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INFORMATION SYSTEMS EDUCATION JOURNAL

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Teaching Case

BI GIS Competition Brings DSS to AITP NCC

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ABSTRACT

A national student competition problem in business intelligence (BI) is considered to foster an understanding of this competition and of the underlying case study problem used. The focus here is two-fold. First, is to illustrate this competition, and second, is to provide a case problem that can be considered for use in various information systems courses. This case problem utilizes a commercially available, hosted software application that includes a rich econometric data set. The data are accessed using spatial queries and produce more than four dozen views of the data through predefined reports. Once the queries occur, the data can be analyzed further with other BI tools that include Microsoft Excel. The case problem requires this analysis of external business data to furnish information for business decision making. This NCC competition and its case problem approach have been successful for the past four years. Clearly, the experience of this competition can be applied to case-based, experiential learning in information system courses that include a BI component. This usage of the competition problem has been found to work well in several of these courses and should be considered by others for similar courses.

Keywords: Business intelligence, geographical information systems, case problems, decision support

1. INTRODUCTION

What is AITP NCC BI GIS? While active AITP faculty and members readily recognize these acronyms, they need to be defined for others. The Association of Information Technology Professionals (AITP) is a leading worldwide society of information technology business professionals and the community of knowledge for the current and next generation of information systems leaders. The purpose of the organization is to serve members by delivering relevant technology and leadership education, research and information on current business and technology issues, and forums for networking and collaboration. One of AITP's premier annual events is the National Collegiate Conference (NCC). The NCC has been held for each of the past 15 years. This conference continues to attract as many as 800 participants, primarily students from various colleges and universities in North America. These students participate in a variety of competitions, attend a number of presentations on current and emerging technology, interact with businesses through a job fair, and meet students from other colleges. This is an outstanding experience to broaden their perception of information technology careers and opportunities.

The Business Intelligence (BI) Geographical Information Systems (GIS) competition is one of more than a dozen competitions held at the NCC. This competition has been included in the NCC for the past four conferences. Other competitions include PC Troubleshooting, Systems Analysis and Design, Database Design, and Programming Languages. BI GIS is the only competition with an emphasis on business analytics, which is concerned with the use of

information to support business decision making. Recently, the primary software used for the BI competition is Business Analyst Online (BAO) from Environmental Systems Research Institute (ESRI). This is a web-based, hosted application that features both a very rich set of GIS data and an interface that facilitates spatial queries of that data. BAO is a GIS tool, because it is designed for these spatial or geographical queries. Business data are displayed on a map to show spatial relationships from BAO's robust econometric database. Results from BAO GIS queries have the option to be delivered in the Microsoft Excel workbook file format, which straightaway supports additional analysis. Clearly, Excel is widely recognized as the leading software tool for end user BI analysis (Evelson, Moore, & Barnet, 2007; Palocasy, Markham, & Markham, 2010), which underscores it use with BAO. The analytics of the BI GIS competition blend commercially available, real-world external business–related information of BAO from ESRI and the Excel spreadsheet tool from Microsoft. Each is recognized as a leader in the advantage it delivers for BI analysis. The business analytics process is completed in Excel using the spatial query data from BAO. (See Figure 1, in Appendix)

The purpose here is twofold. First is to increase knowledge of an available BI tool which affords a substantial set of commercially available external business-oriented data for decision making. Second is to provide an example case problem for potential course usage. The desired outcome here is to impart an understanding of how the case problem from this competition might be utilized in information system courses, especially those with a current or planned BI module, and to increase awareness of this competition to encourage future participation by emerging information technology professionals, while they are still students.

2. BACKGROUND

The concept of BI has been around since it was first coined by Hans Luhn (1958). He defined it as: "the ability to apprehend the interrelationships of presented facts in such a way as to guide action towards a desired goal." According to Power (2007), it was in 1989 that Howard Dresner proposed BI as an umbrella term to describe "concepts and methods to improve business decision making by using fact-based support systems." However, it was not until the late 1990s that this usage became widespread. So, the tools for BI deployment have finally arrived to effectively and efficiently create Luhn's earlier vision. Today, SAP AG has a BI product, as do SAS, IBM, and others. BI is the present-day label for that half-century old idea, which is now supported by an array of advances in information technology (Anonymous, 2010). BI is the most recent characterization for many of the concepts of decision support systems (DSS), which have been around since the 1970's. DSS has gone through a number of "hot new names" to sell the latest iteration of software tools. This seems to be more of a software vendor marketing movement of the evolution of software tools than truly break-through, totally new technology. On the other hand, this evolution of tools, in concert with the development of the Internet, now makes these tools more cost effective and widely available. It is that availability which renders the BI GIS competition at the NCC the reality it is today.

Individually, software vendors vary their specific definitions of BI that match their particular tool and its unique capabilities. As a result, while there are similar views of what BI is, in general, there are also these individual differences. Without question, many software tools are available in the BI software tool space, where each has its unique features that make it the "best" tool for different analysis. For purposes of the NCC BI competition, a variety of tools were considered that would not only support DSS and BI queries, but also provided a rich dataset of information easily comprehended by student participants. BAO by ESRI includes a number of features that make it an exceptional tool to use with the NCC Competition. BAO's ample dataset houses a source of high-quality external data, which is of interest to a wide variety of different businesses. The econometric datasets in BAO supply this information, while operating with a user-friendly interface. Further, BAO is a hosted, web-based BI environment. This means that it is easily accessible by a large number of users without the need to create a separate hosting platform for both potential and actual contestants, as well as making it available for information system course usage. Further, ERSI agreed to provide BAO for this contest at no cost to students or the Conference itself. For these reasons, the NCC Competition presented here explores an example of a case problem, and by extension, an example hands-on BI analysis that should be considered for inclusion in information system courses.

