



# Sales Conversion Optimisation

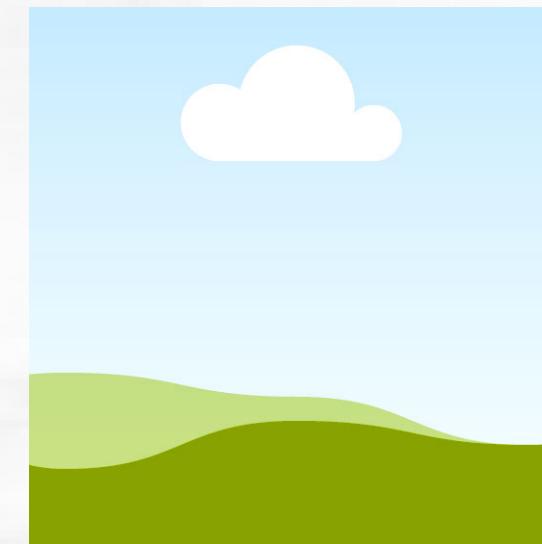
MGMT 52500-001 - Group 8



# Team



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...

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...

...

# Data Description

An anonymous Organization's  
social media ad campaign Data

1143 observations  
11 variables



# Variable Description

...

1

Unique ID for each ad

2

Ad Campaign ID  
(3 Campaigns)

3

ID for Facebook tracker

4

Age Group

5

Gender

6

Category of person's interest

7

Impressions: the number of times the ad was shown

8

Clicks: number of clicks on for that ad

9

Spent: Amount spent by campaign to show the ad

10

Total conversion:  
Total No. of people who enquired after seeing the ad

11

Approved conversion: Total No. of people who purchased after seeing the ad

*Objective : Explore features to determine optimal customer segments and next steps for ad targeting*

# Problem Statement

...

- Optimize the social ad campaigns for the highest conversion rate possible
- Finding the perfect target demographics utilizing appropriate marketing KPIs

1

Phase 01

Exploratory Data  
Analysis and Marketing  
KPI Analysis

2

Phase 02

Hypothesis testing to  
validate analysis  
findings

3

Phase 03  
Modelling

# Basic EDA

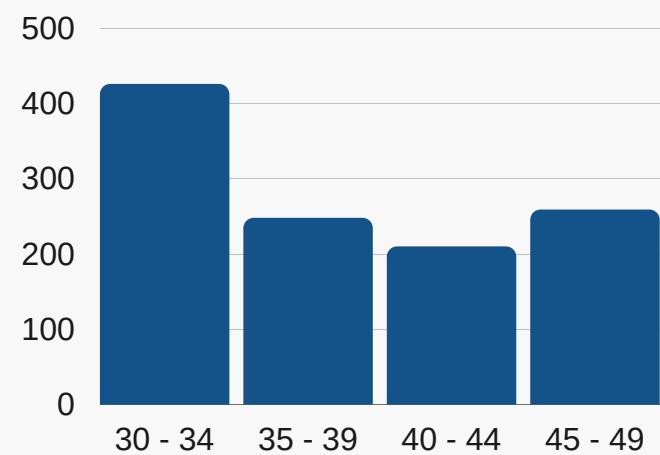
...

Age group 45-49 has higher Click to Impression ratio

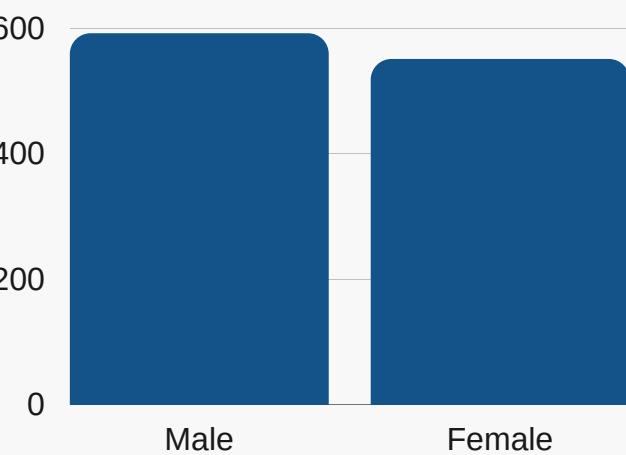
Age group 30-34 has higher approved conversion rate than any other group

On Average,  
Males - Significant conversions for age 30-34  
Females - CTR is high across ages

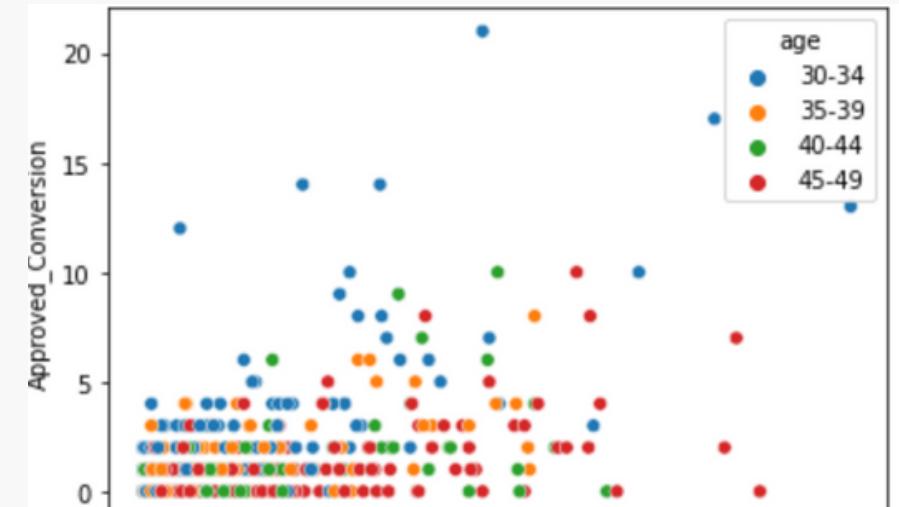
### Age group distribution



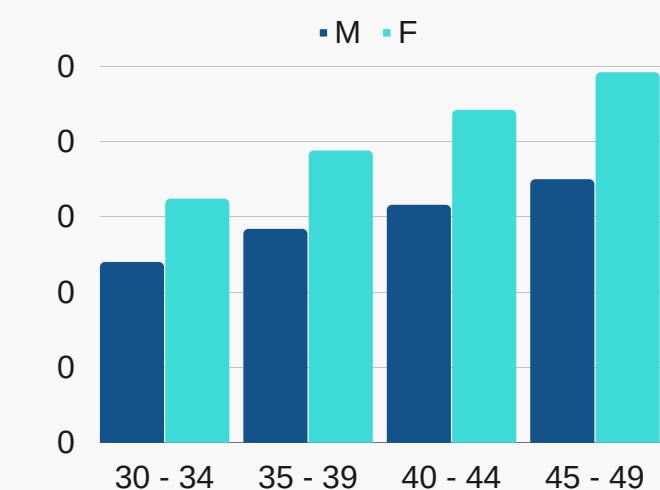
### Gender distribution



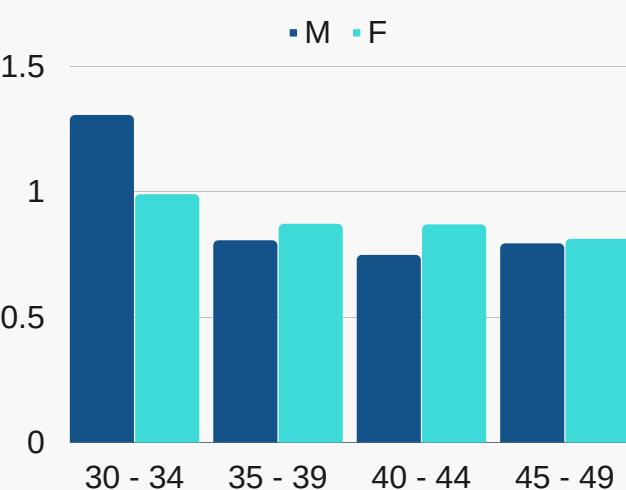
### Approved Conversions vs Clicks for each age group



