

IMPROVING GEOSPATIALLY DEPENDENT BUSINESS DECISIONS WITH INDIRECT
PSYCHOGRAPHIC MEASUREMENTS

By

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Abstract of Thesis Presented to the Graduate School
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Lifestyle Segmentation Profiles (LSP), also known as psychographic measurements, are widely used by business geographers to characterize their prospective or existing customers. LSPs are composite indexes that represent propensity to consume. Households given the same LSP index have greater similarity in consumption than they do with households with other LSP indexes. It has been argued and empirically demonstrated that LSP indexes can provide superior forecasting performance over standard demographic measurements such as income and race. LSP indexes are directly assigned to households based upon their current street address.

This thesis departs from previous analyses utilizing LSP indexes by indirectly assigning LSPs to prospective customers utilizing a secondary street address instead of current address. The secondary address can be more relevant when assigning the LSP index than the primary address.

In this study, the indirect method of LSP assignment is demonstrated with two examples. Both examples draw upon factual data, and both analyses provide

documentation actually used by management. In the first example, the trade area is known, and population within the trade area are characterized by their indirect LSP measurement. In the second example, the location of the trade area is determined based upon the location of customers characterized by indirect LSP measurements. The first example is that of a government initiative to influence voters, and the second solves for areas in which consumers are most likely to take part in a service offering.

CHAPTER 1 INTRODUCTION

Lifestyle Segmentation Profiles (LSP), also known as psychographic measurements, have been widely used by business geographer academics and practitioners to characterize households and populations. LSPs measurements partition households according to their propensity to consume. Households with the same LSP index have greater similarity in consumption than they do with households with other LSP indexes.

This thesis departs from previous analyses utilizing LSP indexes by indirectly assigning LSPs to prospective customers utilizing a secondary street address instead of current address. The secondary address can be more relevant when assigning the LSP index than the primary address. Two examples are provided to illustrate the indirect method of LSP assignment. The first example is that of a government initiative to influence voters, and the second solves for areas in which consumers are most likely to take part in a service offering.

Business geography (BG) is recognized by the Association of American Geographers as a separate and highly important subfield of the discipline.¹ Among the other academic and practitioner organizations that have recognized BG as important to their body of knowledge is the American Real Estate Society, Certified Commercial Investment Member, National Association of Realtors, the Appraisal Institute, and many

¹ The Business Geography Specialty Group (BGSF) was formed at the request of the Association of American Geographers in 2008, and subsequent approval by the AAG. See <http://www.businessgeography.info> Grant I Thrall, the first elected Chair of the BGSF, was invited to give a keynote presentation on Business Geography in the plenary session of the 2010 annual meetings of the AAG.

others. As would be expected of a new academic and practitioner field, there are many opportunities to contribute to the body of knowledge.

Following on this opportunity, the objective of this Masters thesis is to demonstrate the value of "indirect Lifestyle Segmentation Profile (LSP)" assignment. In previous contributions to the BG field, LSPs are assigned "directly" utilizing current address. It is argued here that direct assignment of LSP can yield insufficient information upon which to characterize households, and that indirect assignment can better characterize the target population.

In addition to the indirect approach to assignment LSP measurements, this thesis addresses the managerial conundrum - how to choose from the capabilities of many possible geospatial analyses that may be performed, to attain the single "ah ha" moment in which a decision maker recognizes a previously unknown and geospatial relationship, geospatial problem, and geospatial opportunity; and then integrates that recognition into a managerial decision.²

University of Florida Professor Grant Thrall defined the BG field with this quote: "Business geography integrates geographic analysis, reasoning, and technology for the improvement of the business judgmental decision." BG being a young field provides opportunities to fill gaps in the body of knowledge, particularly the interface between practitioner and academic. With the importance that BG offers to the business to business service sector³, it is expected that both the literature and demand for BG solutions, namely employment opportunities, will grow in the foreseeable future.

² "Managers don't always generate a range of solutions. They struggle with the problem and, slowly but surely, they start to settle on and build and sculpture a solution." (Kneeland, 1999)

³ The business to business service sector is one of the fastest growing sector of the US economy. (Raisch, 2000)

Rynes, Bartunek and Daft (2001) indicate that the divide between practitioner and academic can be narrowed using a multidisciplinary practitioner-researcher paradigm where the researcher is assigned tasks by the practitioner, rather than choosing problems themselves. This “cross-profession collaboration” often leads to theoretical breakthroughs as well as benefits for both parties.

Gap-filling contributions in this field have included highly philosophical discourse (Thrall and Wofford, 1997) along the lines of philosophy of science, namely epistemology, such as the well known contributions by Kant, Popper and others.⁴ While recognizing those benefits particularly to academia, such discourse is unlikely to make an impression on the practitioner. Instead, practitioners learn by example, and learn by doing. Therefore, to demonstrate both the indirect method of LSP assignment, and the strategy of incorporating LSP descriptive measurements into managerial decisions, two experiments are presented as examples that can be replicated in other contexts. These two experiments have actually been used in the design of geospatial analysis and have actually contributed to business managerial decisions.⁵

⁴ “Whenever a theory appears to you as the only possible one, take this as a sign that you have neither understood the theory nor the problem which it was intended to solve.” (Popper, 1972)

⁵ “The case study approach is a research strategy which focusses on understanding the dynamics present within single settings.” “Building theory from case studies...attempts to reconcile evidence across cases, types of data, and different investigators, and between cases and literature increase the likelihood of creative reframing into a new theoretical vision.” (Eisenhardt, 1989)

CHAPTER 2 SUPPORTING LITERATURE

Measurements of lifestyle segmentation profiles (LSP), also known as psychographics, have been part of the revolution in improved management decision making in a geospatial context (Goss, 1995). LSPs provide the best most cost effective predictive measure of customer choice and behavior, and has therefore become a standard data measurement in business. LSPs are drawn upon to separate market information into its constituent components and thereby provide better understanding of market composition (Cahill, 2006). A better understanding of the market can give rise to greater accuracy and better predictability of those populations groups that make up the market. For example, management can learn what their target customers would pay for a product and develop a product specifically for their target market.

Rather than basing segmentation on race or income, lifestyle segmentation profile measurements rely on a track record of consumption behavior. Behavior includes expenditure of income and allocation of time on activities such as leisure (Cahill, 2006). Contemporary data collection and data analysis, especially information from social networking services¹, has made for greater accuracy and precision, including households with obscure lifestyle segments. Instead of merely counting numbers of customers, LSP data groups potential customers together that have similar wants and ability to obtain those wants. In other words, in the final analysis, households with the same LSP consume more like one another than as other groups (Weinstein, 2004).

¹ Social networking sites are “web-based services that allow individuals to (1) construct a public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. (Boyd and Ellison, 2007)

Figure 2-1 provides a breakdown of income by Lifestyle Segmentation Profile. Note, the range of income significantly overlaps the various LifeMode groups.

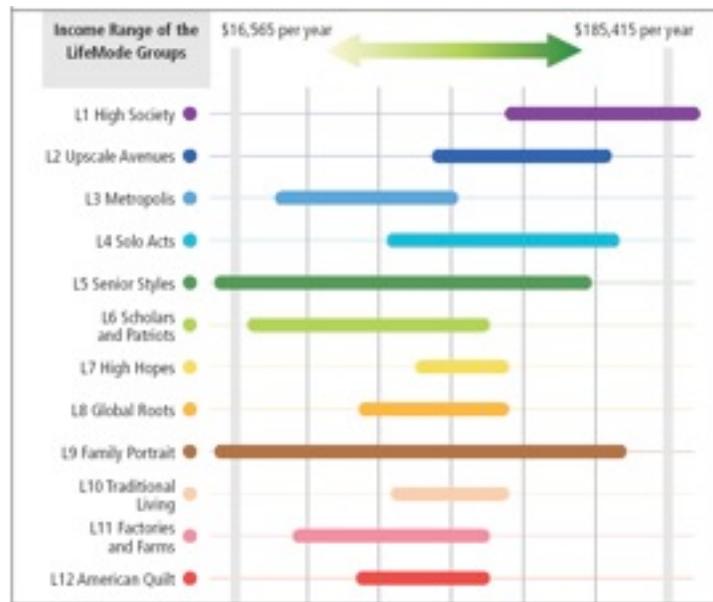


Figure 2-1. Income Breakdown by LSP (ESRI 2007)

When LSPs are used in the context of geospatial analysis, they are known as geodemographic segmentation. Geodemographic segments are descriptive characteristics of a population that are spatially arranged, and presented at a geographic scale that is useful for the purpose of the analysis (Thrall, 2002). This type of segmentation is based on the concept that “birds of a feather flock together”, or Tobler's "First Law of Geography" (Tobler, 1970). In other words, “we are more similar to those who live around us than we are dissimilar” (Cahill, 2006).

The geodemographic segmentation data used for the analysis presented here is Community Tapestry produced by ESRI (www.esri.com). Community Tapestry segmentation provides an "accurate², detailed description of United States neighborhoods" (ESRI, 2007). Like other geodemographic segmentation systems,

² Accurate in the sense that the Community Tapestry measurements provide consistent predictive behavior

Community Tapestry depends on the conjecture that people with similar tastes, lifestyles and behaviors either actively seek others with the same tastes, or passively through their revealed consumption preferences have more association (particularly in their choice of residence location) than they do other groups (Samuelson, 1948). People are thusly segmented by their propensity to consume. For example, if the federal government were to provide households a "cash bonus" of \$1,500, what percentage of that bonus would go to books versus tennis shoes? This question is similar to the economist's "marginal propensity to consume."³ However, instead of measuring propensity to consume by broad categories of income groups, geographers measure LSPs using data on revealed behavior without a-priori income bias. Indeed, income and ESRI Tapestry segments are largely independent as shown in Figure 2-1. For illustration, two LSPs that are relevant to the work here are "Scholars and Patriots" and "High Society".