3. BI AND DSS

The work of Gorry and Scott Morton (1989) is a classic reprint of their original work written in 1971. They indicate the usefulness of a framework is that it … "allows an organization to gain perspective on the field of information systems and can be a powerful means of providing focus and improving the effectiveness of the systems effort." Their framework postulates a number of parameters (Table 1, in Appendix) that are DSS characteristics. Additional corroboration for this framework is provided by Adam, Fahy, and Murphy (1998), who, after considerable evaluation of multiple perspectives, concluded that the Gorry and Scott Morton framework endures as it was originally advanced in 1971. The framework continues to provide substantial direction in the study and application of BI. "Largely External" is an information characteristic for Strategic Planning. That is, the information is obtained from sources other than the typical data housed in a business' own repository and used for its customary business activities. Demographic data is one example of this. So, where do businesses obtain this Largely External information? That is, how does DSS concept meet analytical reality? BAO is one alternative with its econometric datasets providing relevant business-oriented data for decision making, which is a key focus for the Strategic Planning category in Table 1. BAO serves as a stalwart means of obtaining high quality external information to support decision making in strategic planning. For this reason, BAO is an excellent candidate software tool for the NCC BI GIS competition. And, BAO changes the competition's emphasis to business problem solving rather than the mere collection, maintenance, and access of external data. Thus, the nucleus becomes one of selecting appropriate data for the problem at hand. A business maintains its competitive advantage not through its own storage and maintenance of this econometric data, but rather through the data selection and analysis performed. This is the analytical focal point of the BI GIS competition, and by extension, to a case problem for information system courses.

4. BAO SPATIAL QUERY

Maps are utilized recurrently to display spatial relationships of business-oriented data. Consequently, BAO uses maps in analyzing business data. A spatial query is a special type of database query supported by geodatabases. A geodatabase (also known as a spatial database) is a database designed to store, query, and manipulate geographic information and spatial data. Spatial queries differ from SQL queries in several important ways. Two of the most important are they permit the handling of geometry data types such as points, lines and polygons; and these queries take into account the spatial relationship between these geometries.

Within a spatial database, the econometric data is treated as any other data type. Vector data can be stored as point, line or polygon data types, and may have an associated spatial reference system. A geodatabase record exploits a geometry data type to represent the location of an object in the physical world and other standard database data types to store the object's associated attributes. Spatial databases are optimized to store and query data related to objects in space, including points and polygons. While typical databases can understand various numeric and character types of data, additional functionality needs to be included for databases to operate on spatial data types. These are typically called geometry or feature types.

BAO delivers spatial queries in three popular, easy to use arrangements – rings, drive times, and donuts; however, other more specialized areas can also be deployed. The three popular configurations are the ones that encompass the core of the competition problem. Each of these query types is considered next.

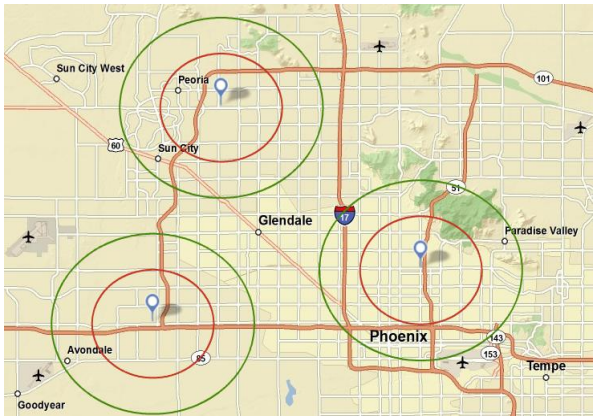


Figure 2: Ring spatial query

Rings – most widely used for market-area analysis, are circles generated on a map around a specified point. It is possible to choose up to three rings and indicate the radius, in miles, of the rings around the point. Report data are summarized for the area bounded by each ring.

That is, each of the outer rings includes the data from the rings inside that outer ring. Queries are cumulative for the entire area from the selected location point to the outer ring. (See Figure 2)

Figure 3: Drive time spatial query

Drive Times - represents how long it takes a customer to drive from a specified central location. These areas represent the distance traveled from the identified point on the map in a given amount of time. For example, a store's ten minute drive-time area defines the area in which drivers can reach the point in ten minutes or less. Travel time evaluation uses posted speed limits for the street segments. Here, each outer area comprises the data from the area inside of it. That is, it is cumulative or an overlap of the internal areas. This is the same approach as that for rings. (See Figure 3)

