

Demographics Driven End-to-End Funnel Efficiency & Budget Strategy

AGENDA

- Objective
- Background
- Practical Application
- Key findings
- Appendix:
 - Data sources
 - Data model assumptions

OBJECTIVE

- Maximize ROI by lowering blended CPA.
- Quantify the impact of ad spend on conversions, and optimize targeting strategies
- Identify which audiences and campaigns convert most efficiently.
- Compare performance across audience demographics and segments
- Identify underperforming campaigns for reallocation or optimization
- Provide evidence-backed recommendations for the next product launch

BACKGROUND

- We are analyzing paid-social campaign performance to improve ROI, using the dataset and project brief provided.
- Core fields: impressions, clicks, spend, approved conversions (proxy for sales), age band, gender, interest, and XYZ campaign IDs.
- Key funnel metrics: CTR (impressions → clicks) and Conversion Rate (CVR) (clicks → sales); cost metrics: CPM (₹/1k impressions) and CPA (₹/sale).
- Objectives: Find which age×gender segments and campaigns are most efficient, reallocate budget, and produce recommendations for the next launch.
- Assumptions used: Approved_Conversion ≈ sale; all costs are same currency; metrics are computed on aggregated totals;

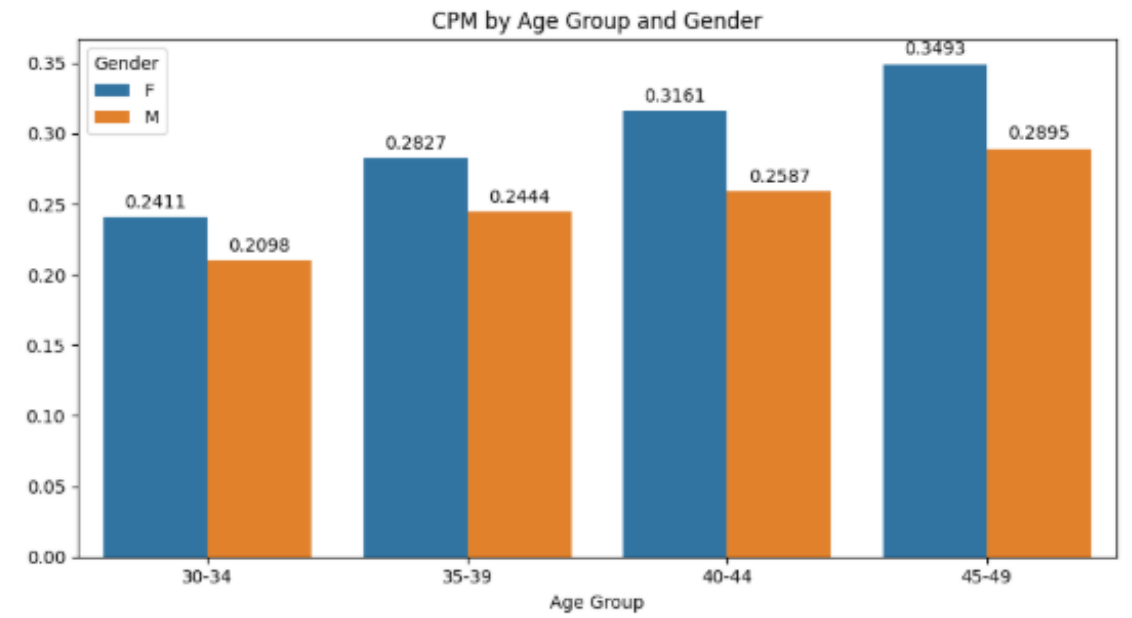
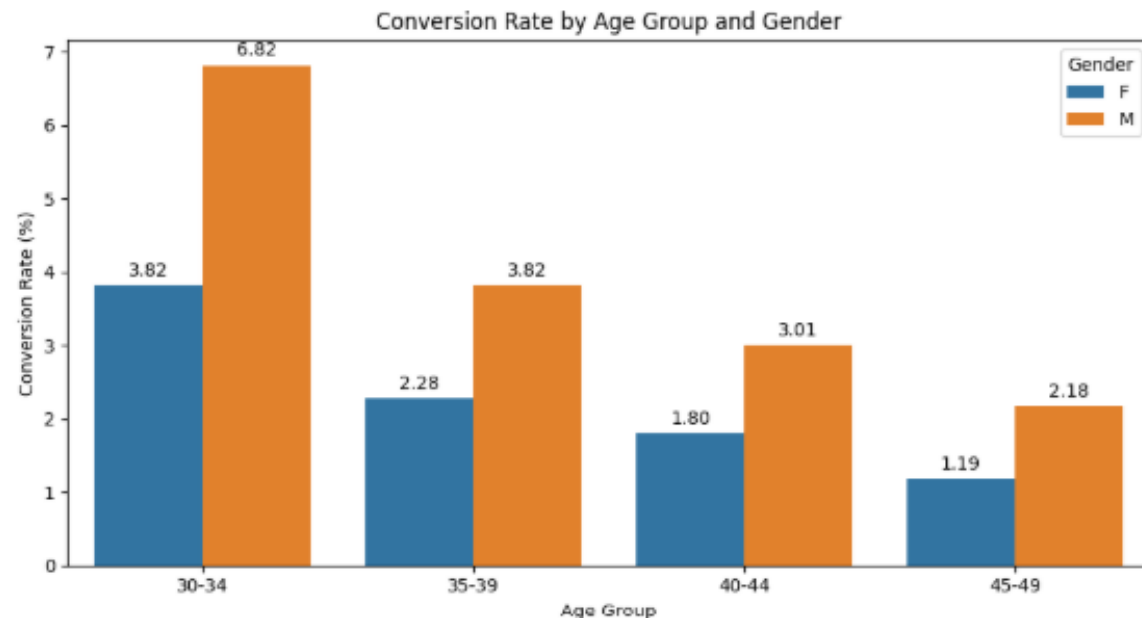
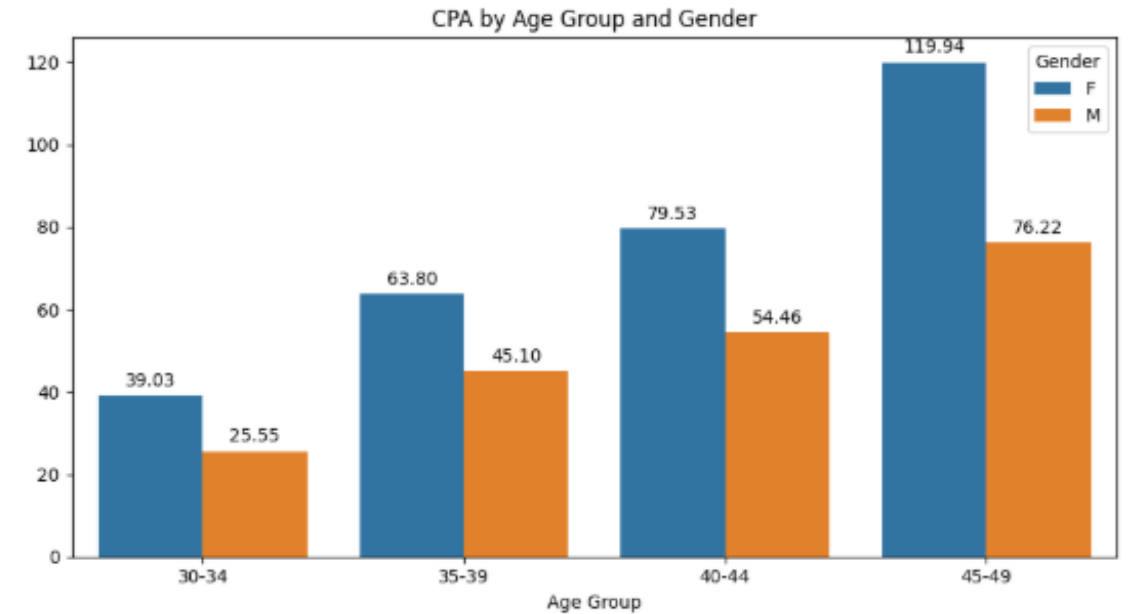
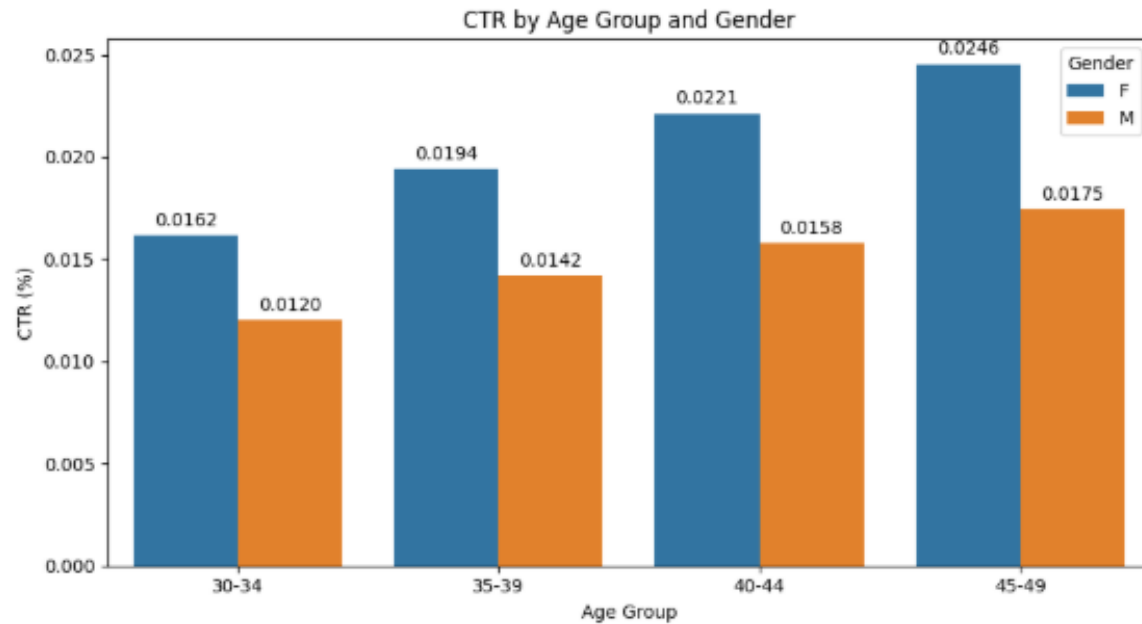
DATA OVERVIEW