The "Scholars and Patriots" group is characterized by youth, lower incomes and either college life or military service. Few own homes due to their life stage, and most residents are pursuing college degrees and work part-time at low-paying jobs to support themselves. Furthermore, "Scholars and Patriots" participate in sports activities, they are style conscious and are well connected with technology, and they are beginning to acquire household furnishings (ESRI, 2007).

Conversely, residents segmented as "High Society" are affluent and well-educated. They represent 12% of U.S. households, but generate 25% of the total U.S. income, and their current median household income of \$97,400, is almost twice the

³ Marginal Propensity To Consume is a metric that quantifies the increase in consumer spending that occurs with an increase in disposable income. (Paiella, 2007)

national median income. “High Society” is one of the least diverse Lifestyle Segmentation Profiles, but it is one of the fastest growing; increasing at 2% annually. They are financially, civically and physically active; they participate in a wide variety of public activities and sports; and, they travel extensively (ESRI, 2007).

Lifestyle Segmentation Profiles are generally assigned on the basis of street address from which a postal ZIP+4 is derived. ESRI Community Tapestry software will calculate the current ZIP+4 from street address data input. Given a ZIP+4, the software will dip into an existing database of ZIP+4, and for each ZIP+4 record retrieve household count by LSP segment. If a ZIP+4 cannot be assigned, then higher levels of postal geography are assigned, with each step up in level, precision and accuracy of LSP assignment is lessened; for example, ZIP+2, and ZIP code. Address match geocoding will also assign a geographic coordinate to the data record. This allows the analyst to visualize the spatial distribution of LSPs within the analyst's database.

"GIS integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information" (ESRI, 2007; Peuquet & Marble, 1990). Wofford and Thrall (1997) explain that GIS can be a problem solving tool and a means for incorporating inductive reasoning, and while it cannot be applied in every situation, GIS provides “information and analytical capabilities that may be helpful in many stages of problem solving and provide a more structures and systematic approach to inductive reasoning.”

GIS had been growing in popularity in the 1990's and now can be considered a ubiquitous technology. Hernandez and Thrall (2007) demonstrated a best-practices approach for implementing geospatial decision processes for an enterprise engaged

primarily in real estate portfolio management. Earlier, Thrall (1998) had presented his futuristic conjecture on how geospatial analysis and technology could and should be used for financial institution risk management, and how geospatial technology would change the real estate and related financial industries. During the past decade, Thrall's predictions have become reality, as web based utilities like Zillow.com and Realtor.com have entered mainstream consumer acceptance. The recent mortgage industry debacle has come about in large measure because financial institutions and associated real estate institutions either resisted adoption because they were unaware of the benefits, deliberately did not adopt, or deliberately hid the analysis performed "behind closed doors" so that the market would not discover the risk until after the profits were attained.⁴

Indirect calculations of LSP can be more useful and revealing than direct calculations. A direct calculation of LSP is a measurement derived from current residence address, such as the address of a student at a campus while attending a university away from their permanent home location. An indirect calculation of LSP would use a student's permanent or home address. Thrall (2005) introduced the indirect method with the calculation of University of Florida students' home or permanent locations. Thrall's conjecture was that students' home or permanent address was more representative of their LSP and propensity to consume, than the LSP based on their campus residence (Thrall and Mecoli, 2003).

This review of the literature reveals that geospatial analysis and geospatial technology are not new, including their use in business. Indeed, if anything today, their

⁴ Personal communication with Dr. Grant Thrall

use is nearly ubiquitous across the academic disciplines and among businesses. In particular, LSPs are not new, nor is geocoding with industry proven Tapestry Community Coder from ESRI. While these utilities are used in this thesis, the work that follows is nevertheless a contribution because

1. it applies indirect LSP measurements versus direct LSP measurements to derive superior descriptive insights into the characteristics of consumers;
2. it is the first published on target messaging to voters, and having a measurable success associated with that targeting;
3. this is the first published application of geospatial technology and analysis, particularly LSPs, in the field of Career Resources and "Manpower Creation"⁵;
4. the overall contribution is a general managerial procedure in which geospatial analysis is demonstrated as a valuable component integrated into the management decision metric.

⁵ The total number of all available workers; the workforce

CHAPTER 3 ANALYSIS

The case studies presented here have three overriding elements in common:

- geospatial methods and solutions
- trade areas
- demographic information

The weighting of the importance of each to the managerial decision is shown to be different. The two case studies are:

1. Influence voters to support a local government initiative for annexation
2. Identify areas to receive priority attention to influence consumers to participate in a service offering

Each of the two case studies are introduced and presented successively in-depth below.

Case Study 1: Influence Voters

The Strategic Planning Division for the City of Gainesville, Florida, was directed by the City Commission, the Mayor, and City Manager, to convey to voters why they should support annexation of their neighborhood into the City of Gainesville. The neighborhood had previously voted twice and overwhelmingly not to be annexed (Rowland, 2003). The Mayor of Gainesville, Pegeen Hanrahan, was familiar with the BG literature and general concepts, in particular Thrall (2002). She encouraged her senior management to include BG analysis in their strategy.¹

The targeted area to be annexed was largely comprised of Voting Precinct (VP) 36 (see Figure 3-1). VP 36 is centrally situated in the city's retail core and educational

¹ Professor Grant Thrall, University of Florida, was subsequently contacted and volunteered to offer an afternoon workshop for City of Gainesville and County of Alachua senior management on the topic. Senior management understood the importance of understanding the psychographic composition of the neighborhood, and attributed their lack of understanding to that important component for having failed in the previous annexation attempt.

center. Adjacent and to the south of VP 36 is Butler Plaza. Butler Plaza has over 1 million square feet of retail, over 1.25 miles of state highway frontage, and is adjacent to

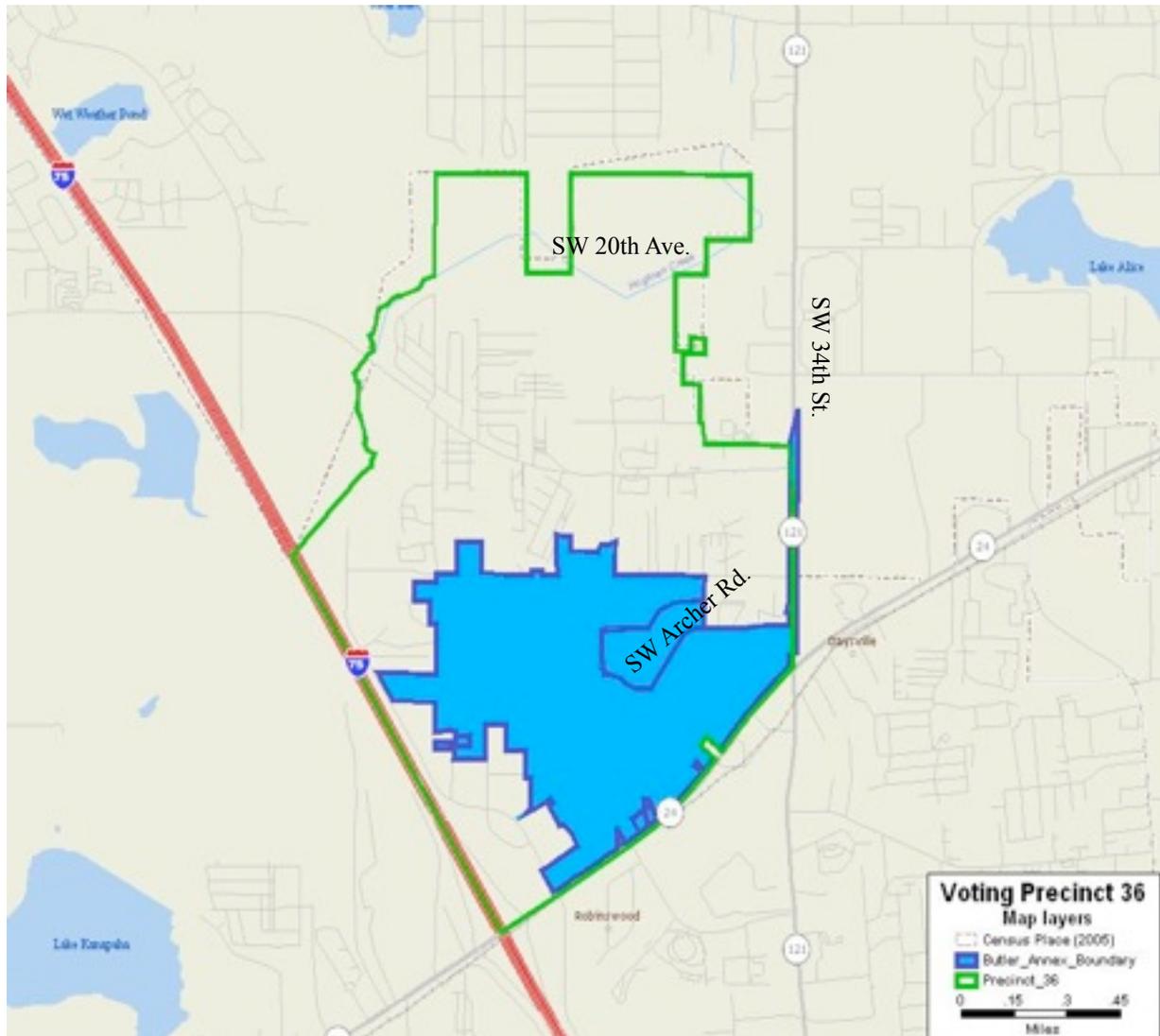


Figure 3-1. Voting precinct 36, target of annexation

an Interstate ramp; it is the largest power center² in the southeast. Butler Plaza had earlier chosen to be annexed into the City of Gainesville. The owners of Butler Plaza, Clark Butler and his daughter Deborah Butler, owned 150 bare acres within VP 36, and adjacent to the existing Butler Plaza. The Butlers were proceeding through a

² A center dominated by several large anchors, including discount department stores, off-price stores, warehouse clubs, or "category killers," i.e., stores that offer tremendous selection in a particular merchandise category at low prices. (ICSC, 2010)

Development of Regional Impact (DRI) and wanted the property to be annexed prior to committing to develop 1.5 million square feet, hybrid mixed use Towne Centre at Butler Plaza.