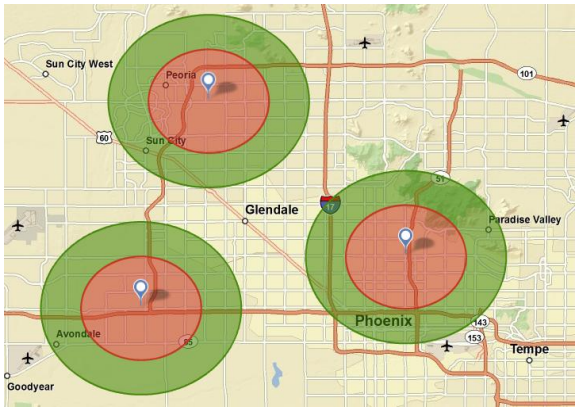


Figure 4: Donut spatial query

Donuts – study areas in a donut shape have no overlap and provide the traditional ring study area but without duplication of overlapping areas. That is, the query data for each area is mutually exclusive. Donuts are useful for recognizing the incremental market changes as you move away from a center location. For example, specifying donut values of 1, 3, and 5 miles will result in reports being generated for data from 0-1, 1-3, and 3-5 mile bands from the center. (See Figure 4)

5. BAO DATA

Why is BAO data appropriate for this NCC competition and hands-on case problems? BAO delivers data that is readily grasped by many people without in-depth knowledge of a particular business or industry. That is, it is reasonably industry non-specific. BAO data is commercially available, which signifies its value to many different businesses in a variety of industry sectors. BAO contains extensive demographic data, especially census data, as well as other econometric data portraying various industry sectors. Using their technologically advanced methodologies, ESRI presents updated census data projections every year. They offer a projected estimate for the current year and for five years in the future.

So, why conduct BI GIS through BAO? Yes, this is a limitation of the approach presented here. It is acknowledged there are other approaches to data marts for data warehouses that support other, different strategies to BI analytics. However, BI is a concept with many diverse facets. Clearly, BI GIS presents one of those views. A vision that uses a widely and readily available tool with an expansive data set, which contains data easily grasped by students with a variety of backgrounds with minimal effort.

Market Profile

The Market Profile report (Figure 5, in Appendix) emphasizes population data. This includes data from the last census, a current year estimate, and a five year projected estimate. These estimates are provided by ESRI and use their advanced, proprietary methods of estimation. Population data is arranged by age group and by race or ethnicity. Household data includes the number of households, median income, and income by category. Other data includes per capital income, median age, employment by industry, employment by occupation, and spending by category.

Retail Goods and Services Expenditures

The Retail Goods and Services report (Figure 6, in Appendix) contains current year estimates, five year projected estimates, a comparison to a

national average index, and more detail of spending by category than the Market Profile report. In Figure 6, 2009 Consumer Spending shows the amount spent on a variety of goods and services by households that reside in the market area of the spatial query. Expenditures are shown by broad budget categories that are not mutually exclusive, so consumer spending does not equal business revenue. The Spending Potential Index represents the amount spent in the query area relative to a national average index of 100. This provides a quick analytic comparison of relative consumer expenditures.

Retail Market Place Profile

The Retail Market Place Profile report (Figure 7, in Appendix) displays data by industry groups. The data are provided for the Retail Demand, the Retail Supply, the Supply/Demand Gap, and the Supply/Leakage Factor. The factor is a percent measure of the retail gap divided by the sum of the demand (retail potential) and the supply (retail sales), where the retail gap is the difference between the demand and supply. These differences are exploited to produce a chart of the Supply/Leakage Factor (Figure 8, in Appendix) and compare graphically the various industry groups.

In Figure 7, Supply (retail sales) estimates sales to consumers by establishments. Sales to businesses are excluded. Demand (retail potential) assesses the expected amount spent by consumers at retail establishments. Supply and demand estimates are in current dollars. The Leakage/Surplus Factor presents a snapshot of retail opportunity. This is a measure of the relationship between supply and demand that ranges from +100 (total leakage) to -100 (total surplus). A positive value represents 'leakage' of retail opportunity outside the trade area. A negative value represents a surplus of retail sales, a market where customers are drawn in from outside the trade area. The Retail Gap represents the difference between Retail Potential and Retail Sales. ESRI uses the North American Industry Classification System (NAICS) to classify businesses by their primary type of economic pursuit. Retail establishments are classified into 27 industry groups in the Retail Trade sector, as well as four industry groups within the Food Services & Drinking Establishments subsector,

6. NCC COMPETITION PROBLEM

Clearly, the BI GIS competition problem is but one example of and approach to BI analytics. It is not presented here as the only method or as the absolute "best" method. Rather, it is one example of an approach that has proven itself through the NCC competition over several years. This history is an indicator of the success of this organization of the BI competition for a diverse group of contestants. The success underscores a reason for also considering the competition problem as a case problem for information system courses with a BI component.

The NCC competition problem involves site selection decision making. Contestants are given a case narrative which describes the details of the decision for which they are preparing a recommended course of action. (The 2010 BI GIS competition problem statement is available at http://my.mis.cmich.edu/BI/Problem.doc.) Site selection is for a retail business, which is a common business problem requiring decision making. The case problem statement provides a list of potential sites together with component costs of acquiring land and constructing a building. Contestants are guided in the selection of some data for the evaluation. This encompasses the industry sector, the expected service area of the business, and the expected share of the wallet for the business. Their task is to perform a financial analysis which includes a payback period and a revenue-to-assets ratio. Then, they provide a ranked list of the locations, which supports selecting the "best" sites, which may be within an indicated budget amount. That is, they must present the results for making a decision based on their analysis.

