datasets from World Bank and MOSPI into R using read.csv or readxl.
2. Checking for missing values using is.na() and summary().
3. Handling missing data using na.omit() or imputation if required.
4. Converting year column into Date or Time Series format using ts() or zoo package.
5. Visual inspection using plots like line graphs and scatter plots for trend identification.
6. Scaling or normalizing values if needed for certain models.

2. Modeling, Diagnostics, and Statistical Techniques

1. Apply ARIMA model for forecasting GDP and sectoral contributions.
2. Use ETS (Exponential Smoothing) method as an alternative to ARIMA.
3. Perform stationarity checks using Augmented Dickey-Fuller test (adf.test()).
4. Use ACF and PACF plots for lag identification.
5. Compare model performance using AIC, RMSE, and residual analysis.
6. Apply Holt-Winters method if seasonal patterns are detected.

3. R Packages and Pre-defined Functions

1. forecast: For ARIMA, ETS, and Holt-Winters forecasting methods.
2. tseries: For statistical tests like adf.test().
3. ggplot2: For data visualization and plotting forecasts.
4. dplyr: For data wrangling and transformation.
5. zoo and ts: For handling time-series objects.
6. urca: For unit root tests and other advanced time-series diagnostics.