PROFIT ANALYSIS

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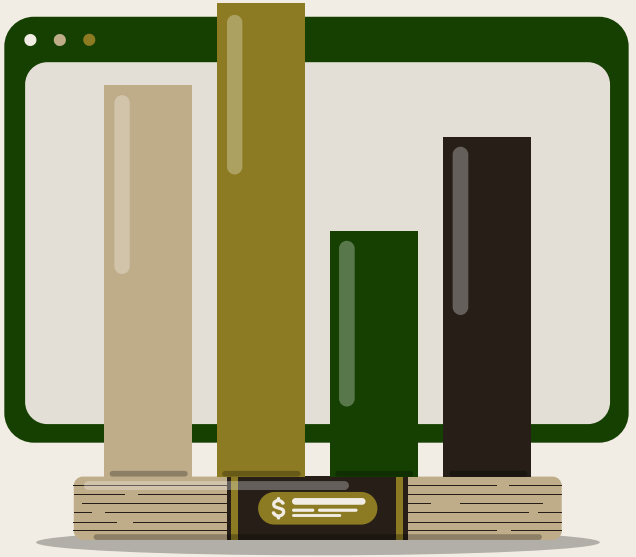
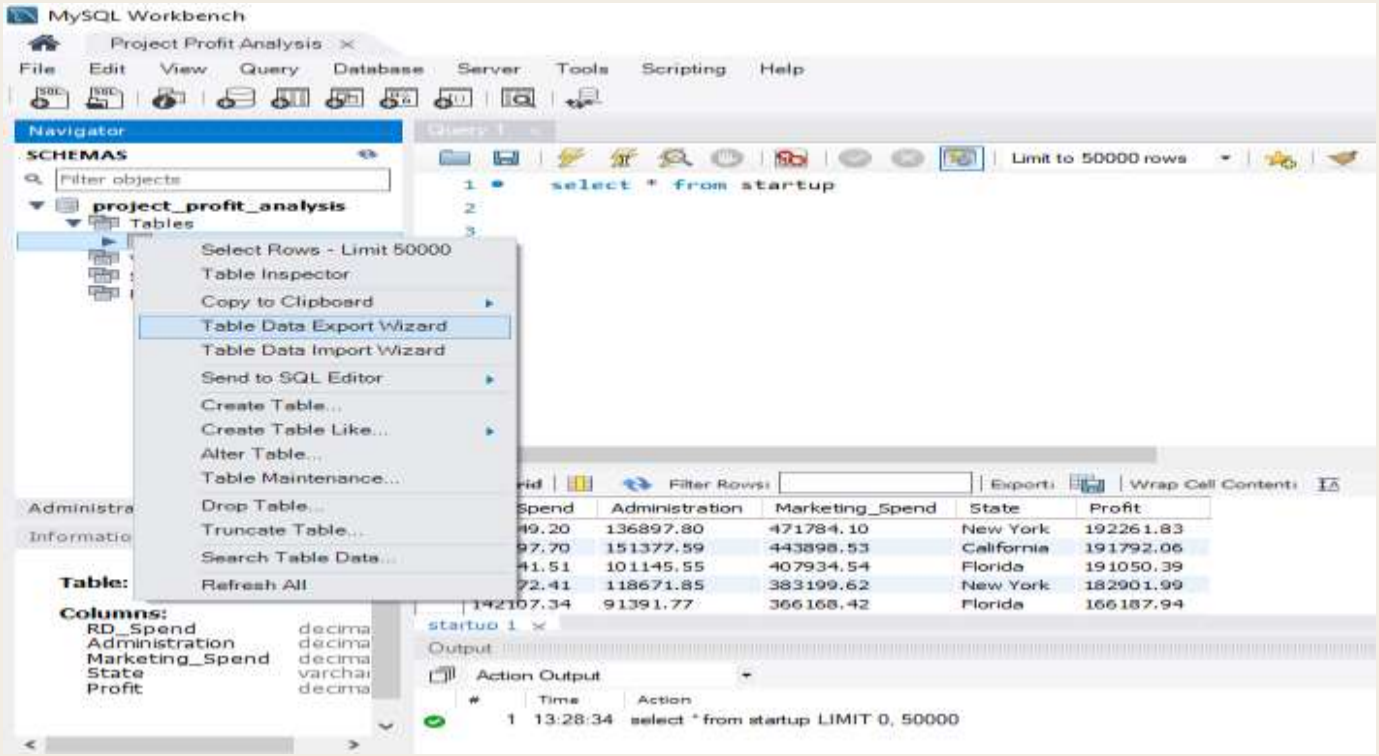
01

