# E-Commerce Econometric Modeling of Promotions and Media Mix

**Category:** *E-Commerce, Consumer Goods*

**Methods:** *Econometric Modeling, Advanced Analytics*

## Summary

For a Fortune 1000 firm in a consumer goods category, predictive modeling was applied to quantify the impact on e-commerce sales of promotion/media type, promotion location on the website homepage or within emails to consumers, alternative headlines, and competitor actions. Decision Analyst's Predictive Analytic Services team created an analytic database with 264 SKUs across 104 weeks. Advanced econometric modeling was applied and interpreted to suggest an optimal e-commerce promotion strategy.

## Strategic Issues

Our client's firm, a category leader, had a multiyear agreement with a major retailer to manufacture a set of products. In order to provide action-oriented recommendations to the retailer, our client wished to analyze the retailer's sales data from multiple channels, focusing on e-commerce. Within e-commerce, the retailer had only recently developed a sustained promotional effort for the prior two years. For this reason, the e-commerce promotional strategy required a solid data-driven analysis to recommend an optimal e-commerce promotional strategy.

## Research Objectives

Our client wished to identify patterns and trends in the retailer's e-commerce sales and promotions. More specifically, the research objectives included:

- Determining the ROI of alternative promotional types and promotional components by applying econometric predictive modeling.
- Measuring the impact of competitor promotional activity on the retailer's sales.
- Identifying the optimal mix of promotion types and components, specific to e-commerce.

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■ Making recommendations based on the analyses in order to optimize the e-commerce promotional strategy.

## Research Design and Methods

An analytical database was constructed based on weekly e-commerce sales data for each SKU for a two-year period. The correlation structure of potential predictor variables was investigated to determine which variables were unique and which were redundant. Data-reduction techniques were applied to increase the reliability of the subsequent modeling. The resulting time-series, cross-sectional data set included 104 time slices (weeks) for 264 SKUs and included 140 potential modeling variables.

Econometric modeling of this data set explained unit sales as a function of a large set of predictor variables. The econometric model was then used to measure the relative ROI of promotion types, the value of specific promotional offers, and the relative return for specific promotional components. Charts and tables were used to highlight the model findings, visually communicating results to the client management team.

## Results

The research revealed which promotion types were most effective and which were deemed relatively ineffective. Average ROI of presence of a given promotion on the homepage was quantified, and the most effective location for promotions on the retailer's homepage was determined. For email promotions, the relative value of different placements of the promotion within the email was evaluated, indicating the most effective email strategy. In addition, the impact of competitor promotion types on client e-commerce sales was determined, suggesting the kinds of countermoves that would minimize competitor success.

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