

**Category:** Retail

**Methods:** Advanced Analytics, Predictive Modeling, Sales Predictive Modeling

## Summary

Decision Analyst developed a predictive model of store sales per square foot from customer-satisfaction surveys, **9.4 million records** of store transactions, shopper demographics, employee/staffing data, and store-a-graphics (format, size, age of store). The model was used to identify key drivers of sales and indicators of store performance, enabling the client to prioritize stores for improvement initiatives.

## Strategic Issues

The client's primary business objectives were to:

- Identify factors that potentially influence store sales as measured by sales per transaction, transactions per square foot, and/or sales per square foot.
- Understand how levels of the predictors can lead to increases or decreases in the sales metrics.
- Use the predictor store variables to allow management to:
  - ◆ Better identify underperforming stores.
  - ◆ Better define a path to improve overall store performance (i.e., sales).



## Research Objectives

Based on store-level data, customer-satisfaction survey data, and external demographic data, the research objective was to build a predictive model that used customer satisfaction, shopper demographics, employee/staffing data, and store-a-graphics as predictors of store sales per square foot.

## Research Design and Methods

The records in the data set for the sales predictive model consisted of **9.4 million records** (store by month) and more than 100 variables, disaggregated from a transactions database of over 50,000 records.

Data was preprocessed and modeling variables were constructed for:

- Store variables such as point-of-sale (POS) transactions data, customer satisfaction, store square footage, and remodel dates.
- Demographic and store-visit data for customer-satisfaction survey respondents.
- Employee data such as employee tenure and number of employees by job type (exempt and non-exempt) for each shift.

The final modeling data set consisted of 34 months of data for more than 1,400 stores.

Time-series cross-sectional regression was applied to develop a predictive model, and influencers of sales per square foot were identified, ranked, and measured.

## Results

Based on the predictive model, Decision Analyst demonstrated the predictors of sales per square foot to the client. In particular, the team reported the importance and influence of each predictor, including employee staffing variables, ratings of store facilities and service, and merchandising metrics. The client used the results to assess store-level performance, to prioritize stores that needed improvement, and to help rank improvement initiatives.

