# The GIS and data solution for advanced business analysis

## Soluţii GIS şi de date pentru analiză avansată a afacerii

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## Abstract

*The GIS Business Analyst is a suite of Geographic Information System (GIS)-enabled tools, wizards, and data that provides business professionals with a complete solution for site evaluation, selective customer profiling, and trade area market analysis. Running simple reports, mapping the results, and performing complex probability models are among the capabilities The GIS Business Analyst offers in one affordable desktop analysis solution. Data and analyses produced by The GIS Business Analyst can be shared across departments, reducing redundant research and marketing efforts, speeding analysis of results, and increasing employee efficiency. The GIS Business Analyst is the first suite of tools for unlocking the intelligence of geography, demographic, consumer lifestyle, and business data. It is a valuable asset for business decision making such as analyzing market share and competition, determining new site expansions or reductions, and targeting new customers. The ability to analyze and visualize the geographic component of business data reveals trends, patterns, and opportunities hidden in tabular data. By combining information, such as sales data of the organization, customer information, and competitor locations, with geographic data, such as demographics, territories, or store locations, the GIS Business Analyst helps the user better understand organization market, organization customers, and organization competition. The business intelligence systems bring geographic information systems, marketing analysis tools, and demographic data products together to offer the user powerful ways to compete in today's business strategies.*

**Keywords:** *Geographical Informatic Systems, business analysis*

## Rezumat

*GIS - Business Analyst este o suită de Sisteme informatice geografice, diferite instrumente, wizard-uri şi baze de date oferind profesioniştilor din domeniul afacerilor o soluţie completă pentru evaluarea site-ului, profilul clientului selectat, analize de piaţă ale zonei de comerţ. Realizarea de rapoarte simple, de cartografiere a rezultatelor, precum şi furnizarea de modele de probabilitate complexe sunt doar câteva dintre capabilităţile GIS - Business Analyst într-o singură soluţie accesibilă desktop. Datele statistice şi analizele produse de GIS - Business Analyst pot fi partajate între departamente, reducând redundanta datelor, accelerarea analizei rezultatelor şi creşterea eficienţei angajaţilor. GIS Business Analyst este prima suita de*

*instrumente folosite pentru deblocarea informaţiilor geografice si demografice, stilul consumatorilor, precum şi datele afacerii. Acesta ajută la luarea deciziei in conducerea afacerii, cum ar fi: analiza cotei de piaţă şi concurenţa, determinând o noua expansiune sau o reducere a site-ul, şi un nou grup ţintă de clienţi. Capacitatea de a analiza si vizualiza componenta geografică din informatiile afacerii dezvăluie tendinţe, modele, şi oportunităţi ascunse în datele tabelare. Prin combinarea de informaţii, cum ar fi datele despre vânzări, informaţiile despre clienţi şi locaţiile concurentei, cu date geografice, cum ar fi datele demografice, teritoriile sau locaţiile magazinelor, GIS Business Analyst ajută la înţelegerea pieţei, a clienţilor şi concurenţei. Sistemul Business Intelligence aduce în acelaşi plan sistemele informatice geografice, tools-urile de analiza a pieţei, precum şi datele demografice oferind o modalitate puternică de a concura cu strategiile de afaceri actuale.*

**Cuvinte-cheie:** *Sisteme informatice geografice, analiza afacerii*

## Introduction

G̃IS represents a working technique more and more useful for contemporary world both in the field of theoretical research and in very many practical activities. In fact, GIS represents a system that has more informational components, reported to geographical coordinates. Components introduction, their storing, interpretation and analysis is done by means of the computer, the result being mainly the ability to see some complex information, spatially differentiated in comparison to real geographical coordinates. Secondly, GIS techniques allow combining information of different types (figures, images, maps), hardware and software components, all being under the direct coordination and determination of the human component, in order to make analyses and correlations of great complexity (Radut and Chitu, 2009).

GIS is an integrated collection of computer software and data used to view and manage information about geographic places, analyze spatial relationships, and model spatial processes. GIS provides a framework for gathering and organizing spatial data and related information so that it can be displayed and analyzed. GIS gives the user tools to analyze organization data and see the results in the form of powerful, interactive maps that reveal how things work together, allowing the user to make the most informed decisions possible. The GIS is an integrated family of software products that consists of Desktop GIS, Server GIS, Mobile GIS, and Online GIS. The GIS technology is a platform for building a complete geographic information system (GIS) that lets the user easily author data, maps, globes, and models on the desktop; publish them to a GIS server and/or share them online; and use them on the desktop, on the Web, or in the field.

