Probs & Stats
PRESENTATION

DIGITAL MARKETING ANALYSIS

25 APRIL’24

Probs & Stats PRESENTATION

Team 5

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Problem Statement

“Analyzing the Effectiveness of Digital Marketing Platforms in Driving Sales and Customer Reach: A Comparative Study of Instagram and Alternative Platforms.”

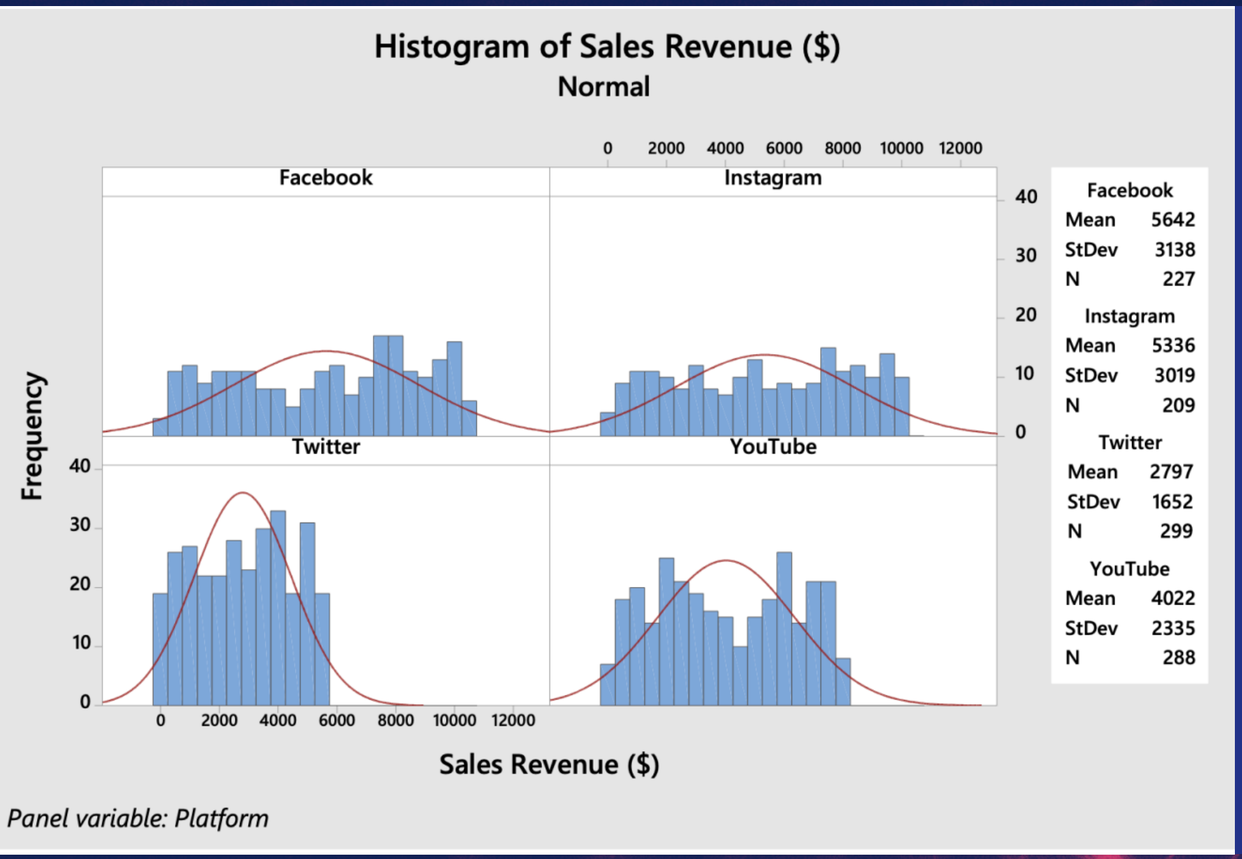
Social media platforms have become essential tools for boosting sales and return on investment in various industries in today's society. This presentation will explore how social media influences five important sectors: Entertainment, Travel and Hospitality, Food and Beverage and Education.

Statistical tests such as hypothesis testing, involving ANOVA, One Sample T-Testing and Paired Testing are used to identify significant differences and relationships between the variables of interest.

Project Goal

- To examine how the industries use social media platforms for digital marketing are doing in terms of sales and customer engagement.
- Using different statistical testings, we hope to analyse the statistical significance of changes in sales and consumer reach between Instagram and other platforms.
- Scope of the project is to use engineering probability and statistics ideas to analyse, illustrate, and visualise customer engagement and sales between Instagram and other platforms.