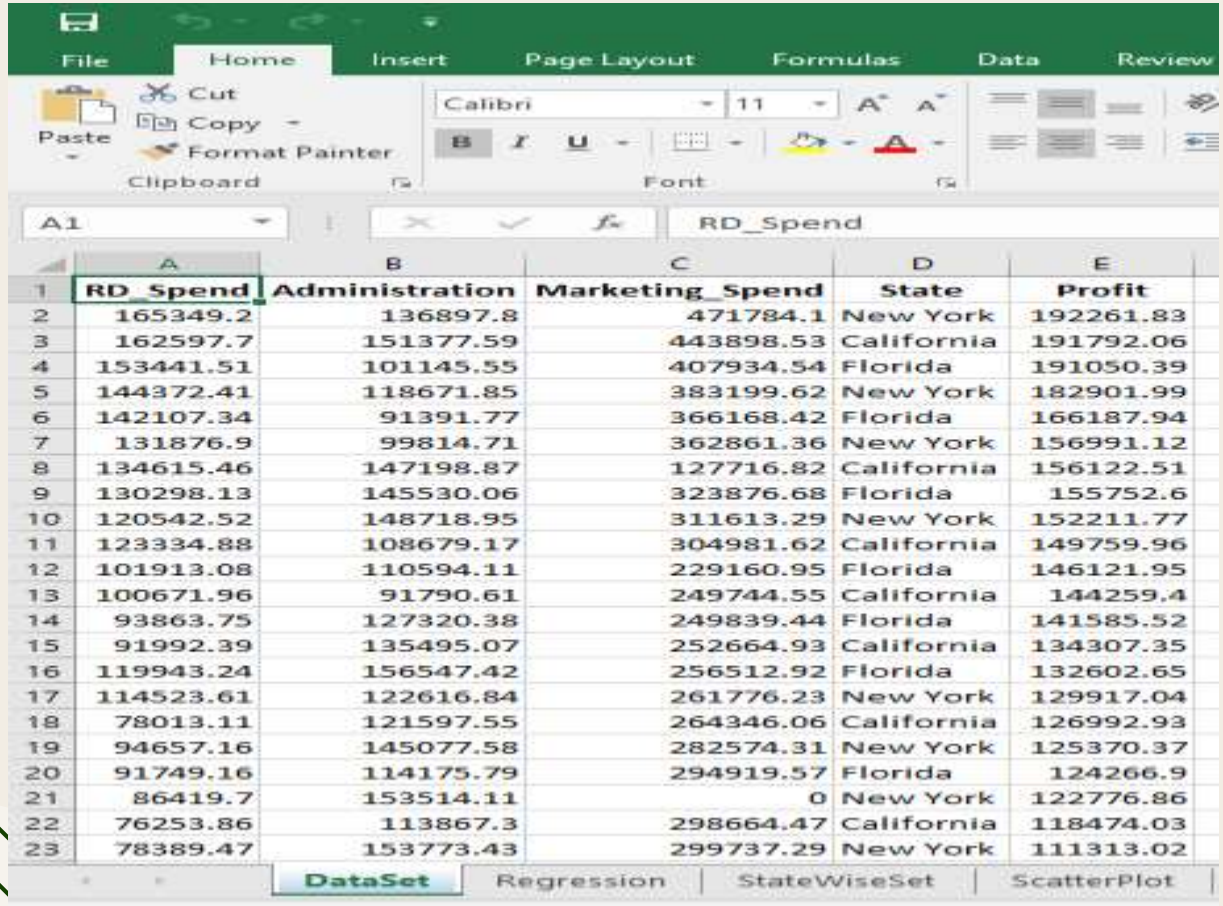
FETCH DATABASE



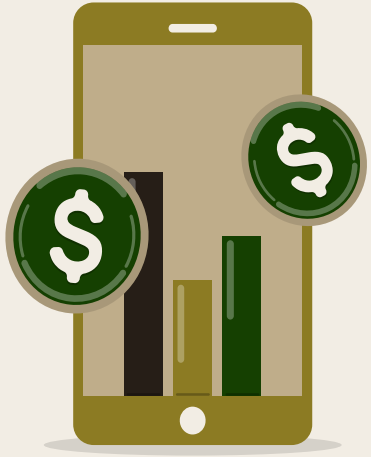
Task 1 - Get data from the database with the given credentials.



