Digital Campaign Analysis

Facebook vs. AdWords Performance Comparison

Business Problem & Objective

Business Problem

Inefficient Digital Ad Spend Allocation- the company is investing in both Facebook and AdWords advertising but lacks data-driven insights to determine which platform delivers better ROI, leading to potential budget waste and missed growth opportunities.

Objective

- **Compare Performance:** Quantitatively assess which platform (Facebook vs. AdWords) generates higher conversions
- **Identify Efficiency:** Analyze the click-to-conversion relationship to determine platform efficiency
- **Predict Outcomes:** Develop a predictive model to forecast platform conversions based on click volume
- **Provide Recommendations:** Deliver actionable insights for optimal budget allocation and performance improvement

Finding the Middle of Clicks

Central tendency metrics (Mean, Median, & Mode) help in compare the data. **AdWords Ads generate more clicks on average than Facebook Ads**, with symmetric distributions indicated by closely aligned mean and median values.

Facebook Ad		AdWords Ad	
Mean (Clicks)	44.05	Mean (Clicks)	60.38
Median (Clicks)	43.00	Median (Clicks)	60.00
Mode (Clicks)	36.00	Mode (Clicks)	78.00

Finding the Middle of Conversions

Central tendency metrics (Mean, Median, and Mode) help in compare the data. **Facebook Ads** drive significantly **more conversions on average than AdWords Ads**. The closely aligned mean and median for both platforms indicate a symmetrical distribution.

Facebook Ad		AdWords Ad	
Mean (Conversions)	11.74	Mean (Conversions)	5.98
Median (Conversions)	12.00	Median (Conversions)	6.00
Mode (Conversions)	13.00	Mode (Conversions)	5.00

Standard Deviation

Facebook's conversion numbers fluctuate more; this is because it regularly achieves **high conversion volumes** than AdWords. While **AdWords** struggles with **inconsistent** click delivery, Facebook's reliable click generation combined with its ability to reach **high** conversion peaks makes it the superior **growth platform**.

Facebook Ad		AdWords Ad	
Standard Deviation (Clicks)	12.14	Standard Deviation (Clicks)	14.38
Standard Deviation (Conversions)	2.92	Standard Deviation (Conversions)	1.63

Frequency Table of Facebook

Facebook ad conversions show strong performance concentration, with **nearly half** of all occurrences (189 out of 365) **falling in the 11-15** conversions range. The distribution indicates consistent mid-range performance with fewer extremes at both low and high conversion levels.

	Number of "Facebook" Conversions by Grouping for 2023			
Number of Conversions	**1 to 5**	**6 to 10**	**11 to 15**	**16+**
Number of Occurrences	1	128	189	47

Frequency Table of AdWords

AdWords conversions **are concentrated in low-to-mid** ranges (1-10), with no occurrences exceeding 10 conversions. This indicates limited conversion capacity in generating high conversion volumes compared to Facebook.

	Number of "AdWords" Conversions by Grouping for 2023			
Number of Conversions	**1 to 5**	**6 to 10**	**11 to 15**	**16+**
Number of Occurrences	155	209	0	0

Contingency Table of Facebook

Facebook Ads show a **strong**, predictable relationship between clicks and conversions. The data reveals that **higher click** volumes consistently lead to **higher conversion** counts, demonstrating efficient performance scaling.

Facebook Ad Clicks vs. Conversions (2023)				
	Low Clicks (1–30)	**Medium Clicks (31–50)**	**High Clicks (51+)**	**Total**
Low Conversions (1–5)	1	0	0	1
Medium Conversions (6–10)	47	81	0	128
High Conversions (11–15)	2	107	80	189
Very High Conversions (16+)	0	0	47	47
Total	50	188	127	365

Contingency Table of AdWords

AdWords shows a **weak** and inefficient relationship between clicks and conversions. Even with **high click** volumes, campaigns **fail to generate proportional conversions**, revealing significant performance leakage.