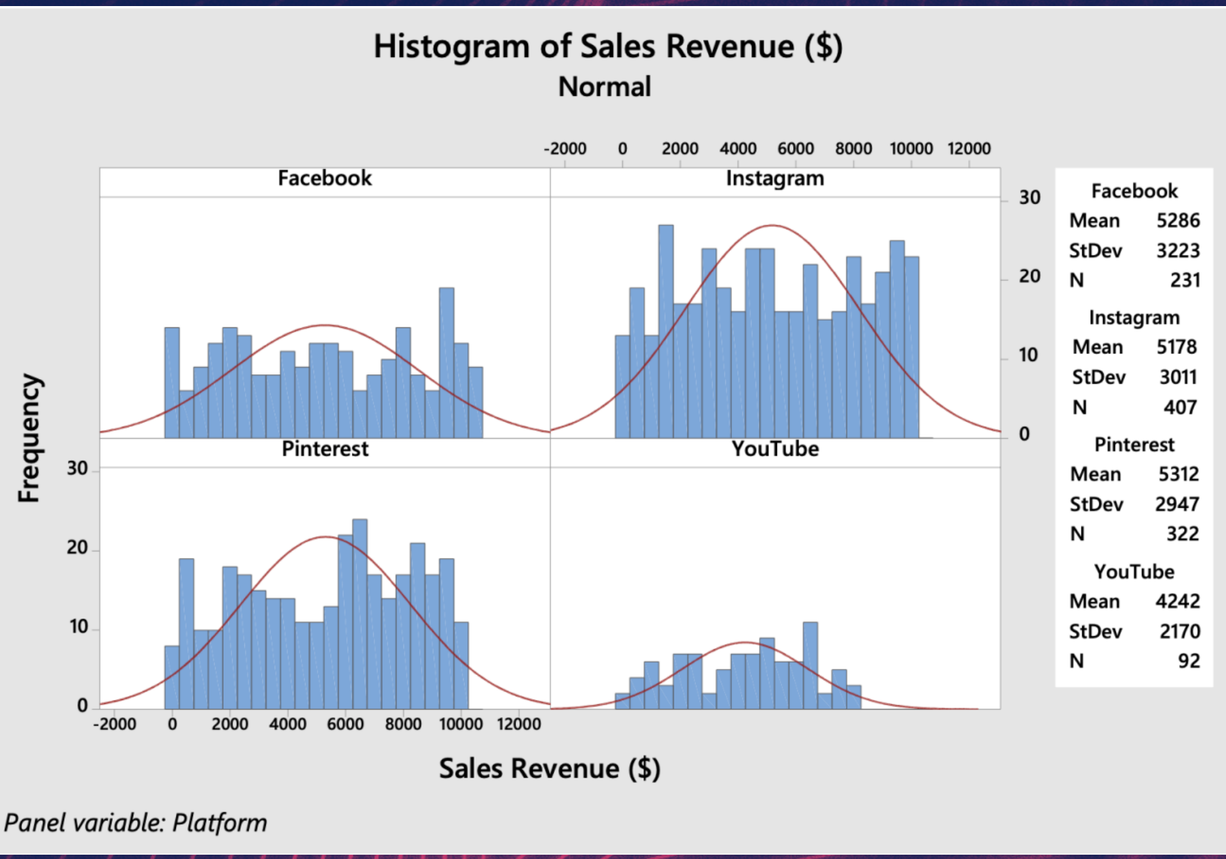
ENTERTAINMENT INDUSTRY



Panel variable: Platform

- Facebook mean value > Instagram mean value
- X(Twitter) and YouTube generates low revenue