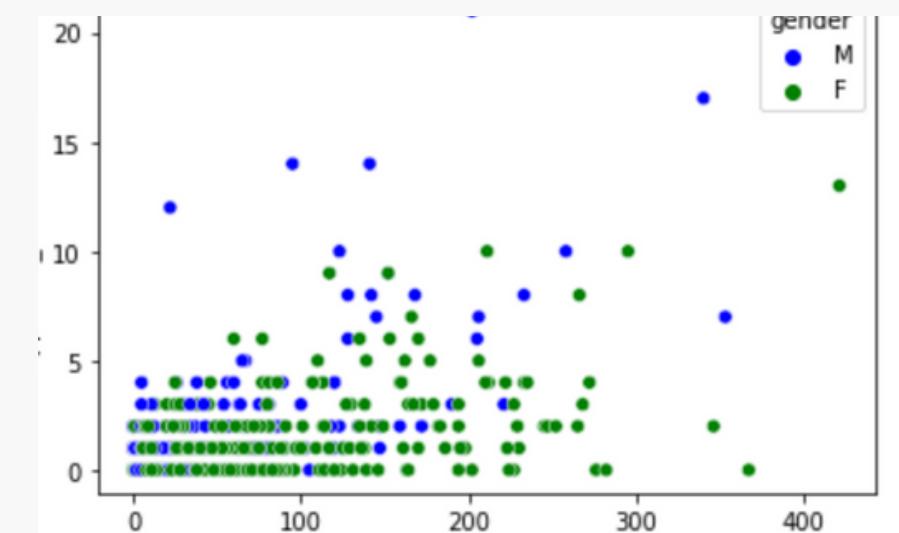
### Click-to-impression by age



### Approved conversion rate by age



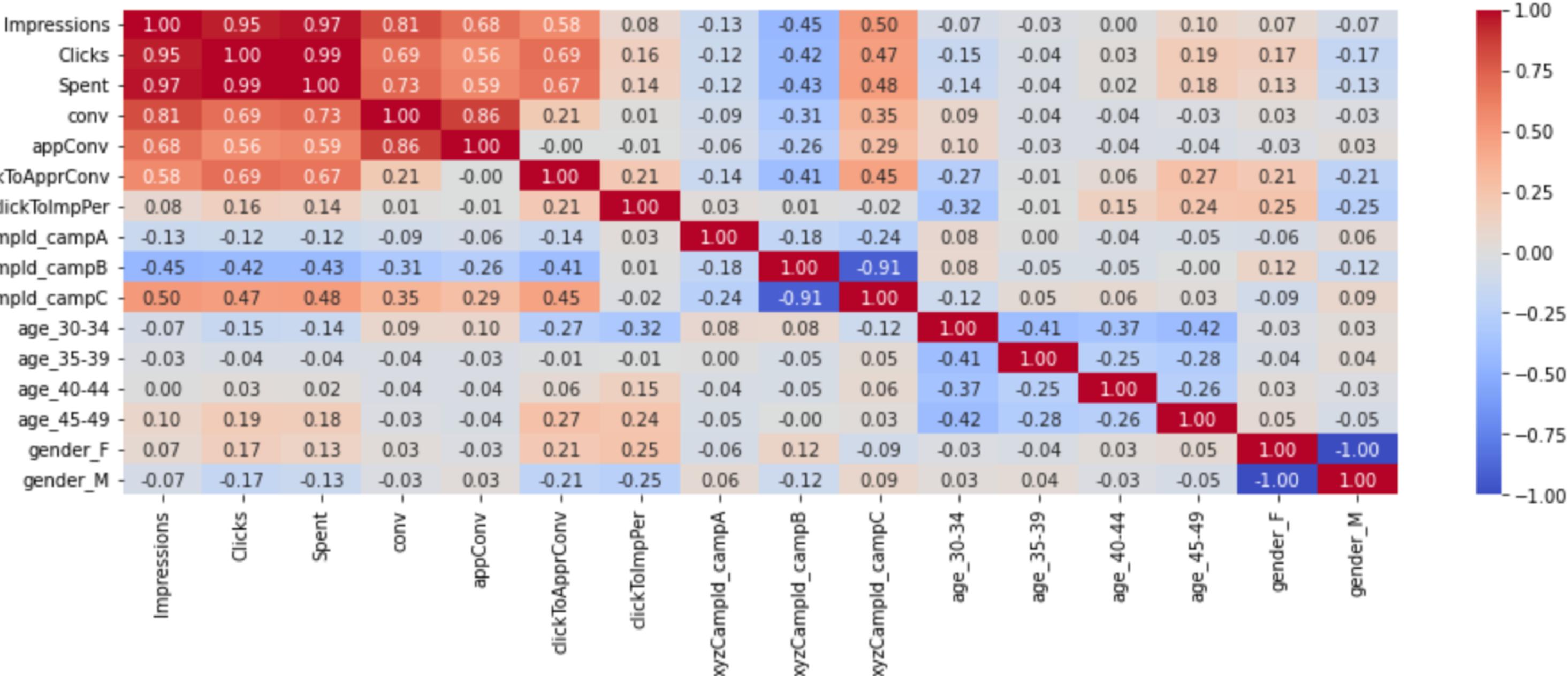
### Total Conversions vs Clicks for each gender



# Correlation Matrix

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- Very strong correlation between spend and impressions and spend and clicks
- Moderate to strong correlation between conversions to spend



# Campaign Level Analysis

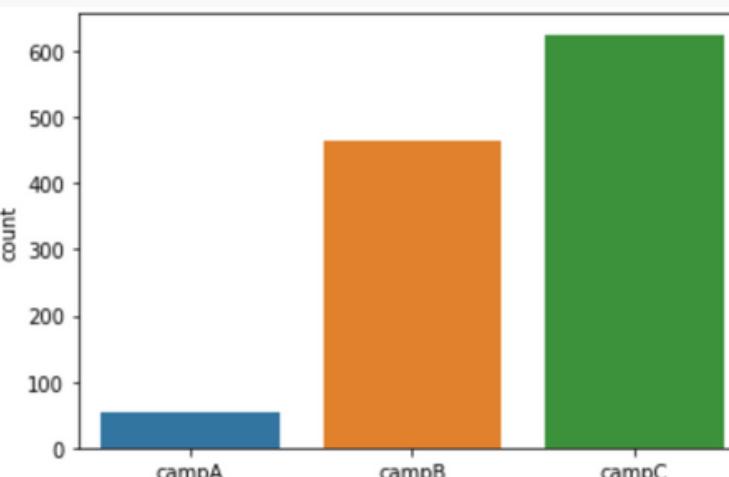
...