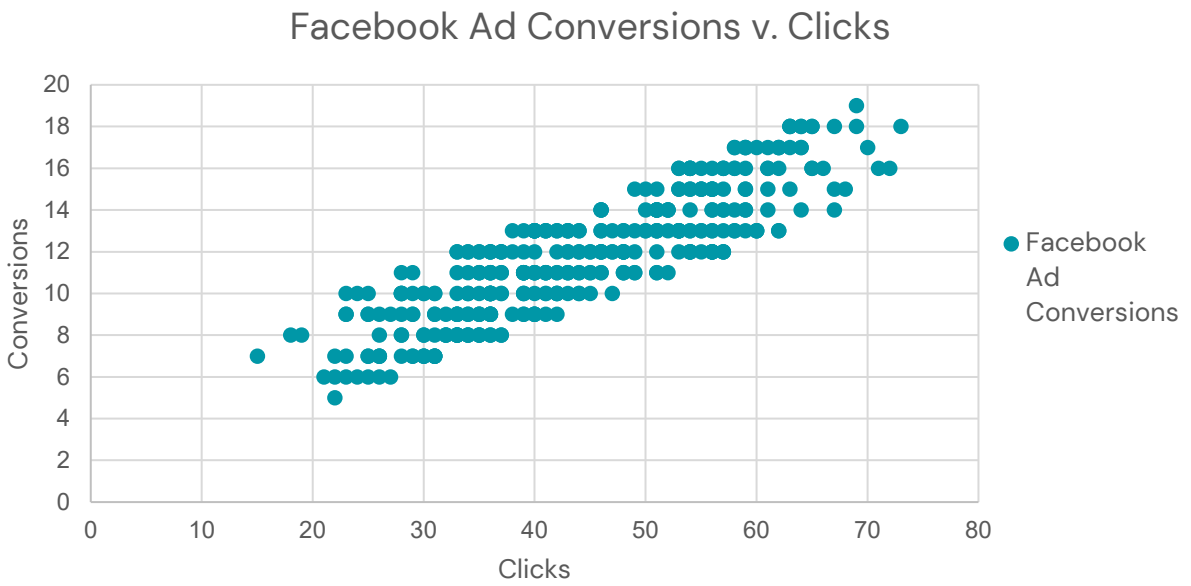
AdWords Ad Clicks vs. Conversions (2023)				
	Low Clicks (1–30)	**Medium Clicks (31–50)**	**High Clicks (51+)**	**Total**
Low Conversions (1–5)	0	68	87	155
Medium Conversions (6–10)	0	40	169	209
High Conversions (11–15)	0	0	0	0
Very High Conversions (16+)	0	0	0	0
Total	0	108	256	364

Scatter Plot of Facebook Ad

Correlation coefficient: 0.873775015

Insights:

- Strong positive correlation shows clicks reliably drive conversions
- Clear upward trend indicates predictable return on ad spend
- Efficient platform worthy of increased investment

