
Mape Budget Forecasting & Optimization Report

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To Answer These Questions:

- What will be the impact from different media channels on our sales?
- Which channels have the highest/lowest effectiveness and ROI?
- What will be the optimal spend and mix of marketing investments?
- What will be the predicted sales in the future?

Sales Forecasting Model Variables

Sales

Consumer Confidence Index (CCI)

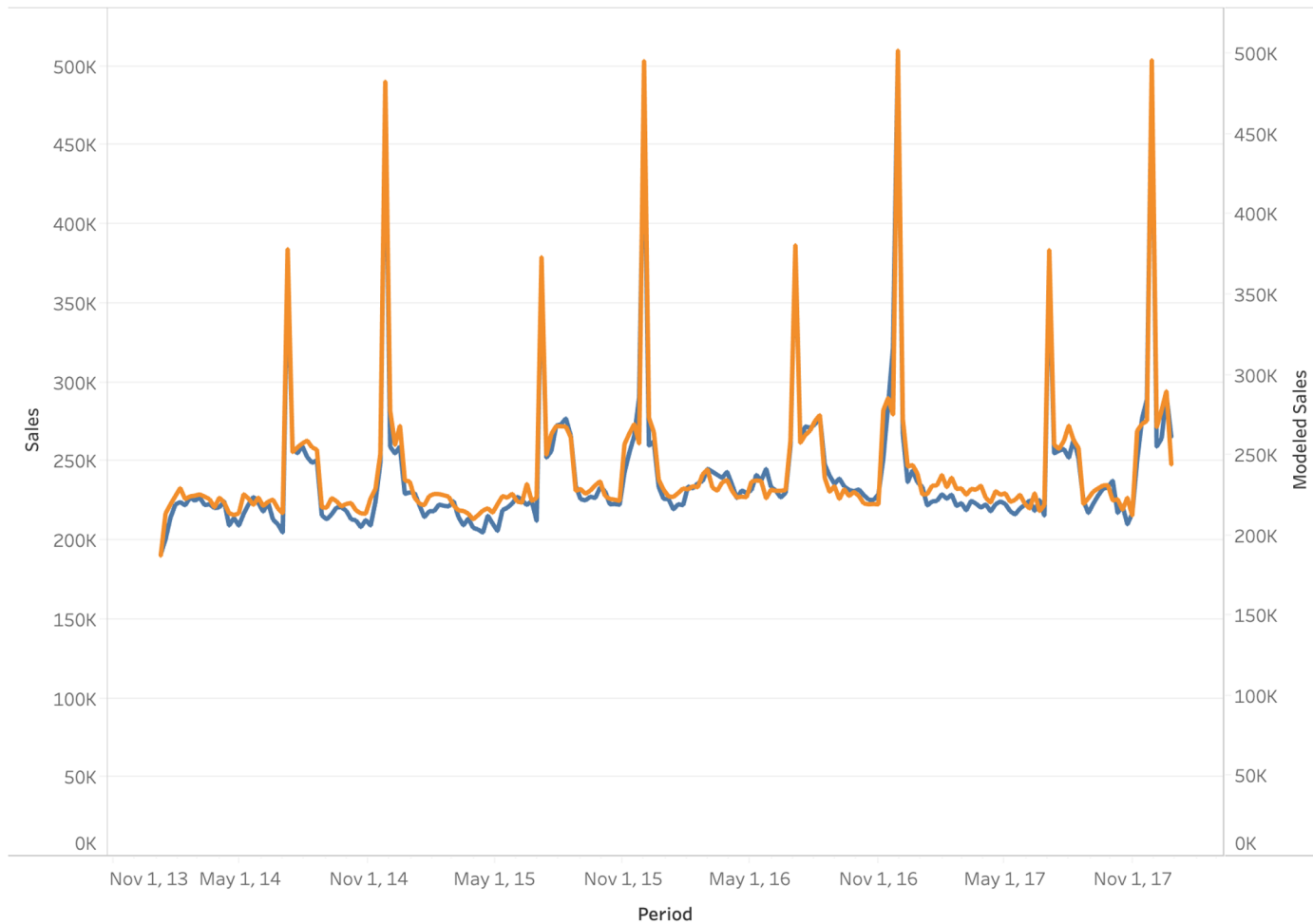
Sales Event, July 4th, Black Friday

National TV, Magazine, Paid Search, Display, Facebook, WeChat

Note:

- Data range is from 01/2014 to 12/2017 and is by week

AVM

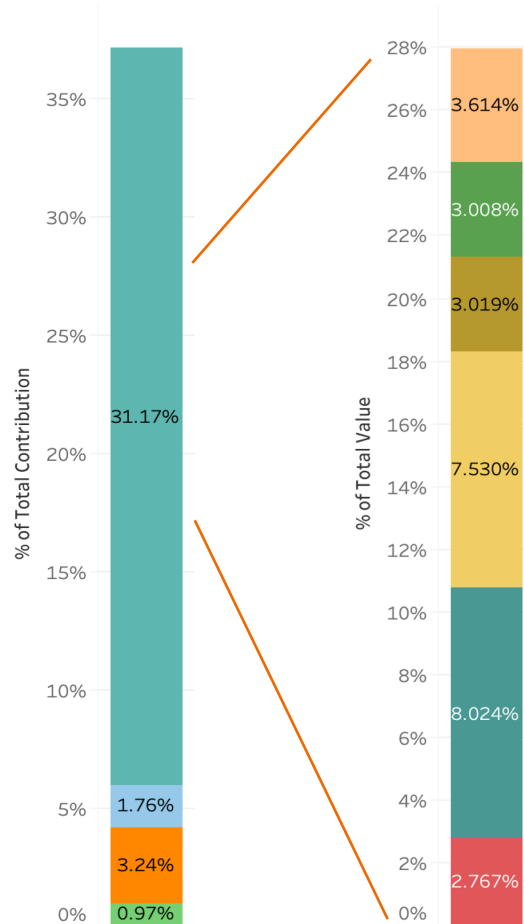
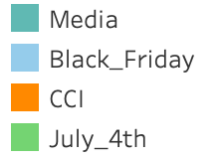


Modeled Sales
Sales

- **MAPE: 2.4%**
- **R-Squared: 0.9678**
- The model performed well during large-spike sales events but overperformed during normal weeks.

Contribution

Media Contribution



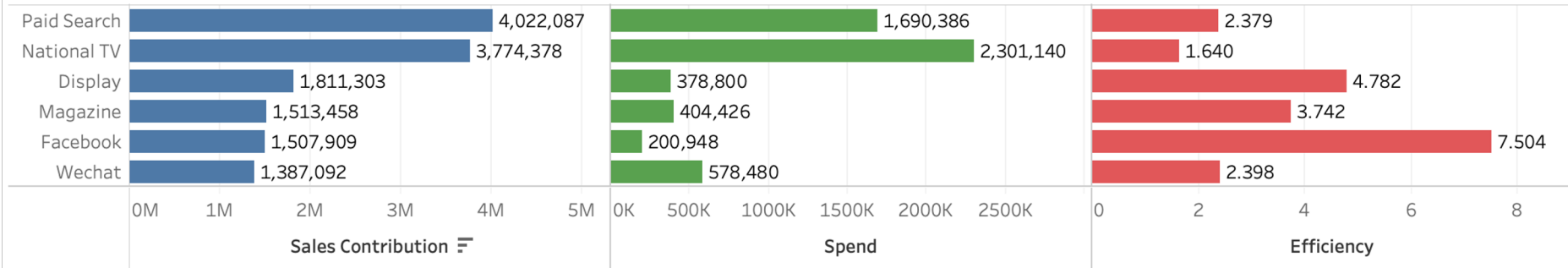
- 31.17% of contribution comes from media marketing
- National TV and Paid Search made the highest contribution to sales
- Wechat made the smallest part of contribution among all of the media marketing channels

Media Efficiency Comparison

$$\text{Efficiency} = \text{Contribution} / \text{Spend}$$

Efficiency

Variab..



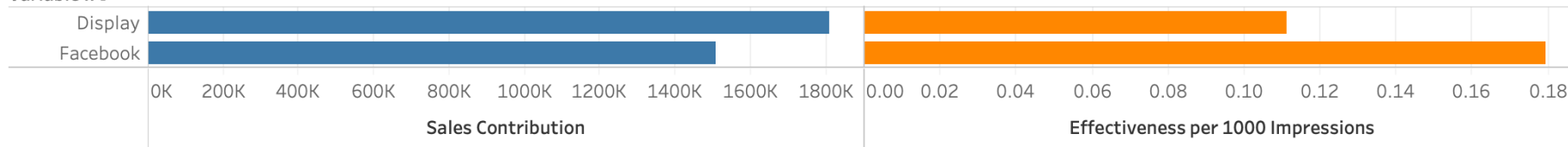
- National TV and Paid Search have the highest sales but have the lowest efficiency
- Facebook has the highest efficiency among marketing channels

