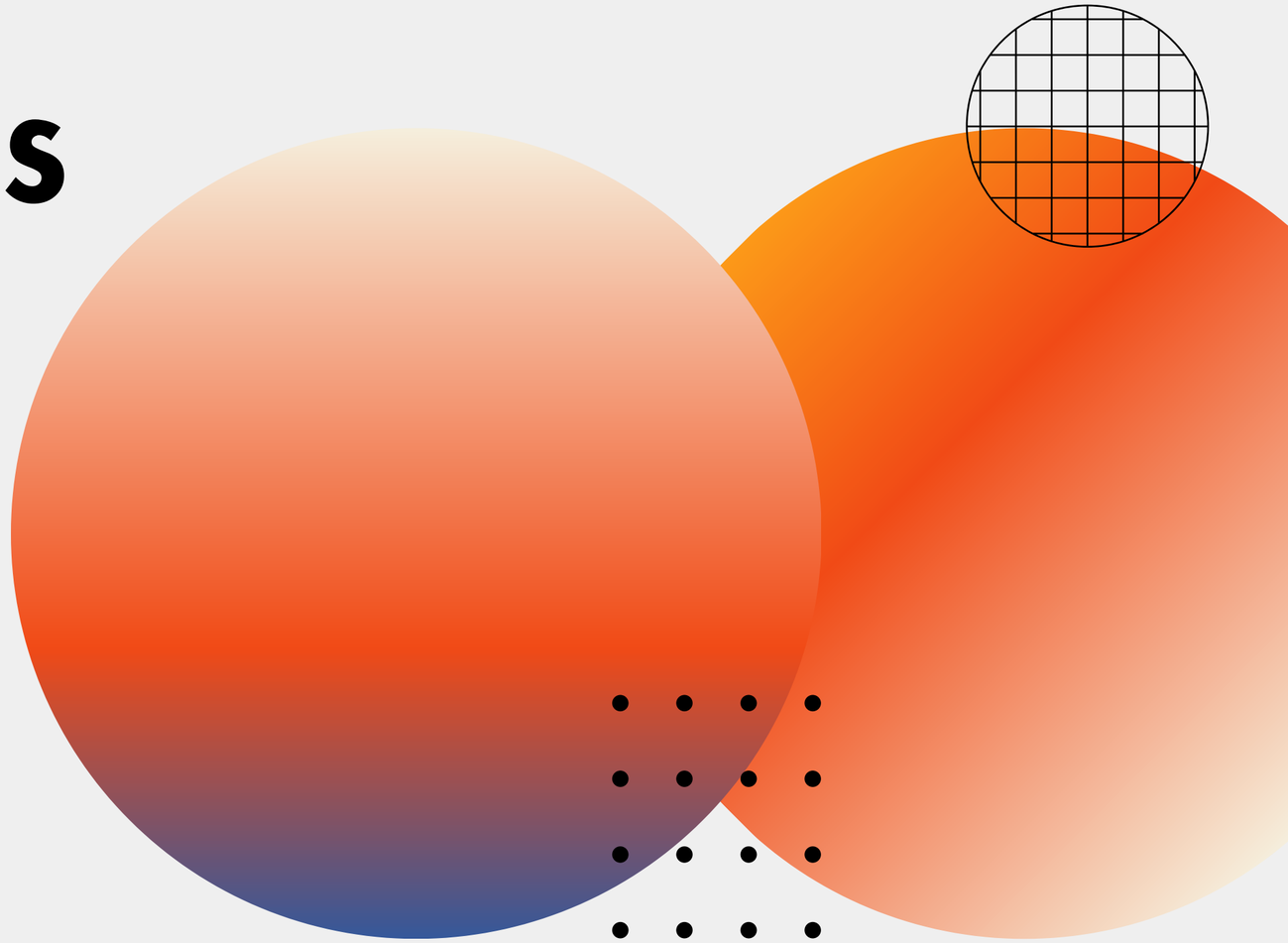
Strategic Analysis of a FMCG business

Group 2: Vidhi, Parisa, Diya, Sia



INTRODUCTION

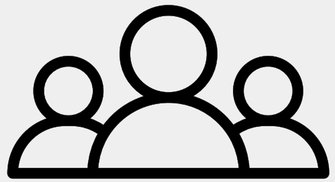
The objective is to analyse the following drivers of an FMCG business:

1. FMCG Sales
2. Marketing Expenditure
3. Inventory Management
4. Consumer Behavior

How did we do it?