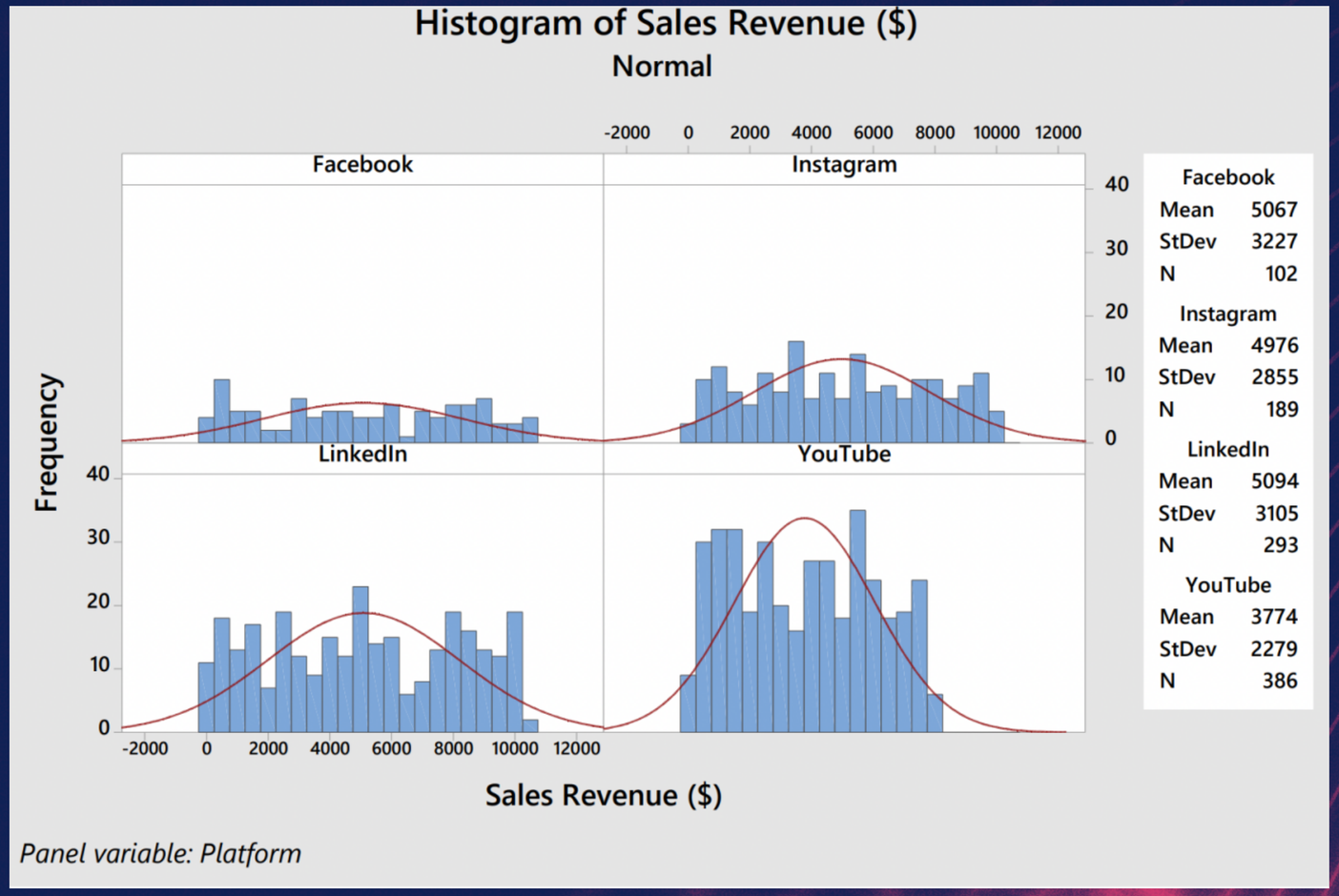
FOOD AND BEVERAGE INDUSTRY



Panel variable: Platform

- Every platform exhibits distinct efficacy in generating sales revenue.
- Pinterest generates higher sales revenue

EDUCATION INDUSTRY

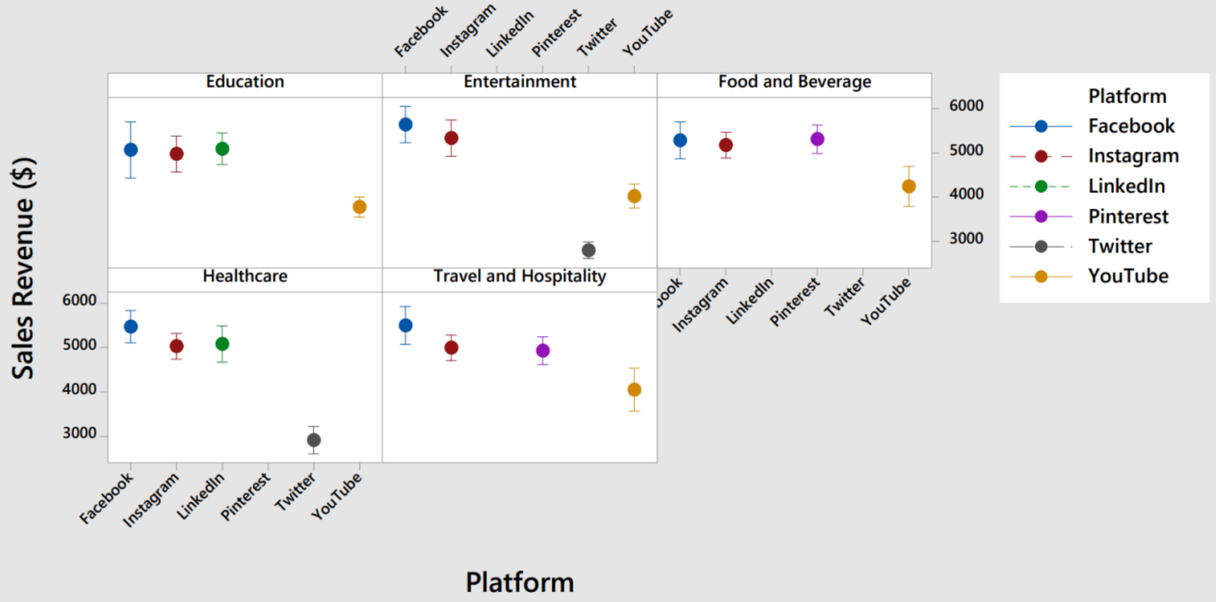


- In the education sector, Facebook tops in sales revenue, followed by LinkedIn, while Instagram offers more stable returns than YouTube.

In Conclusion:

- Facebook leads in revenue across entertainment, food, and education sectors, while other platforms like Instagram, Pinterest, and LinkedIn show strengths in specific industries.