Introduction of integrated GIS systems are used to improve workflow and to address the most urgent problems. Such integrated system is used for: - administration of / data including systems integration, management of complaints / cases, administration and management areas within the service Parties constituents

/ clients - planning and analysis such as weather forecasts and risk analysis - specific business operations such as call centers, monitoring and creation of trails, collection of field data, inspection, maintenance and operations specific to its - awareness of situations including decisions and client access / public organization level they represent an integrated collection of GIS software that provides a standard platform for spatial analysis, data management and mapping, is scalable and can be integrated with other type enterprise such as distribution management controls, security and management at executive level.

## Key features of GIS Business Analyst

The GIS Business Analyst provides advanced analysis tools and a complete data package to help make mission-critical business decisions. Key features:

*a. High-quality data*—The GIS Business Analyst products include an extensive library of data from industry leading data providers. The GIS Business Analyst provides the same GIS-based analysis tools as The GIS Business Analyst but with a complete data package optimized for the markets (Franke 2001; Saabeel 2002).

*b. A popular and complete GIS*—The GIS Business Analyst is based on the world's leading desktop GIS. All the power of The View is available to complement the features of The GIS Business Analyst. The GIS Business Analyst includes the following software: Network Analyst—this extension adds routing, closest facility, service area analyses, origin-destination matrices, and advanced network management and creation. Network Analyst can be used for a variety of applications including classic point-to-point routing and advanced time-based delivery models; Business Objects Crystal Reports XI—View, print, and export reports to a variety of popular formats.
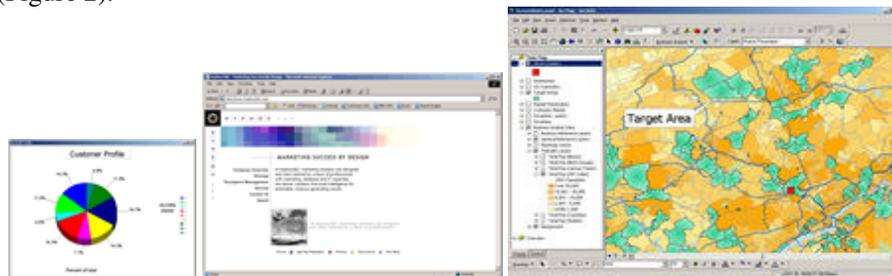
*c. Customer market analysis*—Use customer data to evaluate store locations. The GIS Business Analyst is a powerful and flexible addition to departmental and organizational decision making. The GIS Business Analyst technology has been deployed in a wide range of industries. The GIS Business Analyst uses organization customer data to define organization store's trade areas and analyze the corresponding markets. The results of this analysis provide a foundation for implementing marketing programs, siting a new facility, conducting a performance evaluation of a location, identifying where the competition is in comparison to organization customers, and more. The user can calculate market penetration, locate untapped market areas, and discover store cannibalization problems within organization trade areas. The GIS Business Analyst lets the user perform the following types of customer market analysis: Simple and complex market area boundaries drawn around sets of customers based on customer counts or customer sales; Desire lines drawn between customers and their assigned stores to identify market pull; Market penetration calculated based on the number of

customers within an area compared to the total population; New store siting by finding the center of a group of customers (Figure 1).
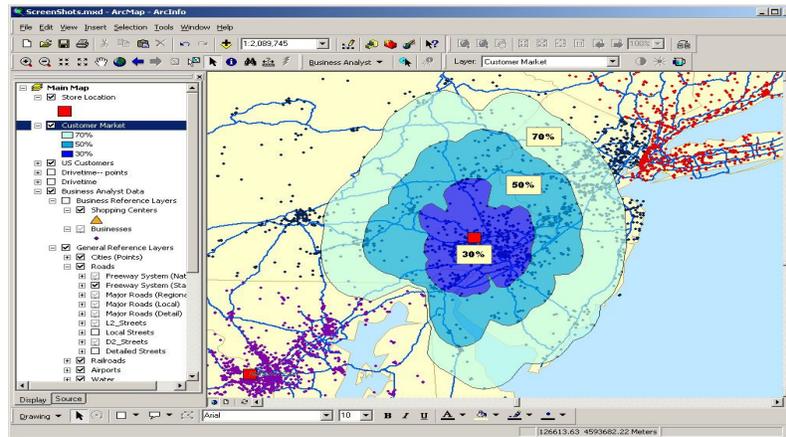


**Figure 1. Customer Market Analysis—Use Customer Data to Evaluate Store Locations**

*d. Customer profiling and prospecting*—Identify and target organization best customers. Analyzing customer demographics and geography enables organizations to locate areas with ideal demographic characteristics for targeting new customers. The GIS Business Analyst allows the user to create profiles of organization most profitable customers and identify untapped areas matching these characteristics. We can use the customer prospecting tools in The GIS Business Analyst to: Target organization marketing campaigns, Profile organization customers to find more like them, Conduct queries based on demographic data (Figure 2).



