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DESKTOP MAPPING: A TOOL FOR IMPROVING SMALL BUSINESS MARKETING ANALYSIS AND CUSTOMER PROSPECTING

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ABSTRACT

Moderately priced personal computer based spatial analysis systems consisting of linked database, spreadsheet, and desktop mapping/GIS programs can now more effectively turn consumer and census data into useful information. This paper describes the operation of one such system – Microsoft Map – a feature embedded in Microsoft's Excel spreadsheet. Excel's data-mapping capabilities let you plot spreadsheets on thematic maps, making it easier to see relationships in your data. This paper implements a systematic approach for applying consumer data and spatial marketing techniques to a small business, a photo studio, for trade area growth and customer mining. Spotting points and densities of sales for the sampled customers provide a foundation for understanding the spatial extent of the customer base. For the small business, the mapping exercise identified purchasing patterns for their services, showing those areas were major customers reside. Using those areas identified for their services, the company can begin to plan their strategy to tap into those markets and hopefully increase their sales. It is important to note that Excel's mapping abilities provide a powerful and fertile new ground for data analysis experimentation. Small business manager' use of spreadsheet analysis, combined with the enhanced presentation mapping feature, enable the small businessperson to conduct analyses with even greater detail.

INTRODUCTION

Small businesses owners have traditionally thought through the years that, as long as they had the right location, the customers would come to them. Such a limited business plan may indeed have been sufficient for success in the "old" days. But in today's highly complex and competitive environment, waiting for the customer is not always enough. Increasingly, small businesses must find new ways to reach their customers, realizing that doing so can increase customer share and expand the market trade area. In today's real world of tight budgets and high competition, it is more important than ever for small businesses to maximize their resources. It is important to identify and focus on high priority prospects, analyze sales activities, and plot key demographic data, which will provide a foundation for establishing effective sales efforts.

This paper will present an emerging application of a Geographic Information System (GIS) to help meet this small business challenges-and others. Desktop mapping solutions can take the guesswork out of data analysis by mapping and analyzing the geographical distribution of data. It has the ability to display queries geographically in such a way as to present relationships and trends in an accessible and attractive format that are beyond the scope of traditional databases. The paper utilizes a case study approach for a small photography studio to illustrate how effective customer analysis and prospecting can be undertaken using a PC based, easy to use GIS system embedded within Microsoft Excel.

Why Desktop Mapping?

Desktop mapping offers an innovative approach to data analysis and decision making for the small business manager. Desktop mapping uses the geographic component in most business data to visually illustrate relationships between various sources of information. According to MapInfo, one of the leading vendors of desktop software, nearly 90 percent of all business communications involves location data that can be mapped (Phelps, 1997). By enabling users to analyze and visually compare data such as customer locations, population trends, and geographic boundaries, desktop mapping brings patterns and trends to life that might otherwise go unnoticed in data.

Geocoding

The heart of a GIS consists of the "engines" that manage spatial databases. Geographic Information Systems allow new large-scale databases to be geocoded. The ability to enhance these databases with additional information is particularly important. Geocoding is the process of assigning latitude and longitude coordinates to data (Harder, 1997). Most business data contains a geographic component, such as an address or a ZIP code, and a geocoder simply codifies that component to allow spatial analysis or visual display of the information on a map. For example, consider a list of customers whose name and addresses are known. A GIS can geo-code those customers onto a computer map of that city. A small business can then locate each customer with a dot on the map. If the amount of money each customer spends were also known, customers would be represented by dots sized according to that amount. In short, GIS can sort and present any part of a geocoded database. The value of the analysis can be increased by adding information such as average household income in various areas of the city.

At the Core: A Database

In its present form, GIS technology integrates spatial modeling, database management, and computer graphics in a hardware/software system for managing and manipulating geographic data (Berry, 1987; Koshkariov,Tikunov. & Trofimov, 1989; Smith, Menon, Starr, & Estes, 1987). Typical GIS software, therefore, will provide the mechanisms to capture, encode, edit, analyze, and display spatial data organized as map layers in a GIS database (Burrough, 1986). In effect, these functions are characterized as the four major components of a GIS: data input, data analysis, data management, and data output (Aronoff, 1989; Star & Estes, 1990). Figure 1 diagrams the relationship between the software and data in this setup.