City of Gainesville senior management considered annexation of VP 36 to be crucial to the economic stability of the City. If the area was not annexed, then Towne Centre at Butler Plaza would not be developed. If Towne Centre at Butler Plaza was not developed, then property at a competing Interstate ramp (I-75 and 39th Ave.) would likely be a contender for DRI approval. The DRI approval requirement limits the amount of retail space per capita to be under a ceiling value. Pennsylvania Real Estate Investment Trust (PREIT) owns 360,000 square feet at the competing location and was preparing to apply for a permit to build 1.5 million square feet of retail space.

PRIET's location was "greenfield"³ (Figure 3-2). If PREIT received the permit, under planning laws existent at the time, that would preclude the Towne Centre at Butler Plaza from being developed.⁴ Market studies had indicated that the PREIT development would bring about a decline in the neighborhoods in the west portion of the City of Gainesville, and merely transfer residential choice to the north west, west of I-75.⁵ Also,

³ A greenfield development site is land that has not been previously developed and usually outside of the existing urban edge. (A Housing Strategy for Eastleigh, n.d.)

⁴ The process of the DRI includes calculation of population within the market area and the existing supply of competitive retail square footage. If PRIET were to develop first, then no retail square footage gap would remain to be allocated to Towne Center at Butler Plaza under then current market conditions.

⁵ Personal communication with Dr. Grant Thrall. Dr. Thrall gave expert testimony at the public hearing on the proposed PRIET development at I-75 and 39th Ave. The new development would be expected to cannibalize retailers from their existing locations including Butler Plaza and Oaks Mall. Residential choice to minimize the distance between house, work, and shopping locations would bias the market in favor of northwesterly expansion and bias the market against existing neighborhoods in the west and southwest side of Gainesville. However, if Towne Centre at Butler Plaza were instead developed, a bias would exist to maintain current market forces that shaped existing neighborhoods in Gainesville's urban area.

fiscal problems of paying for the services necessary for the existing population and economic activities in the area. So, how to convince the voters in VP 36 that it was in their personal interests to both vote, and vote in favor of annexation?

The "Orderly Annexation Team" was formed to oversee the annexation and to communicate to the voters the issues and importance of annexation. The team was comprised of senior management of the City of Gainesville, and the County of Alachua. The annexation team requested and paid attention to BG advice so that the message would have a higher likelihood of being received and understood by the voting population.

Annexation of VP 36 was considered by the team as a "trial run." In addition to the two prior attempts at annexing VP 36, the City had experienced a string of annexation failures. Unless annexation was judged by decision makers to be highly likely, the City would not pursue further annexations.

A barrier to understanding the preferences of the voting population of VP 36 was lack of funds to perform a survey of prospective voters. A declining local economy and declining public revenues made it politically unfeasible to reallocate funds to perform a study. However, a survey was needed to better understand the voting population. The Orderly Annexation Team decided that psychographics, lifestyle segmentation profiles, would be a cost effective substitute for a survey.

Thesis author Nicholas Serluco was employed by the Orderly Annexation Team to advise them on procedures to follow based upon "best practices" BG methods. The procedural steps adopted by the "Orderly Annexation Team" were as follows:

1. Identify the desired goals; voting outcome, study area
2. Describe the voting population by calculating geographic coordinates, defining the voting population by LSP and combining LSP measurements with external data
3. Develop a strategy to achieve the desired outcome by determining the benefits arising from annexation, emphasizing those benefits expected to be most desired by the voting population and designing an strategy to convey the benefits to the voting population.
4. Implement the strategy
5. Evaluate the vote outcome - did the vote achieve the goals of Step 1?

The procedures are represented in Figure 3-3, and discussed in detail below.

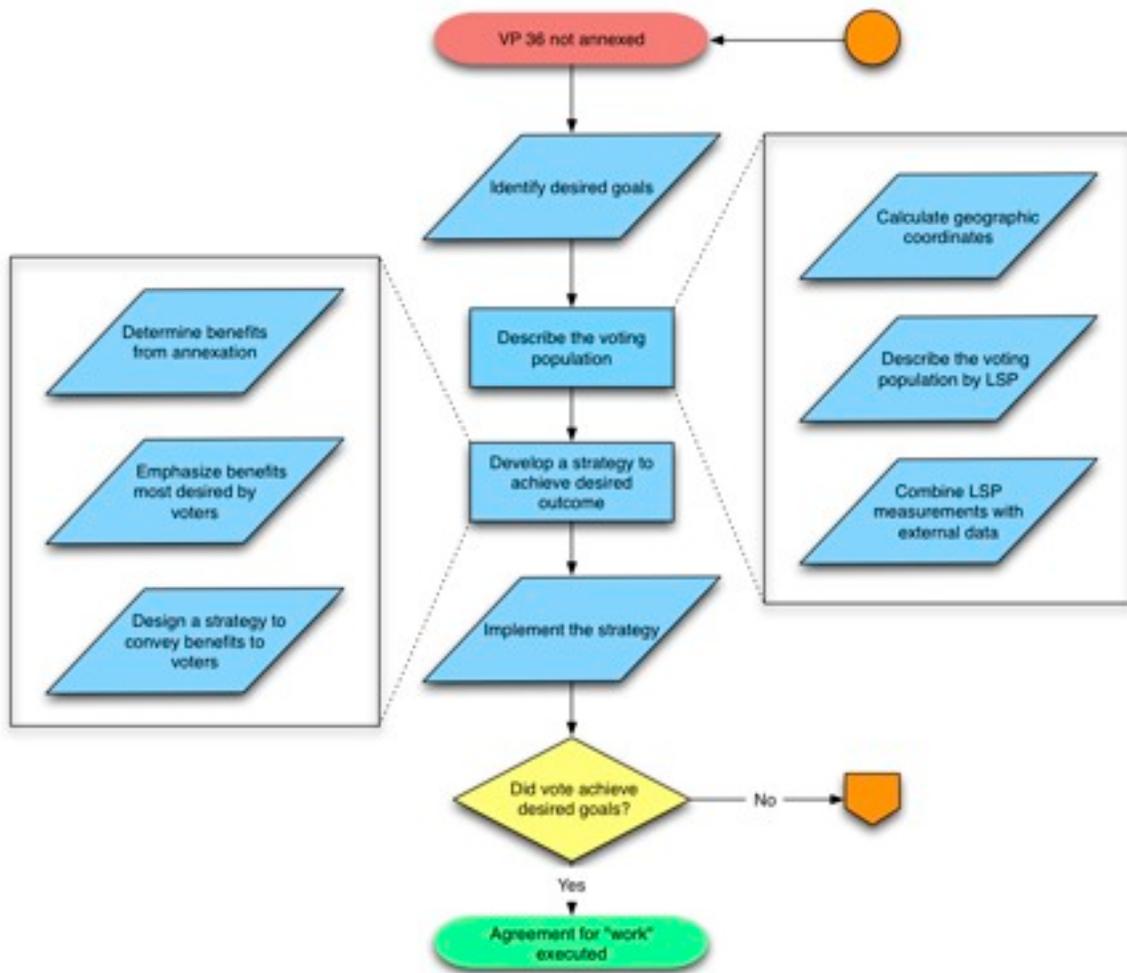


Figure 3-3. Orderly Annexation Team procedure

Identify Desired Goals: The Orderly Annexation Team met and unanimously agreed that the most important area to be annexed was Voting Precinct 36. A positive vote by VP 36 to be annexed was judged to have the greatest economic benefits to both City and County. A positive vote would contribute to other districts slated for annexation votes to be more receptive to being annexed into the City, and City management would learn from the positive vote what needs to be done for the population to vote in favor of annexation. The timing of a vote in November, 2008, was decided on because of the expected high voter turnout attributable to interest generated by the Presidential election.

Describe the voting population: Voter registration information was obtained from the Supervisor of Elections for all the registered voters residing in Precinct 36. Each data record contained voters' eligibility to vote by prior election, voters' street address, and history of having voted or not within eligible prior elections. The addresses of the voters in VP 36 were address matched geocoded thereby creating a latitude-longitude for each voter's location; also, the most likely LSP was assigned to each voter's data record based upon the address.

