

A/B Testing – Marketing Campaign Analysis

Comparing Facebook and AdWords Ad Performance

Data-driven insights for smarter advertising decisions

Analysis by Aiswariya Ramachandran



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.



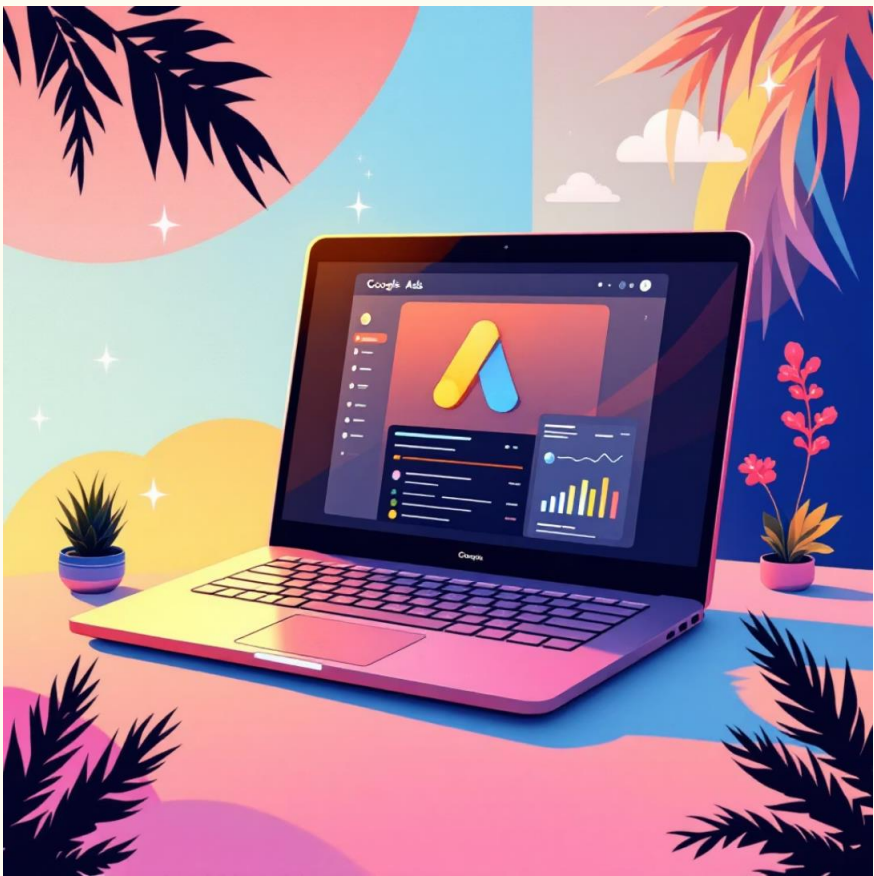
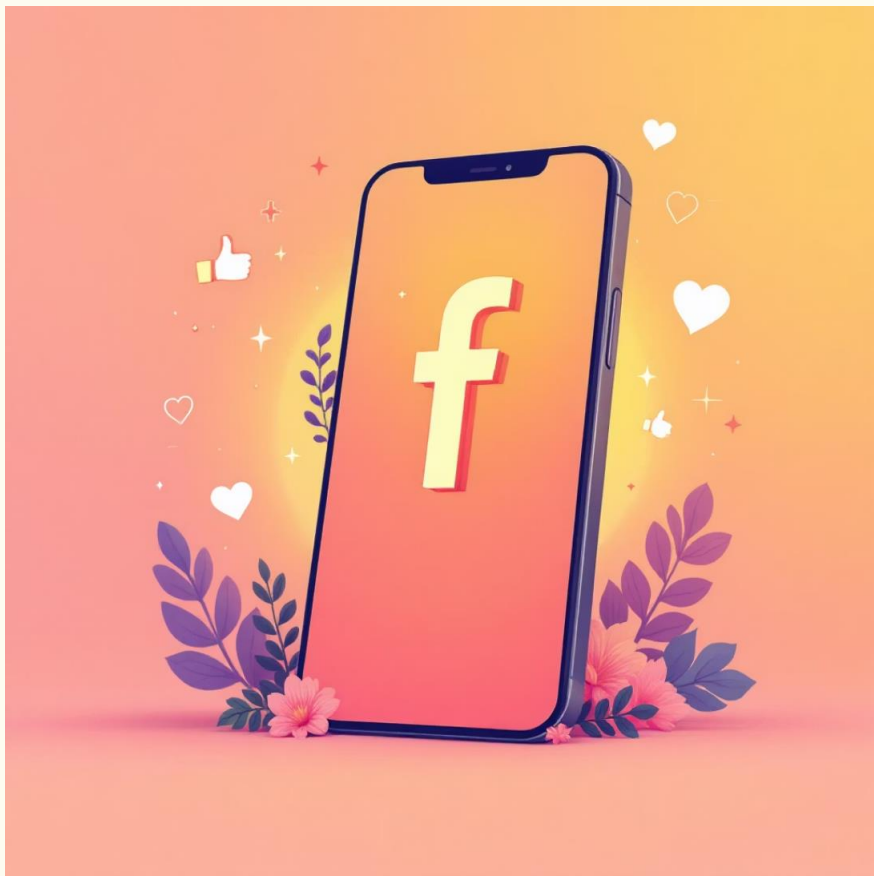
Conversion Efficiency

