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## **Selected Issues of GIS as a Tool of Modern Management Type of Retail Chain Company**

### **Introduction<sup>1</sup>**

The Geomarketing is a combination of marketing knowledge with geography. The concept of geomarketing encompasses the usage of Geographic Information Systems (GIS) that enable conducting analyzes supporting the decision making process in marketing, sales and customer service. GIS usage for data analysis allows obtaining highly valuable information. With visualization and an integration of data onto maps, GIS provide necessary information for effective strategic planning of business development, sales and marketing. Application of proper GIS tools permits the development of appropriate strategies to reach customers on a regional, local or micro level and more efficient and effective decision making.

### **GIS in marketing and market research**

PCs and spreadsheets are considered common tools in daily work of those involved in market research, strategic decision making or marketing. Simultaneously, the data analyzed consists of spatial data in the most cases. The data used for such spatial analysis and research can be divided into two groups.

The first group encompasses the data about a company, its methods of conduct and achieved results. Each company has its own location and territory of its operation. It may also have

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<sup>1</sup> 1) Geomarketing. Analizy przestrzenne w biznesie (*Geomarketing. Spatial Analysys in business*), [http://www.mapinfo.pl/down/ulotki/Geomarketing\\_IMAGIS.pdf](http://www.mapinfo.pl/down/ulotki/Geomarketing_IMAGIS.pdf) [26.11.2011].

2. Customer Analytics & Sales Strategies, [http://www.gfk.pl/marketing\\_solutions/geomarketing/index.pl.html](http://www.gfk.pl/marketing_solutions/geomarketing/index.pl.html) [07.01.2012].

3. Geomarketing in Practice, [http://www.gfkregiograph.com/fileadmin/regiograph\\_en/customer\\_support/geomarketing\\_in\\_practice\\_compact.pdf](http://www.gfkregiograph.com/fileadmin/regiograph_en/customer_support/geomarketing_in_practice_compact.pdf) [07.01.2012].

representatives or branches that operate in a given territory. Individual branches generate different financial results. The company also has its customers located in different places.

On the other hand, data relating to competition and describing the market constitute the second group of data. These are the demographics that determine the number of people of the same age group living in a particular area. These are also the sociological data, concerning these people's preferences and their average income and, finally, the data locating the biggest potential customers in the given area. Spreadsheet based data analysis does not allow the analysis of spatial aspects of information. As a result, key information may not be visible and thus not taken into account in decision-making process, which in turn may result in the company not achieving the expected profit.

Nowadays, spatial analysis usage in business operations, market research and marketing attracts more and more followers. Highly advanced GIS are not required for spatial data analysis in the market applications. This is one of the factors influencing the large interest in this solution. Basic analysis oriented GIS applications cover all the features needed in marketing and market research. The analysis conducted on such classes of data allows the company to identify the potential market and demand for its services or products more precisely. It also allows avoiding setting unrealistic goals and mismanaging the resources. Overlapping of these two sets of data in the process of data analysis permits finding the relationships and deriving conclusions – the results otherwise impossible to achieve without the graphical analysis.

In order to illustrate the problem better, the example of reorganizing sales areas can be used. The analysis of these areas location and of profits they generate was conducted. Let us assume that, in spite of rather equal distribution of resources, there are disproportions between the profits generated by different branches. It should be determined whether this situation is a result of branch's poor performance or unequal number of potential customers. In order to solve this problem, the number of potential customers in each of the areas should be determined. If the numbers of potential customers is unevenly distributed across the areas, boundaries of these areas should be changed or the resources transferred. Such a change should aim at assigning a comparable number of potential customers to each of the areas.

Nowadays, GIS is used in many companies. In the same time, these systems application creates a market for data sets containing information on population demographics, income and ways of living. What's more, a need arises for the sets of data concerning objects that may be taken into account in this type of analyzes<sup>2</sup>.

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<sup>2</sup> J. Urbański, *Zrozumieć GIS Analiza informacji przestrzennej (Understanding GIS. Analysis of Spatial Information)*, PWN, Wyd. 1, Warszawa 1997, s. 114-115.

## **GIS as a tool of modern business management type**

Company's activities in many business processes may be supported by GIS, starting from marketing activities, through assets management, staff supervision, support of technical teams activities, finally to the activities in the sales area. The economic results of many companies, especially those big ones, indicate that the implementation of GIS components is very economical and often necessary for the sole functioning of the company<sup>3</sup>. GIS potential may support almost any business decision. The system is used as a part of effective business management.

Management with GIS usage finds application in administration, production and services, science, and even in non-profit organizations. The economy where scientific management methods are applied is mainly influenced by computer networks (including the Internet) and technological progress. The effective use of GIS requires the understanding of importance of scientific management methods, the role of innovation, motivation underlying human actions and specific features of spatial information by the managers<sup>4</sup>.