Most residents of VP 36 are students at University of Florida, a short walk away. The calculation of Direct LSP Measurements revealed, not surprisingly, that 95% of the registered voters in this area were categorized as L6 - "Scholars and Patriots"; a lifestyle segment dominated by students. So the direct assignment of LSPs did not yield any information that was not already known, though it was confirmatory. Indirect measurements of student geodemographics were needed to better reveal their preferences, and thereby substitute for a survey.

To discover more detail about these voters, student records were obtained from the University of Florida registrar and geocoded based upon declared campus address. Students residing in VP 36 were selected from the database. Those students' permanent addresses were available in the database. ESRI Community Coder was again employed to assign LSPs to students based upon their permanent addresses thereby creating Indirect LSP measurements. The neighborhood geodemographics were subsequently described and summarized using Indirect LSP information. Most students permanent address is their parents' address, which is a good indicator of their geodemographic legacy.⁶

The indirect geodemographic analysis of permanent addresses of student voters in Precinct 36 revealed that 22% of those prospective voters were classified as “Dorms to Diplomas” which is yet another, though more narrowly defined university student segment. Students that list their campus address as their permanent address are more likely to be older, more mature, perhaps married, or perhaps an international student. If the student is international, there is a high likelihood of ineligibility to vote. They might also be dependents of university faculty and staff. Furthermore, the indirect geodemographic analysis of permanent addresses revealed that 28% of VP 36 residents were classified as “Sophisticated Squires”, “Suburban Splendor”, “Boomburbs”, “Exurbanites”, and “Connoisseurs”. These sub-segments collectively form L1 - “High Society”.

⁶ Student data was obtained by Professor Grant Ian Thrall from the University of Florida. To obtain the data, Professor Grant Ian Thrall signed a confidentiality agreement, in which Professor Thrall agreed to the prohibitions on revealing to anyone any individual student information, and not to provide information that could be tracked back to an individual student. Therefore, only summaries of the student data at the neighborhood level VP 36 could be used in this study. That level of data aggregation was judged to be sufficient by the Orderly Annexation Team. For confidentiality reasons, all processing of student records was performed by Professor Grant Ian Thrall.

The voter registration information obtained from the Supervisor of Elections Office includes voters' street address, the political party affiliation, and whether or not the voter participated in previous elections and referendums. This information was used as an indicator if the eligible resident would vote or not vote in the referendum.

A combination of Indirect LSP measurement and probability of voting was judged by the Orderly Annexation Team to successfully substitute for, and supersede, the much higher cost detailed survey of the voting district.

Develop a strategy: An estimate of expected voter turnout of Voting Precinct 36 was calculated. Summaries of the Indirect LSP data were used to create the message for the voting population.

In previous annexations, door-to-door campaigning strategy was used to deliver the city's message for the entire area. However, the new geospatial reports using Indirect LSP measurement allowed the team to deliver a more targeted message within the larger VP 36.

Implement a strategy: Custom messages were targeted to different groups. The message was delivered to the targeted group in a manner that was most appropriate for the LSP segment. Instead of campaigning door-to-door for the annexation as had been executed previously and failed, and which had been planned to be repeated, the Orderly Annexation Team used social networking websites including Facebook and Twitter, and mobile text messaging to deliver a message that would be noticed and supported.

The challenge the Orderly Annexation Team faced was explaining to student what being annexed into the City of Gainesville really means, and why they should take

an interest. The Team first appealed to the UF Student Senate, which passed a unanimous resolution to support the annexation referendum. Explaining why students should care about annexation was vital to its success and spreading this message using the student government and the college newspaper, The Florida Alligator was a reliable first step. The Orderly Annexation Team also used Facebook to increase awareness. Team members and city employees passed out pamphlets at campus bus stops ferrying students to VP 36 urging students to learn more about the benefits of annexation on Facebook. In this way, the targeted students were shown how annexation would affect them, and how they would benefit from supporting the referendum. Especially because the annexation referendum was on the ballot alongside the presidential election, it was of vital importance that students knew what they were voting for, and it showed in the polls.

Evaluate the outcome: 80% of the registered voters came out to the polls. 62% of those who voted, supported annexation. This is in contrast to two previous attempts at annexation in which voters voted down annexation in 1992 by 49% in favor and 51% opposed; and in 2003, 41% in favor and 59% opposed with 18% of registered voters voting. In reviewing the outcome, the Orderly Annexation Team considered timing and informed voters to be the most important factors that led to a positive annexation:

- timing is crucial; presidential elections normally draw over 60% of eligible voters in Alachua County, while local elections normally draw about 22% of eligible voters (Supervisor of Elections, n.d.).
- While funds did not allow for a follow up survey, feedback from voters expressed that they were well informed of benefits of the annexation in general, and how that annexation would better serve them personally.

The Orderly Annexation Team judged the experiment a success and intended to extend the procedure presented here to other districts slated for annexation votes.⁷

Case Study 2: A Service Provider Looking To Increase Market Outreach

The Career Resource Center (CRC) at the University of Florida is a comprehensive career planning facility located on campus at the J. Wayne Reitz Union. The CRC serves as an interface between students and prospective employers; its full-time staff of 24 provides a complete range of services in the areas of career development (counseling and skills training), experiential education (cooperative education, internships and externships) and employer relations (including on-campus interviews and assistance in self-directed job search). The CRC regularly holds workshops to help students with their resumes and portfolios, interviewing tactics, job searches and other potential leads for finding employment in the corporate, academic or public sector. In 2010, The Princeton Review ranked the CRC at the University of Florida 1st overall in Career/Job Placement Services out of 368 universities (The Princeton Review, n.d.). Dr. Wayne Wallace is the Director of the Career Resource Center (CRC) at the University of Florida. Dr. Wallace served as the representative "client" and managerial decision maker for this study.

The CRC's objective is to serve the entire student body at one of the nation's largest universities. Not all students choose to take advantage of the CRC, and the CRC faces two significant hurdles to increasing the percentage of all students served.

⁷ The Principal Investigator for the Orderly Annexation Team was MA Thesis author Mr. Nicholas Serluco. Mr. Serluco was employed as a student intern to assist the team. Professor Grant Thrall volunteered his time and use of technology which was licensed to him. Together Nicholas Serluco and Professor Thrall designed the procedures, and carried out the analysis. Nicholas Serluco presented the findings and recommendations to the Orderly Annexation Team.

First, University of Florida has over 50,000 students at its Gainesville, Florida campus, ranking UF as one of the four largest single campus universities in the US. Second, the CRC's funding is tied to private donations. Even in good economic times, the CRC's budget is highly limited. In the current recession, the CRC's net budget has declined. Increasing the challenge over for example, a retail business that serves the same in-place population for many years, the clientele of the CRC continually changes with the natural turnover of the university student population, and the changing demographics of the state of Florida's churning population (Bullock, 2006). A more realistic though unarguably "second best" objective⁸ of the CRC is to sustain the current numbers of students served, and to increase the numbers served as much as resources allow.

The CRC must continually market its services. Ideally, the CRC's message reaches students before they arrive on campus⁹; this provides the greatest opportunity for career counseling to maximally impact and benefit the student.

Most of Florida's senior higher education administrators are familiar with Professor Grant Thrall's 2005 report requisitioned by the Florida Board of Governors *Geographic Access to Higher Education in the State of Florida* (Thrall, 2005). That report led to Professor Thrall being invited to give a keynote address to the Florida Association of Colleges And Universities (Thrall, 2005). This in turn resulted in Professor Thrall being invited to give a keynote address to Florida Career Center's Annual Institute on August 7, 2008. In his presentation, Professor Thrall introduced the

⁸ If one optimality condition in an economic model cannot be satisfied, it is possible that the next-best solution involved modifying other variables away from values that are usually assumed to be optimal (Lancaster and Lipsey, 1956).

⁹ A message reaching a student before arriving at UF's campus increases the likelihood that the student will consult with the CRC, consult with the CRC on career opportunities that are defined by major, and then the student knowingly chooses between majors that best fit their goals.

audience to Business Geography. A show of hands at the beginning of Professor Thrall's address revealed that of about 100 attendees, less than six raised their hands indicating they were familiar with any geospatial concepts. Attendees were not aware of any literature on higher education career counseling that utilized BG; and no literature has subsequently been found. Encouraged by the response of attendees, and the opportunity to introduce a new segment of professionals to the benefits of BG, Dr. Wallace and Dr. Thrall agreed that the next step should be to perform a "pilot study" in which CRC data was analyzed geospatially, and reports created that would indicate some of the benefits to career resources. A side benefit of both the presentation and the pilot study would be increased visibility of geography among those who have very significant influence on which majors students' choose to investigate and ultimately pursue. Professor Thrall and Dr. Wayne Wallace chose that the work would not be merely descriptive by placing the CRC's data on a map. Because the core motivation of Business Geography is to improve the business decision, the analysis would be designed to benefit CRC's management decisions.

Thesis author Nicholas Serluco was invited to join the "pilot study" team in Fall 2009. The procedure followed is important to any applied Business Geography work. The procedure is summarized below, and also in the flow chart decision-tree in Figure 3-4.

1. Form a team comprised of client and business geography analysts. In this study the client was Dr. Wayne Wallace, Director CRC. The business geography analyst was Mr. Nicholas Serluco.
2. Hold client-analyst meetings in which the analyst presents hypothetical scenarios that might be of interest to the client. The client responds to the hypothetical scenarios, reformulates and clarifies the research agenda based upon the client's priorities.

3. Following from the ranking of client priorities, analysts query about data availability.
4. Client responds by providing details on data availability.
5. Analyst presents research agenda to client, considering data and time constraints, and client's expressed priorities.
6. An agreement for "work" is executed (in this case, analysis to be reported in an MA thesis, versus other situations which might be paid consultancy).