Digital Media Effectiveness Comparison

Effectiveness = Contribution / Activity

Digital Effectiveness

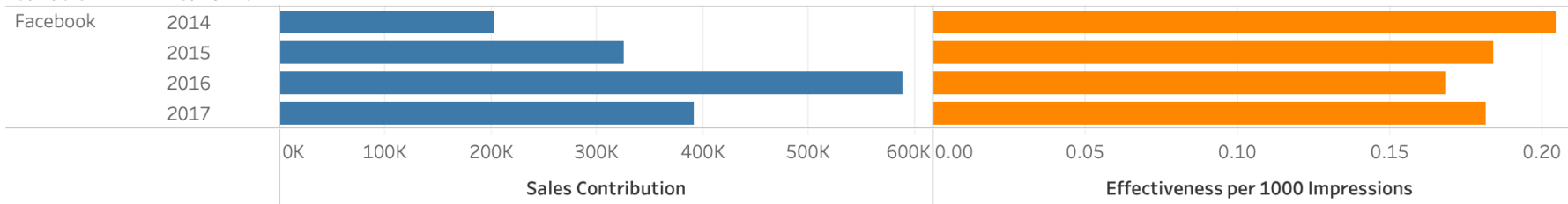
Variable ..



Facebook Effectiveness

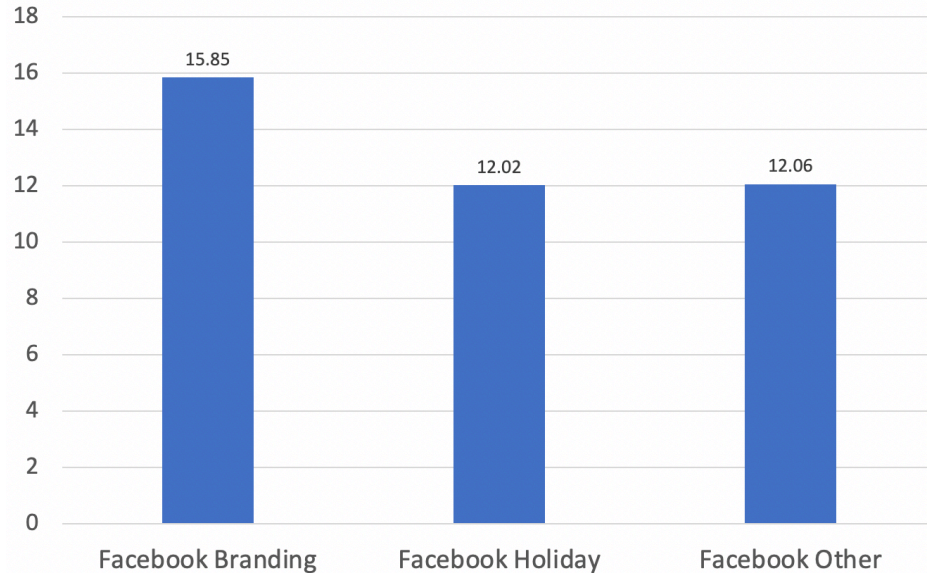
Variable ..

Year of Peri..