Contestants need to determine which BAO reports, from all the available reports, contain appropriate econometric data for their spatial queries. These data are then analyzed using a set of primary key factors and relationships presented in the NCC problem statement. The purpose is to furnish adequate direction for a common solution analysis and presentation, which can be judged readily. However, contestants must understand both the BAO data and the subsequent evaluation relationships in order to perform the case problem analysis. This stresses the necessity to do more than just retrieve the data for decision making. Clearly, the data require further analysis to provide the essential context for decision making. This is a typical situation for business decision making, which utilizes the 'Largely External' information requirements as postulated by Gorry and Scott-Morton (1989).

Key Factors and Relationships

Key factors and relationships establish the necessary guidance to direct contestants towards a relatively common solution for the NCC competition problem. This is where the BAO BI GIS bumps into Excel for BI analysis. Here, the BI confluence is a balancing situation. Adequate direction is set forth to achieve a reasonably common analysis for judging the competition, while challenging contestants in their use of BAO to acquire data and then conduct an appropriate analysis of that data using the ubiquitous BI tool Excel. Several of these factors and relationship are considered here to provide an overview of this direction.

- Primary and secondary service areas are set forth in miles and drive times with the data in these areas to be considered as non-overlapping data.
- A share of the wallet indicates a decrease in participation in the secondary area.
- The ring (or donut) and drive time service areas must support one another which is achieved by averaging the results for the different geographical areas. This requires contestants to do multiple queries in order to combine the influences on the results.
- The number of households and median disposable income are determined from the most recent estimates available within BAO.
- The NAICS classification of the business is specified.
- A table provides a mechanism for converting median disposable income into an expected amount spent for a location.
- A general description is outlined for each of the Location Summary Matrix items (Figure 9, in Appendix), which presents the averaged or summarized results that combine the two different query influences.

These factors and relationships indicate clearly that contestants must understand the BAO data to both perform the necessary spatial queries and carry out the subsequent analysis which leads to decision making. And, understanding the data is always a key factor in the analysis and solution of business problems, in general.

Problem Solution

The summarized calculations for each Location (Pad or Site) for the project scoring parameters are shown in Figure 9. These are the results from which the Location Scoring Index values are calculated for each parameter (Figure 10, in Appendix). The parameter indices are summed to yield the final, overall score for the location (site) in the Score column (column N). The Score values are used subsequently to rank the desirability of each location (Figure 11). Then, Figure 12 (See Appendix) graphically compares the location index scores. For comparability among solutions submitted for the competition, design sketches of Figures 9 and 11 are provided to contestants, but contain no data. This greatly assists in judging the submitted competition solutions and would be most useful in grading the solution for a case problem analysis submitted by students.

Rank Sort by Score		
Rank	Location	Score
1	8	0.42
2	2	0.24
3	5	0.17
4	9	0.15
5	3	0.13
6	1	0.10
7	4	0.01
8	7	-0.02
9	6	-0.21

Figure 11: Location Index Scores sorted by sorted by rank

NCC Competition Timeline

Each year, the NCC competitions are announced by posting them to the competition web site at the end of October (Figure 13). Although many of the NCC competitions continue from year to year, some new ones are added, and old ones dropped or replaced. These changes depend on student participation each year and competition revisions recommended to the NCC organizing committee as advances in information technology occur and become mainstream technology. The October posting date provides student participants with time to determine in which competitions they will compete and to do their preparation for these competitions. For BAO, a guest access is available immediately when the competition is announced. This allows prospective contestants to explore and examine

this software tool. Once a contestant has registered for the competition, they are supplied an enhanced access (Figure 13, Enhanced BAO Access), which provides them access to reports beyond those available with a guest access and includes all reports used with the competition. With the cutoffs for NCC registration, the enhanced access usually occurs during the first week of March. This is done to limit the full access to the BAO report suite to only registered contestants of the BI GIS competition, and not to all 800 attendees of the NCC. The limitation is done at the request of ESRI and is because of the commercial value of the data available through the BAO tool. The contestants use the enhanced BAO access setup at this time during the actual competition. The NCC competition then occurs at the end of March. Since the second year of this competition, prospective contestants have been provided access to prior year competition problems. Contestants can begin their preparation of the contest any time after the contest announcement. This permits them to better prepare for the competition and affords continuity of the access, which makes access available to them immediately at the beginning of the contest. That is, they have registered already for access, so that process occurs before the competition and gives additional time for the competition analysis. Then, the enhanced BAO access continues for contestants until a week after the completion of the competition at the NCC and enables them to go back and review their solutions.

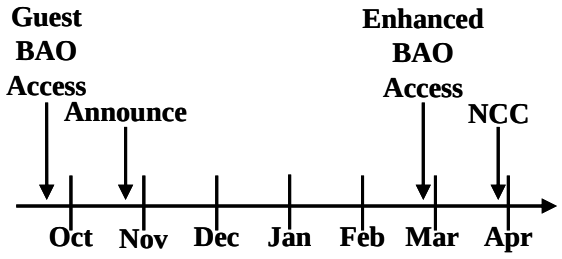


Figure 13: NCC Competition Timeline

Other NCC Problem Usage

NCC competition case problems from prior years have been used in both undergraduate and graduate courses in decision support systems and business intelligence at the author's university. The competition problem is used as an applied BI case problem for student analysis. Based on comments from students, the BI GIS case is well received. They appreciate the ability to use commercially available, leading-edge applications in BI to solve business problems. Also, course instructors, other than the author, have used the NCC competition problem as a case application problem in these courses. These instructors have reported they have found the cases works well as a major case application in their course. Based on these experiences, other educators should consider using the NCC competition problems as case applications in their courses, which contain a BI component that can be demonstrated with the BAO GIS software application. Also, this can serve as preparation for the next year's NCC BI GIS competition.

