Profit Analysis Report

Data Overview

Dataset Summary :

- Number of Records: 50 observations
- Variables Analyzed
- R&D Spend
- Marketing Spend
- Administration Spend
- Profit (Target Variable)

Goals

1 . To analyze profit trends and identify strategies to enhance business profitability using data insights from Excel and Power BI.

2 . Leverage insights from Excel regression and Power BI dashboards for data-driven decision-making.

Tools Used in the Project

- **SQL**
  - Used to extract data from the team’s database for analysis.

- **Microsoft Excel**
  - Used for data analysis and regression calculations. Excel's built-in functions, such as the Data Analysis Toolpak, were utilized to perform linear regression, identify correlations, and analyze profit-driving variables.

- **Power BI**
  - Used to create interactive dashboards and visualizations for better insights into profit trends. Power BI helped in visualizing sales performance, expenses, and operational efficiency across various business segments.

Regression Analysis Results

- In this section, we performed a multiple regression analysis to identify the key factors influencing profits.
  The analysis was conducted using Excel, which provided us with the following key outputs:

  - Regression Statistics
  - ANOVA Results
  - Coefficients and P-Values
  - Model Equation

R&D_Spend	Administration	Marketing_Spend	State	Profit
165349.2	136897.8	471784.1	New York	192261.83
162597.7	151377.59	443898.53	California	191792.06
153441.51	101145.55	407934.54	Florida	191050.39
144372.41	118671.85	383199.62	New York	182901.99
142107.34	91391.77	366168.42	Florida	166187.94
131876.9	99814.71	362861.36	New York	156991.12
134615.46	147198.87	127716.82	California	156122.51
130298.13	145530.06	323876.68	Florida	155752.6
120542.52	148718.95	311613.29	New York	152211.77
123334.88	108679.17	304981.62	California	149759.96
101913.08	110594.11	229160.95	Florida	146121.95
100671.96	91790.61	249744.55	California	144259.4
93863.75	127320.38	249839.44	Florida	141585.52
91992.39	135495.07	252664.93	California	134307.35
119943.24	156547.42	256512.92	Florida	132602.65
114523.61	122616.84	261776.23	New York	129917.04
78013.11	121597.55	264346.06	California	126992.93
94657.16	145077.58	282574.31	New York	125370.37
91749.16	114175.79	294919.57	Florida	124266.9
86419.7	153514.11	0	New York	122776.86
76253.86	113867.3	298664.47	California	118474.03
78389.47	153773.43	299737.29	New York	111313.02
73994.56	122782.75	303319.26	Florida	110352.25
67532.53	105751.03	304768.73	Florida	108733.99
77044.01	99281.34	140574.81	New York	108552.04
64664.71	139553.16	137962.62	California	107404.34
75328.87	144135.98	134050.07	Florida	105733.54
72107.6	127864.55	353183.81	New York	105008.31
66051.52	182645.56	118148.2	Florida	103282.38
65605.48	153032.06	107138.38	New York	101004.64
61994.48	115641.28	91131.24	Florida	99937.59
61136.38	152701.92	88218.23	New York	97483.56
63408.86	129219.61	46085.25	California	97427.84

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.975062046
R Square	0.950745994
Adjusted R Square	0.947533776
Standard Error	9232.334837
Observations	50

ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regression	3	75683964196	25227988065	295.9781	4.53E-30
Residual	46	3920856301	85236006.54		
Total	49	79604820497			

