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Competitive Impact on Store-Level Sales

The interactive effect of population density (residential and employment) and competitor type on store-level sales.

By Susan Haynie, Rod Brown and Dan Graham

Leading retailers are always looking for a better understanding of the variation in their sales performance. They know that analysis of the retail competitive market can lead to a greater understanding of sales patterns, profitability and logistical issues. Standard approaches to understanding the consumer market are an important first step: household surveys and panels, neighborhood or zip code demographics, and store rankings/clustering. However, consumer data often fails to tell the complete story, and substantial variation in store-level sales performance remains unexplained.

Tough, unanswered questions include:

- Why do some stores outperform others in certain categories?
- Which competitors impact my sales the most?
- Which locations will generate the highest sales of new products and how should we stage our inventory?
- Which retailers are surprisingly immune to competitive impact?
- Where should I put my promotion, display and retail coverage resources?

These questions have typically been extremely difficult to answer. However, with the advent of improved data sources (i.e., easier accessibility to store-level sales), and technology that can manage very large databases, new techniques can be applied. Spatial analysis to integrate very diverse data sources is the key to new understanding.

In order to provide a new approach to these questions, this paper discusses how standard geo-demographic approaches can be augmented by examining additional predictive factors:

- Spatial analysis of direct competition
- Density of Residential Population (persons residing in the area)
- Business Environment (persons employed in the area)

Data Collection:

Required data includes:

- Store-level sales data
- Geographic location of stores (latitude and longitude)
- Proximity of stores to varying types of competitors (by Class of Trade, e.g., Grocery, Mass, Drug, etc.)
- Precise estimates of persons residing within specified distances of the stores
- Precise estimates of persons working within specified distances of the stores

Store-level Sales data by category or product is typically collected by the retailer using scanner technology. This "Point of Sale" data (POS) is sometimes shared (or sold) to CPG manufacturers, consultants, or brokers to enable further analysis, with the goal of increased retail performance. Geographic locations of stores can be created by geocoding the address lists of the stores, yielding a latitude and longitude (required for spatial analysis using a geo-demographic or Geographic Information System (GIS). However, the geocoding of store lists is problematic, due to non-standard addresses (e.g., shopping center locations). Vendors specializing in collecting and processing this information are typically used to provide required data (please see list of vendors below).

Estimates of residential and employment population within specified distances (radii) are derived using a Census Block Centroid retrieval method available in some geo-demographic marketing information systems. Vendors of small-area demographics provide population estimates at the Census Block Group level, which are then used as input to the block centroid retrieval system (please see list of vendors below). Estimates of persons employed are based on compiled lists of businesses, with associated employee counts. (Note: this measure of employed persons differs from the U.S. Decennial Census definition of employed persons. It is collected based on where people work, rather than where they live).

There are several possible effects of the amount of competition on store-level sales.

- Greater competition leads to lower sales (Negative effect of competition)
- Greater competition leads to higher sales (Positive effect of competition, aka "draw")
- Greater competition has no effect on sales

Various measures of the impact of competition are calculated for varying distances, including:

- Average sales by Number of Competitors
- Average sales per capita (per person living in the area)
- Average sales per employed person employed in the area
- Indices of Competitive Impact

It is noted from the results that there is not a direct inverse relationship between number of competitors and sales. The relationship among the various measures is more complex, and involves an interaction effect of:

1. Type of competitor
2. Population density
3. Employed person density.

The resulting analysis showed that the "types" of competition around a store had an influence on category sales. Further, the competitors that had the most impact may not have been considered by the retailer to be a major competitive threat.

Stores can be segmented or "clustered" based on level and type of competitive impact. That is, different groups of stores can be treated differently, depending on their competitive impact measures. Such analyses can provide the impetus for major strategic shifts, including product pricing and promotions, increased focus on specific consumer segments, changes in merchandising configurations, and adjusted assortment and inventory levels.