For this case, the client (Dr. Wayne Wallace, Director CRC) has evaluated the need for a market analysis of its customers. As the client's effectiveness is primarily determined by the number of students who utilize its services, the client will have an increased awareness as to the kind of students that it has intentionally or unintentionally targeted; this will be used in a "feasibility analysis" that relates cost of getting the desired message to student "customers" to maximize their use of CRC resources.

The project analysis includes the creation of a GIS database and maps including points of students who utilize the resources of the CRC, a psychographic breakdown of students based on their location, and an analysis of the Career Resource Center's customers in contrast to the market that has not been penetrated; in other words, CRC users versus non-users.

The agreed upon work presented as the second case in this Masters thesis differs from the analysis of the first case in that the "ideal" trade area is unknown. The ideal trade area is the location that has the greatest market penetration potential and highest likely yield, and the customers are students that utilize CRC services.

Conversely, the first case had a known trade area - VP 36 as shown in Figure 3-1. The demographic composition of voters in VP 36 was unknown, and their

composition would influence their decisions on a pro or con annexation vote. A commonality the two cases share is the use of psychographic measurements, or lifestyle segmentation profiles, that are derived from the students' permanent addresses. In Case 1, these measurements were referred to as Indirect LSP.

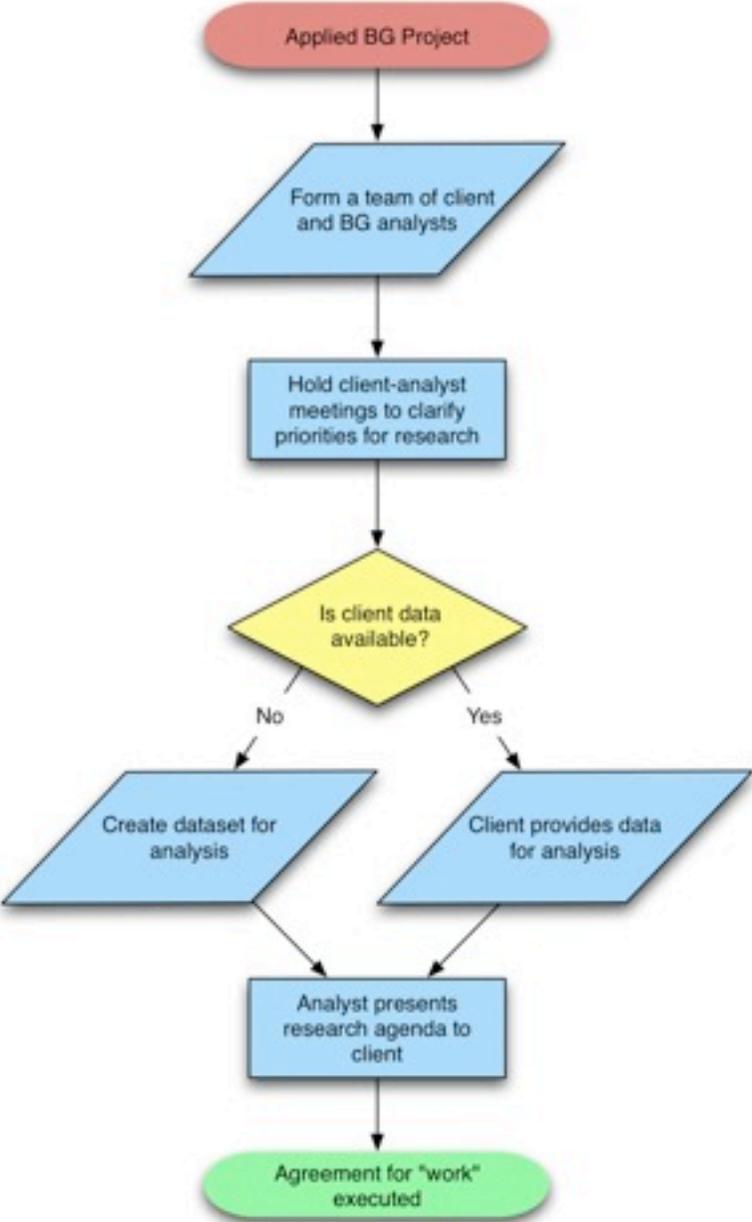


Figure 3-4. Flow chart decision tree for applied BG projects

This study was commissioned by Dr. Wayne Wallace, director of the CRC. Data had been collected detailing which students had been attending CRC events. Through the analysis of this data, this study was to provide recommendations to Dr. Wallace regarding the following objectives:

- increase the number of students served by the CRC
- ensure that the students being served are representative of the general UF student body, subject to cost of changing the mix of students served
- identify geographic areas where market penetration can be most cost-effectively improved

The conclusions drawn from this study would be presented to Dr. Wayne Wallace, to apply the recommendations as he deems appropriate. Dr. Wallace also provides feedback and suggestions to the research team as the research progresses. After discussions with Dr. Wayne Wallace, the following work flow was agreed:

1. Identify and obtain CRC and UF student data
2. Geocode and assign LSPs to both CRC and UF student data
3. Display on map(s) the point database of CRC students, UF students as well as UF and CRC students for comparison
4. Display as tables and charts the frequency distributions of UF versus CRC students
5. Create a grid overlay of the State of Florida and calculate the expected number of CRC student increase
- 6.
7. Identify zones of special CRC attention for seminars and other outreach activities

Acquire data: The University of Florida CRC provided data on students they had previously served. The CRC maintains a database of all the students who attend their Career Showcase each semester. The Career Showcase is a major job fair that draws

students of all majors throughout the university. Dr. Wallace stated that the Career Showcase was most representative of students served, and requested that the pilot study be limited to students who attended that event in 2008. The University of Florida Registrar (UF-R) provided a database of all the students currently attending the university.

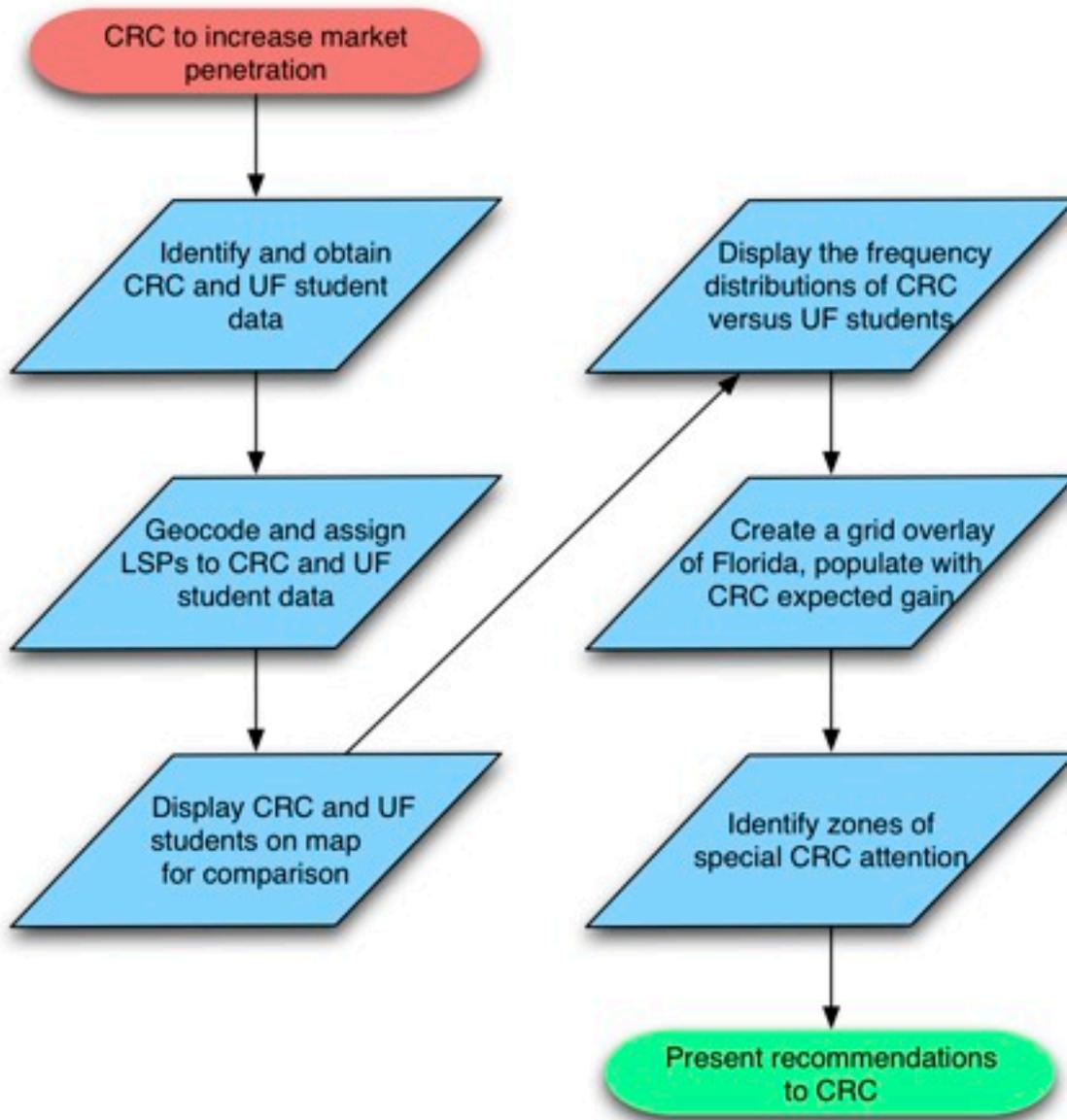


Figure 3-5. CRC workflow

Both CRC and UF-R data included students' permanent address. The two databases were separately input into ESRI's Community Coder component of Business Analyst for street address match geocoding and for assigning Tapestry LSP to each student's data record. Students who attended Career Showcase were mapped and compared against the UF student population by both LSP and geographic location. See Figure 3-6 where blue points represent UF students, and green points represent students who attended Career Showcase in 2008.