While, databases suit the storage and management of information, busy small business managers spend a great deal of time trying to make sense out of the rows and columns of reports and spreadsheets. Because this process lacks precision and a visual component, critical relationships between companies and their customers or competition go unnoticed or unexplored (MapInfo, 1996).

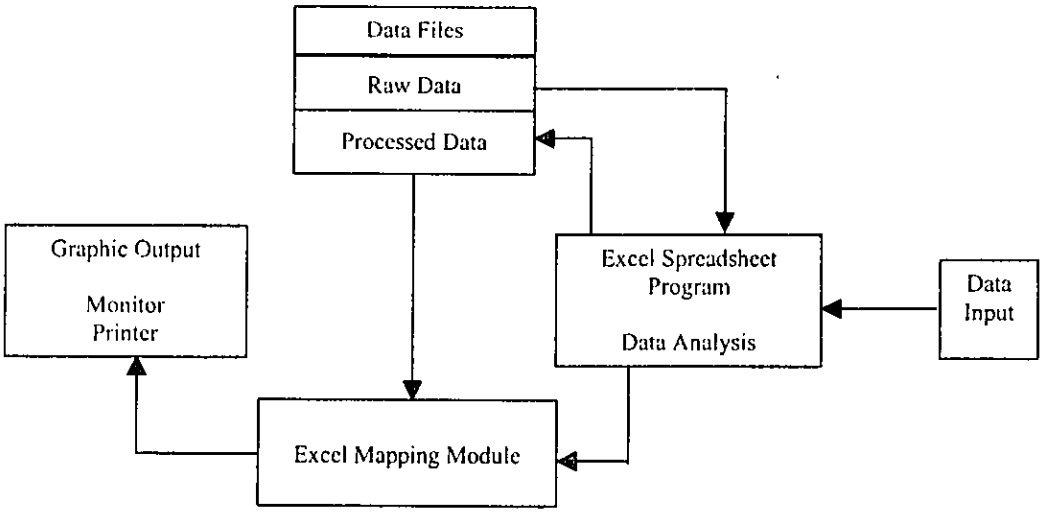


Figure 1: GIS Coupled Program

Therefore, small businesses that implement desktop mapping solutions can benefit. In the process, they will make better decisions, better serve their customers, and find new and better market opportunities.

MAPPING SOFTWARE OVERVIEW

Until recently, GIS software tended to be expensive ($1,000 and up). Many of these packages required geographic and GIS expertise and were not particularly user friendly. That has changed. Now low-priced ($150-$400) GIS packages are available from a variety of specialty software developers (Rubin & West, 1999, p.6). Among these entry-level GIS packages are *BusinessMAP PRO*, from Environmental Systems Research Institute (ESRI); MapLinx's MapLinx *Express and Professional*; Microsoft's *MapPoint 2002*; and MapInfo's *Desktop*.

In addition to the mapping software that usually includes databases of boundary maps, off-the-shelf GIS packages often supply some demographic data. They may include population density by location, population by age, and other similar public census information. Most also offer additional map and demographic databases as options and accept third party demographic databases. Many can import proprietary user data, such as customer and prospect information (Rubin & West, 1999, pp. 6-7). Some companies, such as Geographic Data Technology and Claritas, specialize in developing highly accurate and refined geographic databases such as, ZIP Code boundaries, current and comprehensive nationwide street and address coverage for spatial analysis of business data, and highway connectivity for improved routing performance. These databases are subsequently licensed to GIS software application developers. They also sell these databases directly to end users to incorporate into GIS application software that they use.