- File: KAG_conversion_data_raw.csv | Rows: 1,143 | Columns: 16
- Key fields: impressions, clicks, spend, approved conversions, age, gender, interest, campaign IDs.
- Granularity: ad-level rows and campaign level rows aggregated and demographic slices (Age and Sex) for analysis
- Aggregated by age×gender and by campaign for stable metrics
- **PERFORMANCE METRICS DEFINATIONS**
- $\text{CTR} = \text{Clicks} / \text{Impressions} \times 100$
- $\text{Conversion Rate} = \text{Conversions} / \text{Clicks} \times 100$
- $\text{CPM} = \text{Spent} / \text{Impressions} \times 1000$
- $\text{CPA} = \text{Spent} / \text{Conversions}$

KEY FINDINGS

- **Costs rise with age:** CPA and CPM both increase from 30–34 to 45–49
- **Gender gap:** Male gender gap is lesser than females when it comes to CPA and CPM at every age.
- **Best vs worst:** Male in age group 30–34 have the lowest CPA & CPM vs Females in the age group 45–49 have the highest CPA & CPM) → ~4.7× difference in cost per sale.
- **Funnel behavior:** CTR tends to increase with age, but **Conversion Rate declines**; older cohorts click more but buy less, inflating CPA.

CTR, CPA, CPM BY AGE GROUP AND GENDER



CAMPAIGN LEVEL FINDINGS

- **xyz_campaign_id 936** was the best performing campaign with overall funnel efficiency (per campaign): CTR %, Conversion Rate %, Conversions per 1k Impressions, whereas campaign ID
- **FB campaign - 109857** has the highest CTR, **FB campaign id - 123440** has the highest conversion rate and **FB campaign id 123733** has the highest Conversions per 1k Impressions. All these belong under xyz_campaign_id 936
- AD ID - 708746 has the lowest CPA and CPM. AD ID 711764 has the highest CPA and the highest CPM. They all belong to XYZ campaign id 936.

DEMOGRAPHICS LEVEL FINDINGS

- Overall, highest Ad spends come from 45-49 age group and from females and the highest Ad Sales come from 30-35 age group for Males
- Males are cheaper than females at the same age group, for both, CPA and CPM.
- Best segment: M 30-34 — CPA ₹25.55 ; CPM ₹0.2098
- Worst segment: F 45-49 — CPA ₹119.94 ; CPM ₹0.3493

CONCLUSION & RECOMMENDATIONS.

- Shift budget toward Males in age group 30–34 (then Females in age group 30–34, Males in age group 35–39) to lower blended CPA.
- De-prioritize Females in age group 45–49 and Females in age group 40–44 unless LTV justifies; use retargeting and tighter audiences.
- Optimise to CPA / Conversions per ₹1k spend rather than CTR.
- As you scale winners, monitor marginal CPA weekly and rebalance.

APPENDIX-ASSUMPTIONS

- Approved_Conversion \approx final sale.
- Metrics computed on aggregated totals (not row averages).
- $CTR = Clicks / Impressions \times 100$;
- $CVR = Conversions / Clicks \times 100$.
- $CPM = Spent / Impressions \times 1000$;
- $CPA = Spent / Conversions$.
- Safe division (NaN when denominator=0); no imputation.

TOOLS & LIBRARIES

- Python 3 • pandas • numpy • matplotlib • python-pptx
- Jupyter/ipython workflow for EDA and charting