Unequal distribution of both individual ads and the impressions

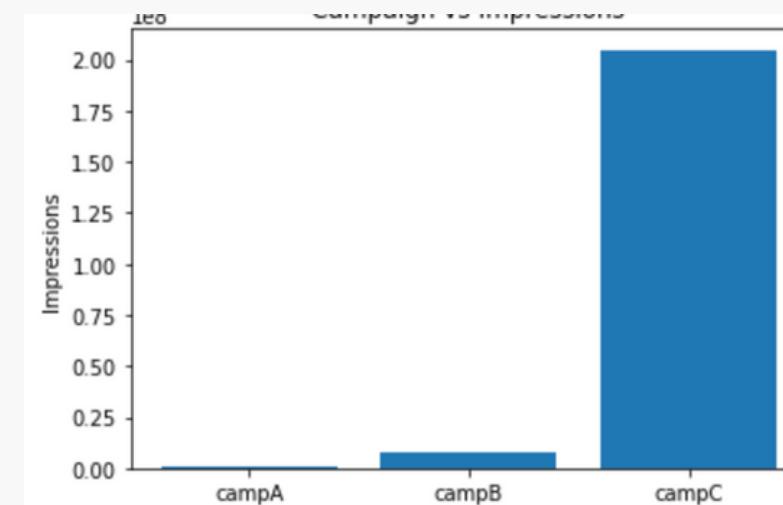
Campaign C has the highest ad spend and highest conversions

Need to define more attributes to gauge performance

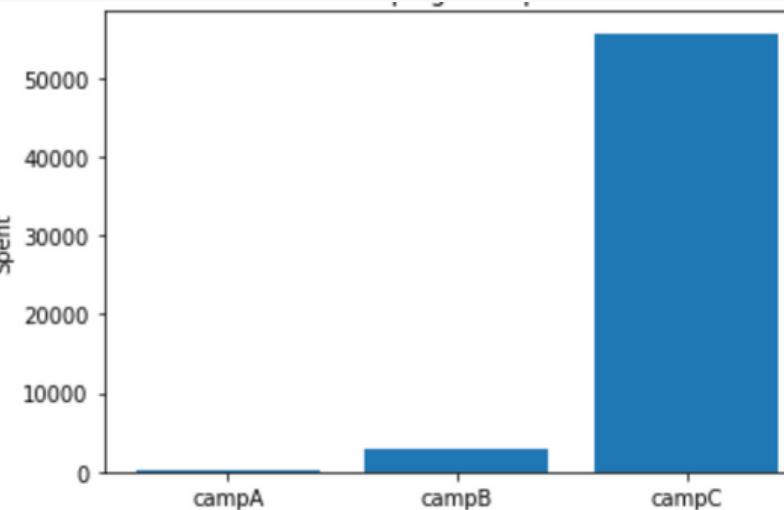
### Count of Individual Ads



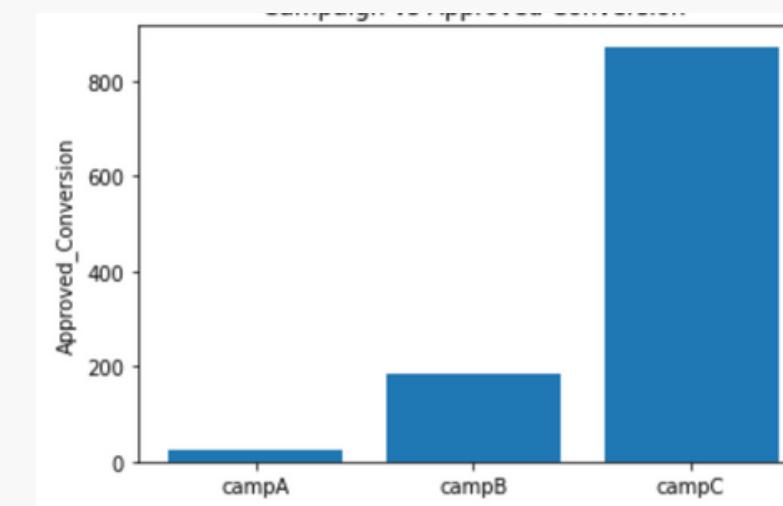
### Campaign vs Impressions



### Campaign vs. Spent



### Campaign vs Approved Conversion



...

# Marketing KPIs

Need for additional features to properly measure campaign efficacy

## CTR

Click Through  
Rate

[Clicks] /  
[Impressions]

## CPC

Cost Per Click

[Spent] /  
[Clicks]

## Conversion Rate

[Approved  
Conversions] /  
[Clicks]

## CAC

Customer  
Acquisition Cost

[Spent] /  
[Approved  
Conversions]

# Gender-wise Analysis

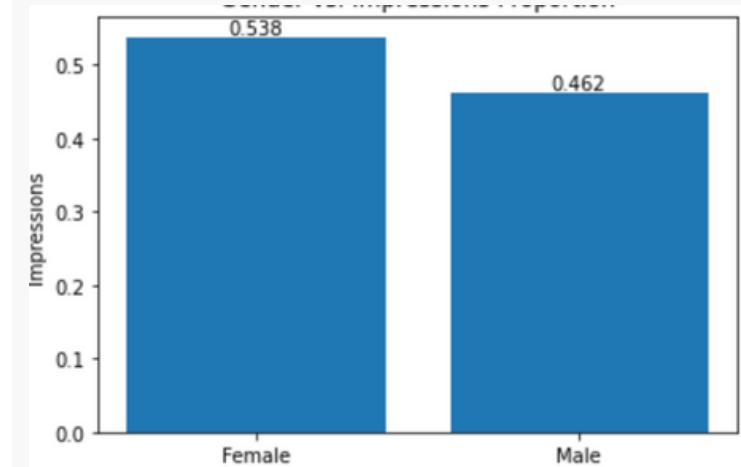
...

Although females have a higher CTR Males are almost twice as likely to actually complete a purchase once on the site

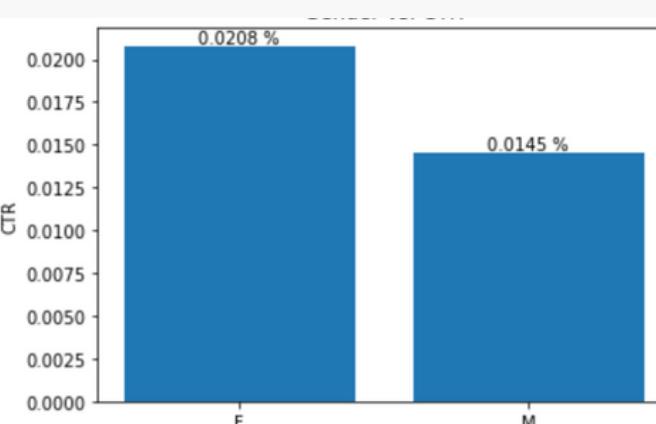
Across all campaigns females are more exposed to the advertisements