Among the applications that include GIS features are the Windows 95/97/2000 version of Microsoft's Excel spreadsheet. *Microsoft Map* is a feature in Excel that lets the user create maps from database information in a spreadsheet as easily as you can produce bar and pie

charts from the same data. Microsoft Excel's mapping feature is a scaled down version of MapInfo, one of today's best-known geographic information systems applications. Although *Microsoft Map* lacks several of MapInfo's advanced features, its strength lies in its ease of use and it does do an admirable job for basic mapping.

The easiest software to use is the software you already know. Since many small business managers' already know how to use Microsoft Excel, they already know almost everything they need to know to make a map with *Microsoft Map*. The best feature of *Microsoft Map* is its easy-to-use dialog boxes that make defining chart and thematic maps easy. Whenever you need a map, *Microsoft Map* is ready to use immediately. *Microsoft Map* is inside your spreadsheet, so the ability to map your data is there when you need it. You simply choose a Microsoft Excel spreadsheet or Microsoft Access table, and *Microsoft Map* automatically creates a map for you. Then you customize it to suit your needs just by dragging and dropping various map features. The new capabilities allow a fairly large number of features to be customized to meet managers' needs. As examples, it is possible to color code states by sales to determine whether sales regions are meeting their goals. Concurrently, it is also possible to plot demographic data such as median income or population on a map to help form marketing goals. These applications move spreadsheet users forward from using the standard bar and pie charts. The areas of spreadsheet presentation and, more importantly, of performance tracking of geographically based results are becoming revolutionized.

Any small business trying to survive in today's business climate seeks to operate as effectively as possible in a highly competitive environment. Analyzing pertinent market data and then displaying it in an easy-to-comprehend map can provide a competitive edge. Market analysis and representation with visual maps are a giant leap in the evolution of spreadsheet technology.

A SMALL BUSINESS CASE STUDY

A local small photography studio presented us with a unique set of problems. The studio has been in business for two years. It began as a residential fine portrait photographer's studio. In May of 2000, it relocated to a professional office suite in a shopping plaza. The owners believe they have three main competitive advantages. First, they have a mentor in the form of a very successful photographer. This mentor has guided the business into an exceptionally well organized, proven business model.

Successful strategic alliances represent the second competitive advantage. Until recently these alliances have been mainly with OB/GYN physicians. The alliance entailed the physicians giving their patients gift certificates for a baby photo sitting. The parents would receive a free 11 x 14 photograph from that session with no other obligation to the studio. This alliance gave the physicians an opportunity to give a gift to their patients, and at no cost to them. At the same time it introduced the photography studio to new parents. The owners expanded the scope of this program to include other partners such as banks and high-end auto dealers.

The owners indicated they have the ability to quickly establish a bond with their clients. They demonstrate a genuine concern for the clients and communicate a desire to please. They believe this combined with their uncommon attention to detail sets them apart from the competition and thus represents a third competitive advantage.

The owners define their target market in very broad terms. Basically people with incomes greater than $50,000, with at least one child of any age are included. They also believe their potential clients probably live in more affluent areas, and range in age from the mid 20's to

the mid 50's. The business has an ACT2000 database, which gave us an opportunity to analyze the collected data.

The photo studio uses a Point-of-Sale (POS) computer system that captures customer information and maintains it in their database. The database, with over eight hundred data records, which includes customer names, addresses, and purchase history, provided an abundance of data for the mapping project.

The photo studio's owners believe they understand the basic demographics of a photography prospect, but they want to more accurately define its best customers - and identify potential customers.

MAPPING EXPEDITION

Data Used to Understand the Best Customers

One type of data that can help companies better understand their customers are actual transaction or response information. Such data are preferable to survey information because it informs a company what people are doing (purchasing), rather than what they say they are doing. It reflects actual customer history, which is a truer reflection of a company's distribution, marketing, sales, brand image, et cetera. The photography studio study is a good example of the effective application of desktop mapping technology to a small business.