7. CONCLUSION

The BI GIS competition at the AITP NCC offers a means for students to demonstrate their comprehension of BI using the ESRI BAO software, which is a BI tool with a rich set of econometric data. BAO is a commercially available, hosted software application that provides over 50 views of its data through a variety of reports. The BAO data are accessed through spatial queries that provide geo-coded data for business analytics. This permits NCC contestants and other students to work with this software that is readily available in the business environment to deliver external data, which can be used to support decision making.

The NCC BI GIS competition problem provides a case application that can be considered for use in various business courses which contain a BI component. It furnishes a user-friendly environment for obtaining external business-oriented data that are frequently included in decision support system applications. Problems created for the NCC competition have been found to work well in providing a hands-on, experientially-based case in decision support systems courses that include a BI component. A limitation of BAO is that it is a data mart which is oriented around spatial queries with geo-coded data, and, hence, is not a general data mart. On the other hand, an advantage of BAO is the rich econometric data that is does provide and has application in a wide-variety of businesses. Overall, BAO combined with Excel have provided an excellent environment for the NCC BI GIS competition and does represent a strong, readily available candidate for experiential, case-based learning in decision support systems and related courses.

8. REFERENCES

Adam, F., Fahy, M., Murphy, C. (1998). A framework for the classification of DSS

usage across organizations, *Decision Support Systems,* 22(1), 1-13.

Anonymous. (2010, February). *The Economist*. 394(8671), 6-8.

Evelson, B., Moore, C., Barnett, J. (2007, April). *Ouch! Get Ready — Spreadsheets Are Here To Stay For Business Intelligence*. Cambridge. MA: Forrester Research.

Gorry, G. A., Scott Morton, M. S. (1989). A framework for management information systems. *Sloan Management Review*, 31(3), 49-61.

Luhn, H. P. (1958, October). A Business Intelligence System, *IBM Journal*. http://www.research.ibm.com/journal/rd/024/ibmrd0204H.pdf. Retrieved 2008-07-10.

Palocsay, S.W., Markham,I.S., MarkhamS.E. (2010, February). Utilizing and teaching data tools in Excel for exploratory analysis, *Journal of Business Research*, 63(2) 191.

Power, D. J. (2007, March). *A Brief History of Decision Support Systems, version 4.0*. DSSResources.COM. http://dssresources.com/history/dsshistory.html. Retrieved 2008-07-10.

9. APPENDIX

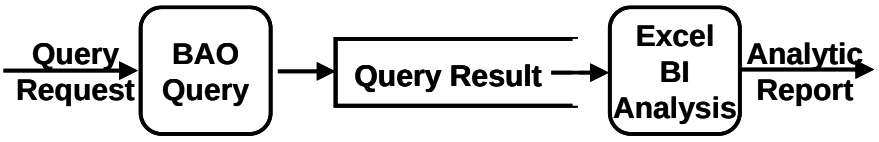


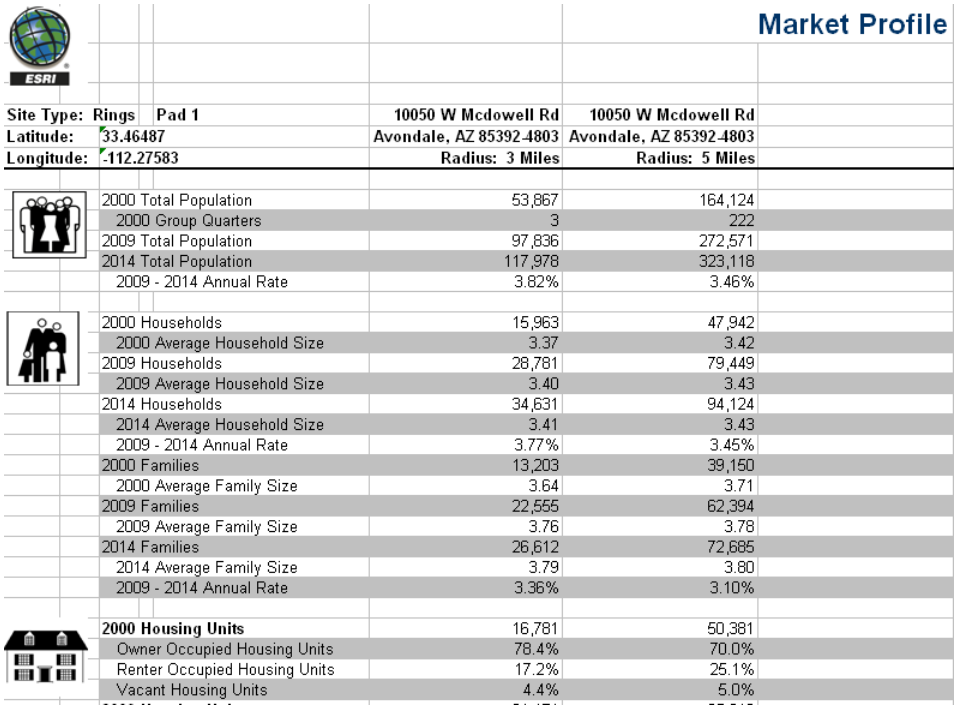
Figure 1: BAO processing and analysis

Table 1: Information Requirements by Decision Category

Characteristics of Information	Operational Control	Managerial Control	Strategic Planning
Source	Largely internal	→	Largely External
Scope	Well defined, narrow	→	Very wide
Level of Aggregation	Detailed	→	Aggregate
Time Horizon	Historical	→	Future
Currency	Highly current	→	Quite old
Required Accuracy	High	→	Low
Frequency of Use	Very frequent	→	Infrequent