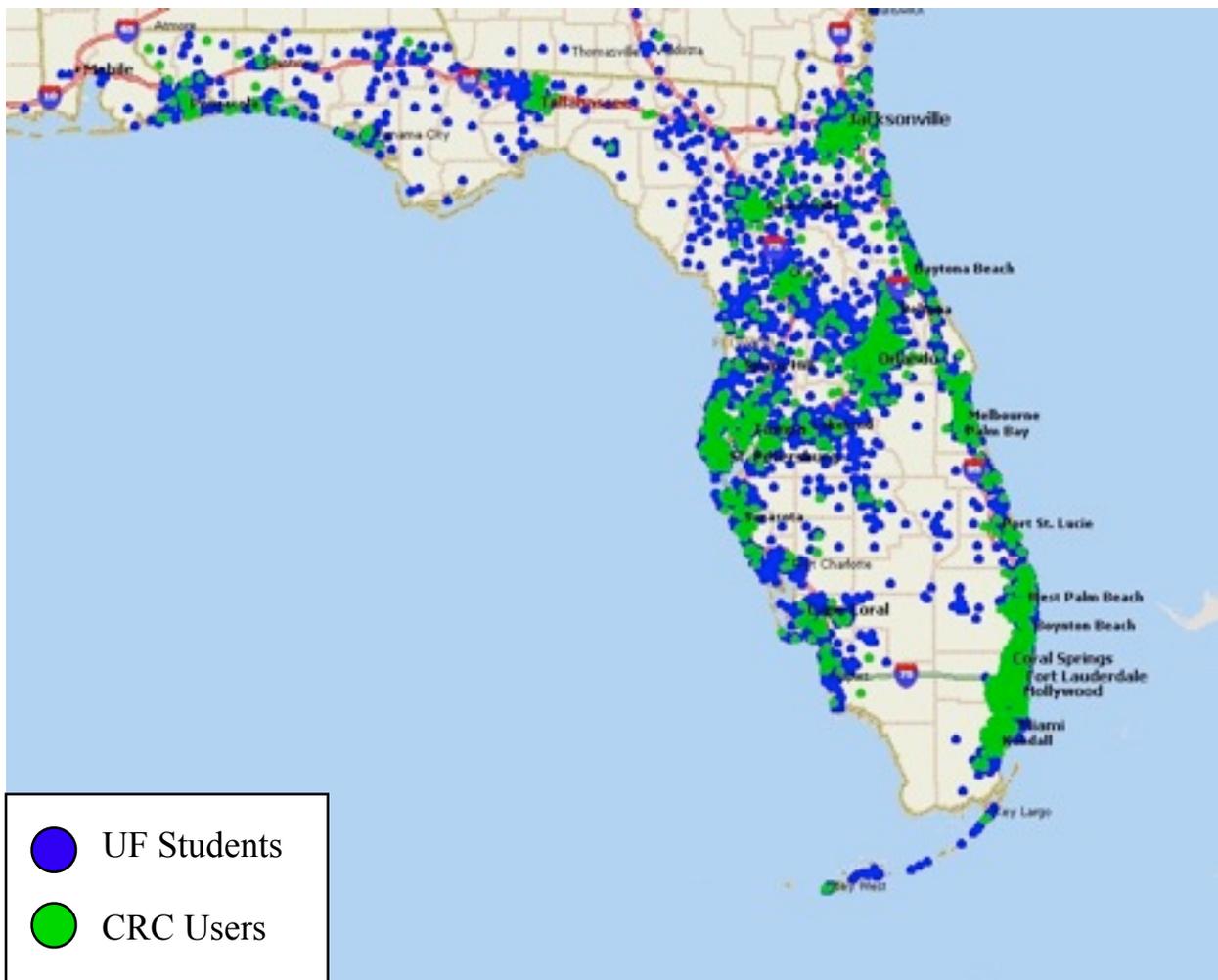


Figure 3-6. CRC users versus UF students

Describe the students: In first comparing students from the CRC database to rest of the student population, initial examination showed that wherever there were UF students, there were also CRC users. The highest concentrations of CRC users, however, were in urban centers. Visually and qualitatively, rural areas were less well served than urban areas.

With the objective in increasing qualitative assessment, a three-dimensional map was created showing both density of UF students and count of CRC users (Figure 3-7). On this map, the orange areas indicate where the UF population is most dense while the height of the grid cells represent count of CRC users. This two theme, three dimensional map qualitatively confirms Figure 3-6, that while the highest concentrations of UF students are in urban areas, there are relatively high numbers of CRC users in non-urban areas such as Naples, Key Largo and Pensacola.

A hypothesis regarding the difference between urban and rural CRC users is that UF students from more rural areas have fewer intervening opportunities because there are fewer jobs available in these rural markets; this creates nodes of relatively high CRC usage. The qualitative analysis also suggested that major urban markets were being successfully penetrated. The management decision was to conduct further analysis to determine where the prospects were greatest for increase in absolute numbers of CRC users in the state of Florida.

A 6x6 mile grid overlay was created to ascertain the density of CRC users while "holding geography constant."¹⁰ The highest densities of CRC users were identified as

¹⁰ "Holding geography constant" refers to standardizing spatial measures to minimize the effects of the Modifiable Areal Unit Problem (MAUP). MAUP is a source of statistical bias that comes about when aggregating point data into districts.

being in urban markets, specifically Jacksonville, Gainesville, Orlando, Tampa and southeast Florida. With the geographic evaluation completed, the differences between students that used the CRC and those who did not were evaluated based on LSP.

Further analysis showed that the CRC is capturing more of some LSPs than others, such as L6's (Scholars and Patriots) and L1's (High Society), however a closer look showed that the lower capture rate percentages usually represent LSPs that classify fewer students. This data was then presented to the client, Dr. Wayne Wallace. Dr. Wallace's managerial decision was that with the limited resources of the CRC, it would be cost ineffective to target potential CRC users on the basis of their indirect LSP