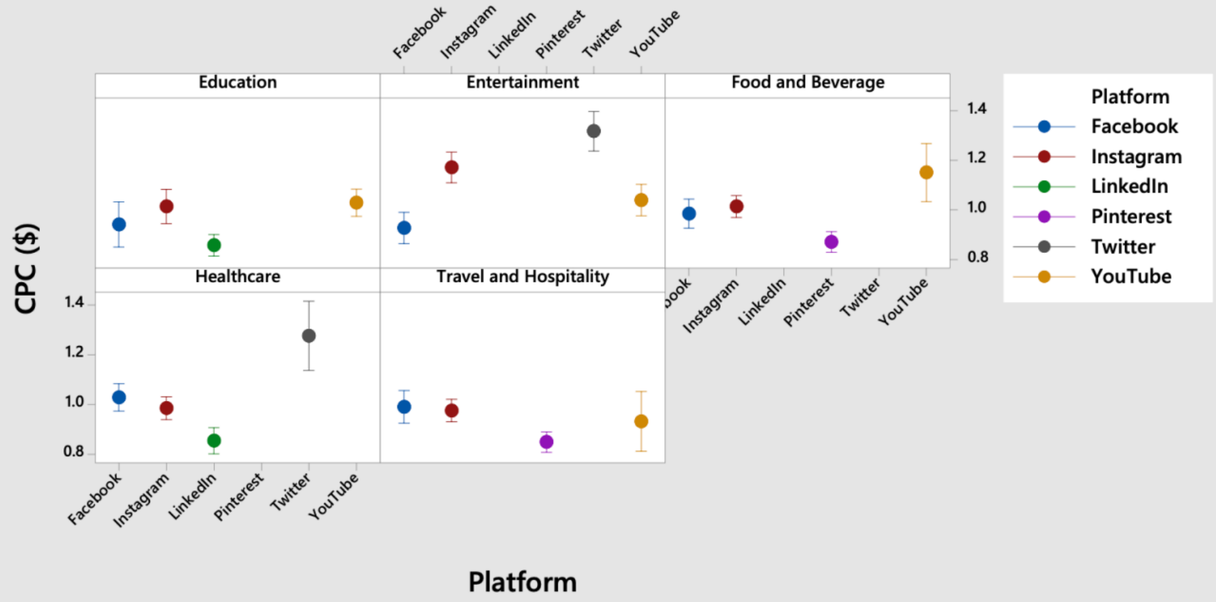
INTERVAL PLOT FOR SALES REVENUE



Panel variable: Industry
Individual standard deviations are used to calculate the intervals.

- Facebook and Instagram excel in visually-focused sectors.
- LinkedIn's consistent performance across industries highlights the value of tailored marketing strategies for ROI optimization.