**Figure 2. Identify and Target Organization Best Customers**

*e. Store market analysis*—Find the best location for organization store using organization data and demographic data. The GIS Business Analyst lets

organizations analyze their geographic markets and those of competitors. Through the use of gravity modeling and consumer data, users are able to calculate how markets will change as competition and consumer spending change. The ability to understand organization competition gives the user a distinct advantage in strategic planning and winning new customers. The GIS Business Analyst lets the user define the following types of trade areas around organization store: Simple ring—created around organization stores using a radius the user specify; Data driven ring—created around organization stores using a radius proportional to a store characteristic such as total sales, square footage, and gross leasable area; Equal competition—creates trade area boundaries halfway between each store and its neighboring stores (Thiessen polygons); Drive time—defines areas accessible along the street network based on organization specified maximum travel time or distance; Gravity model—predicts the sales potential of an area based on distance, competition, attractiveness factors, and consumer spending; Threshold ring—creates rings containing a specified population or household count (Figure 3).
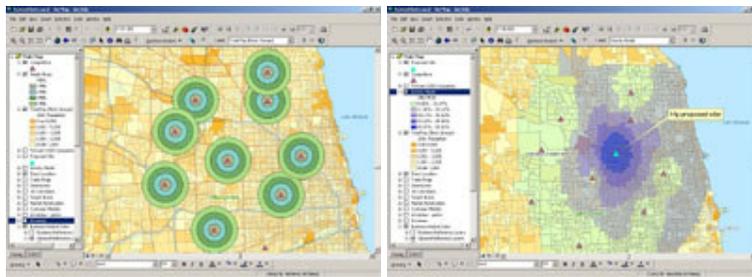


**Figure 3. Find the Best Location for Organization Store Using Organization Data and Demographic Data**

*f. Store prospecting*—Find the most profitable store location based on distance or travel time. Site selection tools enable the user to search for the best store sites for organization business. The user can summarize the underlying demographics around possible new locations for comparison and analysis. Sites are selected by analyzing single or multiple locations. Store prospecting allows the user to evaluate a potential store location based on distance or travel time. The user can specify the distance or travel time based on organization experience at other stores in similar market areas. We can use the GIS Business Analyst store prospecting tools to: Locate a potential store site, Analyze surrounding competition, Analyze the demographics of the area, Assess the market potential around the new site, Perform drive-time analysis around the site (Figure 4).
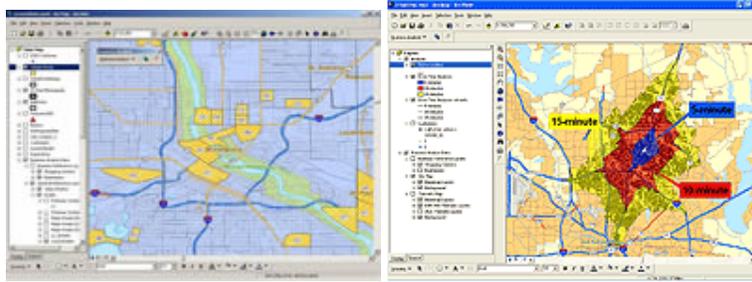
**Figure 4. Find the Most Profitable Store Location Based on Distance or Travel Time**

## Finding success in a soft economy - Case study

Retail marketers are struggling to accurately predict the drop in consumer spending for 2008 and 2009 and offset the effects of a struggling economy. Along with the ever-changing spending patterns of consumers and the rise and fall of the competition, the market is in a constant state of flux. Even the 80/20 rule, stating that if a majority of the stores are successful, then the chain will be successful, is no longer applicable.