Undertook a Statistical Analysis

Methods Used:
One-Way Anova Test
Simple Linear Regression



Created a Profit Prediction Model

Methods Used:
CART

Providing Credible data-driven insights

Deliverables:
short-term & long term
suggestions based on predictions
& hypothesis testing

Hypothesis Testing - *FMCG Sales*

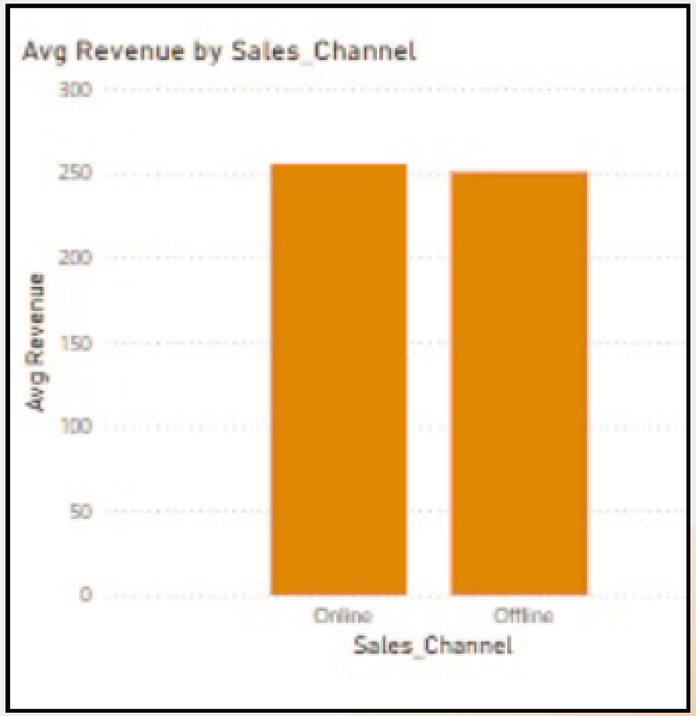
Objective: Testing whether Average Sales Revenue earned differs significantly across channels (offline/online).

Method: Hypothesis Testing using One-Way Anova test

Result: We fail to reject the null hypothesis, hence, the average sales revenue across online and offline channels is not significantly different.

Recommendation: Such a result presents a great opportunity to experiment online and offline. Hence, the firm can take up the following initiatives:

- Increase efficiency by analysing the cost-effectiveness of both channels and further expand in the most cost-effective one.
- Introducing ‘Order Online, Pick up Offline’ services → Omnichannel Approach



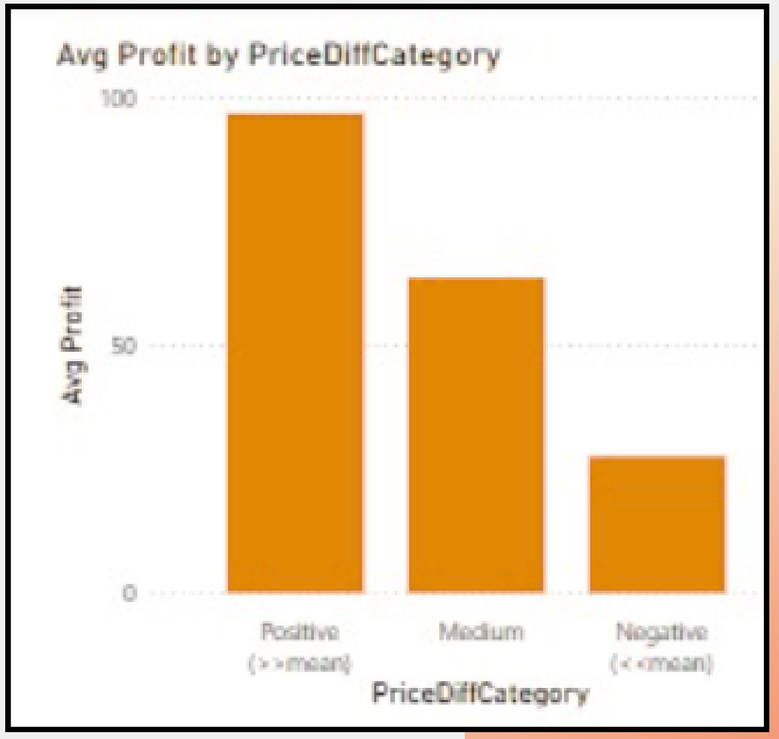
Hypothesis Testing - *FMCG Sales:*

Effect of Price Difference on Average Profits

Objective: Testing whether the difference in own price and competitor's price causes a significant change in average profits.

Method: One-Way ANOVA Test -

- Created Price Differences group (Negative difference, Medium difference, Positive Difference)



Result: As all the p-values are very small, this indicates highly significant differences in mean profits of the three price-difference groups.
The Hedges' g gives an idea of the magnitude of the difference between groups
Based on the Hedges' g values:

1. "Medium" group is moderately higher than the "Negative" group (-0.69)
2. "Positive" group is greatly higher than "Negative" group (-1.31)
3. "Positive" group is moderately higher than "Medium" group (-0.55)

Therefore order of profits is: Positive > Medium > Negative
Recommendation: Focus more on promoting sales of Positive Difference products as the drive profits at a higher magnitude.

Hypothesis Testing - *FMCG Sales:*

Effect of Price Difference on Average Units Sold

Objective: Testing whether the difference in own price and competitor's price causes a significant change in average units sold.