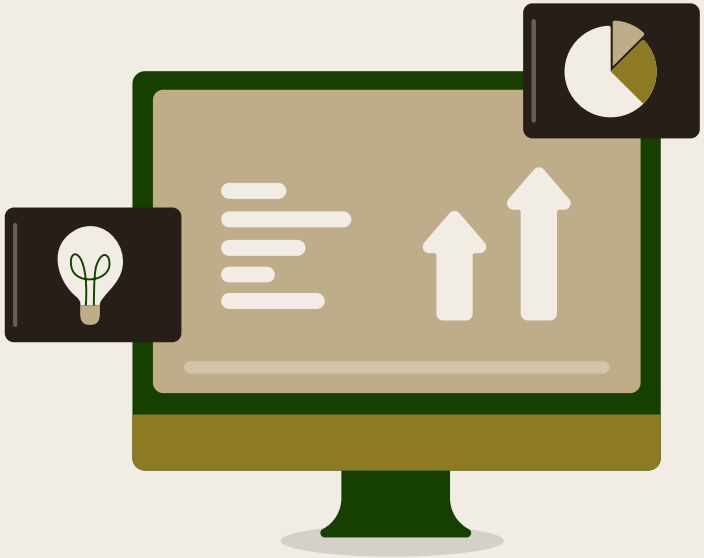
As per the task dataset fetched from MySQL database & process for the same shown here.



	A	B	C	D	E
1	RD_Spend	Administration	Marketing_Spend	State	Profit
2	165349.2	136897.8	471784.1	New York	192261.83
3	162597.7	151377.59	443898.53	California	191792.06
4	153441.51	101145.55	407934.54	Florida	191050.39
5	144372.41	118671.85	383199.62	New York	182901.99
6	142107.34	91391.77	366168.42	Florida	166187.94
7	131876.9	99814.71	362861.36	New York	156991.12
8	134615.46	147198.87	127716.82	California	156122.51
9	130298.13	145530.06	323876.68	Florida	155752.6
10	120542.52	148718.95	311613.29	New York	152211.77
11	123334.88	108679.17	304981.62	California	149759.96
12	101913.08	110594.11	229160.95	Florida	146121.95
13	100671.96	91790.61	249744.55	California	144259.4
14	93863.75	127320.38	249839.44	Florida	141585.52
15	91992.39	135495.07	252664.93	California	134307.35
16	119943.24	156547.42	256512.92	Florida	132602.65
17	114523.61	122616.84	261776.23	New York	129917.04
18	78013.11	121597.55	264346.06	California	126992.93
19	94657.16	145077.58	282574.31	New York	125370.37
20	91749.16	114175.79	294919.57	Florida	124266.9
21	86419.7	153514.11	0	New York	122776.86
22	76253.86	113867.3	298664.47	California	118474.03
23	78389.47	153773.43	299737.29	New York	111313.02



Here is the Dataset of Profit Analysis Project which we got from database.



02

REGRESSION ANALYSIS

Task 2 - Perform Regression Analysis for the given data to identify how the money spent on Marketing, R&D, and Administration is affecting the company's Profit.

