ABSTRACT

Market area analysis is useful for determining market penetration, sales territories, and estimating or monitoring sales. This paper describes some of the types of market area analysis. There are examples using customer data and census tract maps although these techniques can also be applied to other map areas, like zip codes. This type of analysis can be applied in many industries including financial services, health care, insurance, retail, and utilities.

INTRODUCTION

Market area analysis is a broad area of application suitable for a geographic information system (GIS). This paper identifies some of the types of business problems that can be addressed when data analysis is combined with a GIS. The general problem stems from the difficulty of tracking an increasingly diverse consumer base. Tracking your consumers is an ongoing process as tastes and preferences change. Even businesses whose direct consumers are other businesses can track their ultimate consumer. For example, most toy makers sell to toy stores, but the real consumer is the customer of those stores. Who are those consumers? Where do they live? And what are they like? Answering those questions about your customers as accurately as possible can enhance your business decisions.

MARKET AREA ANALYSIS

Market area analysis uses your own data combined with data available from data vendors and trade groups to look at characteristics and trends of your customers and the areas where they live. Market area analysis includes:

- Trade Area Definition
- Customer Profiling
- Site Selection
- Target Marketing
- New Product Design
- Product Selection

TRADE AREA DEFINITION

Most of the types of market area analysis depend on knowing where your market is. Trade area definition allows you to define polygons that can be displayed on a map to represent where your customers are. You would normally have a trade area for each store although sometimes they may be grouped. For example a customer might buy jeans at the same store in one of several local malls. The simplest way to define a trade area is to aggregate existing polygons into the trade area(s). The main geographic areas that are used for aggregation are shown in Table 1.

<table>
<thead>
<tr>
<th>Census Geography</th>
<th>Number of Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>1</td>
</tr>
<tr>
<td>States (+ DC)</td>
<td>51</td>
</tr>
<tr>
<td>Counties</td>
<td>3141</td>
</tr>
<tr>
<td>Tracts</td>
<td>61,258</td>
</tr>
<tr>
<td>Block Groups</td>
<td>226,399</td>
</tr>
<tr>
<td>Postal Geography</td>
<td></td>
</tr>
<tr>
<td>Postal Sectional Centers (3-digit ZIP)</td>
<td>919</td>
</tr>
<tr>
<td>ZIP Codes</td>
<td>42,496</td>
</tr>
<tr>
<td>Media &amp; Large Market Geography</td>
<td>212</td>
</tr>
<tr>
<td>MSA (Nielsen)</td>
<td>212</td>
</tr>
<tr>
<td>Congressional Districts</td>
<td>436</td>
</tr>
</tbody>
</table>

It is important for you to understand both the power and limits of the geography you choose. A smaller geographic unit gives you more detail but looking at a large area with a small geographic unit can strain the memory and processing of your system. For example, looking at over 61,000 census tracts for the whole United States yields a map with more detail than can be seen all at once, even after you wait for 61,000 polygons averaging 50 points each to draw. Some of these areas are very constant - the census geography changes every 10 years at most - while others are changing constantly. ZIP codes not only change, as area definitions they are approximations. ZIP code boundaries are formed from the postal carrier routes in each zip code. Undeveloped areas are assigned to a near-by route. These approximations do not cause much problems for marketing applications since the happen most where there are no or few people anyway.

Display 1  Map of Tracts In Dallas-Fort Worth Area

The following code assigns each census tract in Display 1 to a trade area based on which bank branch has the most deposits from the tract.
proc summary data=Customer;
  class County Tract Branch;
  var Deposits;
  output out=Sum n=Count sum=Total;
run;

data Area;
  retain Most Area;
  set Sum;
  by County Tract;
  if first.Tract then Most = 0;
  if Count > Most then do;
    Most = Count;
    Area = Store;
  end;
  if last. Tract then output;
  keep County Tract Area;
run;

The resulting data set has an observation for each tract with the area variable indicating to which branch the tract is assigned. The following code will add the area variable to the chains data set of a SAS/GIS spatial data base.