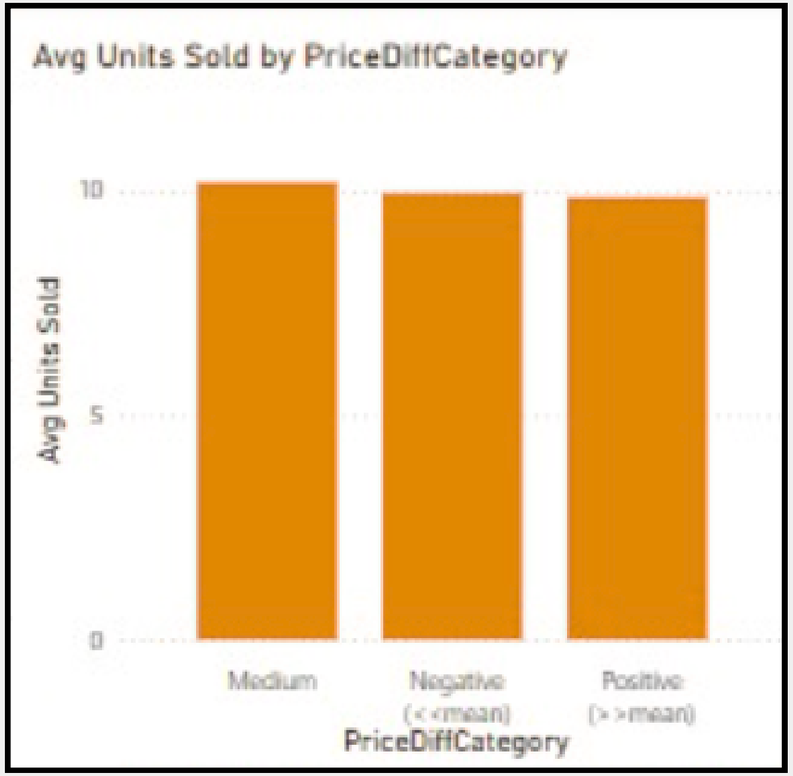
Method: One-Way ANOVA Test -

- Created Price Differences group (Negative difference, Medium difference, Positive Difference)

Result: the price difference does not cause a significant difference in average sales, this shows that our 'cheaper' products, similarly priced products, and relatively 'expensive' products all have statistically the same number of sales.

Recommendation: Since price is not the main driver of sales volume. Take up the following measures:

- People are likely choosing based on non-price factors. Hence, improve your brand positioning, Product quality, USPs.
- Consider introducing premium versions of popular products. Test price increases in small increments for certain segments—increase margin without losing volume.



Hypothesis Testing - *FMCG Sales:*

Brand-Wise Difference in Average Profits

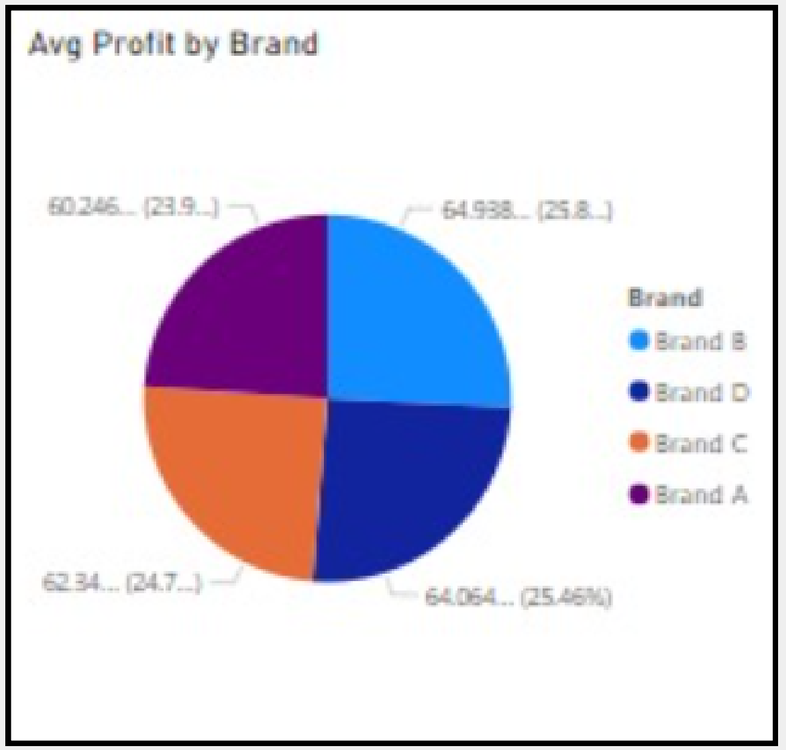
Objective: Testing whether there is a significant brand-wise difference in average profits.