SOURCE: Gorry and Scott-Morton (1989)

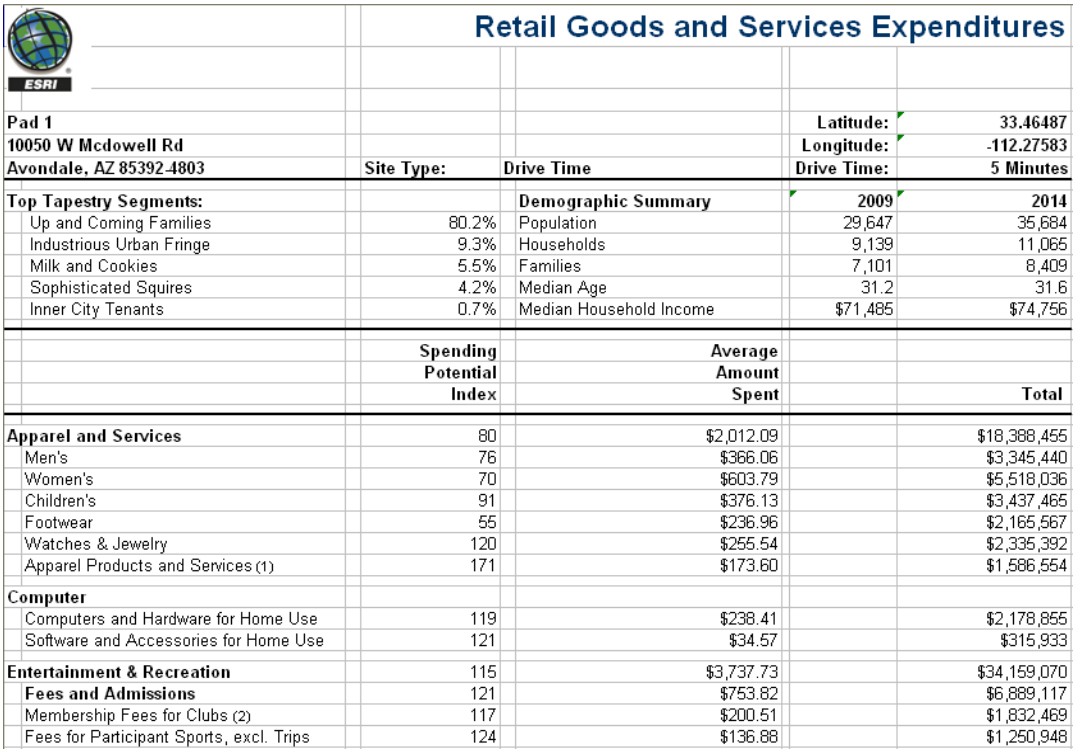
DSS



Market Profile

Site Type: Rings Pad 1	10050 W Mcdowell Rd Avondale, AZ 85392-4803 Radius: 3 Miles	10050 W Mcdowell Rd Avondale, AZ 85392-4803 Radius: 5 Miles
Latitude: 33.46487		
Longitude: -112.27583		
2000 Total Population	53,867	164,124
2000 Group Quarters	3	222
2009 Total Population	97,836	272,571
2014 Total Population	117,978	323,118
2009 - 2014 Annual Rate	3.82%	3.46%
2000 Households	15,963	47,942
2000 Average Household Size	3.37	3.42
2009 Households	28,781	79,449
2009 Average Household Size	3.40	3.43
2014 Households	34,631	94,124
2014 Average Household Size	3.41	3.43
2009 - 2014 Annual Rate	3.77%	3.45%
2000 Families	13,203	39,150
2000 Average Family Size	3.64	3.71
2009 Families	22,555	62,394
2009 Average Family Size	3.76	3.78
2014 Families	26,612	72,685
2014 Average Family Size	3.79	3.80
2009 - 2014 Annual Rate	3.36%	3.10%
2000 Housing Units	16,781	50,381
Owner Occupied Housing Units	78.4%	70.0%
Renter Occupied Housing Units	17.2%	25.1%
Vacant Housing Units	4.4%	5.0%