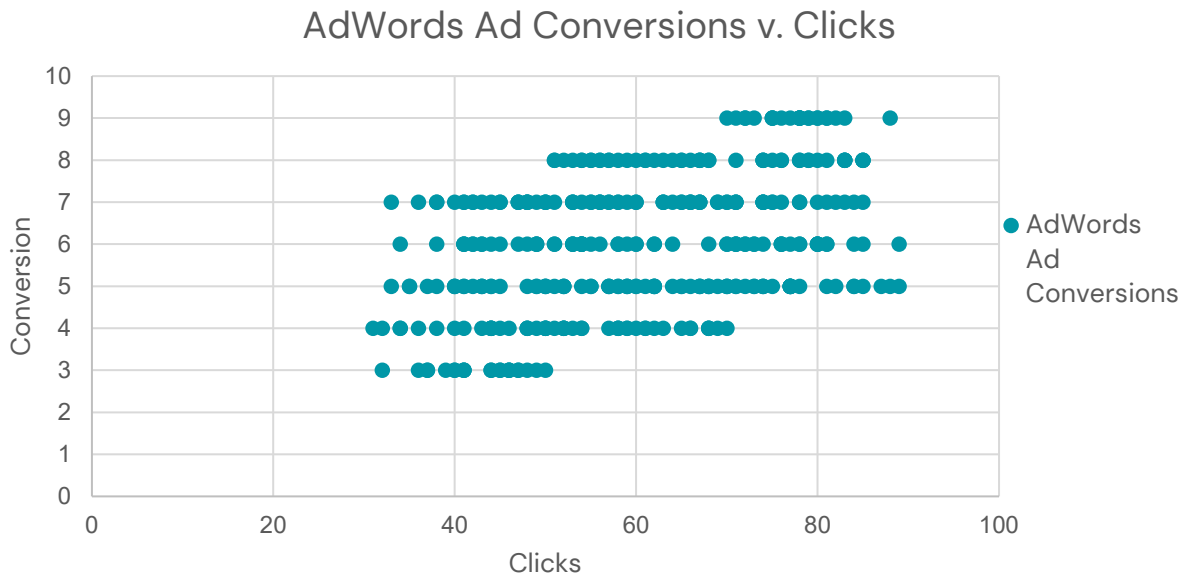


Scatter Plot of AdWords Ad

Correlation coefficient: 0.447993201

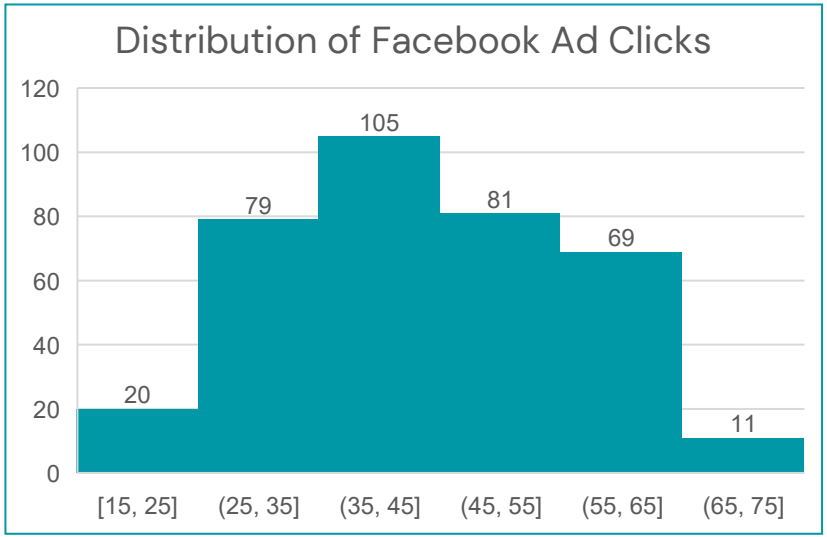
Insights:

- Weak positive correlation reveals poor click-to-conversion relationship
- High clicks often fail to generate proportional conversions
- Needs strategic optimization before budget expansion