Customer Trade Area

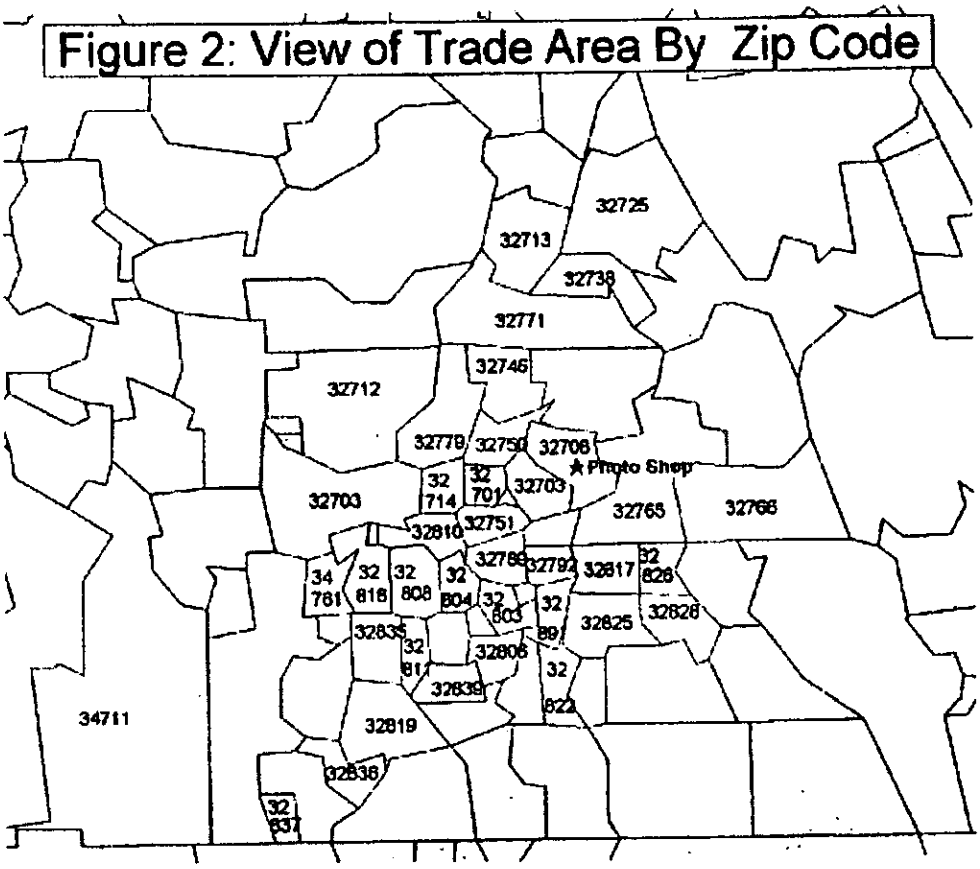
In recent years, much effort has been put into creating detailed spatial databases. For this purpose, ZIP code maps are becoming more popular. Raper et al. (1992, pp. 26-7) name a number of advantages of using postal code areas as an entity for research. Most important advantages are that the system: covers a whole country; is maintained by one organization; is linked to a mailing address; is linked to the 'perceived structure of geography', such as buildings and streets; provides a fixed hierarchy of areas; is easy to handle by computer (in a GIS).

Today, U.S. five-digit ZIP codes are widely used in business and marketing applications (Jones & Pearce, 1999). Figure 2 shows a detailed map of the study area broken into ZIP code boundaries.

These ZIP code areas will be referred to later in identifying the appropriate spatial categories developed from the maps. A complete map file of these ZIP code boundaries is included in an add-in used in this project, First Map, created by Wessex (http://www.wessex.com), for use with Microsoft Excel's map feature. This add-in gives you the opportunity to further your understanding of the map's functionality by allowing you to examine your data at a more detailed level. The add-in, if needed, also includes county and census track boundaries and census information, such as, age, gender, race, household income, employment, and industry.