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*	*Significance F*
Regression	3	75683964196	25227988065	295.9780624	4.52851E-30
Residual	46	3920856301	85236006.54		
Total	49	79604820497			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	50122.19299	6572.352622	7.626217867	1.05738E-09	36892.73332	63351.65266	36892.73332	63351.65266
RD_Spend	0.80571505	0.04514727	17.84637376	2.63497E-22	0.714838309	0.89659179	0.714838309	0.89659179
Administration	-0.026815968	0.05102878	-0.525506752	0.601755108	-0.129531575	0.075899638	-0.129531575	0.075899638
Marketing_Spend	0.027228065	0.016451235	1.6550773	0.104716819	-0.005886553	0.060342682	-0.005886553	0.060342682

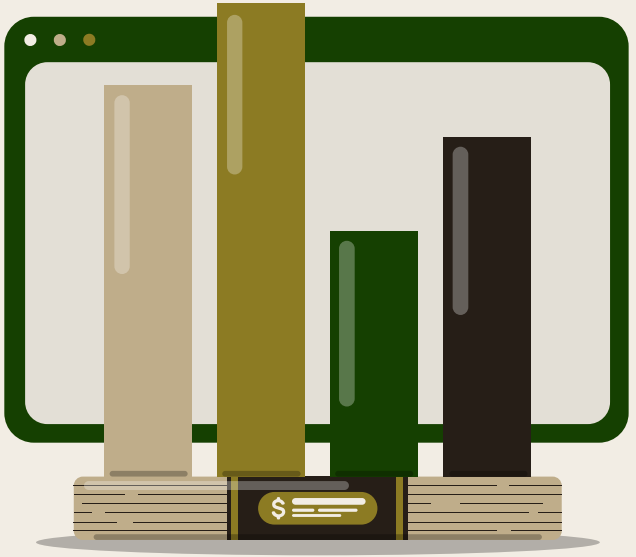
RESIDUAL OUTPUT

	A	B	C
24	RESIDUAL OUTPUT		
26	*Observation*	*Predicted Profit*	*Residuals*
27	1	192521.2529	-259.4228901
28	2	189156.7682	2635.291768
29	3	182147.2791	8903.110904
30	4	173696.7	9205.289974
31	5	172139.5142	-5951.574183
32	6	163580.7806	-6589.660571
33	7	158114.0967	-1991.586669
34	8	160021.363	-4268.763048
35	9	151741.6997	470.0703013
36	10	154884.6841	-5124.72411
37	11	135509.0164	10612.93363
38	12	135573.713	8685.687039
39	13	129138.0542	12447.46582
40	14	127487.9917	6819.358337
41	15	149548.6463	-16945.99633
42	16	146235.16	-16318.11999
43	17	116915.4054	10077.5246
44	18	130192.4472	-4822.077208
45	19	129014.2268	-4747.326806
46	20	115635.2164	7141.643633
47	21	116639.6692	1834.360769
48	22	117319.4516	-6006.43164
49	23	114706.9817	-4354.731717
50	24	109996.6152	-1262.625221
51	25	113362.9661	-4810.926113

	A	B	C
51	25	113362.9661	-4810.926113
52	26	102237.7251	5166.614935
53	27	110600.5754	-4867.03535
54	28	114408.0715	-9399.761457
55	29	101660.026	1622.353995
56	30	101794.9835	-790.3434518
57	31	99452.37294	485.2170639
58	32	97687.85628	-204.2962757
59	33	99001.32899	-1573.488985
60	34	97915.0078	-1136.087805
61	35	89039.27374	7673.526259
62	36	90511.59957	5967.910432
63	37	75286.17459	15422.01541
64	38	89619.53771	329.6022921
65	39	69697.43065	11531.62935
66	40	83729.01198	-2723.251977
67	41	74815.95399	3423.956009
68	42	74802.55624	2996.273761
69	43	70620.41182	878.0781794
70	44	60167.03996	9591.940037
71	45	64611.35492	588.9750843
72	46	47650.64969	17275.43031
73	47	56166.20685	-6675.456853
74	48	46490.58898	-3930.858983
75	49	49171.38816	-13497.97816
76	50	48215.13411	-33533.73411
77			

03

PREDICTED ANALYSIS



Task 3 - Predict the Profit for the below-given input features.