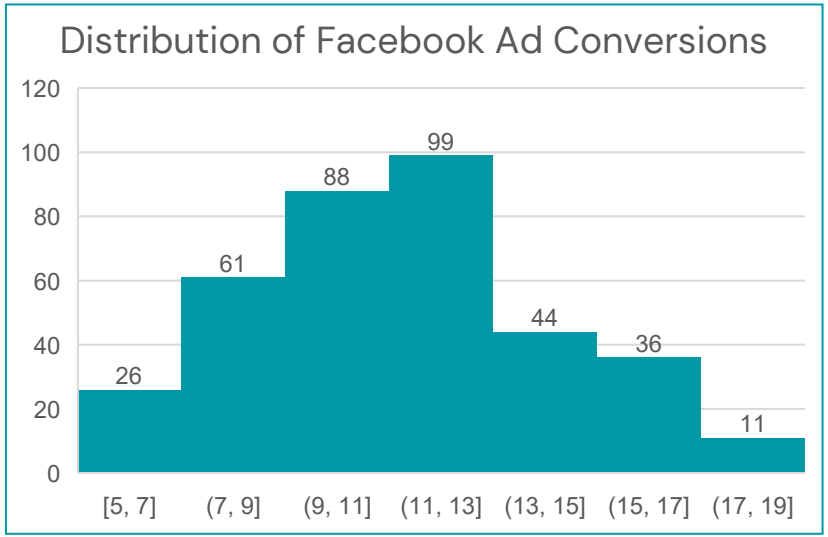


Sample Type of Facebook Ad

- **Bucket Size:** 10
- **Distribution (Clicks)**: Normal

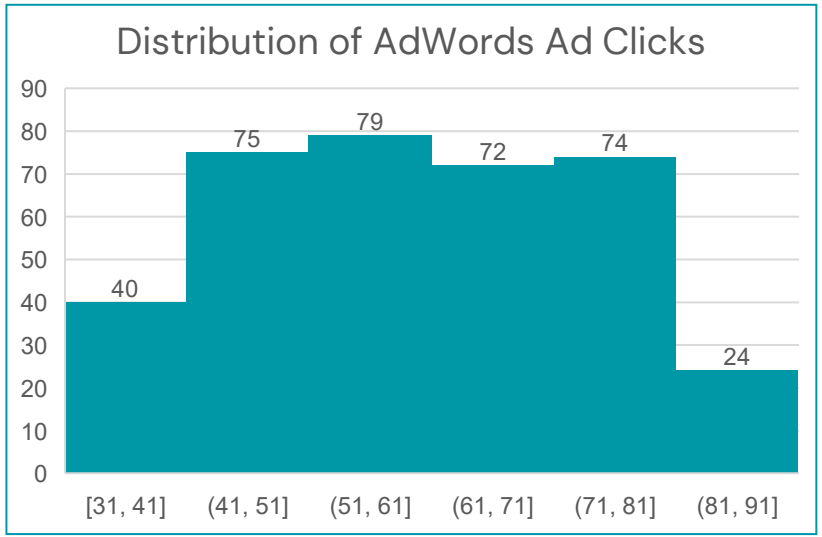


- **Bucket Size:** 2
- **Distribution (Conversions)**: Normal

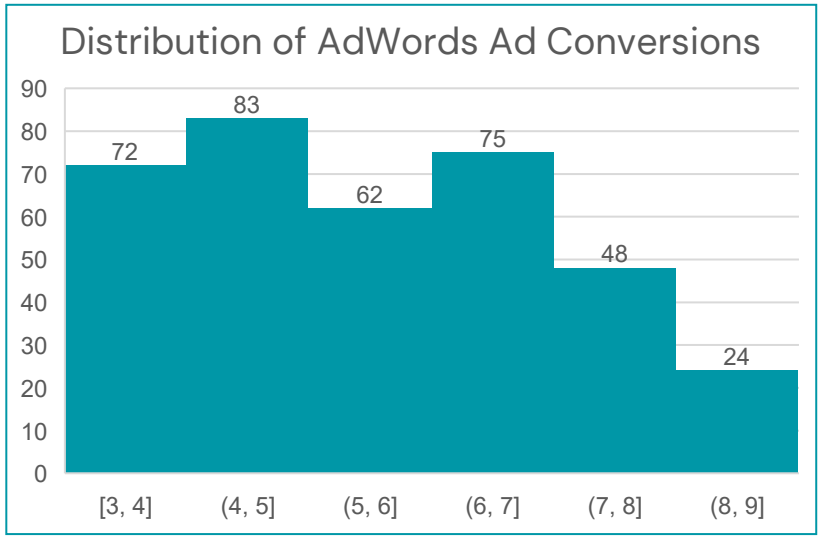


Sample Type of AdWords Ad

- **Bucket Size:** 10
- **Distribution (Clicks)**: Normal



- **Bucket Size:** 1
- **Distribution (Conversions)**: Normal



Variable Types

Quantitative	Continuous	• Cost per Facebook Ad • Facebook Click-Through Rate (Clicks / Views) • Facebook Conversion Rate (Conversions / Clicks) • Facebook Cost per Click (Ad Cost / Clicks) • Cost per AdWords Ad • AdWords Click-Through Rate (Clicks / Views) • AdWords Conversion Rate (Conversions / Clicks) • AdWords Cost per Click (Ad Cost / Clicks)
	Discrete	• Facebook Ad Views • Facebook Ad Clicks • Facebook Ad Conversions • AdWords Ad Views • AdWords Ad Clicks • AdWords Ad Conversions
Qualitative	Nominal	• Facebook Ad Campaign • AdWords Ad Campaign
	Ordinal	• Date

Research Question & Hypothesis

Research Question	Is there a difference between the number of conversions on the Facebook platform versus the AdWords platform?	
Hypothesis	The number of conversions will be higher on the Facebook platform compared to the AdWords platform due to differences in platform engagement and ad targeting efficiency.	