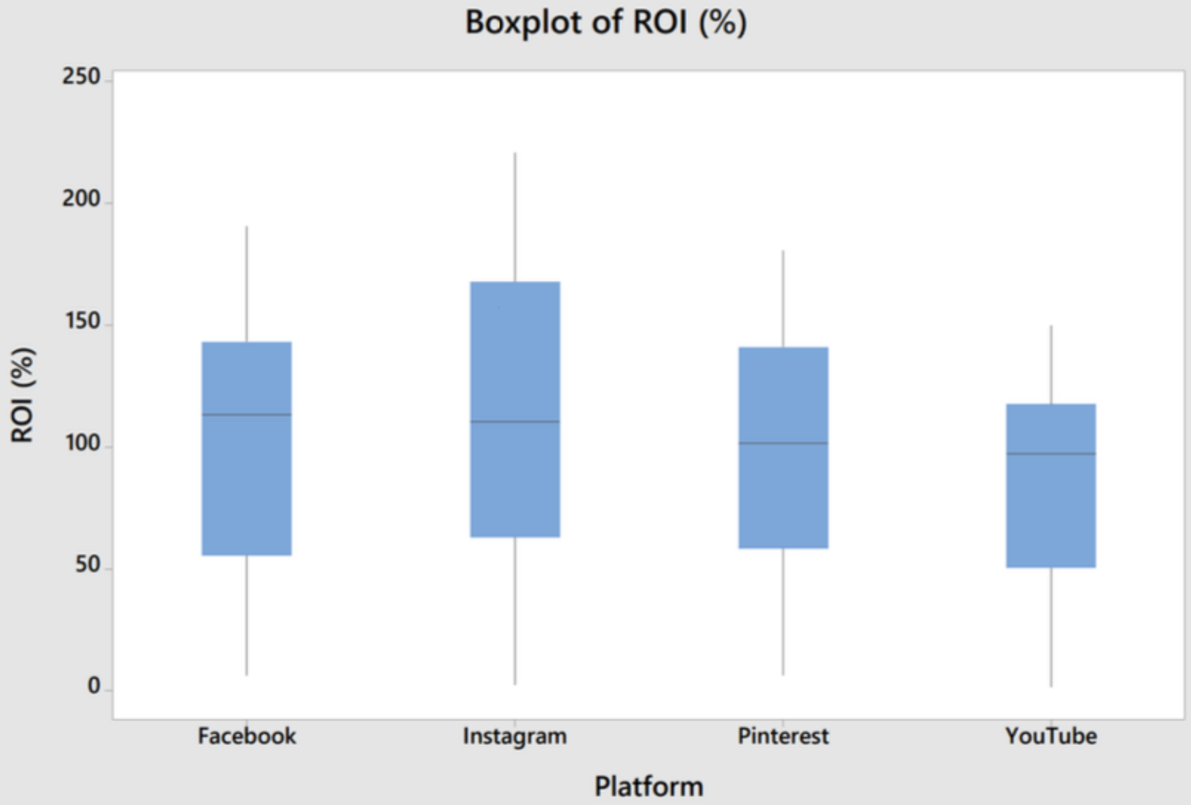
INTERVAL PLOT FOR CPC



Panel variable: Industry
Individual standard deviations are used to calculate the intervals.

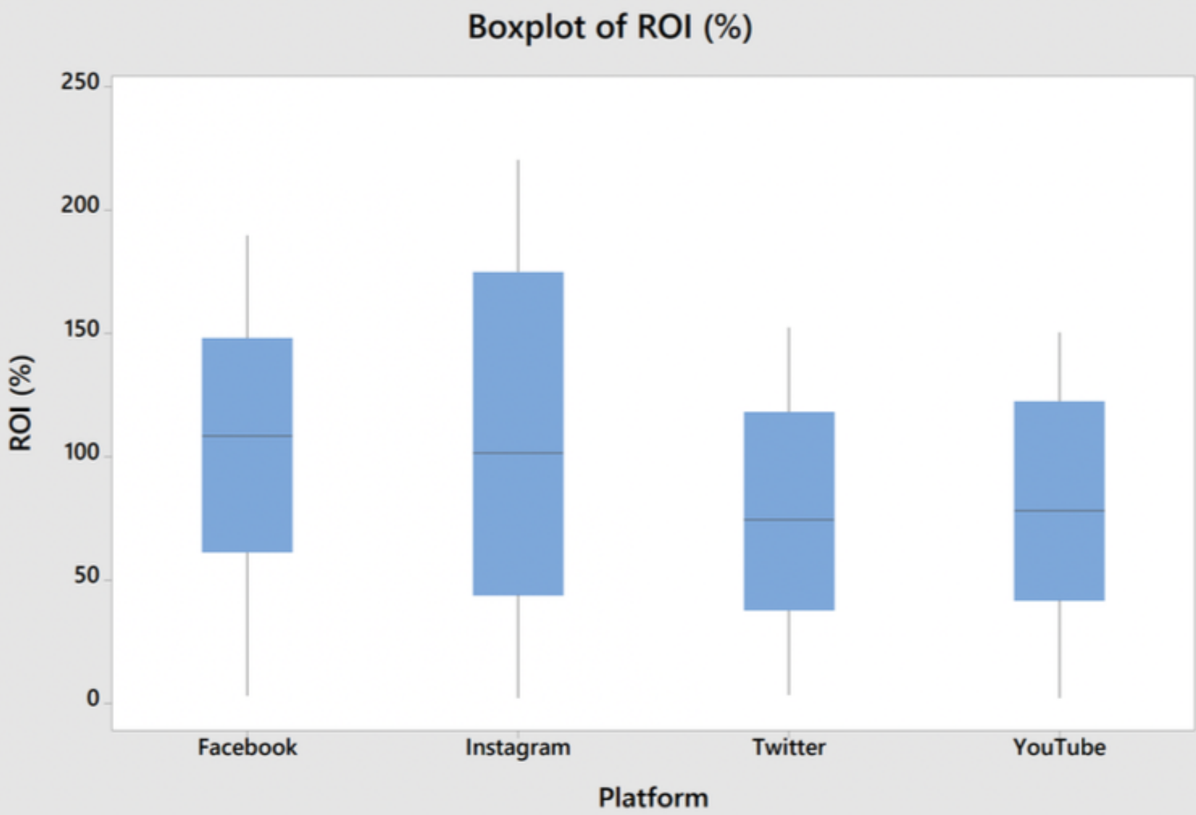
- CPC trend is varying across different platform, strategic budgeting to improve ROI.

BOX PLOT FOR TRAVEL



- Customized travel tactics improve social media ROI by driving budget and content.

BOX PLOT FOR ENTERTAINMENT



- Facebook: highest median ROI.
- Instagram and YouTube: More risk with higher return.
- X(Twitter): Consistent ROI.