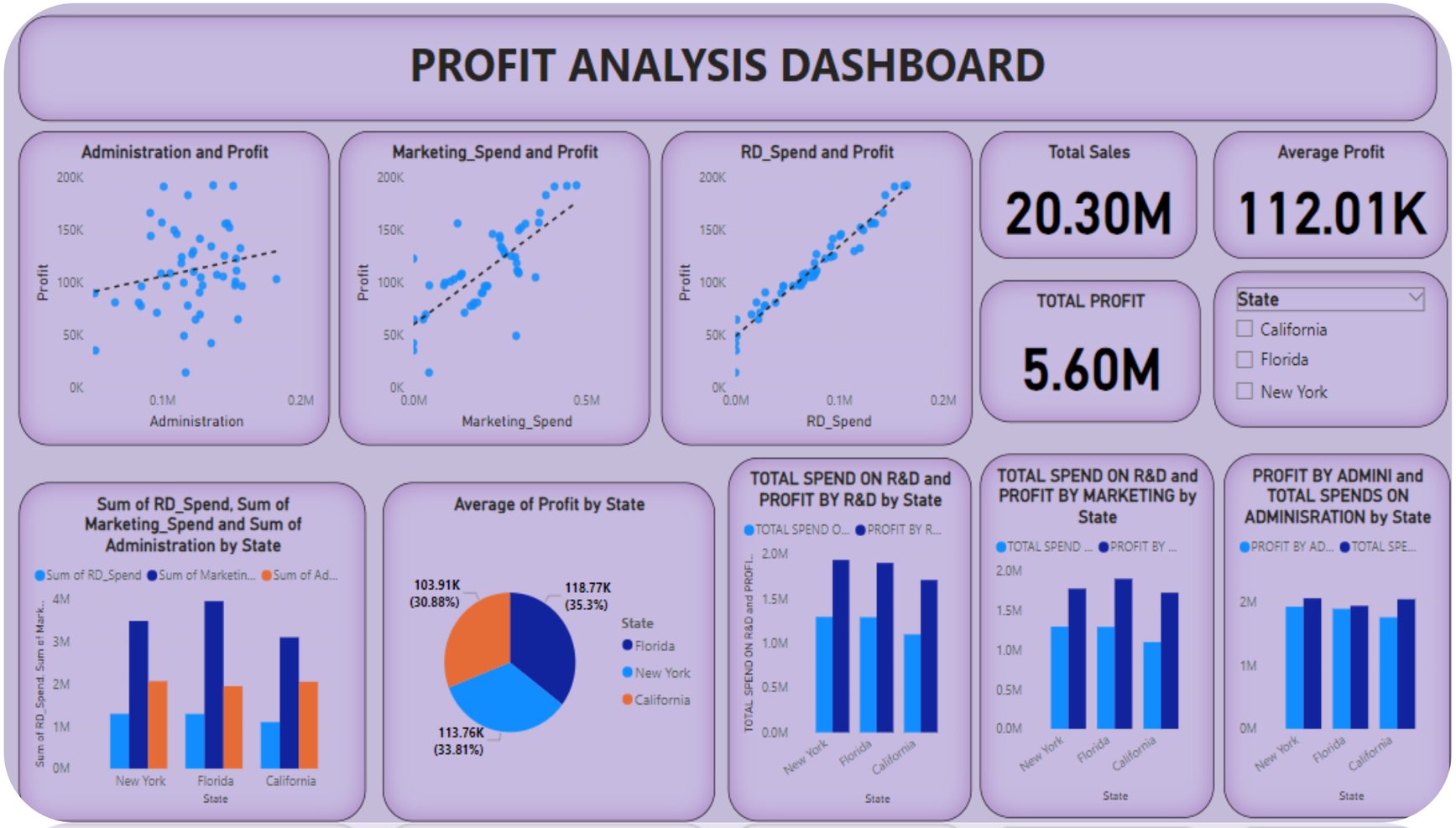
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	50122.19299	6572.352622	7.626217867	1.06E-09	36892.73	63351.65	36892.73	63351.65
R&D_Spend	0.80571505	0.04514727	17.84637376	2.63E-22	0.714838	0.896592	0.714838	0.896592
Administration	-0.026815968	0.05102878	-0.525506752	0.601755	-0.129532	0.0759	-0.129532	0.0759
Marketing_Spend	0.027228065	0.016451235	1.6550773	0.104717	-0.005887	0.060343	-0.005887	0.060343

Formula:

Profit = R&D Coefficient*R&D +Administration Coefficient*Administration + Marketing Coefficient*Marketing + Intercept

R&D Spend	Administration	Marketing Spend	Profit
21892.92	81910.77	164270.7	70037.90
23940.93	96489.63	137001.1	70554.57

Power BI Dashboard:



Actionable Insights

- In **Scatter Plots,** the points clusters are closely around the trendline in R&D, which tells that there is a *strong correlation* with profit among all spending categories.
- **In Bar Chart,** it Compares state-wise spending across all categories.
- In **Pie Chart,** it shows that Florida has the highest average profit, so the startups should expand or focus more resources in Florida.
- **Total sales and profit,** total sales is $20.30M, total Profit is $5.60M and the average profit is $112.01K.
- **State-Wise Analysis,** Florida has the highest average profit of $118.77K (35.3%), followed by New York at $113.76K (33.81%). California records the lowest average profit at $103.91K (30.88%).
- R&D significantly contributes in predicting profit, because **p-value** of R&D is $2.63 \times 10^{-222.63}$ which is less than 0.05.

Thank You