Customer Spotting

The first step in analyzing the data was to display all customers by ZIP code. This was accomplished through a customer spotting routine. The process took the geocoded customers and applied the latitude and longitude coordinates to display them as points in each ZIP code area. Figure 3 shows the distribution of sampled customers. The map clearly shows that the photo studio's customers are located in several key ZIP code areas, which make up their primary trade area.



Trade Area Revealed

Trade area analysis provides a means of determining the performance of a store in relation to the geographical area in which it operates (Davies & Rogers, 1984). The resulting customer-spotting map is used as a base map for trade area analysis (Kohsaka, 1992). Customer spotting facilitates the delineation of the primary trade area and the subsequent evaluation of penetration rates within it (Jones & Simmions, 1990). The addition of Zip code boundaries to the map was of particular interest to the owners of the photo studio because it revealed that 45 percent of the sampled customers came from one of twelve ZIP codes (32707, 32709, 32714, 32746, 32765, 32792, 32708, 32817, 32822, 32825, 32828, and 34761) – a trade area considerably smaller than had been previously assumed.

Until this time, the photo studio had been concentrating its promotional efforts on a much wider area. The owners will now consider restricting promotional efforts to several of the twelve ZIP code areas delineated by the mapping analysis.

Customer Revenue

The next step was to determine the revenue generated by the clients by their ZIP code. Figure 4 shows the revenue categories generated by the GIS map.