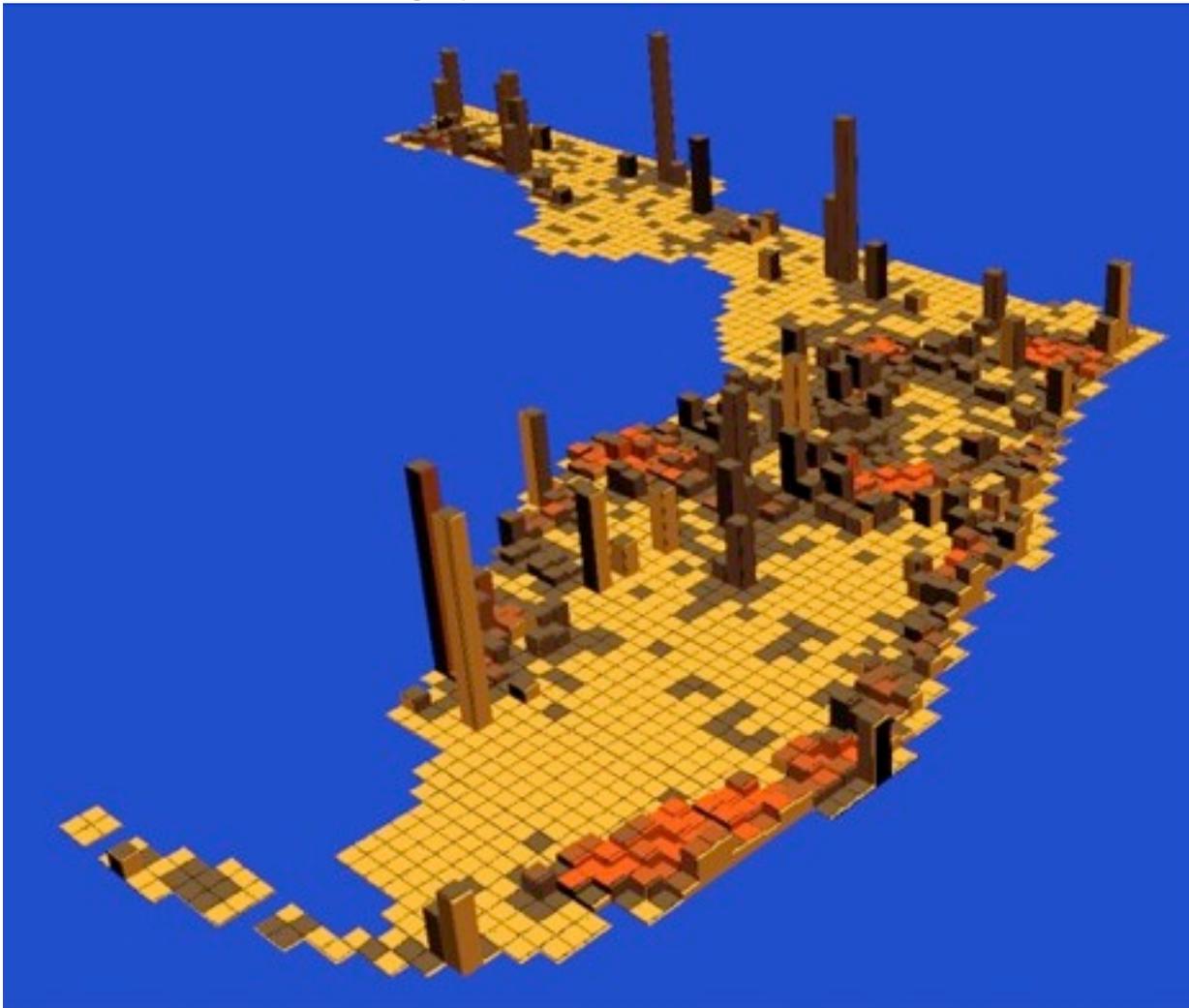


Figure 3-7. CRC user and UF student density

measurement; it was also cost ineffective to send CRC representatives to rural areas. It was decided that qualitatively, there was insufficient evidence to indicate that any LSP groups were not represented.¹¹ Dr. Wallace reasoned that it would not be cost-effective to pursue students from the LSPs with lower captures rates because they represented such a small number of students. The return on investment to capture students from less represented LSPs simply would not justify the cost. With Dr. Wallace satisfied with the demographic analysis, this project's goal was now to identify areas where the CRC's market penetration could be improved most cost-effectively.

Although the CRC was performing admirably at capturing every kind of student, less than 5% of the UF student population was being served (Table 3-1).

Table 3-1. Students by LSP

LSP	UF	LSP Percent of UF	Showcase	LSP Percent Attended Showcase
L6	5858	12.23%	426	7.27%
L11	436	0.91%	29	6.65%
L1	10500	21.93%	589	5.61%
L5	8561	17.88%	437	5.10%
L9	2989	6.24%	152	5.09%
L4	2521	5.26%	125	4.96%
L2	6980	14.58%	330	4.73%
L8	1680	3.51%	78	4.64%
L10	2419	5.05%	105	4.34%
L3	1034	2.16%	41	3.97%
L7	1863	3.89%	72	3.86%
L12	3049	6.37%	98	3.21%
Grand Total	47890		2482	5.18%

It was determined that the best way to counter this shallow penetration was to target

¹¹ This is not to say that a statistical analysis might show some difference. Rather, since LSPs are not presently accepted as a determinant for student services, and since no apparent glaring gaps existed between LSP groups, it would in a managerial sense with a limited budget not be cost effective to pursue this line of reasoning.

areas where expected gain is the highest.

Develop a strategy: A method had to be developed using the analysis already completed to identify areas where the CRC's market penetration could be most cost-effectively improved. To achieve that goal, the scope of the study was reduced to the state of Florida, a 6x6 mile grid overlay was used to cover the state and a variable called Expected Gain was created. Expected Gain is defined as the number of students that can be expected to become CRC users with increased efforts in a 6x6 mile grid cell. Average market penetration is first calculated. Grid cells with below average penetration were selected and a statistical analysis was completed to determine which of these cells were significant.¹² Each of these significant cells was then assigned a Potential Penetration variable where:

$$\text{Potential Penetration} = \text{Average Penetration Rate by grid cell with CRC users} \times \\ \text{Number of UF Students by grid cell}$$

Each below average cell was also assigned a Current Penetration variable which represents that cell's current level of market penetration. Finally, Expected Gain is calculated:

$$\text{Expected Gain} = \text{Potential Penetration} - \text{Current Penetration}$$

Using this formula to create a new field with which to categorize the entries in the GIS database, a map was created to show Expected Gain in the state of Florida (Figure 3-8). The recommendations made to the CRC centered around this data.

Evaluate the outcome: In Figure 3-9, four zones were selected as geographic

¹² Average market penetration for the State of Florida was calculated. Cells with below average penetration were selected; grid cells containing no UF students were excluded. A 2-tailed t-test was applied to determine which of the grid cells were statistically significant at 95% confidence.

standouts where Expected Gain is highest: Gainesville, Tampa, Orlando and southeast Florida.

At first glance, Gainesville has the highest Expected Gain in the state. However, this number is most likely skewed by the number of international and transfer students attending the University of Florida. These students tend to list their Gainesville addresses as their permanent addresses and could easily have inflated the amount of Gainesville's Expected Gain. While the Expected Gain that lies in Gainesville should not be ignored, it should be the lowest priority of the CRC. The CRC's goal was to reach out to students before they come to the University of Florida. The students that are already

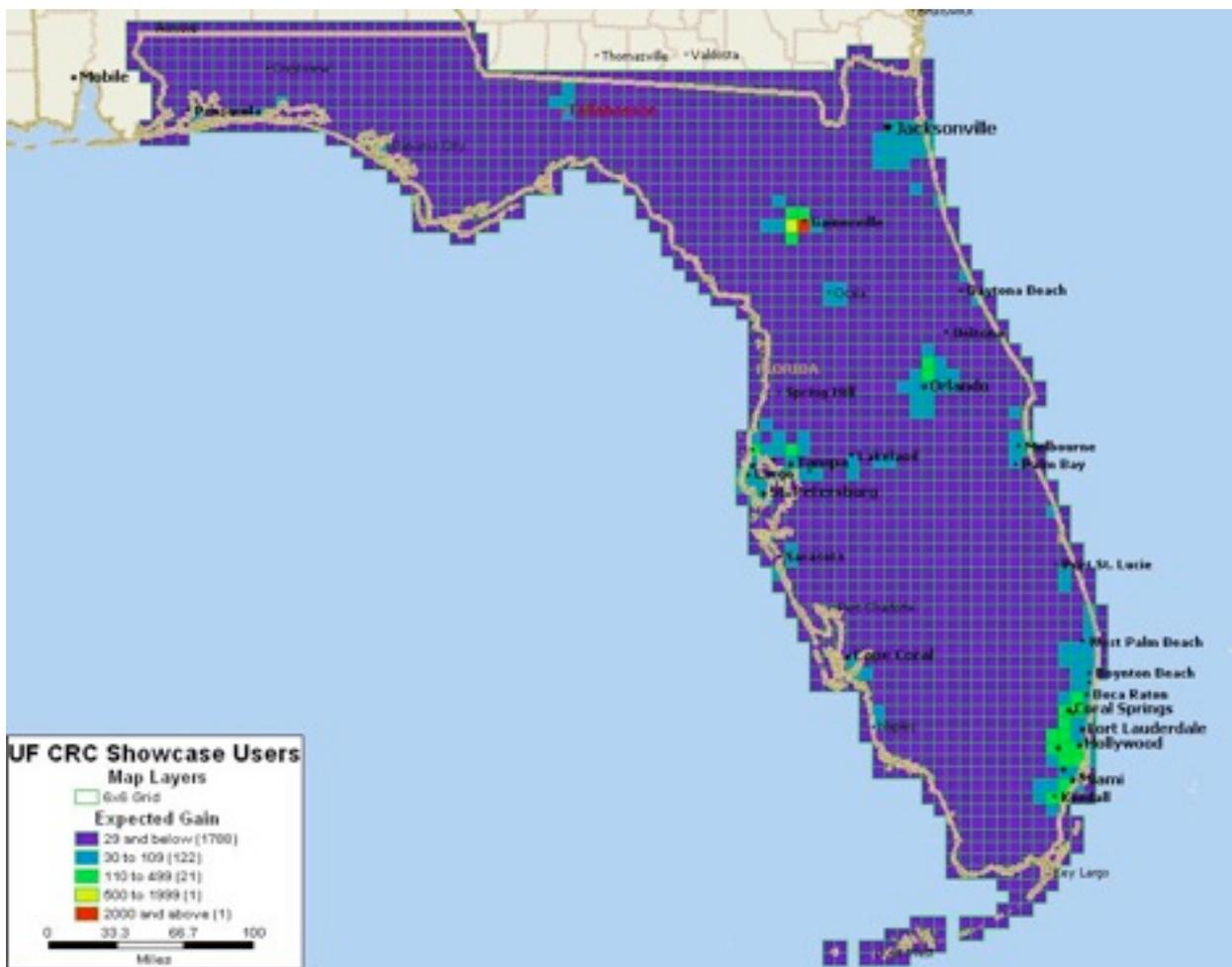


Figure 3-8. Expected Gain in Florida

in Gainesville represent a captive audience for the Career Resource Center. Dr. Wallace agreed that these students can be reached with advertising on campus and more sizable investment is not necessary. The other three zones, namely southeast Florida, offer the next highest Expected Gain in the state, and should be the focus of the CRC.

Hence, it was recommended that the CRC target students whose permanent addresses lie first in southeast Florida, second Orlando and third the Tampa Bay area. By investing in these three zones, the CRC should expect to gain the greatest number of students as clients.

As a direction for further study, the Business Geography analyst may want to look at Expected Gain on a more granular scale. Furthermore, by looking at Expected Gain by LSP, the analyst can determine if Expected Gain differs between LSPs. Using the outcome of this future research, the CRC could tailor more specific messages to different LSP groups chosen by their Expected Gain.