## **Geomarketing systems**

At present, the implementation of GIS in marketing is becoming a standard. Modern corporations spend significant amounts of money on building advanced geomarketing systems enabling increased efficiency of operations, sales support, planning of distribution networks, new investments and branches' location, etc.

Geomarketing is a term created by joining of two words – 'geo' (earth) and 'marketing'. This encompasses all marketing activities that take geographic information into account. The objectives of geomarketing are to perform geographic analyzes, to locate and to define spatial relationships between objects relevant for marketing activities. Geomarketing analyzes are based on geographic data and data obtained from marketing research. Geomarketing may help in finding answers some questions, such as:

- where the customers are from?
- where the competition's clients live?
- in which agency, subsidiary, branch or area to invest?
- how deep the company's penetration in the given sales areas is?
- how the company should organize its marketing campaigns?
- how to set boundaries of commercial companies' sales representatives operations?

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<sup>3</sup> D. Gotlib, A. Iwaniak, R. Olszewski, GIS Obszary zastosowań (*GIS. Areas of Application*), PWN, Warszawa 2007, s. 204.

<sup>4</sup> GIS Teoria i praktyka (*GIS Theory and Practice*), Longley P. Goodchild M. F., Maguire D., Rhind D. W., PWN, Warszawa 2008, s. 419.

- how to organize a distribution network?

Geomarketing systems support the process of marketing strategy definition by, for example, finding areas with large numbers of potential customers. Marketing research allows indicating where people with similar demographics, similar lifestyle and using similar products live. The specific model of a customer (age, family, finances, shopping preferences, free-time activities, etc.) is formulated and then places where such customers live are located. With additional information related to the feature of the area of residence (e.g., city, suburban area, rural area) and investment plans etc., added to such data, it can be determined whether sufficient number of clients corresponding to the model could be found in the given area. In such case, the geographical analysis is of a fundamental importance.

Information concerning competition agencies' locations, their areas of operations, territories the competitors have not reached yet or where the company's offer may be presented to people who already know the specific type of product is important in geomarketing.

Decisions concerning the company or store development or their liquidation may be undertaken on the basis of analysis of relationships between the location and the demographics (population in given age categories, average income, unemployment, etc.) in a given area (e.g., district, city, state). The fact that a branch does not provide income may be caused either by poor management or by inappropriate location. It often happens that moving the facility to an adjacent street may result in multiplied revenues. Geographic information can facilitate the correct division of sales areas, which in turn facilitates the management of the whole company. In this context, the good management means the lack of conflict among employees, adequate availability of company resources, savings from optimizing commuting, etc.

Geomarketing systems help in demographic trends tracking, determining the zones of residents movement, jobs' areas and analyzing the distribution (e.g. to avoid the so-called 'cannibalization', which is a situation where agencies of the same company compete with each other). GIS components may also play important part as components of CRM that is customer relationship management systems. Such technology as GIS allows easy locating the nearest company's office by the call-center according to the customer's current whereabouts or quickly checking the service availability in the area (through determining whether the company already offers such service to anyone in the neighborhood). The possibility of visualizing the call-center reports on network transmission failures may therefore facilitate fast faults location through analyzing the spatial distribution of reports.

The performance of geomarketing tasks requires adequate decision-support geomarketing information system, which includes:

- geographic database,
- marketing database (information on customer, target groups, former promotions, publicity campaigns, etc.)
- expert system supporting queries definition and analyzes,

- GIS tool bringing together all the data, allowing conduct of spatial analyzes through available modeling functions and presentation of the results to facilitate decision-making.

In order to understand the importance of geographic information and GIS analyzes in business, two examples of geomarketing analyzes will be considered: a new resort location planning and an advertising campaign planning.

In the process of decision making in the first case, the useful information can be listed as:

- available technical infrastructure,
- transportation links,
- distance from industrial plants,
- tourist attractions in the area - monuments, trails, museums, leisure centers,
- climate (microclimate),
- natural attractions: lakes, mountains, forests, national and landscape parks,
- accommodation, location of other resorts and their features (e.g. number of customers in the last two years, financial results)
- land prices,
- taxes,
- unemployment rate.

These are the inputs to the geomarketing system model. The system can give some location suggestions on the basis of knowledge base defined in the system and the available algorithms. From these suggestions the investor finally chooses the most convenient one. Here, the main advantage of geomarketing system is a possibility of showing many variants of solutions and of conducting repeated analyzes with input parameters changed.

Practically, conventional mapping usage is possible only when the location was already pre-selected and the objective is to check the advantages and disadvantages of such solution. However, due to labor requirements of traditional geographic information analysis on a map, no more than 2-3 options can analyzed. What's more, before conducting the detailed analysis the initial choice of location has to be made. In geomarketing decision-support system, all the possible locations can be analyzed in a single process.