By noting customer information geographically for an individual store location, clear patterns emerge from the analysis.
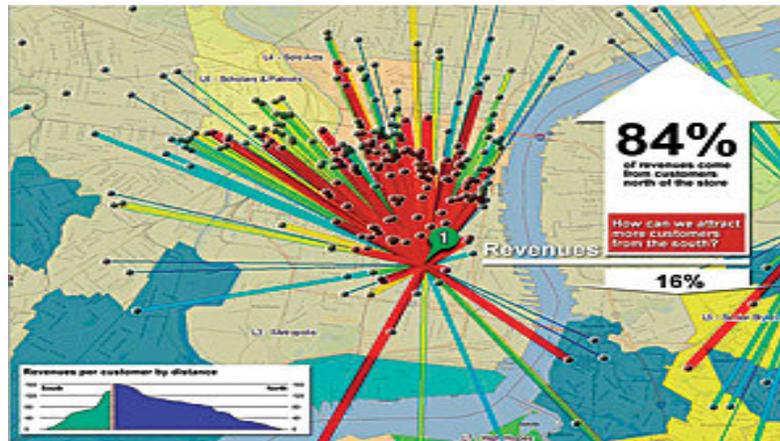


**Figure 5. By noting customer information geographically for an individual store location, clear patterns emerge from the analysis.**

Used for many years by retail organizations for location analysis and determining correct expansion strategies, The GIS Business Analyst will continue

to be a tool for successful organizations that are intent on keeping their businesses healthy and experiencing optimal growth. As the weak economic climate continues to push retailers to understand every nuance of their market, using The GIS Business Analyst for such micro analytics will become even more critical for delving deep into the geographic and demographic shifts in the environment (Figure 5).

## The geography of retail is changing

Savvy retailers continually assess their sales per square foot, real estate portfolio, management, staffing mix, and competitive pressure of individual stores. Consequently, strategic marketing has realigned itself from looking at the marketing landscape at a national level to drilling down to the regional, and sometimes household, level. Many are now trying to understand the retail landscape at the individual store level. This move allows these astute retailers to address up-and-coming niche markets and satisfy customers being abandoned by other disappearing retailers.

Retailers are finding they can no longer rely on stable seasonal sales cycles as a compass for driving promotions. Instead, competitive and market pressures are now driving both operational and promotional strategies throughout the year. For example, when a local competitor shutters its doors, The GIS Business Analyst can be used by another retailer to evaluate the new landscape of the surrounding marketplace. Using trade area models (Fidler et al. 2006) in The GIS Business Analyst, the retailer can reassess its market area in light of the revised competitive landscape. This can answer many questions: Can the retailer save money but maintain market share if it decreases the number of stores in the area? Can stores be consolidated and moved to a more lucrative site now that the competitive landscape has changed? Should the retailer consider moving to accommodate other factors, such as proximity to new customers or employees?

The economic changes many neighborhoods are facing have clear geographic implications: stores are closing and malls are left vacant, and retailers are moving to accommodate shifting consumer appetites. The analytic, modeling, and visualization tools provided by The GIS Business Analyst—such as gravity modeling and data-driven ring analysis—along with its mapping and reporting capabilities help guide a retailer's decision-making process. The software can assist in determining such issues as what mix of products would best suit the customer base abandoned by a previous competitor or how much merchandise should be delivered without having too much. Through careful analysis, adjustments to product mixes and promotional merchandizing can be made accordingly, not only nationally but also at the individual store level. All of these factors have clear marketing implications—stronger analytic tools like those found in The GIS Business Analyst are needed to strategically and successfully drive sales or determine potential store consolidations on a micro geographic level.

By utilizing the GIS Business Analyst Segmentation Module, overlays of successful customer segments and their modeled response rates can be shown in relative concentration to the store location.

