**Model Overview:**

A Simple Linear Regression model was applied to examine the relationship between **Marketing Spend** (independent variable) and **Profit** (dependent variable). The dataset was divided into a training set (80%) and a testing set (20%) to evaluate the model's performance.

**Key Parameters:**

* **Intercept (𝛽₀):** The intercept value is **48,923.31**, which represents the predicted Profit when Marketing Spend is zero. This can be interpreted as the baseline profit achieved without any investment in marketing.
* **R-Squared:** The R-squared value of **-0.11** suggests that the model fails to explain the variation in Profit. This highlights that Marketing Spend alone may not significantly influence Profit in this context.

**Multiple Linear Regression Analysis**

**Model Overview:**

A Multiple Linear Regression model was developed to predict **Profit** based on multiple factors, including **R&D Spend**, **Administration**, **Marketing Spend**, and **State**. To ensure compatibility with the model

**Key Parameters:**

* **Intercept (𝛽₀):** The intercept of **54,080.72** indicates the predicted Profit when all predictors (R&D Spend, Administration, Marketing Spend, and encoded State variables) are set to zero.
* **R-Squared:** An R-squared value of **0.9001** shows that the predictors collectively explain 90.01% of the variability in Profit. This suggests a strong correlation between the independent variables and the dependent variable.
* **Mean Squared Error (MSE):** The model's MSE is **80,929,465.49**, which reflects the average squared difference between actual and predicted Profit values.