On the other hand, when a marketing campaign is being planned, it is necessary to select areas where an ad should appear, and where promotion activities should be undertaken. It is also important to assess which products should be marketed or promoted in which areas. Also here, GIS technologies and databases can be helpful. The choice of locations for outdoor advertising media (e.g. billboards) is made on the basis of analysis of such parameters as:

- distance from schools, kindergartens and churches,
- proximity to shops with alcohol, pubs, discos and other entertainment venues,
- proximity to shopping centers,

- position in the lane of main roads and streets,
- potential ‘audience’ of different age groups,
- ad medium’s visibility from the road,
- commuting routes.

Geographic analysis facilitates the optimal choice of advertising media location for the specific type of products with simultaneous cost calculation of the ad, which depends, among others, on the estimated number of people who will be able to see the medium. With GIS usage, also the interactive advertisement location selection is facilitated. Advanced geomarketing analyzes are most often conducted by the joined forces of GIS professionals and marketing specialists with standard GIS tools usage. Simpler analyzes can be performed by using applications designed specifically for less advanced users<sup>5</sup>.

### **The advantages of GIS usage in retail chain company management**

Tabulated summaries supported by visualization in the form of graphs and diagrams are used often in business data analyzes. Yet, it should be remembered that no analysis can be conducted without taking into account the specific space in which the company operates. The environment where the company operates often determines and influences actions and their outcomes.

It turns out that such factors as – for example – geographic location of the company’s headquarters, its customers or competitors, or even spatial characteristics of sales representative’s operations region can greatly influence the company’s effectiveness and market opportunities<sup>6</sup>. Digital maps usage by the retail chains allows the application of many concepts and theories underlying the geomarketing theory. Business values that retail chains’ managers receive through implementation of GIS applications may be cited as:

- **Location choice:**

With appropriate digital maps application, the selection of potential locations can be carried out. What’s more, each of the locations may be evaluated on the basis of estimating demand.

- **Distribution optimization of and cannibalization**

Dense distribution networks want to avoid the phenomenon of cannibalization (overlapping trade areas). Digital maps also allow for the analysis of competition impact.

- **Customers analyzes – geo-segmentation**

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<sup>5</sup> D. Gotlib, A. Iwaniak, R. Olszewski, GIS Obszary zastosowań (*GIS. Areas of Application*), PWN, Warszawa 2007, s. 204-209.

<sup>6</sup> Analizy przestrzenne w biznesie (*Spatial Analysis in Business*), <http://www.mapinfo.pl/konc/biz.php> [06.12.2011].

Acquiring customers' zip codes enables the analysis of similarities between customer groups on the basis of their carts' contents and place of residence.

– **Trading area analysis**

With the help of GIS applications the shape of the company's trading area and its changes in range over time can be determined. Also, the systems allow the verification of marketing campaigns results.

– **Promotional campaigns support**

Digital maps help to plan the ways to effectively reach the appropriate customer groups in cases of door-drops distribution, billboards or advertising campaigns in local newspapers<sup>7</sup>.

In order to make the advertising effective and the sales profitable, both have to hit the areas where the demand for products and services offered occurs. Spatial analysis on the maps must therefore be an integral part of market research and marketing activities' evaluation and management. The visualization of customer database or information about the potential on the map enables to easily discern the regions with a significant number of current and potential customers, and the ones where the population of the model recipients is almost non-existent. Introducing the additional information enriches the spatial analysis and thus makes designed marketing strategies more effective.

After designing the advertising strategy and conducting it in the chosen area, the extent to which the product sales increased can be observed. It is also important to check whether the new customers actually come from the areas in which the campaign was carried out and where the results were expected. All that is needed is a new clients database with any kind of location indicator, such as address, zip code or statistical region. With this information, all the clients can be located on the map and the effects of the campaign may easily be analyzed<sup>8</sup>. All the shops where the products are available can be incorporated with GIS software and digital maps. Maps with administrative divisions and the demographic data help to indicate places with the greatest market potential. The issue whether the spatial correlation between shops location and potential exists cannot be examined differently than by analyzing the data on maps. Trade effects verification can be conducted with sales data presentation (such as sales size and structure in the regions of agents' operations) on a digital map. Such presentation facilitates the data analysis. It also allows seeing spatial relationships otherwise hidden in tabular form<sup>9</sup>.

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<sup>7</sup> GIS w Sieciach Handlowych (*GIS in Commercial Network*), <http://www.mapinfo.pl/branze/siecihandlowe.php> [06.12.2011].

<sup>8</sup> GIS w Marketingu czyli Geomarketing (*GIS in Marketing or Geomarketing*), <http://www.mapinfo.pl/branze/marketing.php> [06.12.2011].

<sup>9</sup> GIS w FMCG, <http://www.mapinfo.pl/branze/fmcg.php> [06.12.2011].

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