### Demographic change

A second key driver in retail marketing strategy (Feeney 2001; Porter 2001) is the changing face of the consumers themselves. Unanticipated retail leaders have emerged. Brands like H&M, Urban Outfitters, and American Apparel have managed to maintain moderate stability and growth as their core customer constituency of renters, students, and young adults has sustained its buying power through much of the downturn. This is due in part because this population is not as affected by the real estate, retirement, and investment markets. Those who are affected—homeowners, those near retirement, or others who rely on stock portfolios—will suffer more acutely. Larger retailers with a diverse base of customers are also being forced to reevaluate their buying groups to determine where segments of profitability exist. A retailer's best response to this shifting marketplace is to rapidly adjust merchandising and promotions to the segment's needs (Figure 6).
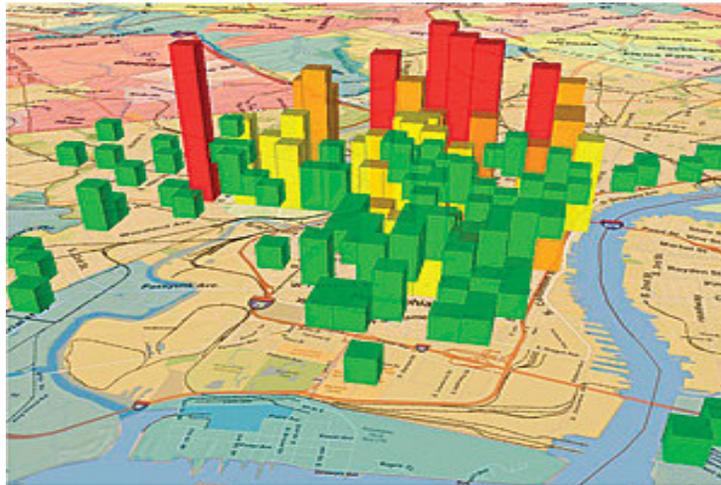


**Figure 6. By utilizing the GIS Business Analyst Segmentation Module, overlays of successful customer segments and their modeled response rates can be shown in relative concentration to the store location.**

As the market continues to create ripple effects into various consumer segments, it will become increasingly critical for strategic marketers to listen to, anticipate, and understand their customer base. Here again, The GIS Business Analyst and an optional extension, the Segmentation Module, provide crucial marketing information to assist retailers in their efforts. Assessing existing records

within a customer mailing list, the loyalty program, or point-of-sale data can readily be enriched by categorizing the data into the 65 unique, fully documented consumer market segments based on Tapestry Segmentation data included in the Segmentation Module. Features such as property ownership, purchasing habits, savings and investment patterns, hobbies, preferred media, and socioeconomic status will emerge that reveal the changing story of consumer and lifestyle behavior. Analyzing customer retention programs—such as loyalty, layaway, and warranty programs and professional services—that are on the rise because of changing customer attitudes and feedback will also be enhanced by using the Segmentation Module. Visibility into these rapid purchasing and promotional pattern shifts, the long-term viability of a customer segment's purchasing power, and the accuracy of analysis produced by customer and point-of-sale data will be instrumental to the survival of both large and small retailers. Marketers who continually profile their customer base on a store-by-store level with The GIS Business Analyst and The GIS Business Analyst Segmentation Module will discover purchasing patterns that will drive the correct merchandise mix, promotions, and retention campaigns to keep those stores healthy.

## Conclusion

The GIS Business Analyst desktop software combines GIS analysis and visualization capabilities with an extensive data package so the user can gain a better understanding and timely information about organization market, organization customers, and organization competition. Organizations use The GIS Business Analyst to improve decisions about consolidations or expansions, determine the effect of changes in consumer behavior on existing business models, and to explore opportunities driven by economic factors and changes in market place.

With The GIS Business Analyst, the user can: Build models that fit into organization analysis workflow for site evaluation, market penetration, and customer prospecting; Visualize organization analysis through an interactive map that allows the user to adjust parameters to run various what-if scenarios that can help the user make better informed decisions faster; Leverage organization in-house data by combining it with The GIS Business Analyst's demographic, business, and shopping center data to discover trends, untapped markets, and opportunities.

## References

Feeney, D. (2001), "Making Sense of the E-Opportunity", *MIT Sloan Management Review*, Vol. 43, No. 2 (Winter), pp. 41-51

Fidler, M., & Fidler, B. (2006), "Implementation possibility CMMI Model's parts in Virtual Organization". *Proceedings of the 10th International conference: Mechanical Engineering. Slovak University of Technology in Bratislava*. Slovakia, pp. 731-736

Franke, U (2001). „The Concept of Virtual Web Organizations and its Implications on Changing Market Conditions", *Electronic Journal of Organisational Virtualness*, 3(4), pp. 43-64

Porter, M. (2001). "Strategy and the Internet", Harvard Business Review, Mar-Apr, pp. 63-78.

Radut, C., & Chitu R. (2009). "Geographical Informatic Systems and Urban Management", *Theoretical and Empirical Researches in Urban Management,* 2 (11), pp. 105-111

Saabeel, W., & Verduijin, T.M., & Hasgdorn, L., & Kumar, K. (2002), "A Model of Virtual Organisation: A Structure and Process Perspective", *Electronic Journal of Organizational Virtualness,* 4(1), pp. 1-16