ANOVA ANALYSIS

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Platform	3	1330579336	443526445	69.54	0.000
Error	1019	6499141861	6377961		
Total	1022	7829721197			

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
2525.46	16.99%	16.75%	16.30%

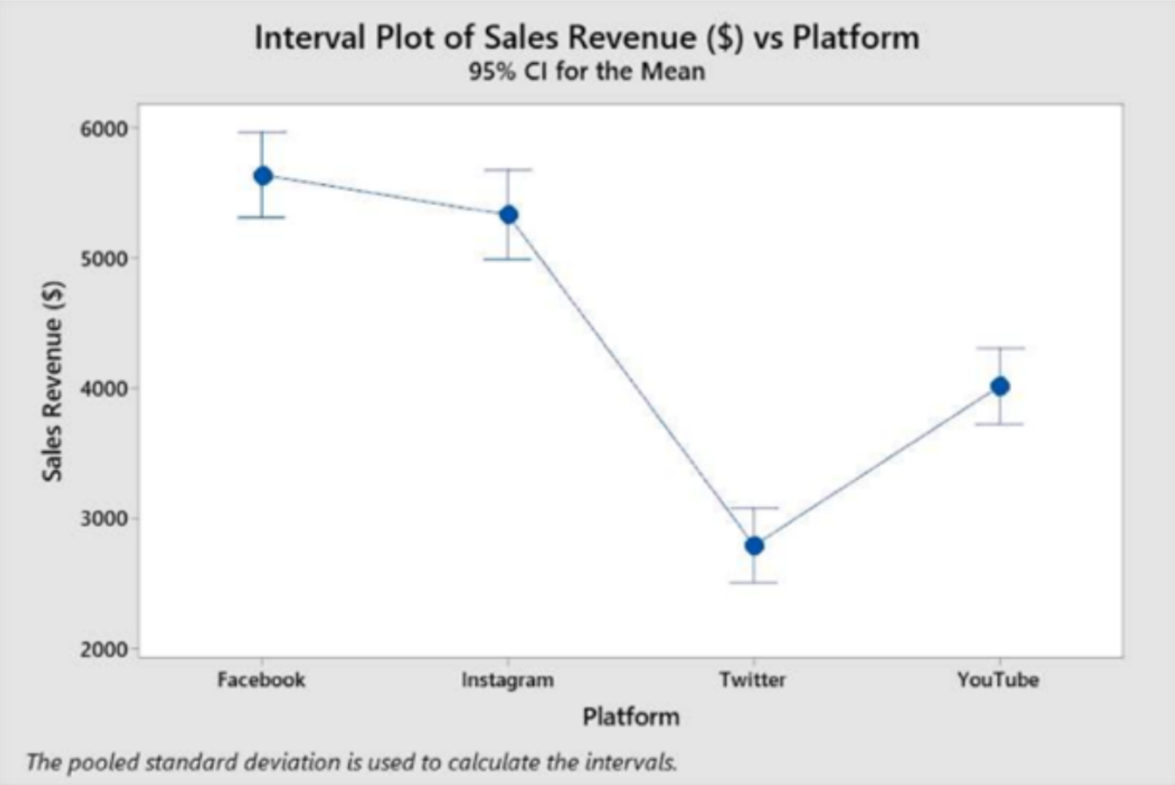
Means

Platform	N	Mean	StDev	95% CI
Facebook	227	5642	3138	(5313, 5971)
Instagram	209	5336	3019	(4993, 5679)
Twitter	299	2797.4	1651.6	(2510.8, 3084.0)
YouTube	288	4022	2335	(3730, 4314)

Pooled StDev = 2525.46

- Null hypothesis, Ho: Mean values are equal
- Alternative hypothesis, Ha: Mean values are different
- Significance level: $\alpha = 0.05$
- Rejecting null hypothesis, P-value < 0.05.

ANOVA ANALYSIS



- Facebook and Instagram both show high average sales revenues in comparison with X(Twitter) and YouTube with lower mean sales revenues.

TUKEY PAIRWISE COMPARISONS

Tukey Pairwise Comparisons

Grouping Information Using the Tukey Method and 95% Confidence

Platform	N	Mean	Grouping		
Facebook	227	5642	A		
Instagram	209	5336	A		
YouTube	288	4022		B	
Twitter	299	2797.4			C

Means that do not share a letter are significantly different.

- Group A = Facebook and Instagram, do not differ in sales revenue performance
- Group B = YouTube intermediate performance with sales revenue.
- Group C = X(Twitter), lower sales revenue.

ONE SAMPLE T-TEST ANALYSIS

WORKSHEET 1

One-Sample T: ROI (%)

Descriptive Statistics

N	Mean	StDev	SE Mean	95% CI for μ
209	107.44	69.03	4.77	(98.02, 116.85)

μ: mean of ROI (%)