Females have a higher CTR & CAC on all campaigns with a lower conversion

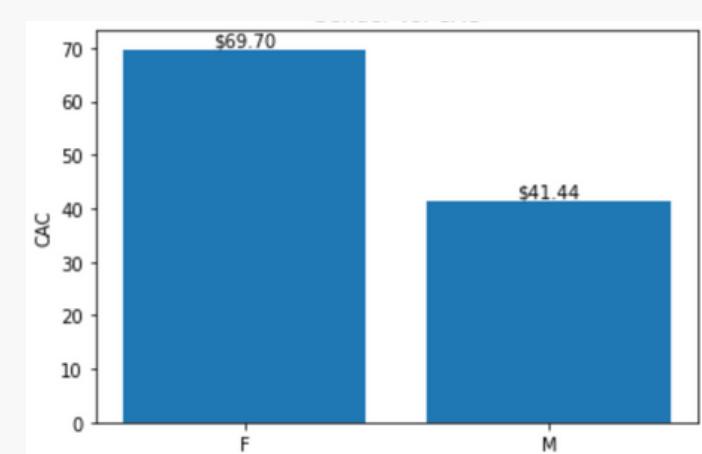
Impressions proportion



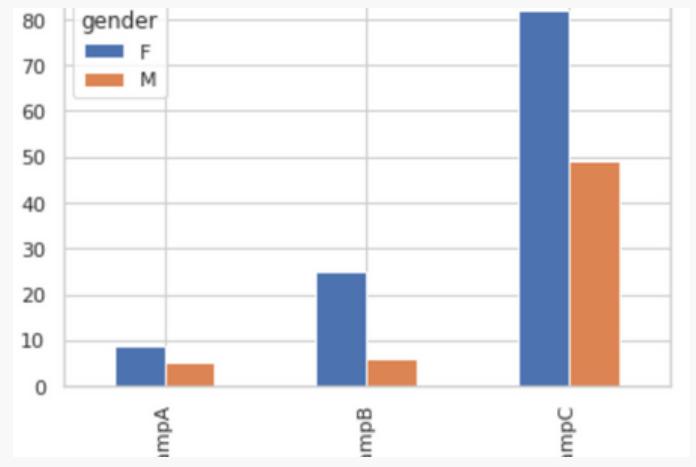
CTR



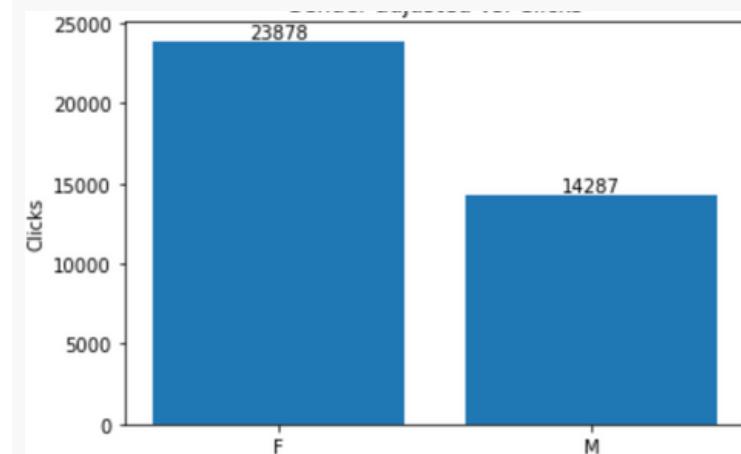
CAC



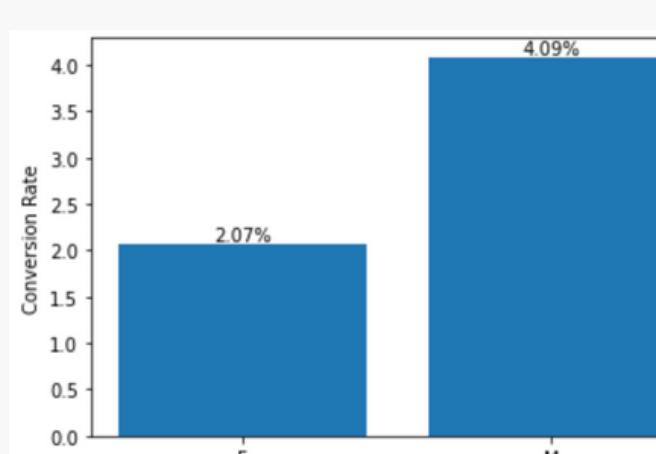
Campaign-wise CAC



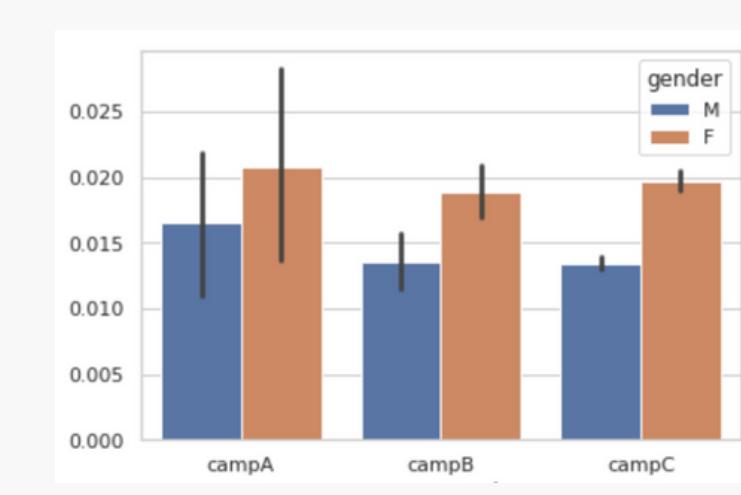
Clicks



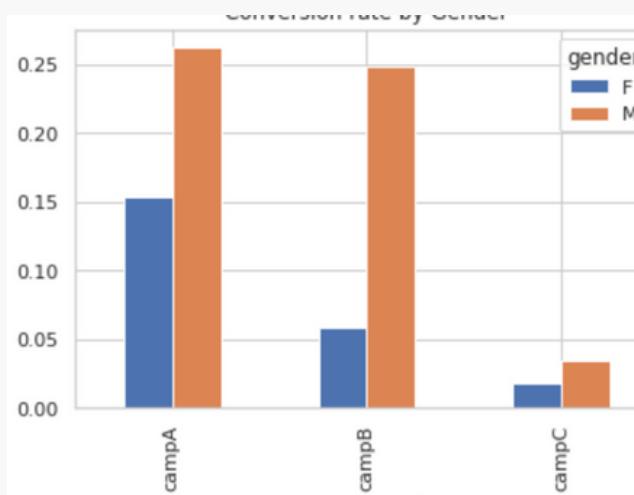