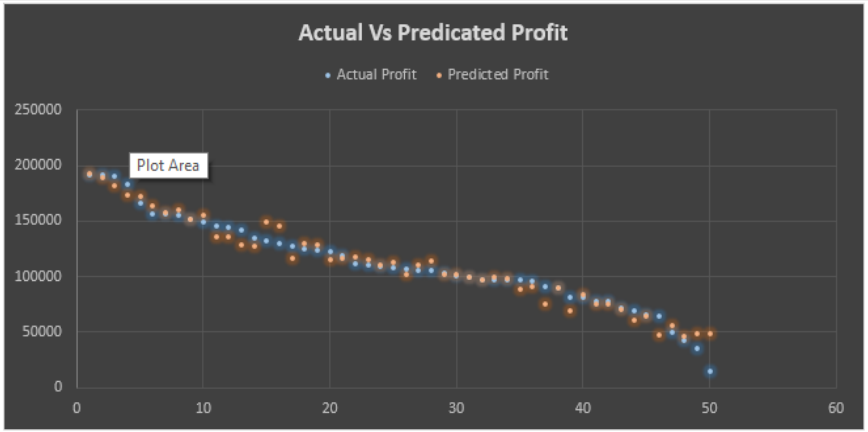
R&D Spend	Administration	Marketing Spend	Profit
21892.92	81910.77	164270.7	
23940.93	96489.63	137001.1	

Here is the output for the predicated profit using the regression analysis method-

H	I	J	L
R&D Spend	**Administration**	**Marketing Spend**	**Profit**
21892.92	81910.77	164270.7	**70037.905**
23940.93	96489.63	137001.1	**70554.573**

In Below image we can see the Actual Profit vs the Predicated Profit with Scatter Plot -

Observation	Actual Profit	Predicted Profit	Residuals	Absolute Error	Absolute Persentage Error
1	192261.83	192521.2529	-259.4228901	-259.4228901	-0.134932082
2	191792.06	189156.7682	2635.291768	2635.291768	1.374035905
3	191050.39	182147.2791	8903.110904	8903.110904	4.660085176
4	182901.99	173696.7	9205.289974	9205.289974	5.032908595
5	166187.94	172139.5142	-5951.574183	-5951.574183	-3.581231095
6	156991.12	163580.7806	-6589.660571	-6589.660571	-4.197473444
7	156122.51	158114.0967	-1991.586669	-1991.586669	-1.275656322
8	155752.6	160021.363	-4268.763048	-4268.763048	-2.740733091
9	152211.77	151741.6997	470.0703013	470.0703013	0.308826513
10	149759.96	154884.6841	-5124.72411	-5124.72411	-3.421958787
11	146121.95	135509.0164	10612.93363	10612.93363	7.263065975
12	144259.4	135573.713	8685.687039	8685.687039	6.020881162
13	141585.52	129138.0542	12447.46582	12447.46582	8.79148222
14	134307.35	127487.9917	6819.358337	6819.358337	5.07742751
15	132602.65	149548.6463	-16945.99633	-16945.99633	-12.77953068
16	129917.04	146235.16	-16318.11999	-16318.11999	-12.56041547
17	126992.93	116915.4054	10077.5246	10077.5246	7.935500503
18	125370.37	130192.4472	-4822.077208	-4822.077208	-3.846265436
19	124266.9	129014.2268	-4747.326806	-4747.326806	-3.820266544
20	122776.86	115635.2164	7141.643633	7141.643633	5.816766802



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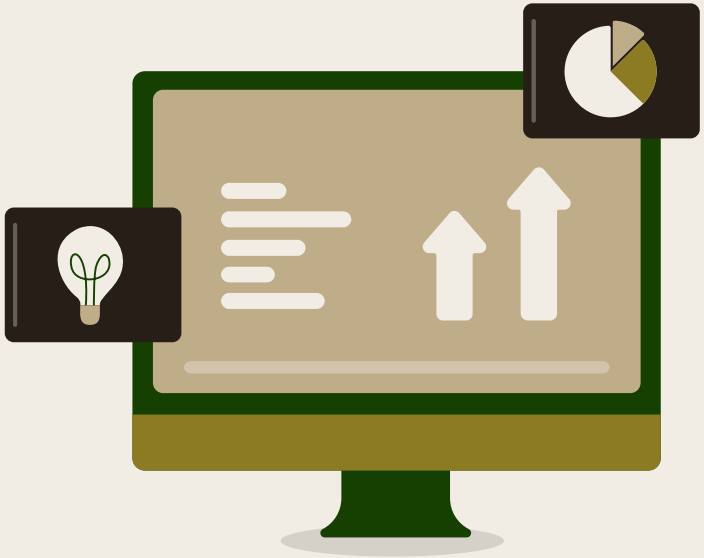
Go to Settings to acti

DataSet | Regression | Regression (2) | StateWiseSet | ScatterPlot



04

VISUALIZATION

Task 4 - Visualize the data using Power BI.