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

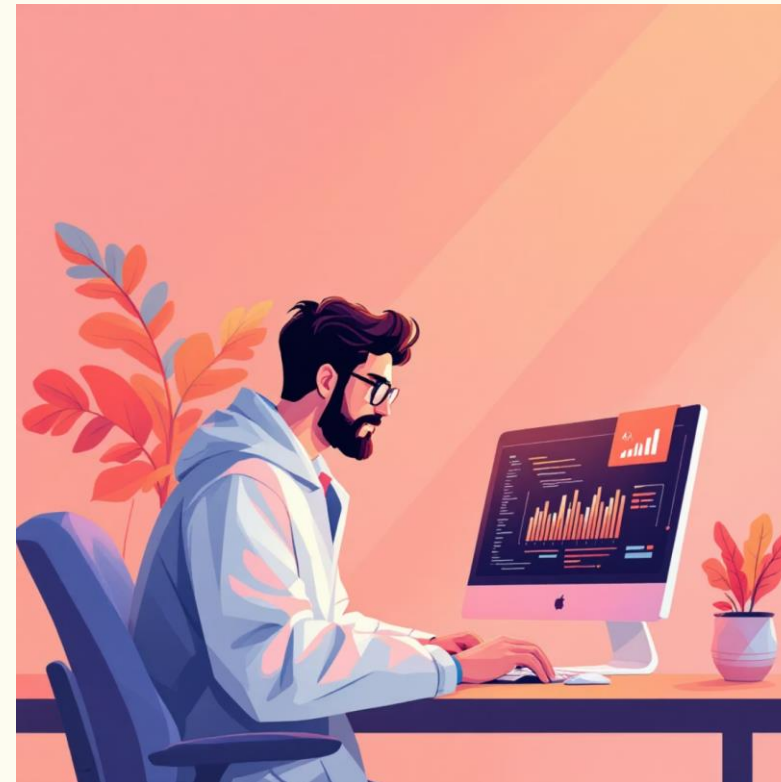


Deep Analysis

Distribution analysis and platform comparisons

Analytical Approach

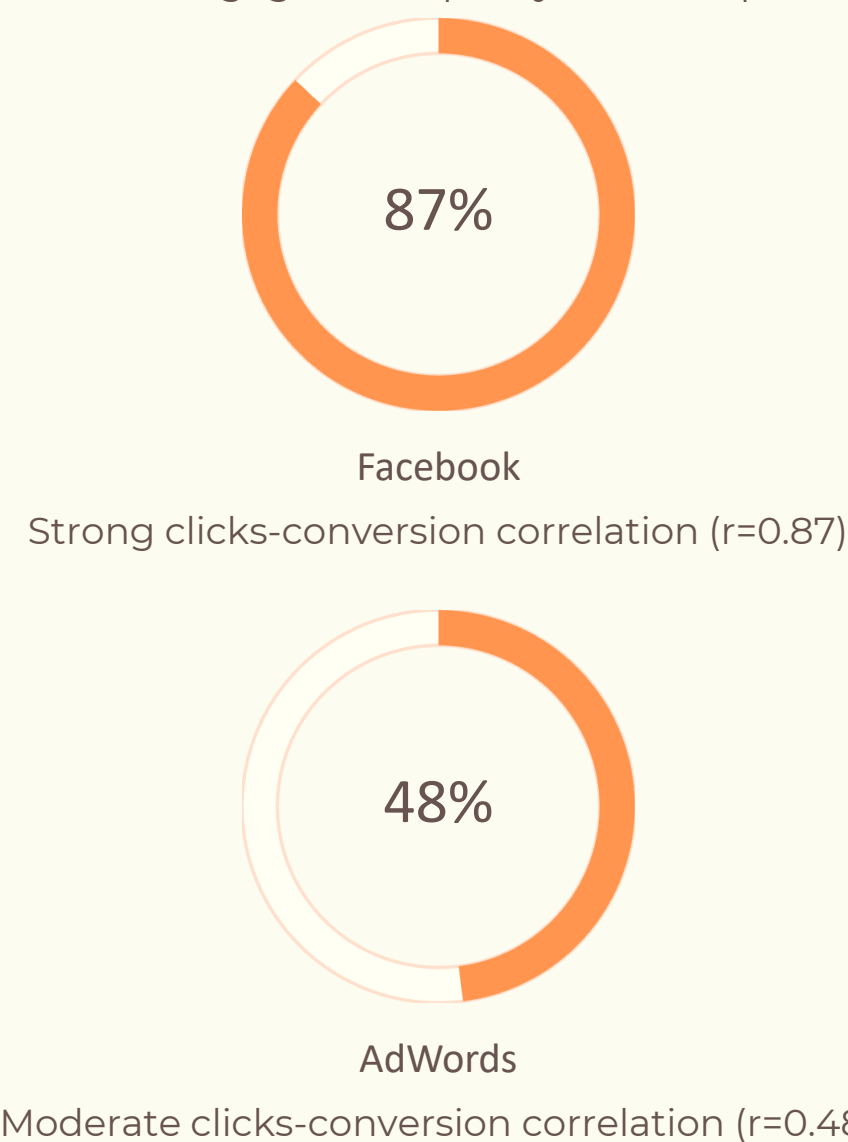
- Distribution analysis of clicks & conversions
- Platform-level performance comparison
- Correlation: engagement & conversion
- Statistical significance testing



Statistical Analysis

Correlation Analysis

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



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