

# A/B Testing – Marketing Campaign Analysis

Comparing Facebook and AdWords Ad Performance

Data-driven insights for smarter advertising decisions

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# The Modern Marketing Challenge

Marketing teams face increasing pressure to demonstrate ROI in a complex digital landscape.

Strategic budget allocation requires rigorous analysis and evidence-based decisions for sustainable business growth.





# Business Problem



Maximize ROI  
Online Ad Campaigns across digital channels



Platform Comparison  
Facebook Ads vs. Google AdWords performance



Performance Insights  
Clicks, conversions, and cost efficiency



Optimize Ad Spend  
Data-driven strategy for improved outcomes

# Research Objective

Our analysis addresses three critical questions that determine advertising platform effectiveness and inform strategic budget allocation decisions.



## Performance Comparison

Compare Facebook and AdWords across key engagement metrics to identify the platform generating more clicks and conversions.



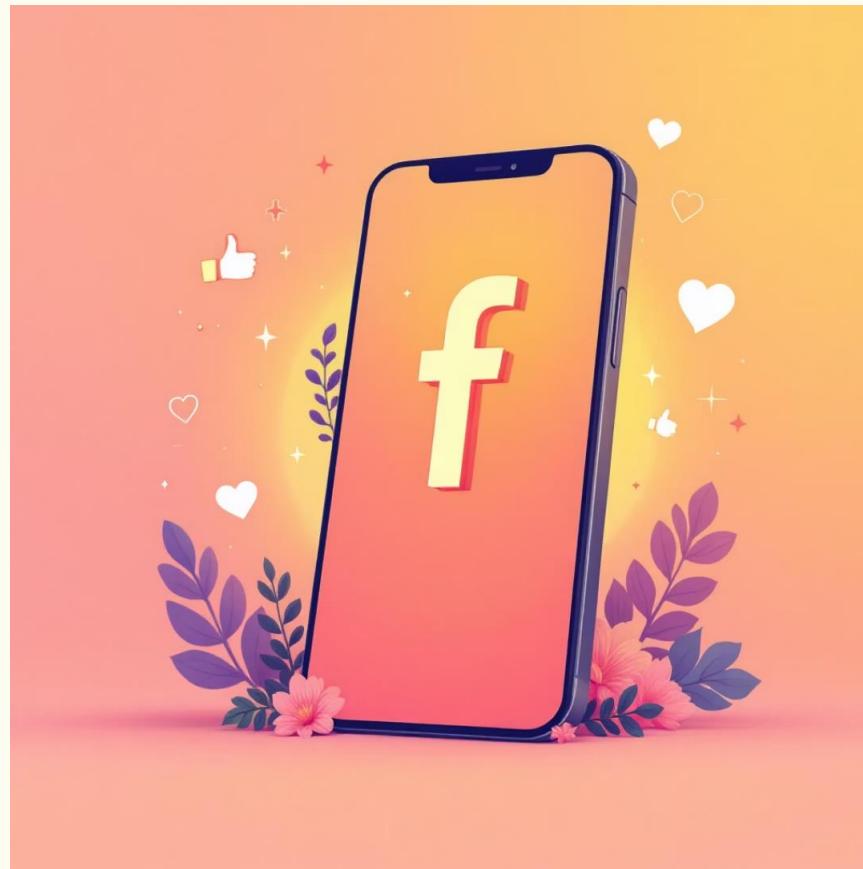
## Conversion Efficiency

Evaluate which platform delivers superior conversion efficiency – transforming clicks into meaningful customer actions.



## Cost-Effectiveness

Determine which platform provides greater cost-effectiveness and optimal return on advertising spend.



# Dataset Overview

731

Daily Entries

Campaign records analysed

2023

Start Year

Through 2025

2

Platforms

Facebook & AdWords

7

Key Metrics

Performance indicators

## Engagement Metrics

- Views
- Clicks
- Conversions

## Cost Metrics

- Cost per Advertisement
- Cost per Click (CPC)

## Efficiency Ratios

- Click-Through Rate (CTR)
- Conversion Rate

# Data Preparation & Methodology

Rigorous data preparation and analytical methodology ensure reliable, actionable insights from campaign performance data.