Conversion Rate



Campaign-wise CTR



Campaign-wise Conversion Rate



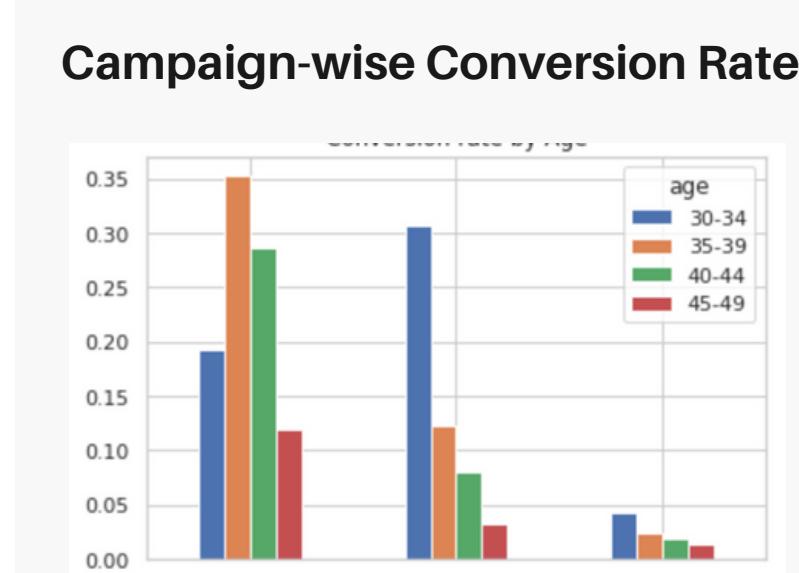
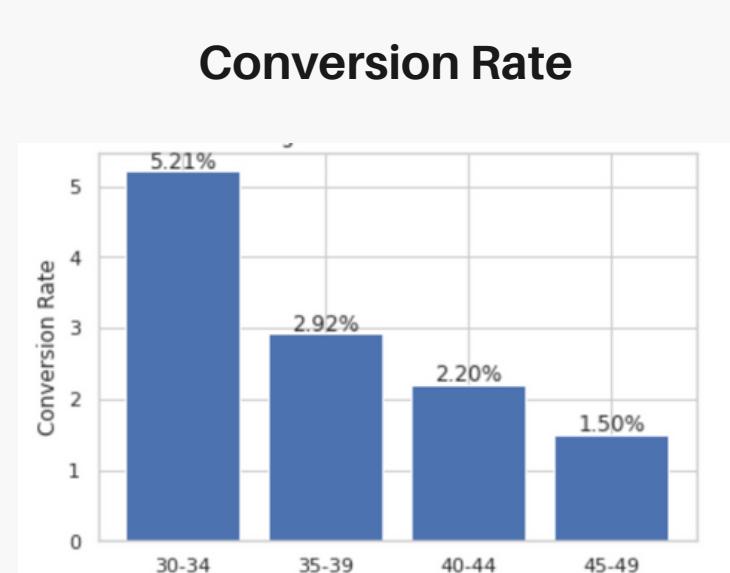
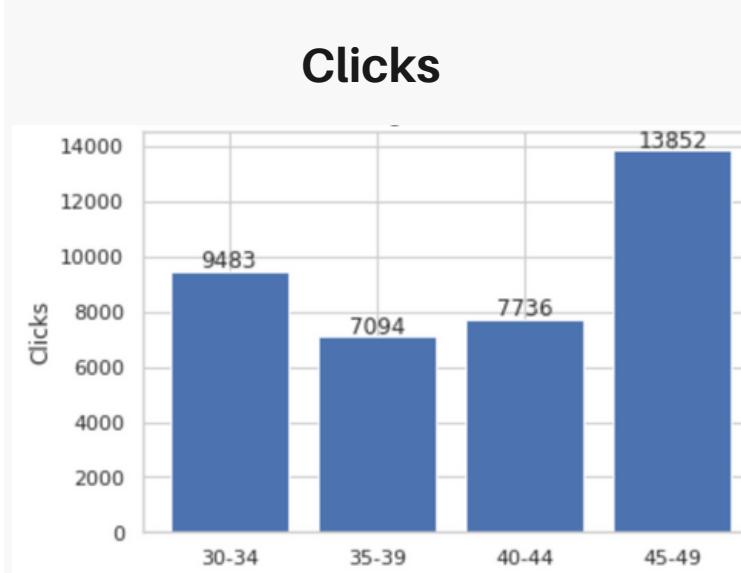
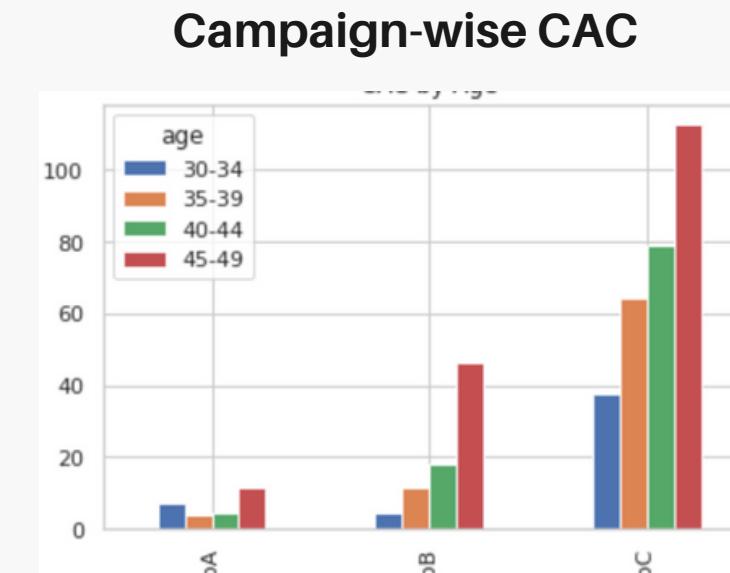
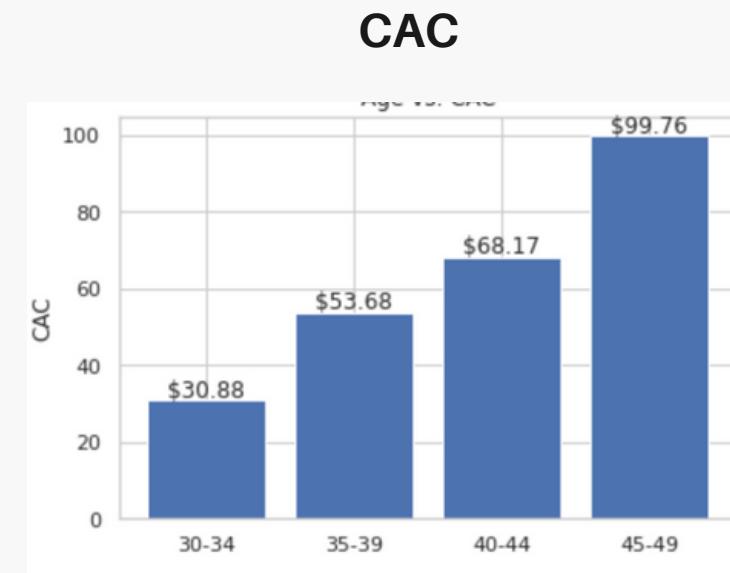
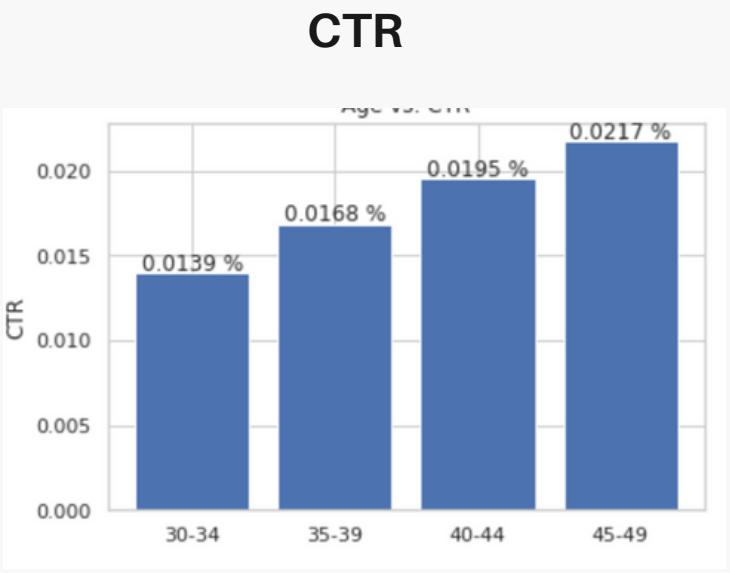
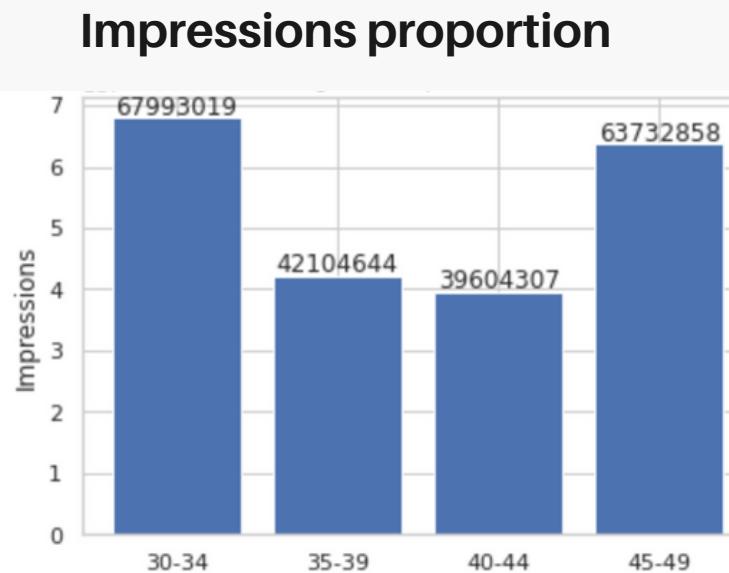
# Age-wise Analysis