Hypothesis Breakdown	What will change?	The number of ad conversions.
	How will it change?	The number of conversions will be higher on Facebook compared to AdWords.
	What will cause the change?	The difference in advertising platforms (Facebook vs. AdWords).

Variable Types & Mean Conversions

Variable Type	Variable Name	Description
Independent Variable	Advertising Platform	The platform where the ads are run (Facebook or AdWords).
Dependent Variable	Number of Conversions	The number of conversions resulting from ads on each platform.

Platform	Mean	Median	Standard Deviation
Facebook Ads	11.74	12.00	2.92
AdWords Ads	5.98	6.00	1.63

Hypothesis Testing & Results

Null Hypothesis (H_0)	There is no difference between Facebook and AdWords Ad Conversions.
Alternative Hypothesis (H_1)	There is a difference between Facebook and AdWords Ad Conversions.

Test	p-value	Alpha (α)	Decision
Two-sample t-test	1.20E-133	0.05	Reject H_0

Conclusion:

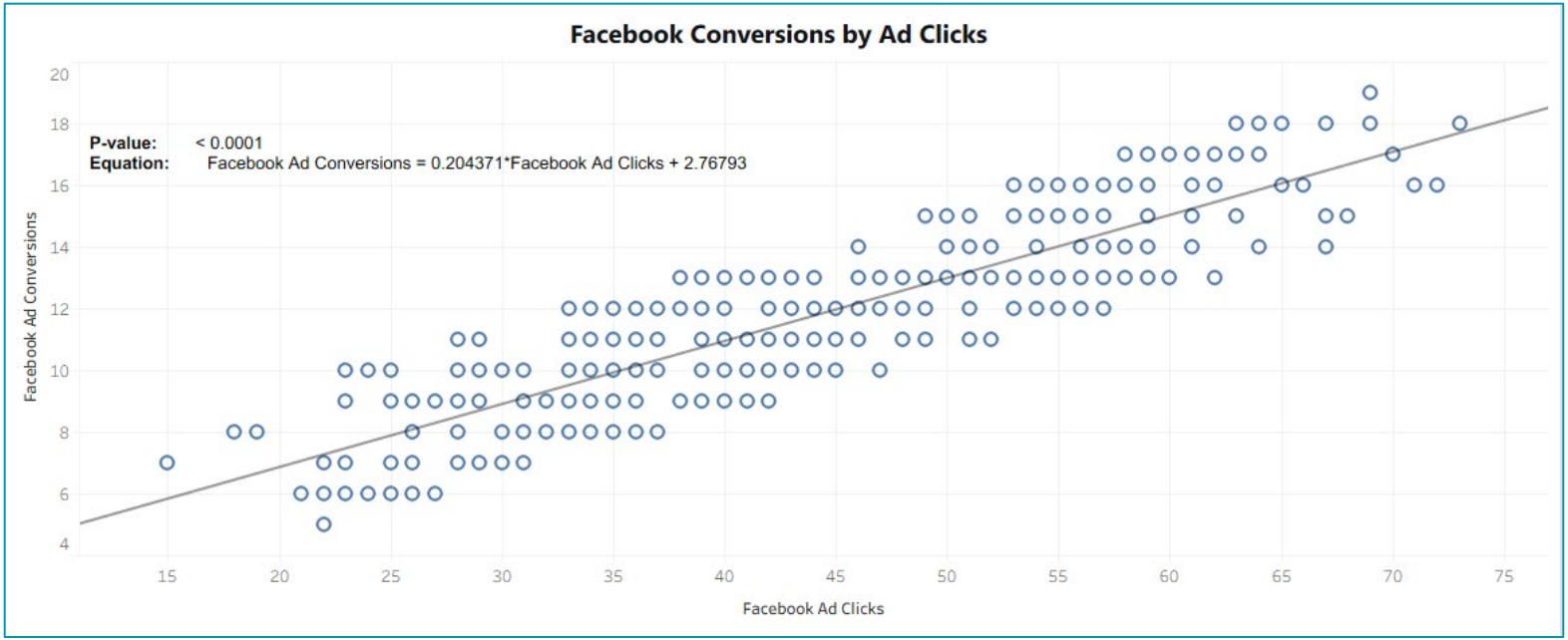
- Since p < **0.05**, there is a statistically significant difference between Facebook and AdWords Ad Conversions.
- This supports **the Alternative Hypothesis** (H_1).
- **Facebook** Ads generate significantly **higher conversions** than AdWords Ads.