## Data Import

Imported campaign dataset using Python Pandas library



## Data Cleaning

Validated data quality, checked for missing values, formatted dates



## Descriptive Statistics

Performed exploratory analysis of key metrics

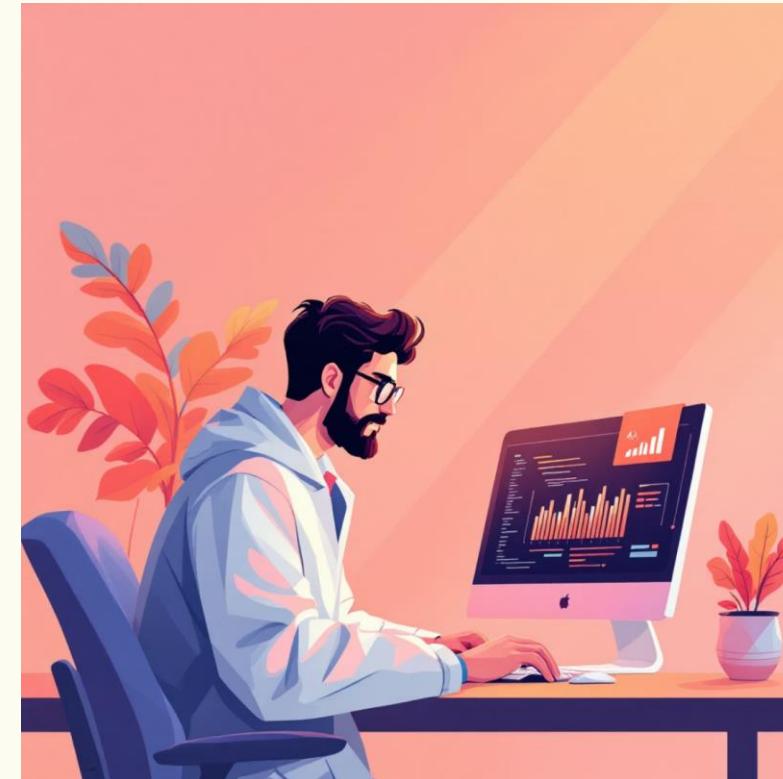


## Deep Analysis

Distribution analysis and platform comparisons

# Analytical Approach

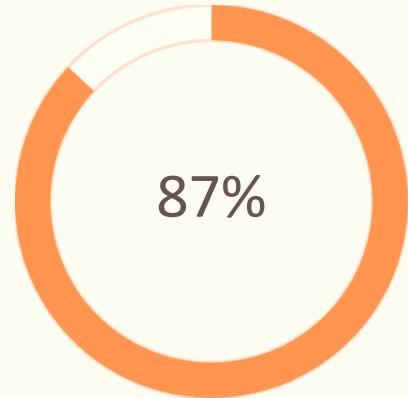
- Distribution analysis of clicks & conversions
- Platform-level performance comparison
- Correlation: engagement & conversion
- Statistical significance testing



# Statistical Analysis

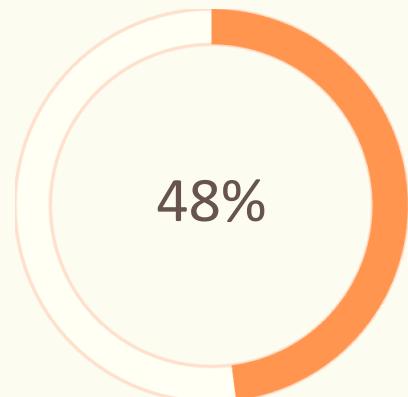
## Correlation Analysis

Examining the relationship between clicks and conversions reveals striking differences in engagement quality between platforms.



Facebook

Strong clicks-conversion correlation ( $r=0.87$ )



AdWords

Moderate clicks-conversion correlation ( $r=0.48$ )

## T-Test Results

Statistical testing confirms the observed differences between platforms are significant and not due to random chance.

### T-Statistic

$T = 14.68$

### P-Value

$p < 0.05$

### Conclusion

Statistically significant difference

▣ **Key Finding:** Facebook conversions significantly exceed AdWords conversions with statistical confidence.

# Key Findings

Our analysis reveals fundamental differences in how each platform converts user engagement into tangible business outcomes.

## Facebook Performance

Generated **fewer clicks** but delivered **substantially more conversions**

## Quality Advantage

Facebook's engagement quality is **demonstrably higher** –  
clicks lead to actions

## AdWords Performance

Generated **more clicks** but demonstrated **lower conversion efficiency**

## Statistical Confidence

The difference between platforms is **statistically significant**  
( $p < 0.05$ )

# Platform Insights

## Facebook Strengths

- Higher conversion rates, strong ROI
- Conversions linked to user engagement
- Superior user intent quality
- Efficient ad spend

## AdWords Strengths

- Broad search network reach
- High volume of initial clicks
- Lower conversion intent
- Ideal for awareness campaigns

## Facebook = Conversion-Efficient

Drives tangible outcomes, maximizes ROI

## AdWords = Reach-Focused

Builds awareness, captures broad audience



# Strategic Recommendations

Transform these insights into action with a strategic, platform-optimised approach to advertising investment.



## Prioritise Facebook for Conversions

Allocate greater budget to Facebook campaigns when conversion efficiency and ROI are primary objectives



## Leverage AdWords for Reach

Utilise AdWords strategically for top-of-funnel awareness campaigns and broad market penetration



## Implement Integrated Strategy

Combine platforms strategically – AdWords for awareness generation, Facebook for conversion optimisation



## Continuous Testing & Optimisation

Maintain ongoing A/B testing programmes to refine platform performance and adapt to evolving market conditions