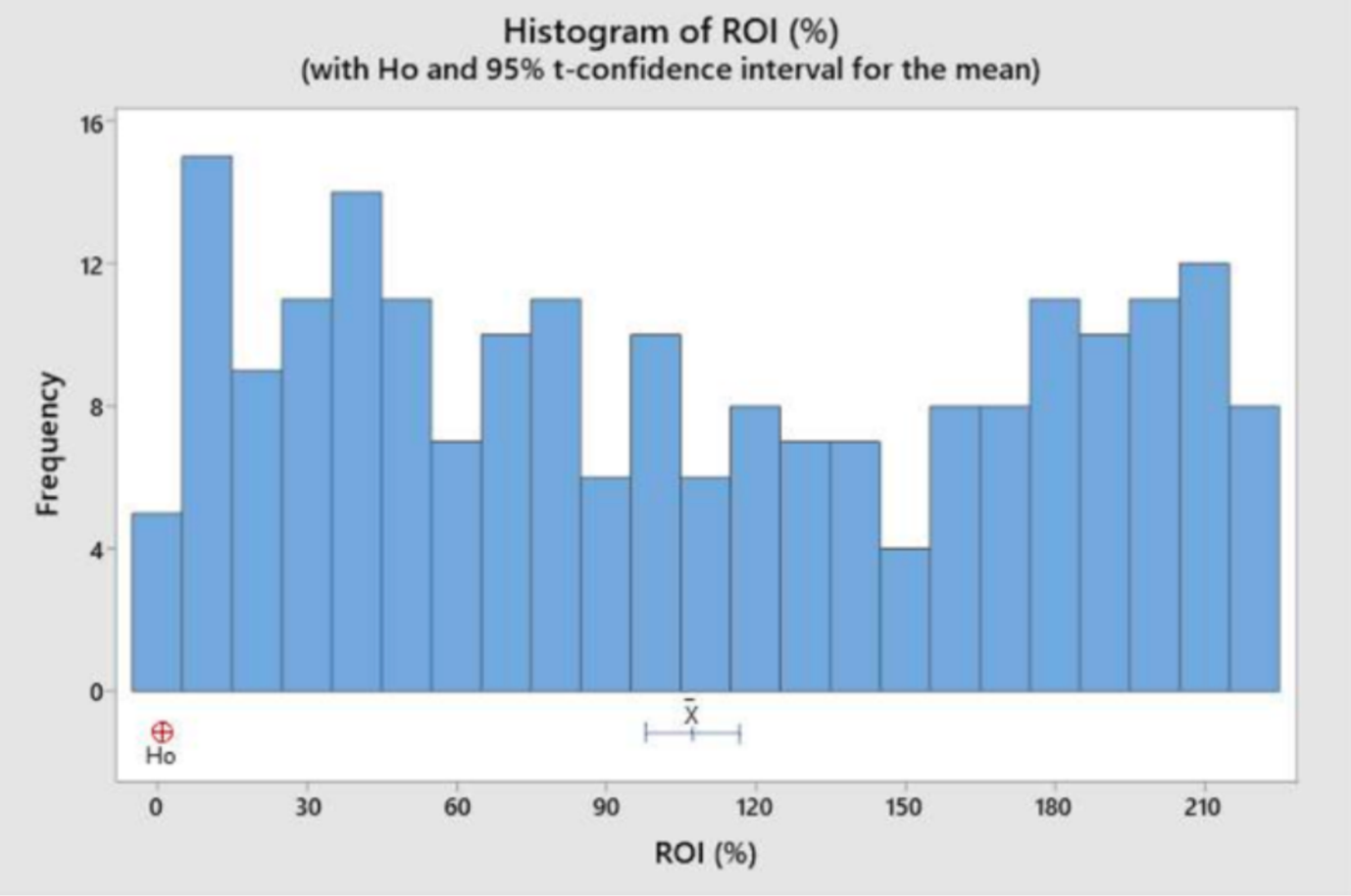
Test

Null hypothesis	$H_0: \mu = 0.8$
Alternative hypothesis	$H_1: \mu \neq 0.8$

T-Value	P-Value
22.33	0.000

- **Data Points:** 209
- **Mean ROI:** 107.44%
- **Standard Deviation (SD):** 69.03%
- **Standard Error of the Mean (SEM):** 4.77
- **95% Confidence Interval (CI) for Mean ROI:** 98.02% - 116.85%
- **T-value:** 22.33
- **P-value:** 0.000

ONE SAMPLE T-TEST ANALYSIS



Conclusion:

This indicates a statistically significant difference between the sample mean ROI and the hypothesized value of 80%

PAIRED TESTING

Paired T-Test and CI: Sales Revenue ($), Sales Revenue ($)_1

Descriptive Statistics

Sample	N	Mean	StDev	SE Mean
Sales Revenue ($)	209	5336	3019	209
Sales Revenue ($)_1	209	5697	3112	215

Estimation for Paired Difference

Mean	StDev	SE Mean	95% CI for μ_difference
-361	4368	302	(-957, 234)

μ_difference: mean of (Sales Revenue ($) - Sales Revenue ($)_1)