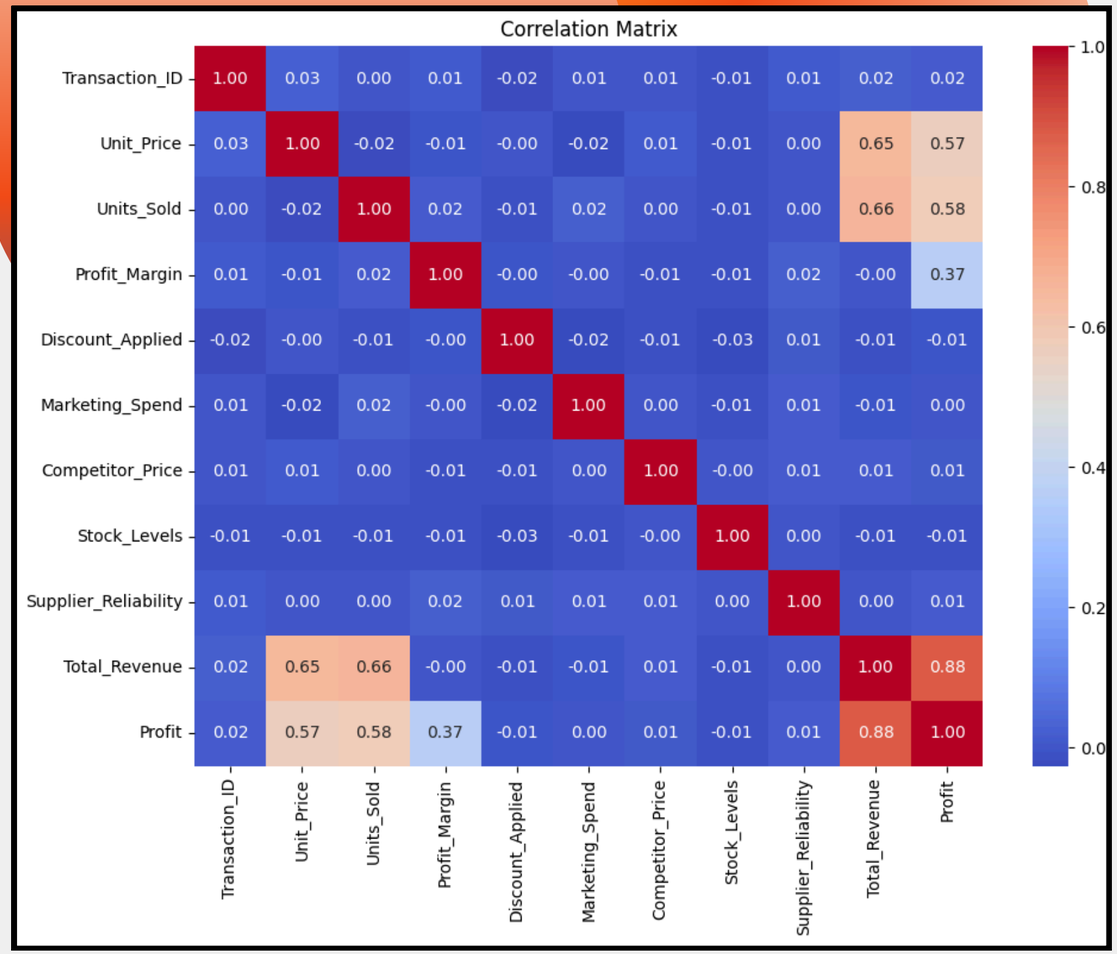
Method: One-Way ANOVA Test

Result: There is no statistically significant difference between the profits earned from the different brands. Therefore, from a strategy or marketing standpoint, this means no single brand is consistently outperforming or underperforming in terms of profit.

Recommendation:

- Evaluate if some brands can be consolidated or co-branded without impacting sales. Focus on building fewer, stronger brand identities.





Hypothesis Testing: *Marketing Expenditure*

We have tested the **effect of the discount applied to marketing expenditure** using a level-log regression model.

- We identified that Marketing Expenditure has the highest negative correlation with the Discount applied.

Hypothesis Testing - *Marketing Expenditure:*

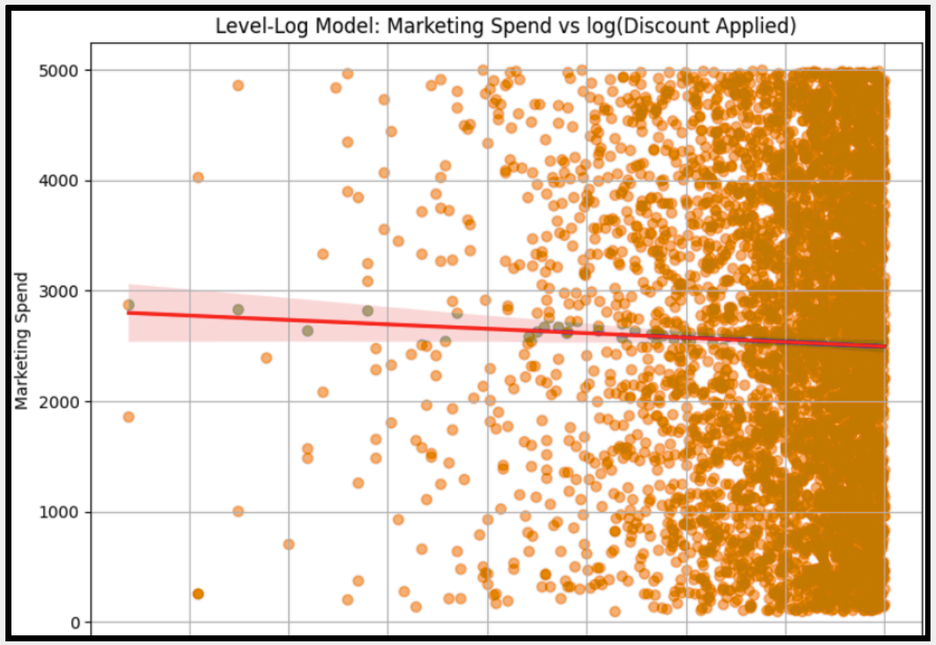
Effect of Discount on Marketing Spending:

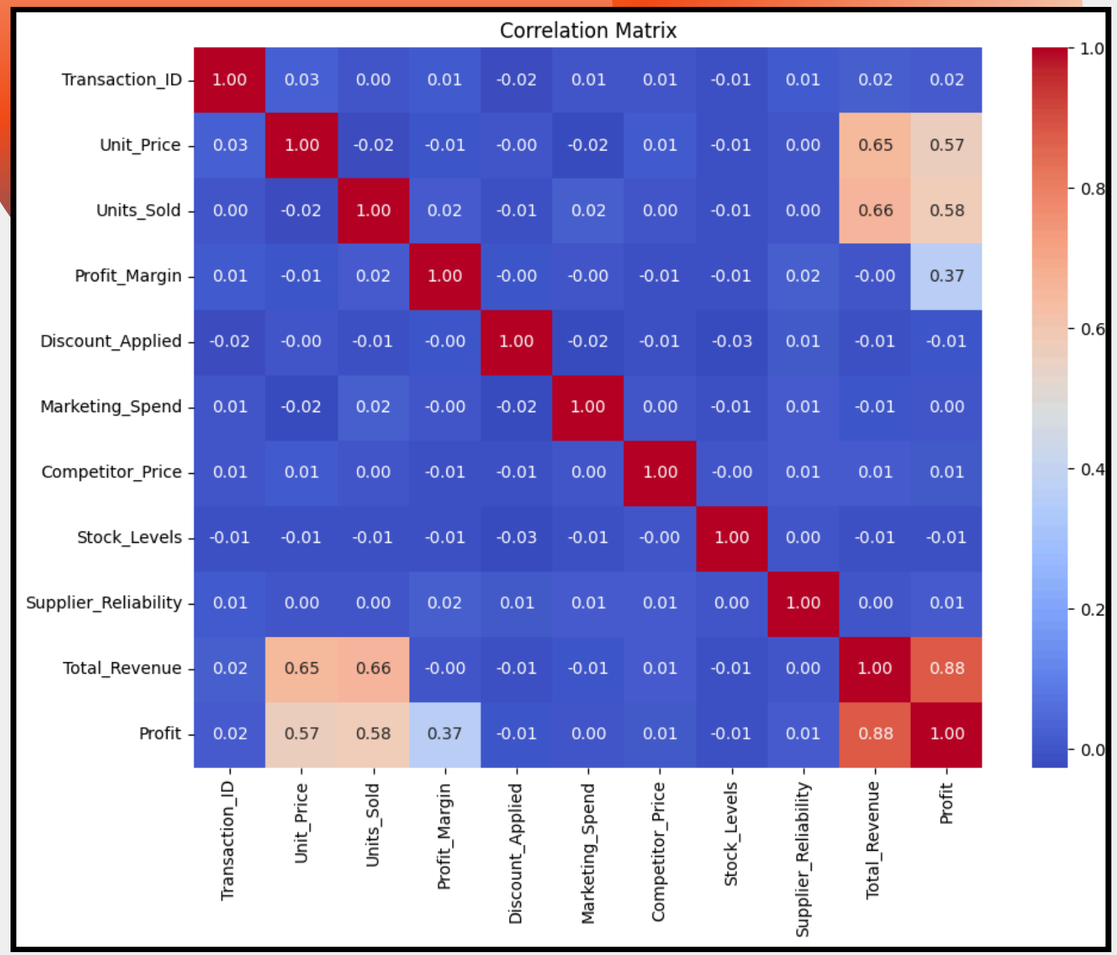
Objective: Testing whether there is a significant difference in marketing expenditure based on the discount applied.

Method: Simple Linear Regression

Result: More marketing spend is associated with a slightly lower discount being applied (in log terms). Implying stronger marketing reduces reliance on price cuts to drive sales.

Recommendation: Reinvest in Marketing to Reduce Price Dependence





Hypothesis Testing: *Inventory - Stock Levels*

We have tested the **effect of the discount applied to stock levels** using a level-log regression model.

- We identified that stock levels has the highest negative correlation with the Discount applied.
- Surprising Results:

Supplier Reliability, Marketing spend and Units sold do not affect stock levels.