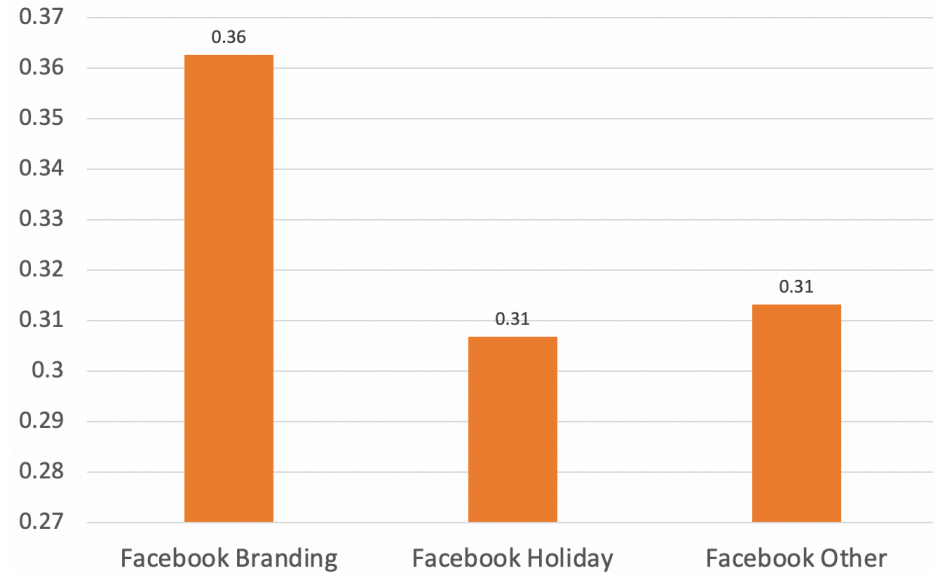


Facebook Campaign Comparison

Facebook Sub-Category Campaign Effectiveness



Facebook Sub-Category Campaign Efficiency per 1000 Impressions



| | Original Budget | Optimized Budget | Changes |
|-------------|-----------------|------------------|---------|
| National TV | \$274,552.35 | \$192,186.65 | -30% |
| Magazine | \$57,546.76 | \$52,541.11 | -8.7% |
| Paid Search | \$209,566.26 | \$272,436.14 | +30% |
| Display | \$46,368.03 | \$60,278.44 | +30% |
| Facebook | \$25,770.72 | \$33,501.94 | +30% |
| Wechat | \$9,532.82 | \$12,392.67 | +30% |

Forecasting Optimization

| | Original | Optimized |
|-------|--------------|--------------|
| Sales | 3,518,628.87 | 3,987,434.93 |
| ROAS | 5.64 | 6.40 |

Executive Summary

- National TV and Paid Search have the highest sales contribution. Wechat has the lowest sales contribution
- Facebook has the highest efficiency and effectiveness
- We should cut the budget on offline media and increase the online media budget by 30%
- The predicted sales is \$3,987,434.93 and the optimized ROAS increases by 13.46%

Appendix

Models:

Sales = 85.3 * CCI + 30942.8 * Sales.Event + 121693.9 * July_4th + 220273.4 * Black_Friday + 1623.7 * NationalTV2 + 0.06 * PaidSearch1 + 4.8 * Wechat2 + 1828.8 * Magazine1 + 0.0002 * Display2 + 0.01 * Facebook1

Facebook Side Model:

| Regression Statistics | | | | | | | | |
|-----------------------------|--------------|----------------------------|--------------------------|------------|----------------|------------|-------------|-------------|
| Multiple R | 0.99535872 | | | | | | | |
| R Square | 0.99073898 | | | | | | | |
| Adjusted R Square | 0.98577058 | | | | | | | |
| Standard Error | 850.530679 | | | | | | | |
| Observations | 208 | | | | | | | |
| ANOVA | | | | | | | | |
| | df | SS | MS | F | Significance F | | | |
| Regression | 3 | 15864787821 | 5288262607 | 7310.26376 | 2.76E-207 | | | |
| Residual | 205 | 148297499.2 | 723402.4351 | | | | | |
| Total | 208 | 16013085320 | | | | | | |
| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Lower 95.0% | Upper 95.0% |
| Intercept | 0 | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| FacebookBrand | 0.00036269 | 3.70924E-06 | 97.78067693 | 5.736E-174 | 0.00035538 | 0.00037 | 0.00035538 | 0.00037 |
| FacebookHoliday | 0.00030674 | 3.1489E-06 | 97.41097869 | 1.227E-173 | 0.00030053 | 0.00031295 | 0.00030053 | 0.00031295 |
| FacebookOther | 0.00031313 | 1.72769E-05 | 18.12428484 | 1.8788E-44 | 0.00027907 | 0.00034719 | 0.00027907 | 0.00034719 |
| FacebookBrandingImpressions | | FacebookHolidayImpressions | FacebookOtherImpressions | | | | | |
| Contribution | 934273.694 | 430233.1822 | 69259.22498 | | | | | |
| Activity | 2575945041 | 1402609330 | 221182838 | | | | | |
| Spend | \$58,942.00 | \$35,789.00 | \$5,743.00 | | | | | |
| Efficiency | 0.00036269 | 0.000306738 | 0.000313131 | | | | | |
| Effectiveness | 15.8507294 | 12.02138037 | 12.05976406 | | | | | |