Chosen Model: Simple Linear Regression

Question	As Facebook Ads generate significantly higher conversions than AdWords Ads. Now question is: " How many Facebook Ad Conversions can be expected given a certain number of Facebook Ad Clicks? "
Why This Model?	
Purpose	Predict the value of a dependent variable based on the value of an independent variable.
Variable Requirements	• Independent Variable: Facebook Ad Clicks (Quantitative) • Dependent Variable: Facebook Ad Conversions (Quantitative)
Data Assumptions Met	• Linear relationship (strong 0.87 correlation confirmed) • Normal distribution (established in Module 2) • Homoscedasticity (consistent variance in scatter plot)

Modeling

Here is a visualization created in Tableau for simple linear regression model.



Facebook Conversion Prediction

Here is interpretation of simple linear regression model.

Regression Equation	**Facebook Ad Conversions** = 0.204 × Facebook AdClicks + 2.77
Model Interpretation	• **Slope (0.204):** Each additional Facebook ad click generates approximately 0.20 additional conversions • **Intercept (2.77):** Baseline conversions when click count is zero • **Practical Insight:** Approximately 5 clicks needed to generate 1 conversion
Prediction Examples	• 100 clicks → 23.2 expected conversions • 500 clicks → 104.8 expected conversions • 1000 clicks → 207.2 expected conversions

Final Insights & Recommendation

Insights

- **Facebook = High-Performance Engine:** 96% more conversions (11.74 vs 5.98) with fewer clicks, indicating superior targeting and efficiency
- **AdWords = Funnel Issues:** More clicks but poor conversion (r=0.45), suggesting ad relevance or landing page problems
- **Facebook = Predictable ROI:** Strong correlation (r=0.87) and reliable regression model enable accurate budget forecasting

Recommendations:

- **Reallocate budget:** Shift 60-70% of AdWords budget to Facebook to maximize conversion yield
- **Optimize AdWords funnel:** Conduct A/B testing on landing pages, ad copy, and targeting to improve conversion rates before considering budget expansion
- **Scale Facebook confidently:** Increase investment in top-performing Facebook segments (medium-high click ranges)
- **Implement closer monitoring:** Track AdWords click-to-conversion efficiency weekly with a target correlation coefficient of >0.6