PROFIT ANALYSIS

Select all | California | Florida | New York

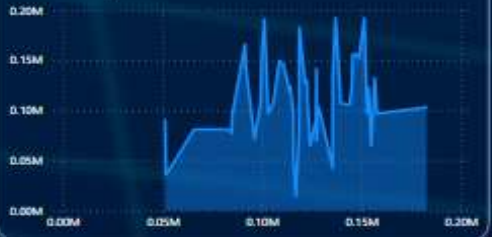
5.6M	192.3K	112.0K	20.3M	29.4
Total Profit	Max of Profit	Average Profit	Total_Spend	ROI

Spending Distribution

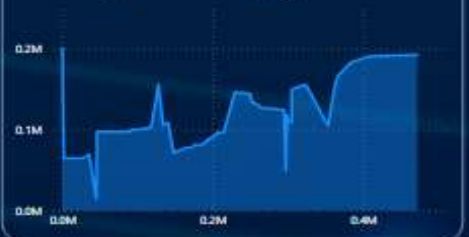
Profit by State

Profit Per Dollar Spend

Profit by Administration



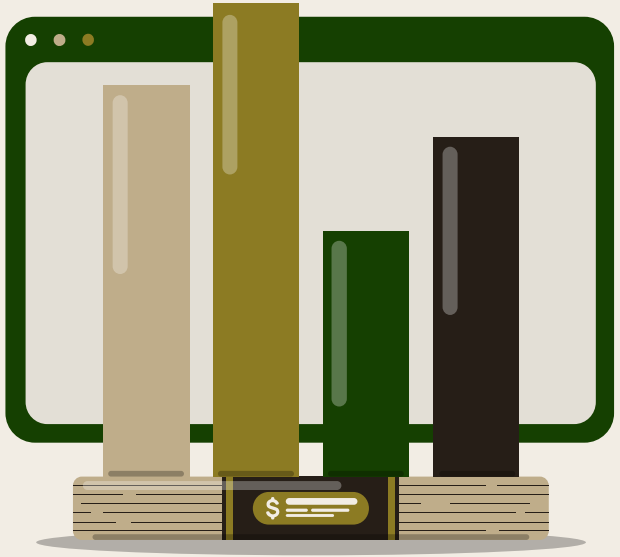
Profit by Marketing_Spend



Profit by RD_Spend

05

INSIGHTS & SUGGESTIONS



Task 5 - insights about all the features provided and give your inputs/suggestions to the company.

Insights -

- **Total spend** (i.e.20.3M) of all department is higher than the Profit of all department (5.6M).
- **Profit vs. R&D Spending** - A positive correlation would suggest higher R&D spending tends to increase profit.
- **Profit vs. Administration Spending** – no clear pattern is observed & administration spending may not be a significant driver of profit.
- **Profit vs. Marketing Spending** - A positive trend would indicate effective marketing strategies leading to higher profits.
- **Spending by Location –**
    - Marketing Spend is the highest in overall all state i.e. in New York 3.5, California 3.1 & Florida 4.
    - RD Spend is the lowest in overall all state i.e. in New York 1.3, California 1.1 & Florida 1.3.
- **Positive Growth -** RD department had given positive growth/profit in upward way.

Recommendations to company -

- **Optimize R&D Investment -** Encourage higher investment in R&D, as it shows a strong positive correlation with profit.
- **Evaluate Marketing Strategies -** Assess the effectiveness of marketing campaigns to ensure they are generating sufficient returns.
- **Efficiency in Administration -** While necessary, consider optimizing administrative costs to improve overall profitability.
- **Regional Strategy –**
  - Explore differences between states to tailor strategies accordingly. This could involve understanding local market dynamics and consumer behaviors.
  - With a significantly higher ROI of 33%, New York's strategies should be closely examined to identify best practices that can be replicated or adapted in other locations to enhance overall profitability.

Thank You