...

45-49 has the highest CTR with age 30-34 being the lowest  
30-34 has max conversion rate

45-49 have the highest customer acquisition cost while 30-34 are the lowest

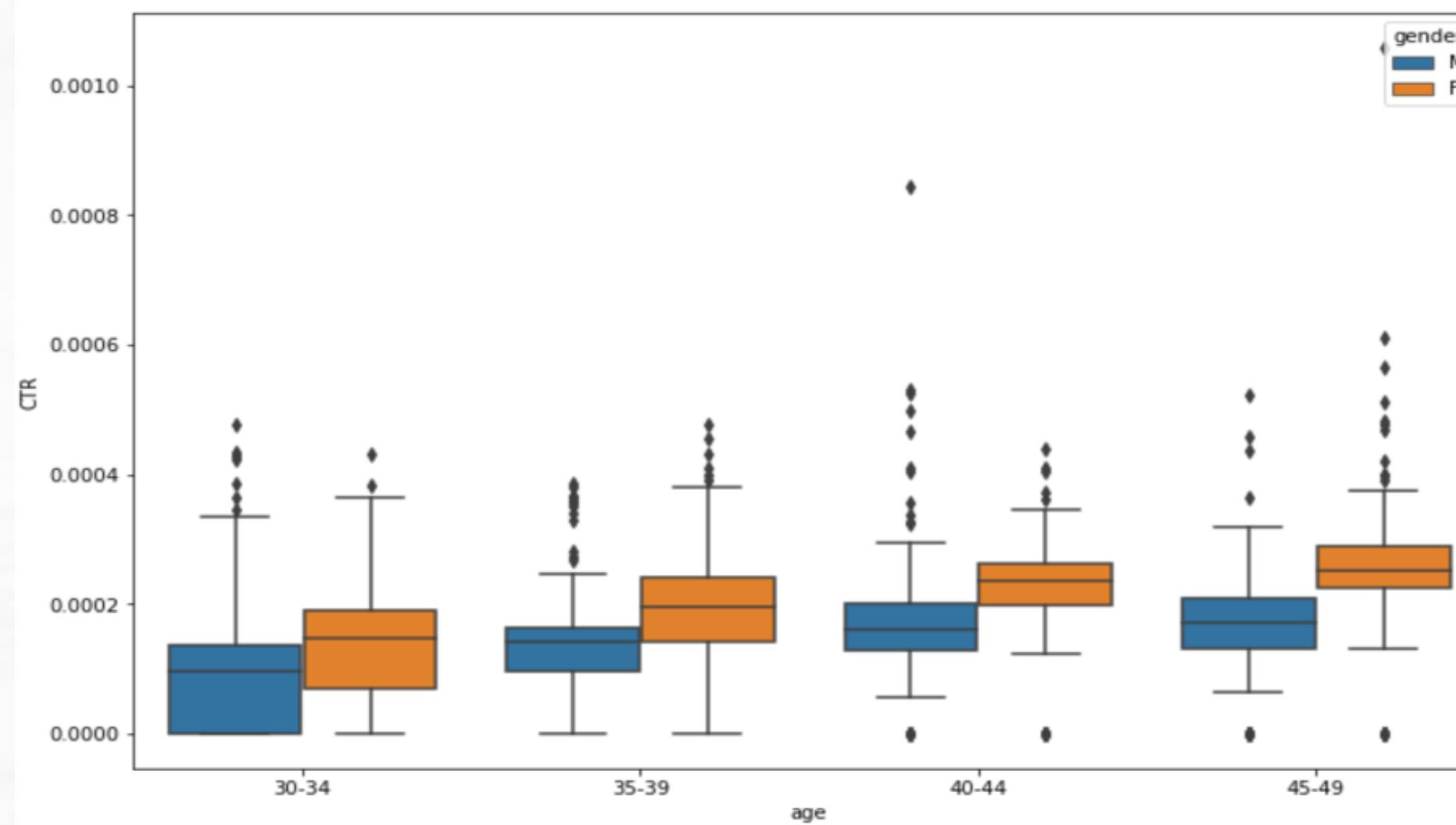
Campaign A has the highest conversion rate for all age groups except 30-34 while campaign C is the lowest



# Campaign Objective 1

...

## Age vs CTR



## Objective: Product Awareness

- Females tend to have higher CTR
- CTR increasing with age - Indicating younger age groups have shorter attention span

# Result Validation through Hypothesis Testing

...

## Gender

1

- H<sub>0</sub>: Mean click-through rates aren't effected by gender
- H<sub>a</sub>: Mean click-through rates are effected by gender



p-value=1.708968397498632e-17)  
Females have higher CTR

## Age

2

- H<sub>0</sub>: All age groups have same mean click-through rates
- H<sub>a</sub>: All age groups have different mean click-through rates