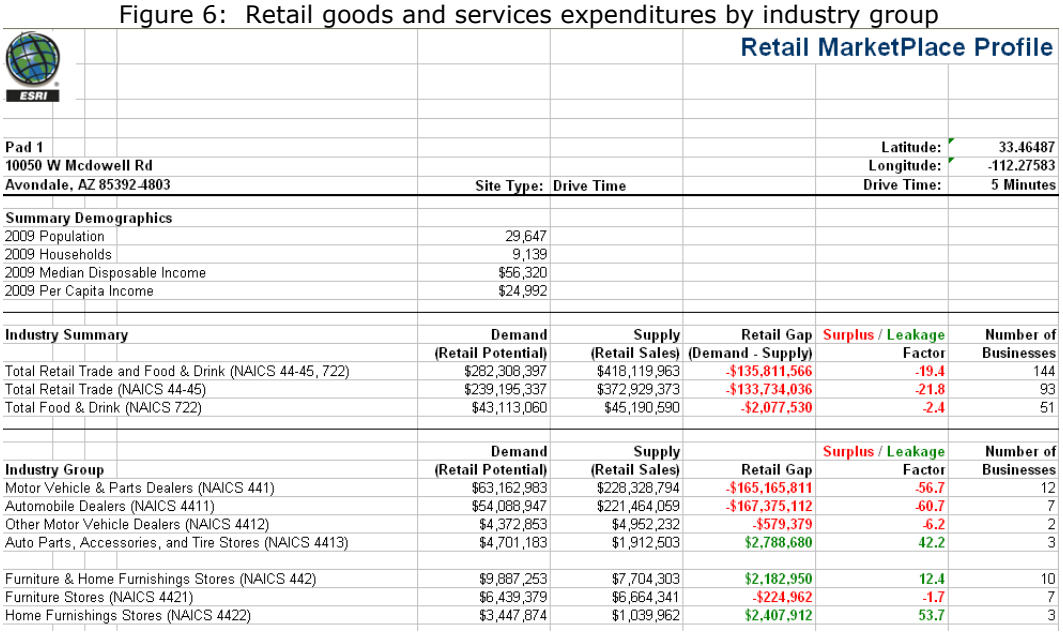
Figure 5: Market profile population data



Retail Goods and Services Expenditures

Pad 1			**Latitude:**	**33.46487**
10050 W Mcdowell Rd			**Longitude:**	**-112.27583**
Avondale, AZ 85392-4803	**Site Type:**	**Drive Time**	**Drive Time:**	**5 Minutes**
Top Tapestry Segments:		**Demographic Summary**	**2009**	**2014**
Up and Coming Families	80.2%	Population	29,647	35,684
Industrious Urban Fringe	9.3%	Households	9,139	11,065
Milk and Cookies	5.5%	Families	7,101	8,409
Sophisticated Squires	4.2%	Median Age	31.2	31.6
Inner City Tenants	0.7%	Median Household Income	$71,485	$74,756
	Spending Potential Index	**Average Amount Spent**		**Total**
Apparel and Services	80	$2,012.09		$18,388,455
Men's	76	$366.06		$3,345,440
Women's	70	$603.79		$5,518,036
Children's	91	$376.13		$3,437,465
Footwear	55	$236.96		$2,165,567
Watches & Jewelry	120	$255.54		$2,335,392
Apparel Products and Services (1)	171	$173.60		$1,586,554
Computer				
Computers and Hardware for Home Use	119	$238.41		$2,178,855
Software and Accessories for Home Use	121	$34.57		$315,933
Entertainment & Recreation	115	$3,737.73		$34,159,070
Fees and Admissions	121	$753.82		$6,889,117
Membership Fees for Clubs (2)	117	$200.51		$1,832,469
Fees for Participant Sports, excl. Trips	124	$136.88		$1,250,948

Figure 6: Retail goods and services expenditures by industry group



Retail MarketPlace Profile

Pad 1				**Latitude:**	**33.46487**
10050 W Mcdowell Rd				**Longitude:**	**-112.27583**
Avondale, AZ 85392-4803	**Site Type:**	**Drive Time**		**Drive Time:**	**5 Minutes**
Summary Demographics					
2009 Population	29,647				
2009 Households	9,139				
2009 Median Disposable Income	$56,320				
2009 Per Capita Income	$24,992				
Industry Summary	**Demand (Retail Potential)**	**Supply (Retail Sales)**	**Retail Gap (Demand - Supply)**	**Surplus / Leakage Factor**	**Number of Businesses**
Total Retail Trade and Food & Drink (NAICS 44-45, 722)	$282,308,397	$418,119,963	-$135,811,566	-19.4	144
Total Retail Trade (NAICS 44-45)	$239,195,337	$372,929,373	-$133,734,036	-21.8	93
Total Food & Drink (NAICS 722)	$43,113,060	$45,190,590	-$2,077,530	-2.4	51
Industry Group	**Demand (Retail Potential)**	**Supply (Retail Sales)**	**Retail Gap**	**Surplus / Leakage Factor**	**Number of Businesses**
Motor Vehicle & Parts Dealers (NAICS 441)	$63,162,983	$228,328,794	-$165,165,811	-56.7	12
Automobile Dealers (NAICS 4411)	$54,088,947	$221,464,059	-$167,375,112	-60.7	7
Other Motor Vehicle Dealers (NAICS 4412)	$4,372,853	$4,952,232	-$579,379	-6.2	2
Auto Parts, Accessories, and Tire Stores (NAICS 4413)	$4,701,183	$1,912,503	$2,788,680	42.2	3
Furniture & Home Furnishings Stores (NAICS 442)	$9,887,253	$7,704,303	$2,182,950	12.4	10
Furniture Stores (NAICS 4421)	$6,439,379	$6,664,341	-$224,962	-1.7	7
Home Furnishings Stores (NAICS 4422)	$3,447,874	$1,039,962	$2,407,912	53.7	3

