



# Evaluating the Impact of Social Media Marketing on Sales Growth for Eco Glow Candles

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## Business Problem

Eco Glow Candles seeks to optimize its social media marketing strategies to drive sales efficiently. Given limited resources, the company must identify which platforms and strategies yield the highest return on investment (ROI).

## Background/History

Eco Glow Candles has invested in social media marketing across platforms like Instagram, Facebook, and Twitter. The company has used various marketing strategies, such as seasonal promotions and product launches, but it needs to be clarified how effective these efforts have driven sales.

## Data Explanation

The analysis used three primary datasets:

1. **Social Media Metrics:** Monthly data on follower growth, engagement rates, ad spending and click-through rates.
2. **Sales Data:** Total monthly sales, holiday promotions, and new product launches.
3. **Customer Behavior Data:** Average time spent on the website, cart abandonment rates, and referral sources.

All datasets were preprocessed and merged by the month to allow for a comprehensive analysis.

## Methods

- **Correlation Analysis:** To identify relationships between key variables.
- **Regression Analysis:** To evaluate the impact of Instagram follower growth on total sales.
- **Time Series Decomposition:** To understand trends and seasonality in sales.
- **K-Means Clustering:** To categorize marketing campaigns into ROI groups.
- **Promotional Effectiveness Analysis:** To determine the impact of holiday promotions.
- **Customer Behavior Analysis:** To explore factors affecting cart abandonment.

## Analysis and Findings

### 1. **Correlation Heatmap** (Figure 1)

- *Finding:* Strong positive correlation between ad spending and total sales.
- *Implication:* Investing more in advertising may increase revenue.

### 2. **Instagram Followers vs. Sales (Regression Analysis)** (Figure 2)

- *Finding:* Positive relationship between Instagram followers and sales.
- *Implication:* Growing our Instagram following is a crucial strategy.

### 3. **Time Series Decomposition** (Figure 3)

- *Finding:* Significant seasonal trends, with sales spiking during promotions.
- *Implication:* Seasonal promotions are highly effective.

### 4. **Elbow Method & Clustering** (Figures 4 & 5)

- *Finding:* Three distinct clusters of marketing campaigns.
- *Implication:* Prioritize high-ROI campaigns for optimal resource use.

### 5. **Promotional Effectiveness (Bar Plot)** (Figure 6)

- *Finding:* Holiday promotions significantly increase sales.
- *Implication:* Continue and expand holiday marketing efforts.

### 6. **Followers Growth Over Time (Line Plot)** (Figure 7)

- *Finding:* Instagram has the fastest follower growth rate.
- *Implication:* Focus more resources on Instagram marketing.

### 7. **Cart Abandonment Rate by Referral Source (Box Plot)** (Figure 8)

- *Finding:* Higher cart abandonment rates for direct referrals.
- *Implication:* Investigate and address issues with direct traffic.

### 8. **Ad Spend vs. Sales (Scatter Plot)** (Figure 9)

- *Finding:* Higher ad spending is positively associated with higher sales.
- *Implication:* Strategically increase ad budget.

### 9. **Referral Sources Distribution (Pie Chart)** (Figure 10)

- *Finding:* Organic search and social media are the top referral sources.
- *Implication:* Optimize content for these channels.

## Conclusion

Eco Glow Candles should focus on Instagram marketing and continue holiday promotions to drive sales. Addressing cart abandonment issues and strategically increasing ad spending will further boost revenue.

## Assumptions

- The data accurately represents the company's marketing and sales activities.
- Customer behavior will remain consistent over the analysis period.

## Limitations

- The analysis is based on only six months of data.
- External factors such as competition and market trends are not considered.

## Challenges

- Isolating the impact of social media marketing from other variables.
- Ensuring data consistency across platforms.

## Future Applications

- Extend the analysis to a full year for more comprehensive insights.
- Include sentiment analysis from customer reviews.

## Recommendations

1. Allocate a higher budget for Instagram campaigns.
2. Address cart abandonment, especially from direct traffic.
3. Continue seasonal promotions and analyze their performance regularly.

## Ethical Assessment

Customer data was anonymized and used solely for internal analysis, ensuring privacy and compliance with data protection standards.