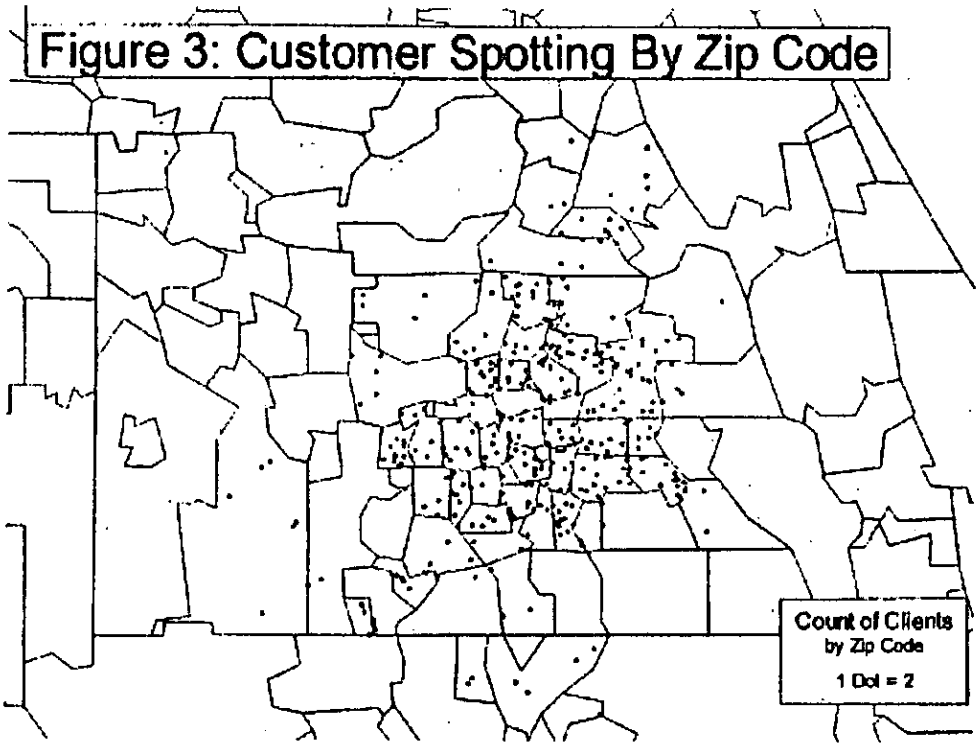


Figure 3: Customer Spotting By Zip Code
Count of Clients
by Zip Code
1 Dot = 2

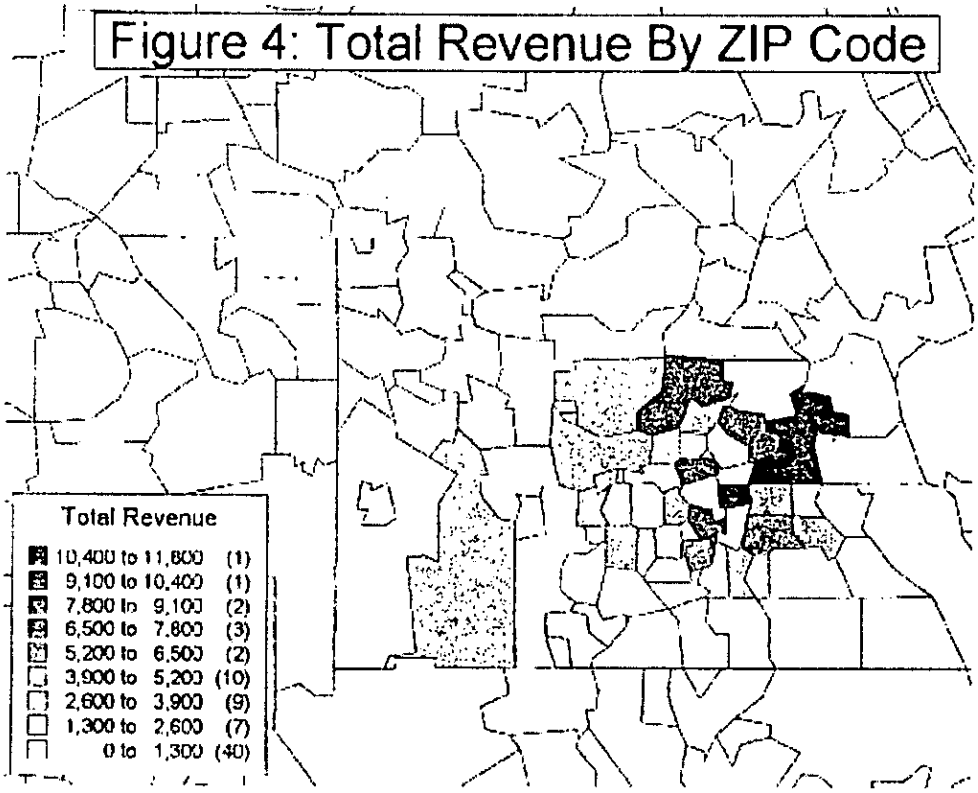


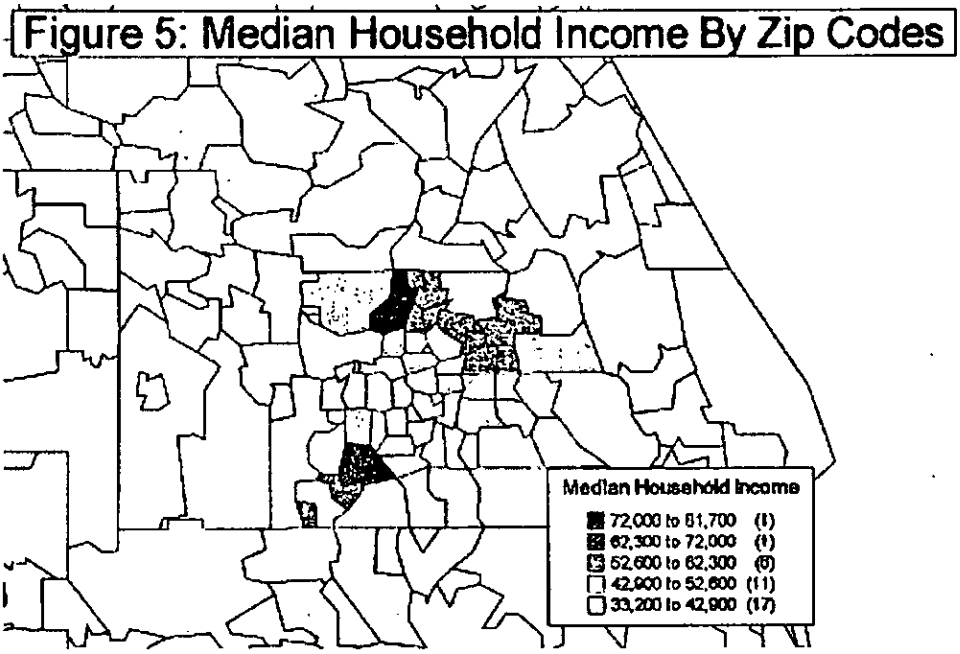
Figure 4: Total Revenue By ZIP Code
Total Revenue
10,400 to 11,800 (1)
9,100 to 10,400 (1)
7,800 to 9,100 (2)
6,500 to 7,800 (3)
5,200 to 6,500 (2)
3,900 to 5,200 (10)
2,600 to 3,900 (9)
1,300 to 2,600 (7)
0 to 1,300 (40)