proc sort data=SUGI.DFWC out=DFWC;
  by CountyL TractL;
run;

data DFWC;
  merge DFWC Area(rename=(County=CountyL
                         Tract=TractL
                         Area=AreaL));
  by CountyL TractL;
run;

proc sort data=SUGI.DFWC out=DFWC;
  by CountyR TractR;
run;

data DFWC;
  merge DFWC Area(rename=(County=CountyR
                         Tract=TractR
                         Area=AreaR));
  by CountyR TractR;
run;

proc sort data=SUGI.DFWC out=SUGI.DFWC;
  by Row;
run;

proc gis c=SUGI.DFW;
  spatial DFW;
  composite replace Area / var=(AreaL AreaR)
    class=area;
run;
  polygonal index replace Area / composite=Area out=SUGI.DFWAI;
run;
  layer replace Area / composite=Area
    type=area;
run;
quit;

CUSTOMER PROFILING

Another important aspect of market area analysis is discovering what your customers are like. This can include demographics, survey data, and clustering systems. Demographics include descriptive counts of the people and households in a specific geographic area. The census is the basic source of demographic data although valuable additions and updates are available from various data vendors like Claritas. Cluster systems are based on the idea that birds of a feather will flock together. Areas with similar lifestyles are assigned to a manageable number of clusters. Income, age, race, ethnicity, neighborhood type and education are some of the main factors used in cluster systems. Survey data can indicate various preferences of consumers in a geographic area or a specific cluster type.
SITE SELECTION

Site selection allows you to understand the potential performance of possible locations. This enables a comparison between potentially higher acquisition cost and reduced risk and a greater likelihood of success.

- Proximity Analysis
- Analog
- Regression

Proximity analysis is looking at the demographic and lifestyle traits around your potential site. In this example, an area around a hospital is examined to determine the number of 20-40 year old females within a 3 and 5 mile radius (see Displays 4 and 5). This being used to help plan a location for a birthing center.

Display 4 Proximity Analysis Map

<table>
<thead>
<tr>
<th>Females in the Primary Childbearing Ages</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Miles: 32,735</td>
</tr>
<tr>
<td>5 Miles: 61,893</td>
</tr>
</tbody>
</table>

Display 5 Proximity Analysis Data

Analog site selection is finding a site with a similar population profile as an existing site that is doing well. Regression adds a statistical model which attempts to predict potential sales based on the population profile. Building the model helps verify which variables in the population profile contribute to sales.

TARGET MARKETING

By knowing who your customers are, what they are like, and where they are you can target the advertising. Should you tie-in with a basketball star, a hockey player, the Olympics, or an opera singer? You can also identify the media preference of the target customers - the type of music they like, the magazines they read and the TV shows they watch.

NEW PRODUCT DESIGN

Knowledge of who your customers are, what they are like, and where they live is invaluable in designing a new product. New products can be aimed at existing customers or designed to attract new customers. For example NASCAR is introducing a truck racing series in 1995 that seems designed for their existing fans. You might speculate than mini-van racing would appeal to a different set of consumers. Or an insurance company who is tailoring a plan for single parents might check the number of single parents in each zip code.

PRODUCT SELECTION

Many businesses need to analyze their customers to help determine the type of products they should offer. Large stores need to determine whether the exercise equipment, baby products, or toys should get more floor space.
While hundreds of cable channels seem to be in our future, cable companies still have to wrestle with adding only some of the channels that are already available. By looking at the customers a cable company can decide if another sports channel or a movie channel would work better.

**CONCLUSION**

Competition and downsizing are forcing enterprises to make more efficient decisions. Proper market area analysis can contribute to more efficient decisions.

**ACKNOWLEDGEMENTS**

SAS, SAS/FSP, SAS/GRAPH, SAS/GIS and SAS/INSIGHT are registered trademarks or trademarks of SAS Institute, Inc. in the USA and other countries. ® indicates USA registration.

Other brand and product names are registered trademarks or trademarks of their respective companies.