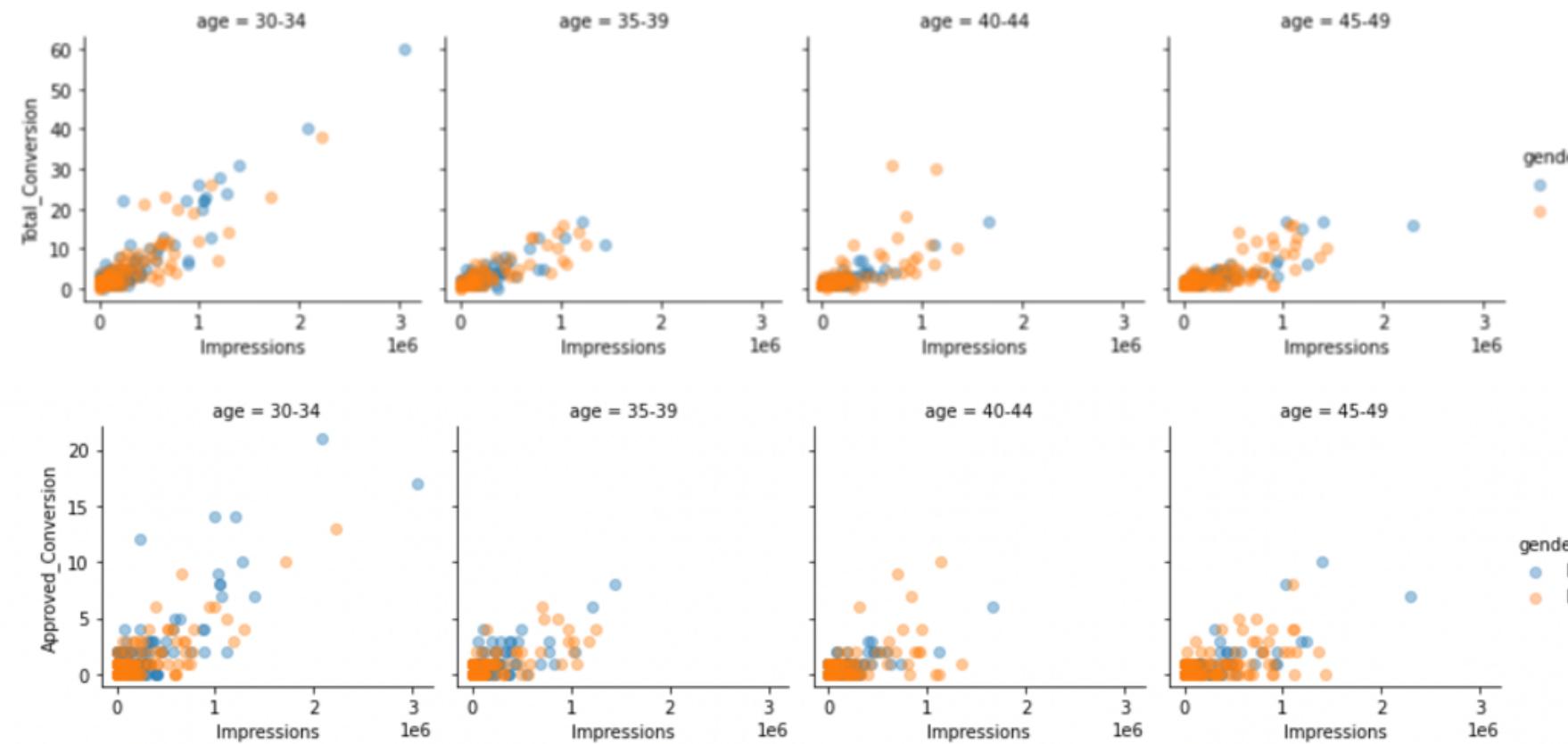


p-value=1.6245998315114536e-07)  
45-49 aged have higher CTR

# Campaign Objective 2

...

## Impressions vs Conversions



## Objective: Customer Acquisition

- Gender: No major differences in conversions between Males & Females across ages
- Age: 30-34 Age group has higher conversions

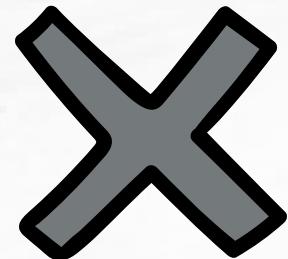
# Result Validation through Hypothesis Testing

...

## Gender

1

- H<sub>0</sub>: Males and females have same mean conversions
- H<sub>a</sub>: Males and females have different mean conversions



p-value=0.3502  
Fail to prove different conversions

## Age

2

- H<sub>0</sub>: '30-34' & '45-49' aged group have same mean conversions
- H<sub>a</sub>: '30-34' & '45-49' aged group have different mean conversions

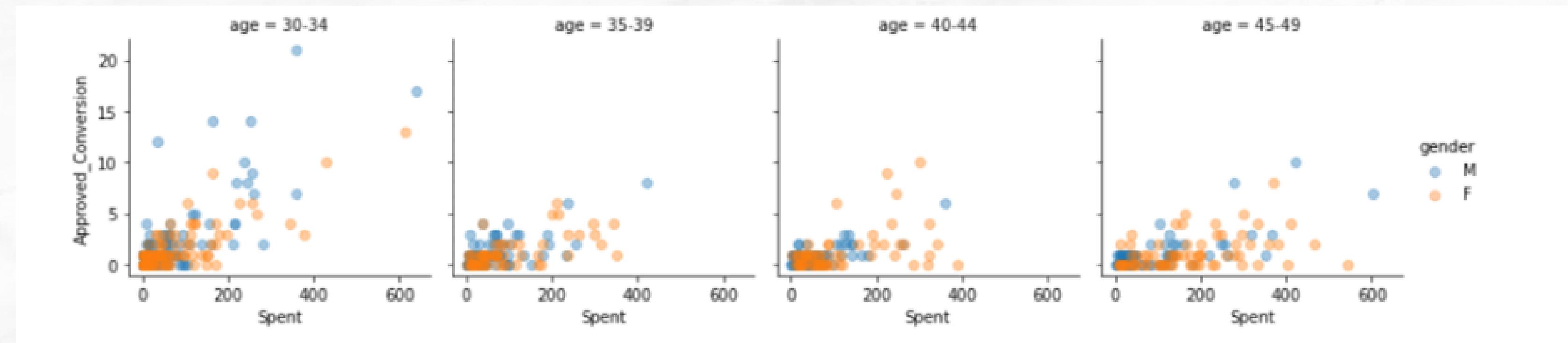


p-value=0.0396  
30-34 aged have more conversions

# Campaign-C

...

## Approved Conversions



Improve  
performance



- Highest spending currently on both 30-34, 45-49 age groups
- Males higher conversions relatively predominantly in 30-34 age group

# Campaigns: FB Level

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Which Campaigns to  
target in future?