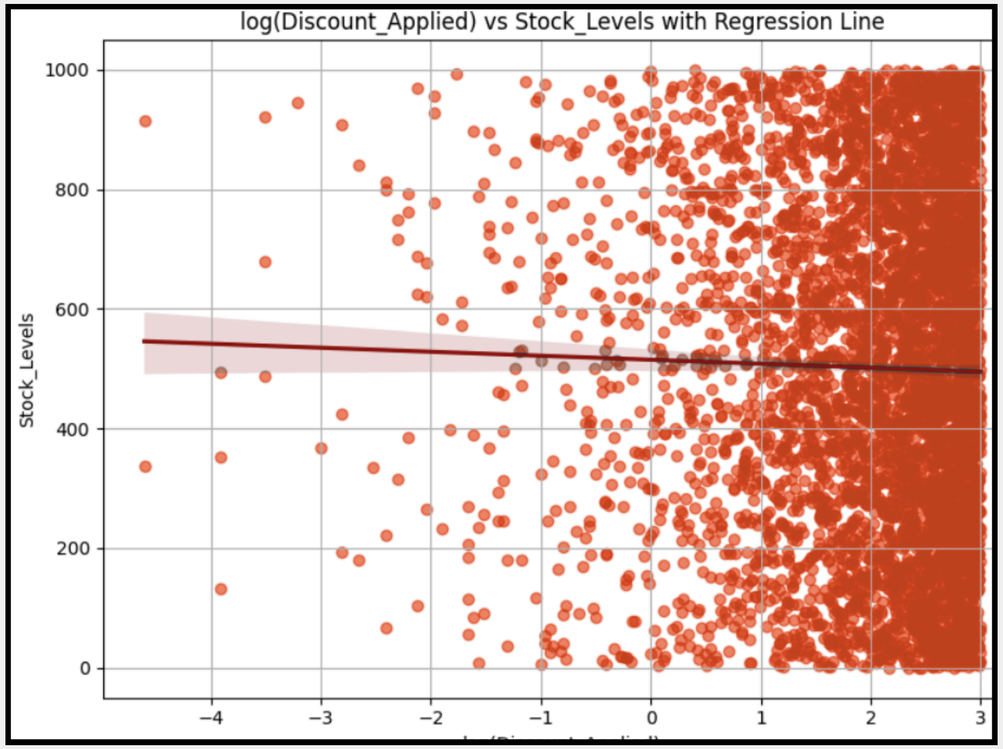
Hypothesis Testing - *Stock Levels:*

Effect of Discount on Stock Levels:

Objective: Testing whether there is a significant difference in stock levels based on the discount applied.

Method: Simple Linear Regression

Result: The regression of Stock levels with Discount_Applied displays that there is no significant effect of Discount Applied on stock levels.



Consumer Behavior Insights:

Units Sold across Age Groups

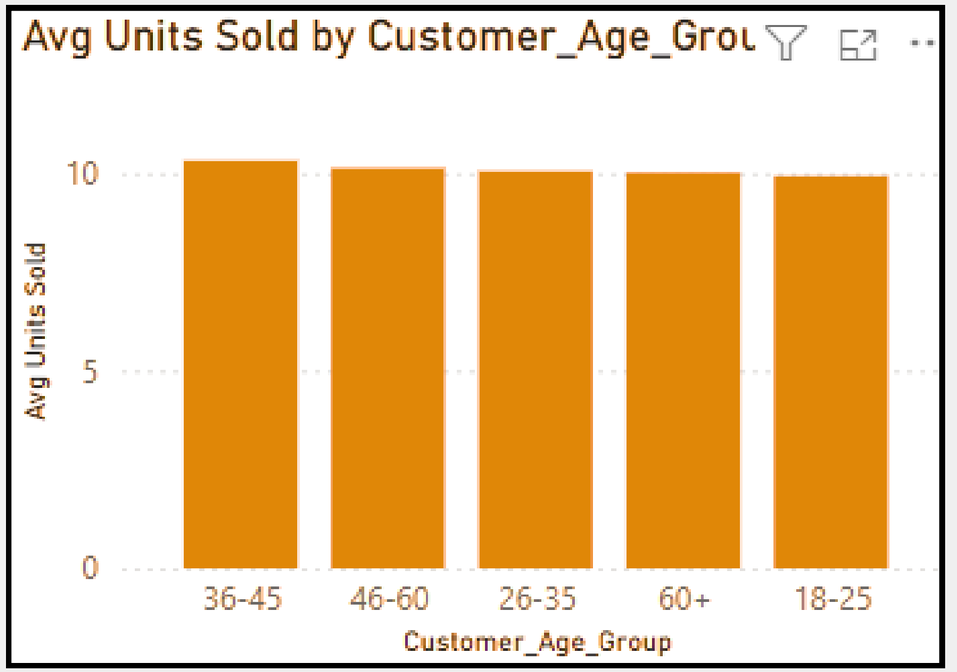
Objective: Testing whether there is a significant difference in units sold across age groups.

Method: One-Way ANOVA Test

Result: There is no statistically significant difference between the units sold across age groups.

Recommendation:

- Instead of changing the message for age groups, vary delivery channels: Use TikTok, Instagram for younger audiences. Use email, in-store signage for older demographics. Same message, different formats.



Consumer Behavior Insights:

Revenue across Regions

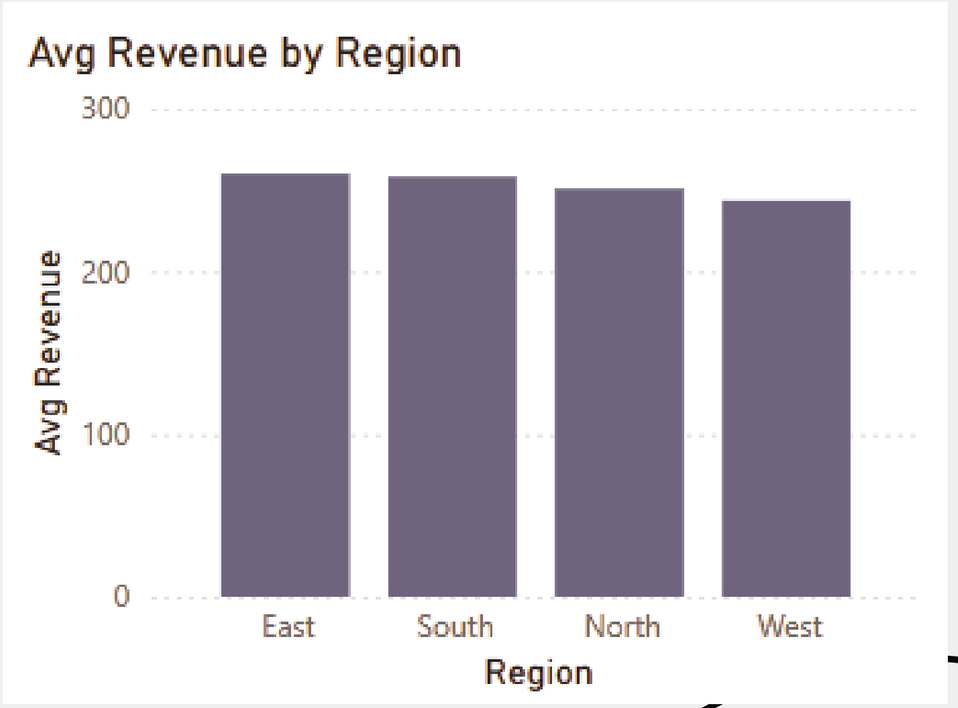
Objective: Testing whether there is a significant difference in average revenue across regions.

Method: One-Way ANOVA Test

Result: There is no statistically significant difference between the units sold across regions.

Recommendation:

- Consider standardizing pricing and promotional strategies across all regions. Focus on optimizing other factors like product assortment, customer service, or local partnerships to drive revenue growth uniformly.



PREDICTIVE MODELLING

CART

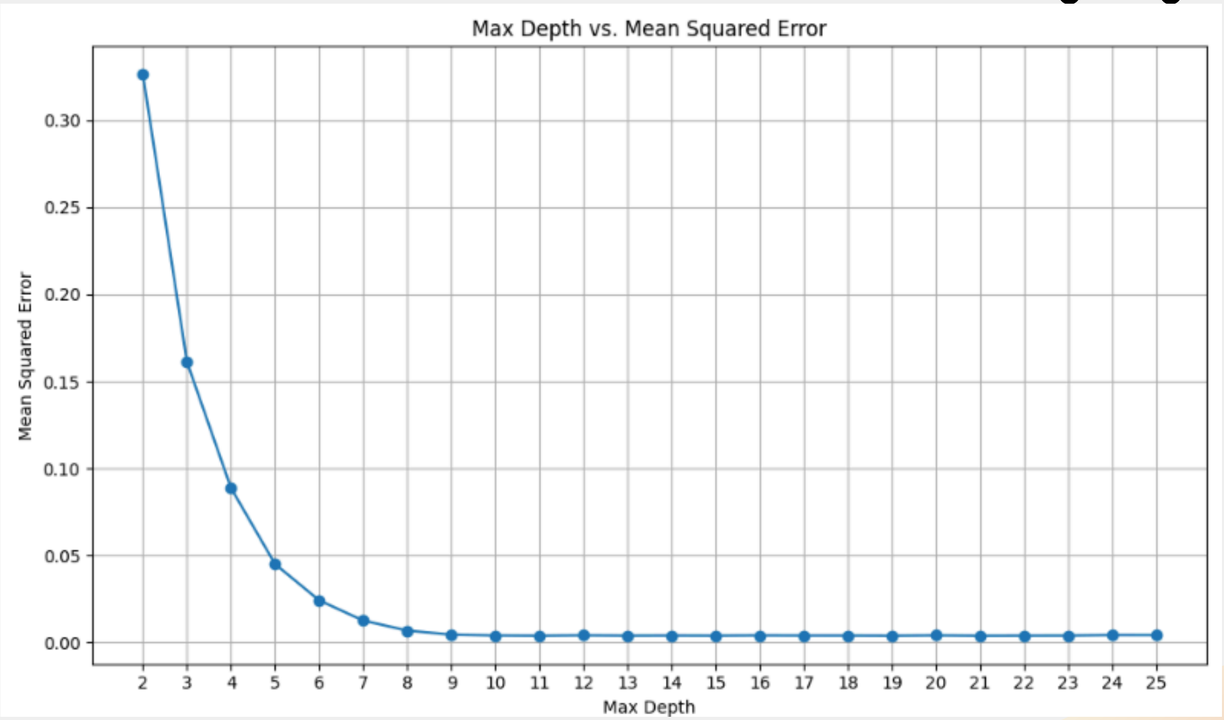
Objective: Making a predictive model for profits

Method: CART using decision tree regressor (as y variable is continuous)