Figure 7: Retail market place profile industry data

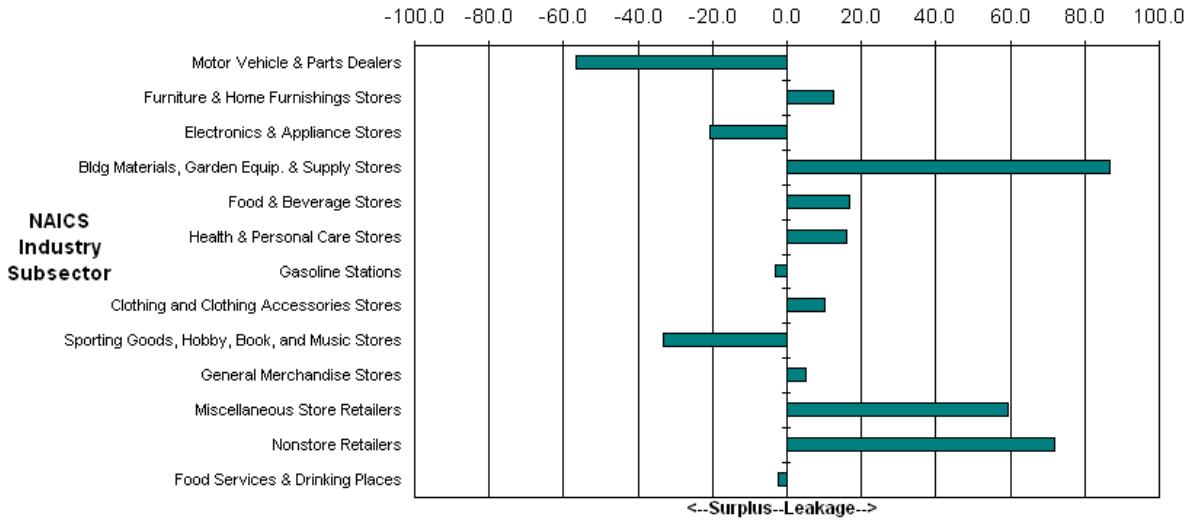


Figure 8: Leakage/surplus factor by industry subsector

A1 Location

	A	B	C	D	E	F
1	Location	cex Index Avg	NAICS Leakage	EBT	Payback	HH
2						
3	1	83	6.6%	176,020	44.1	49,128
4	2	85	-16.3%	366,371	24.9	94,311
5	3	98	-28.0%	279,164	26.0	69,700
6	4	62	-63.4%	310,773	20.1	92,320
7	5	73	6.9%	228,948	35.5	63,810
8	6	136	-85.0%	191,797	41.2	34,280
9	7	108	-66.5%	226,640	14.2	47,094
10	8	69	20.8%	382,709	20.6	108,540
11	9	68	-19.8%	365,682	17.3	44,116
12						
13	Total	781	244.7%	2,528,106	244	603,300

Figure 9: Summarized decision parameters

A1 Location

	A	H	I	J	K	L	M	N
1	Location	cex Index Avg	NAICS Leakage	EBT	Payback	HH		Score
2								
3	1	0.11	0.03	0.07	-0.18	0.08		0.10
4	2	0.11	-0.07	0.14	-0.10	0.16		0.24
5	3	0.13	-0.11	0.11	-0.11	0.12		0.13
6	4	0.08	-0.26	0.12	-0.08	0.15		0.01
7	5	0.09	0.03	0.09	-0.15	0.11		0.17
8	6	0.17	-0.35	0.08	-0.17	0.06		-0.21
9	7	0.14	-0.27	0.09	-0.06	0.08		-0.02
10	8	0.09	0.08	0.15	-0.08	0.18		0.42
11	9	0.09	-0.08	0.14	-0.07	0.07		0.15
12								
13	Total							

Figure 10: Location Scoring Index summary

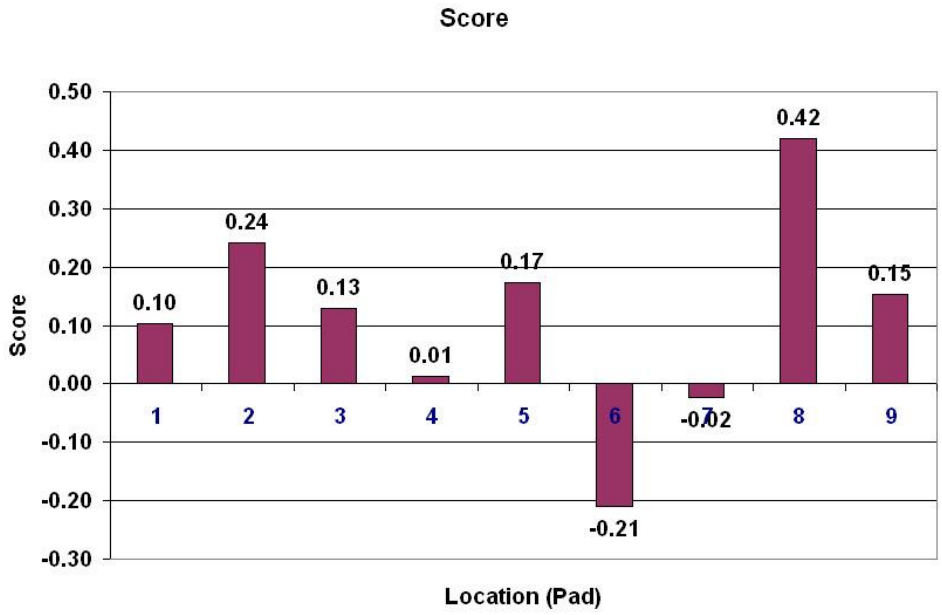


Figure 12: Comparison of location index scores