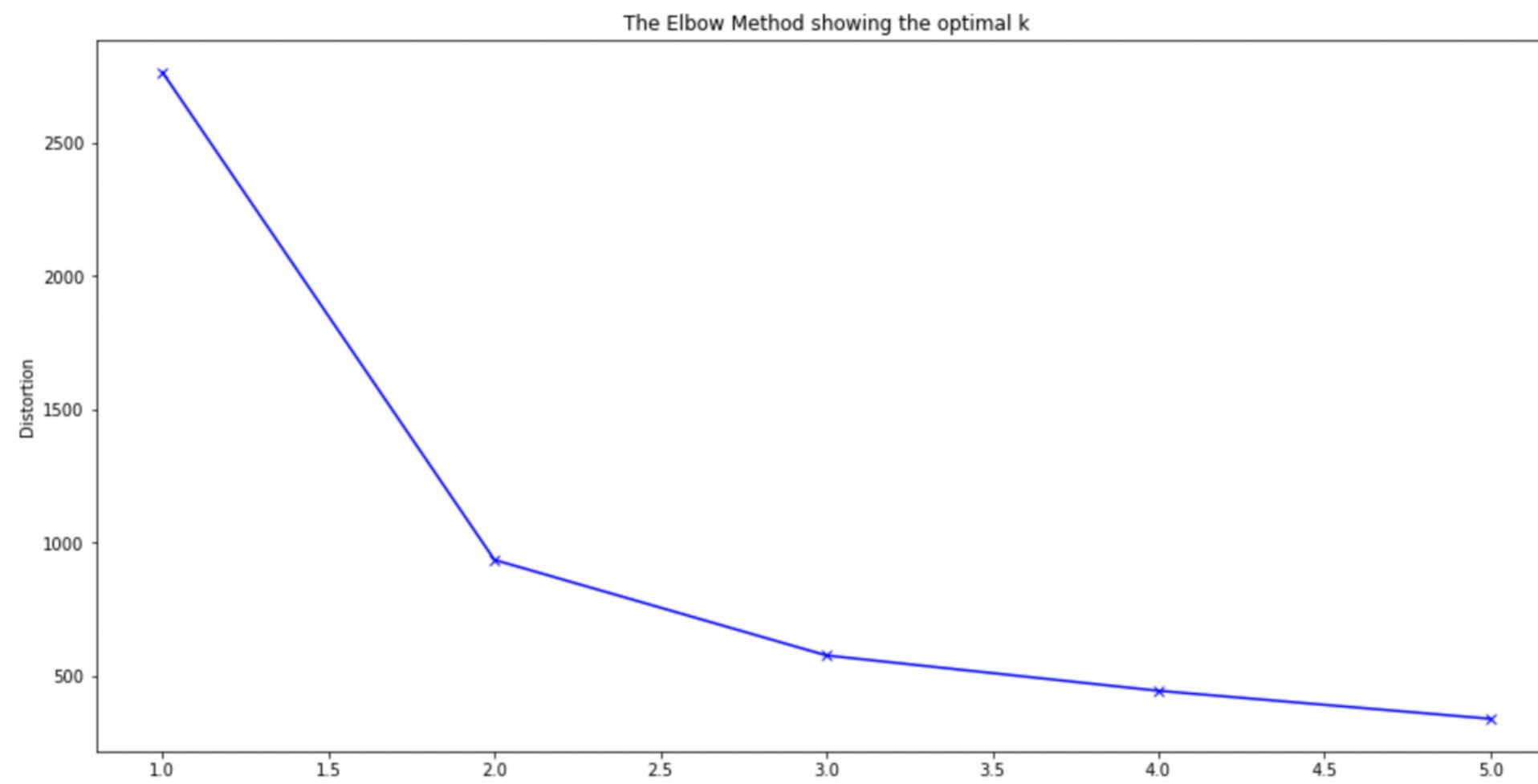
**691**  
*FB campaigns IDs*

# Campaigns: FB Level

...

## K-Means- Clustering

- Cluster 691 FB Campaigns IDs
- On basis on Spend amount, Clicks, Impressions, Conversions to detect unoptimized campaigns
- Using K-Means Clustering
- Heuristic Approach to identify number of clusters - 2 Optimal



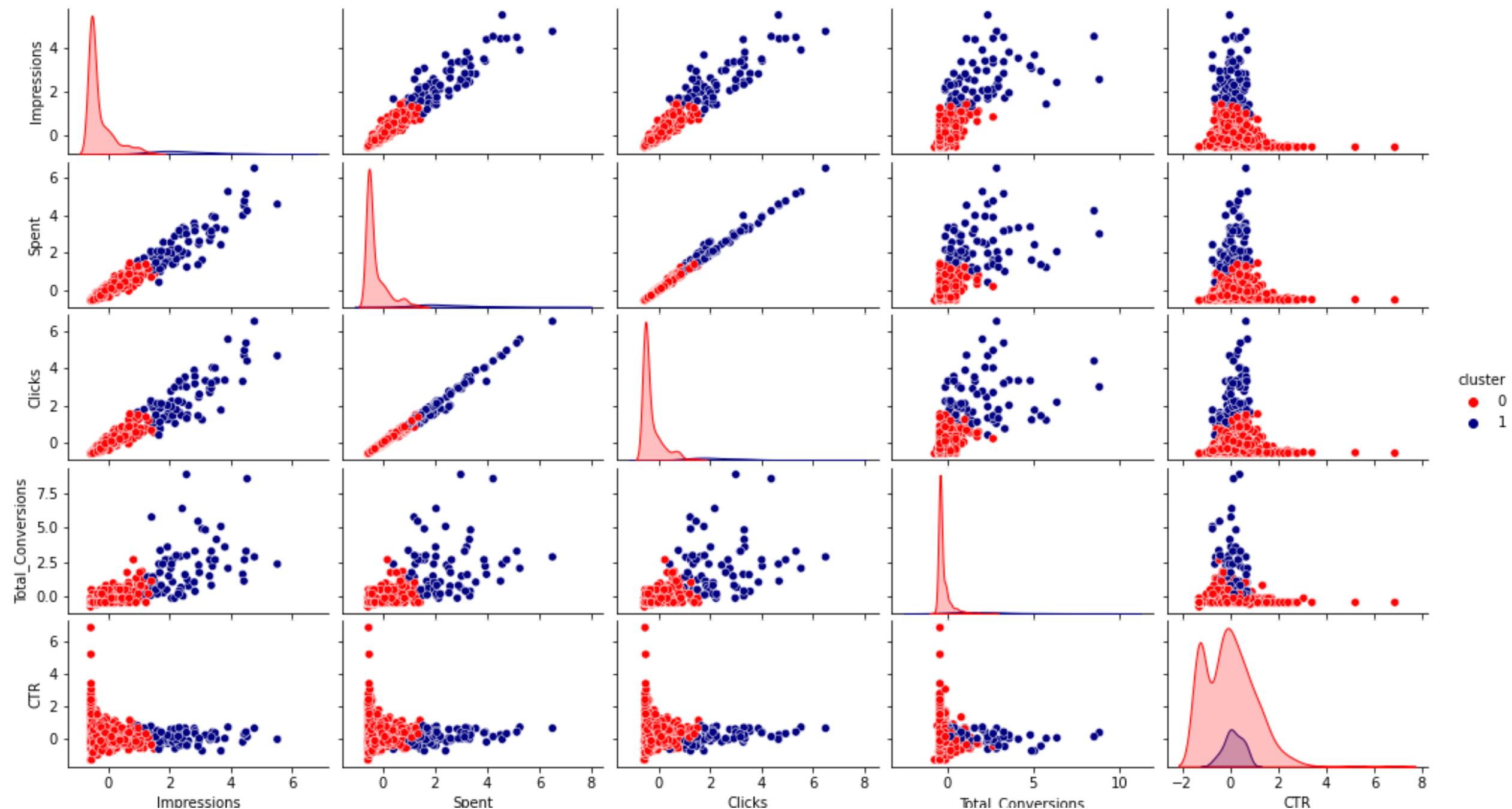
**Elbow Method**

# Campaigns: FB Level

...

## K-Means- Clustering

- Clear distinguishing of clusters
- Campaigns in Red cluster:
  - Low Spend -> High CTR
  - Efficient Performance
- Campaigns in blue cluster:
  - High Spend
  - Low CTR -> Ineffective Campaigns
  - Optimization opportunity



# Conclusions & Recommendations

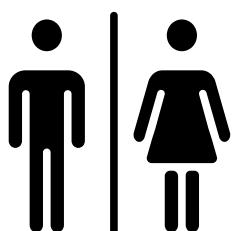
...

## Conclusions



## Age

Users in the age group 30 - 34 are most likely to make a purchase once they click on the ad



## Gender

- In terms of product awareness, company is doing better job targeting females
- In terms of customer acquisition, performance is the same for both males and females



## Campaign

Spend allocation across age groups is not appropriate for campaign C



## Awareness

- Increase ad exposure for age group 30-34 by throwing more impressions
- Target more male users for product awareness by showing them more impressions



## Acquisition

- Target age-groups 35 to 49 for acquisition. Make changes in ad designs to increase their clicks.
- Gender specific targeting not required



## Future Campaigns

For future campaigns, demographics studies and analyses to understand their interests should be undertaken before allocating ad spend across different segments

...



# Thank You!