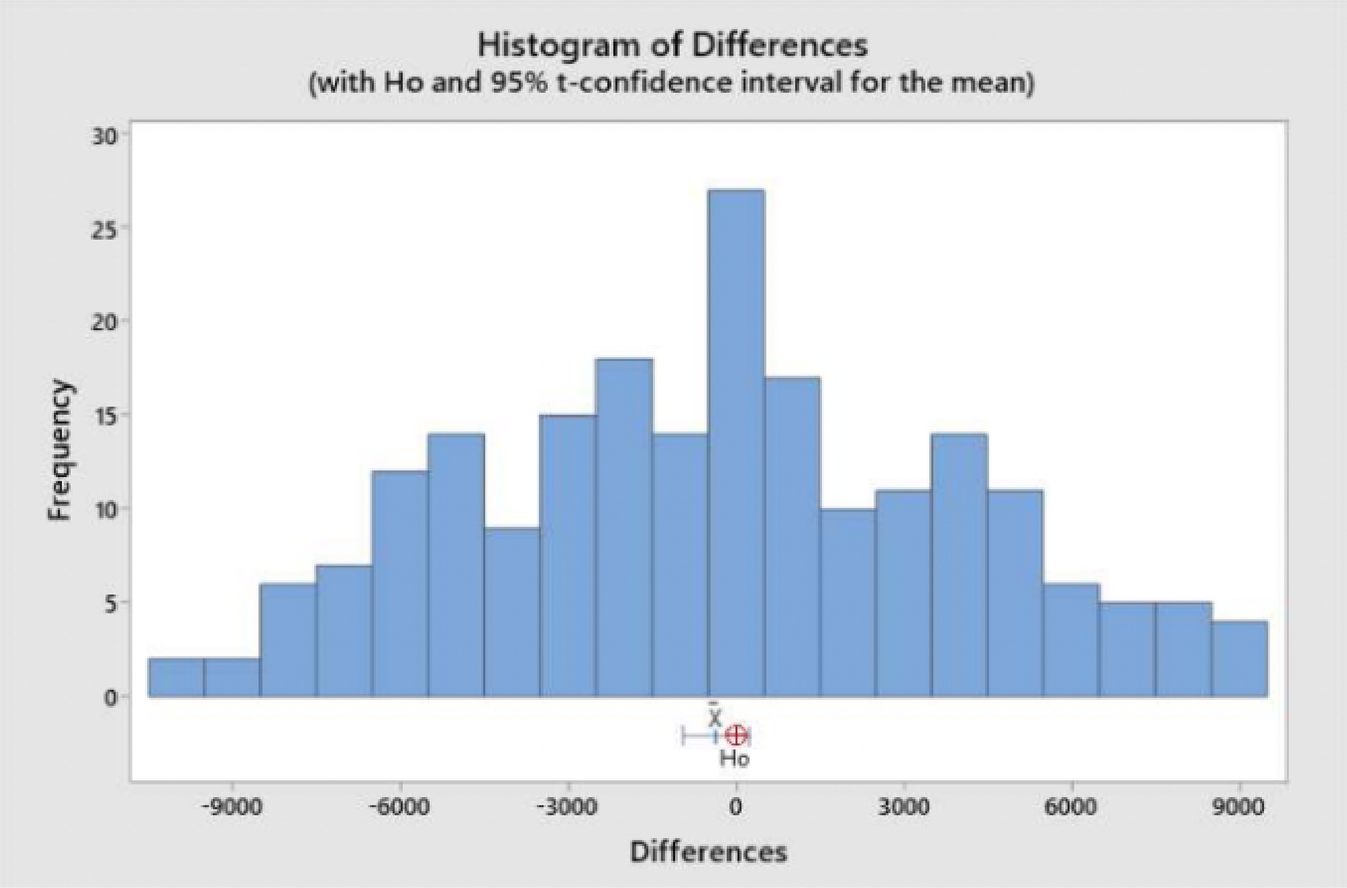
Test

Null hypothesis	H_0: μ_difference = 0
Alternative hypothesis	H_1: μ_difference ≠ 0

T-Value	P-Value
-1.20	0.233

- Slight average difference in sales revenue is identified between Instagram and Facebook with descriptive statistics.
- Paired T-Test yields P-value - 0.233.

PAIRED TESTING



- Paired T-test- Sales revenue potential for Instagram and Facebook in the entertainment industry.
- so marketers can include them with confidence in digital marketing strategies that emphasize campaign details over revenue gaps.

LIMITATION

- The possible biases or limits of the data source, which can impact how reliable the results are, are not discussed in the study.
- Although the study concentrates on the examination of historical data, it does not offer any predicting insights that would be helpful for designing future marketing campaigns.
- The study excludes qualitative analysis and individual brand strategy analysis, which could offer more context to the data.

CONCLUSION

- We conclude that the impact of Instagram varies across different industries, and each sector exhibits a distinct response to various digital marketing platforms. While Instagram has shown considerable strength in some domains, it does not uniformly outperform other platforms in every industry.
- This underscores the necessity for a strategic approach in selecting the most suitable platforms for marketing
- Therefore, it's crucial for marketing strategies to be adaptive and industry-specific, recognizing the strengths of Instagram where applicable, while also capitalizing on the opportunities presented by other platforms to maximize reach and sales effectively.

PROPOSED NEXT STEP

Cross-Platform Interaction Effects:

- Explore how the presence on one platform influences performance on another.
- Investigate the synergy between multiple platforms in a single marketing strategy

Real-Time Data Analysis:

- Implement a real-time data analysis component to provide more timely insights.
- Utilize social media listening tools to gather and analyze data in real-time.

Thank you!