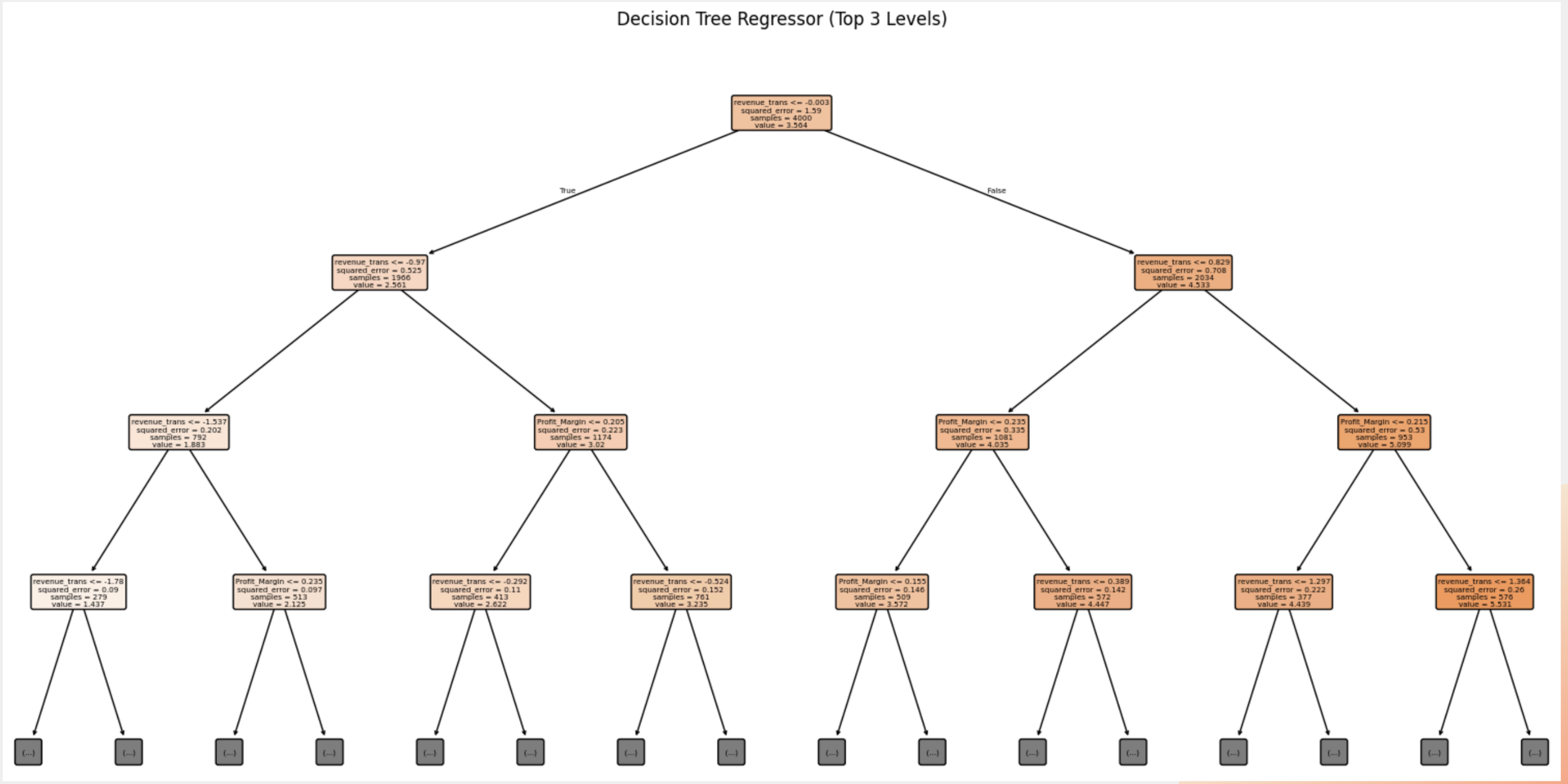
From the graph, we decided the most optimal depth value for the model is 7

Result: R-squared: 0.99846, MSE: 0.0127

Note: The high value of R-squared indicates that the model is probably over-fitted




```
R-squared: 0.9924562058889552
MSE: 0.012676150815794724
```


Decision Tree Regressor (Top 3 Levels)
revenue_trans <= -0.003
squared_error = 1.59
samples = 4000
value = 3.564
True
False
revenue_trans <= -0.97
squared_error = 0.525
samples = 1966
value = 2.561
revenue_trans <= 0.829
squared_error = 0.708
samples = 2034
value = 4.533
revenue_trans <= -1.537
squared_error = 0.202
samples = 792
value = 1.883
Profit_Margin <= 0.205
squared_error = 0.223
samples = 1174
value = 3.02
Profit_Margin <= 0.235
squared_error = 0.335
samples = 1081
value = 4.035
Profit_Margin <= 0.215
squared_error = 0.53
samples = 953
value = 5.099
revenue_trans <= -1.78
squared_error = 0.09
samples = 279
value = 1.437
Profit_Margin <= 0.235
squared_error = 0.097
samples = 513
value = 2.125
revenue_trans <= -0.292
squared_error = 0.11
samples = 413
value = 2.622
revenue_trans <= -0.524
squared_error = 0.152
samples = 761
value = 3.235
Profit_Margin <= 0.155
squared_error = 0.146
samples = 509
value = 3.572
revenue_trans <= 0.389
squared_error = 0.142
samples = 572
value = 4.447
revenue_trans <= 1.297
squared_error = 0.222
samples = 377
value = 4.439
revenue_trans <= 1.364
squared_error = 0.26
samples = 576
value = 5.531
(...)

End

Thank you