Once again, higher revenue figures were generated in several key ZIP code areas (32708, 32746 32752, 32765, 32779, 32792, and 32803). By viewing the geographic information of customers (from the spotting map), along with the variable total revenue, the owners of the photo studio can begin to make decisions on where their promotional efforts can be most efficiently utilized to elicit the best response (32765 and 32793 ZIP codes).

The Art of Prospecting for Customers

The photography studio's goal is to enlarge its customer base to enhance profits for their business. Arthur Hughes (2000), author of *Strategic Database Marketing*, writes about "...finding prospects that match the profile of profitable customers, resulting in expanding the customer base in a cost-effective way." Here is a brief look at how the photo studio can expand their customer base by following Hughes' logic. Marketing consultants generally infer that individuals who earn higher incomes have higher spending habits. More economic resources co-occur with higher levels of discretionary spending. Therefore, the first step is to find an income profile for the appropriate ZIP code areas representing the photo studio's trade area. IDS On-the-Web, using data provided by CACI (CACI, 2000) offers free ZIP code reports that present demographic data for a particular ZIP Code of interest. Figure 5 shows the median household income level for each ZIP Code within the photo studio's trade area.

Figure 5: Median Household Income By Zip Codes



An initial analysis of the map indicates that eight ZIP code areas have a median household income level greater than $50,000 (32708, 32746, 32750, 32765, 32779, 32819, 32836 and 32837) which was the photo studio's original target market income level. Further analysis reveals that four areas (32708, 32746, 32765 and 32779) that had the greatest sales success (from Figure 4) appear on the new map. That leaves four remaining ZIP code areas of high household incomes that may be prospective clients (32750, 32819, 32836 and 32837). Now that we know about the near concentration of affluent households, the photo studio owners are

now able to quantify their success potential in the new markets, estimate revenue potential, and more efficiently reach the new prospective customers who are most likely to respond and purchase photo services.

SUMMARY AND CONCLUSIONS

Demographic data has long been available to help small businesses understand their markets. However, geographic data is the last missing piece in the information chain that can lead to an improved understanding of a company's customers, sales, and productivity. It can contribute significantly to increased revenues, lower costs, and higher profits. To date, the use of geographic information systems in small businesses have only scratched the surface of possible applications. The evolution of personal computing hardware and software have created the potential for demographic data analysis to be a much more effective tool for spatial analysis. Spreadsheets, once the domain of number crunchers, have become a useful tool for performing a variety of tasks, including data mapping capabilities. Given today's competitive environment, the growth of niche markets, and the emergence of online marketing, desktop mapping has become an indispensable information management ally because it gives rise to operating efficiencies, competitive advantage, and proactive decision-making in all applications areas of sales and marketing. As more challenges are placed on the technology to analyze markets, the developers of GIS will generate new capabilities. The result will be that small businesses like the photo studio will be able to make more informed decisions about opportunities. They will move from a mass-marketing approach to a paradigm that emphasizes businesses built upon the quality of customers, rather than quantity.

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