Table 3-2. Expected Gain by zone

Zone	Expected Gain
Zone 1 - Gainesville	3812
Zone 2 - Tampa Bay	258
Zone 3 - Orlando	329
Zone 4 - SE Florida	2093

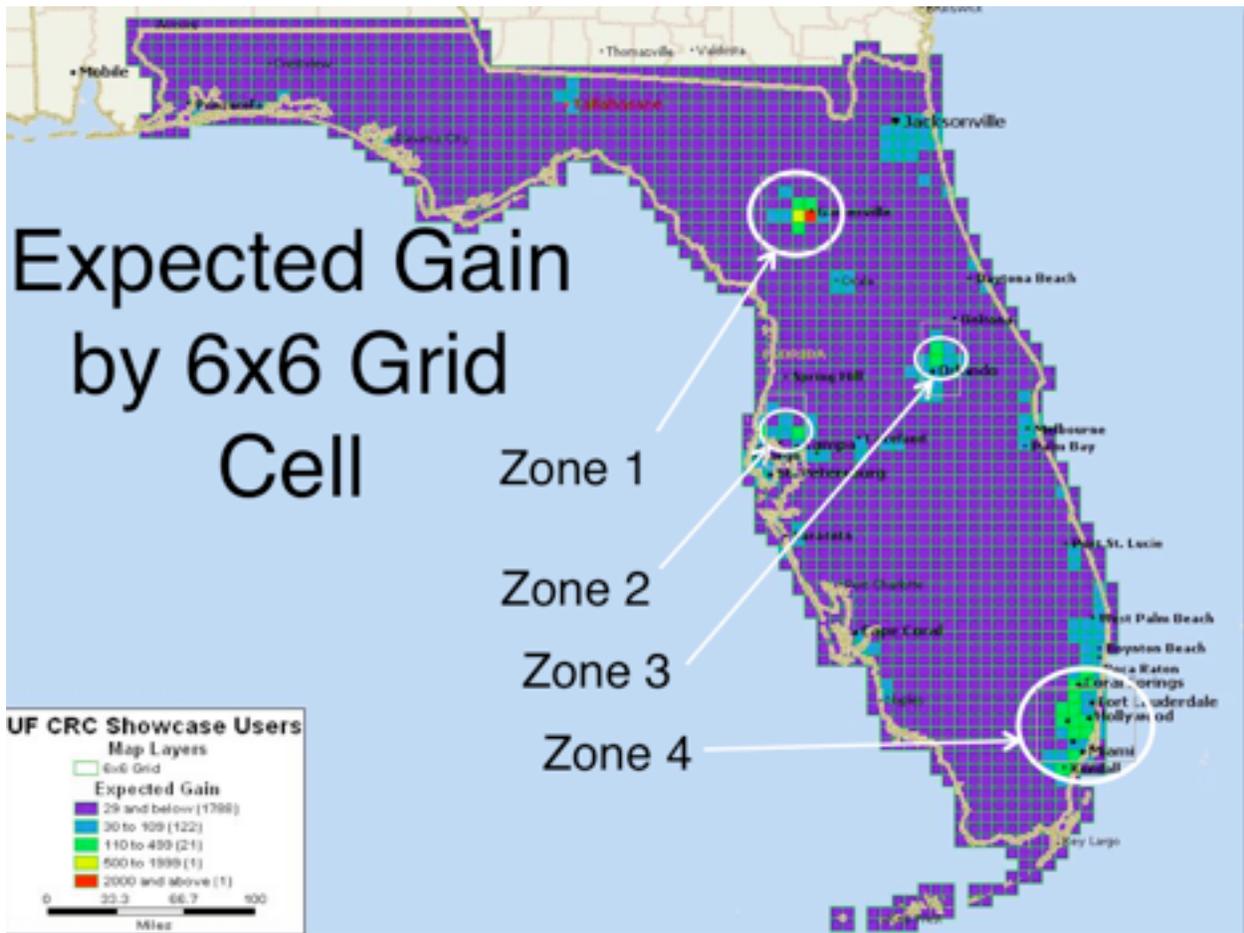


Figure 3-9. Expected Gain, priority zones

CHAPTER 4 CONCLUSION

Business Geography (BG) can improve managerial decisions. The flow diagrams here have shown how BG practices and procedures integrate problem statement, research design, data management, and geospatial analysis with managerial decisions. The Business Geography analyst should be involved in all phases of study design, otherwise risk increases to the client that important potential results are omitted leading to business decisions that are not "the best."

The business geography analyst works with the management team, contributing to decisions that shape the course of the analysis. For example, a research agenda might be presented and agreed upon; however, the weighing of costs and benefits, as preliminary results are revealed, can and did shape subsequent work executed.

As part of his research design, the Business Geography analyst must decide whether the direct or indirect calculation of lifestyle segmentation profiles is appropriate in addressing the problem statement. In most analyses, derivation of lifestyle segmentation profiles have been directly calculated based upon current address. However, as demonstrated here for a student community, direct measurements do not differentiate between students; all students are merely categorized as "students." Instead, indirect measurements based upon students' parent address provides an indicator that can be used to differentiate students based upon the lifestyle segmentation profile of the location in which they have family support. The direct method might extend to military, retirement, and other communities in which households of different LSP background are clustered together.

The methods and results presented in Case 1 were used by the Strategic Planning Division of the City of Gainesville in order to create a methodology to identify sub-areas that would be most responsive to annexation. After the successful annexation of VP 36 in November 2008, the City of Gainesville began planning for twelve more annexations to take place during the next ten years. The City and County government representatives intend to use the approach presented here as a guide for future sub-area selection and design of message to voters in the targeted areas.

The methods and results presented in Case 2 have been presented to the Director of the University of Florida Career Resource Center. He will decide if targeting future CRC users on the basis of LSP or geographic location makes sense in the context of the budget of the CRC and the objectives of the CRC.

APPENDIX A ESRI TAPESTRY LIFEMODE GROUPS ¹³

L1 HIGH SOCIETY. Residents of High Society segments are affluent and well educated. They represent slightly more than 12% of all US households, but generate almost a quarter of the total US income. Their median household income is almost twice the national median and they live in neighborhoods with a median home value exceeding \$345,000.

L2 UPSCALE AVENUES. Members of this group are well educated with above average earnings. Housing choices include townhouses and high rises in the urban markets, single family homes in suburban neighborhoods, and open spaces for more rural segments. The median household income tops \$66,700 and their median net worth exceeds \$175,000. They invest in their homes. Owners do landscaping and remodeling.

L3 METROPOLIS. This group lives and works in America's cities. They live in older single family homes or row houses built in the 1940s or earlier. Those in larger cities tend to have fewer vehicles, relying on public transportation, however, most residents commute to service related jobs. Depending on where they live, median income can range from \$52,880 to \$373,700. This group reflects diversity in housing, age and income. Employment varies from well-educated professionals to the unemployed.

L4 SOLO ACTS. This group features singles who prefer city life. Many are young startup households located in more densely populated neighborhoods. This segment tends to be well educated working professionals who are either attending college or already hold a degree. They have considerable discretionary income.

L5 SENIOR STYLES. Members of this group are 55 years or older. Income in this segment varies greatly with a median of about \$41,000. The variety of income can be attributed to retirement income and social security payments. Housing choices depend on income. This is the most politically active market group.

L6 SCHOLARS AND PATRIOTS. The shared traits in this group include youth, lower incomes and atypical environments, namely college life or military service. Few own homes due to their transient lifestyle and life stage. Most live in townhouses or apartments, one quarter resides in single-family homes.

L7 HIGH HOPES. The High Hopes group seeks the "American Dream" of homeownership and a rewarding job. Most live in single-family houses or multiunit buildings. Residents in this group are young and college educated, one third of the householders are younger than 36years. Their median net worth tops \$81,400.

¹³ Descriptions are based on Grant Thrall's, "ESRI Tapestry LifeMode Groups: Characteristics of Each of 12 LifeMode Groups, And Dominant LifeMode By US County", 2008

L8 GLOBAL ROOTS. The Global Roots segments are ethnically diverse. They are young with modest incomes and tend to rent in multiunit dwellings. Half of the households have immigrated to the United States in the past 10 years. Household types include married couples, typically with children, single parents and singles who live alone.

L9 FAMILY PORTRAIT. Family Portrait is the fastest growing LifeMode group. Youth, family life, and the presence of children are common characteristics. The group is ethnically diverse, nearly 30% of the residents are of Hispanic descent. The neighborhoods are predominantly homeowners in single-family homes. Most households include married couples with children which explains the households' size of more than 3.11 persons per household.

L10 TRADITIONAL LIVING. This group is characterized by hardworking settled families. The median age is 37.4 years. They work hard to earn a modest living and typically own single-family homes in established neighborhoods with slow population growth. Members of this group buy standard four-door American cars and care for their homes and gardens.

L11 FACTORIES AND FARMS. This group represents rural life small towns, villages and farms. Most households are families, either married couples or married couples with children. Residents mirror the U.S. age distribution with slightly more retirees. Median household income is \$38,000 and median home value is about \$68,000. Most own their homes.

L12 AMERICAN QUILT. This group also resides in small towns and rural areas, but represent a more diverse segment of the population than L11. This groups includes workers in local government, service, construction, communication and utilities. It also includes older people retiring to seasonal vacation spots and a younger family segment.

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BIOGRAPHICAL SKETCH

Nicholas John Serluco was born on June 22, 1987 in Richmond Hill, New York. The oldest of three children, he grew up mostly in Richmond Hill before moving to Tampa, Florida, graduating from C. Leon King High School in 2005. He earned his B.S. in Business Administration and his M.S. in Geography from the University of Florida (UF) in 2009 and 2010, respectively. He looks forward to career in market research for retail business and aspires to one day start a consulting firm.