

GIS as a decision-making tool for small businesses in the retailing

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Abstract: *Development of advanced technologies in management of SMEs provides wider scope for their use in decision-making of small businesses. By using the acquired information thoroughly and processing it with the advanced technological procedures, we can more accurately assess and then predict the purchasing behaviour of consumers in the territory in which the company operates. The paper will focus on the analysis of retail units, from acquired local data of three opticians' stores within individual districts of the city Bratislava. The analyzed sample consists of 2,874 consumers. For analysis of such a large number of data, which include the spatial aspect as well, means that we will link the acquired geographic information with spatial information, and we will use the specific application of spatial marketing GIS - Geographic Information System. Processing of the acquired data locating the consumers in connection with spatial data of that territory at the retail level, will allow us to better understand consumer shopping behaviour in the context of the population's increased mobility, correct set-up of the marketing mix for retail and effective communication with existing or potential customers.*

The aim of this article is the evaluation and classification of a small business in relation to a consumer and its preferences in the city of Bratislava and its individual stores.

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Key words: Marketing · Geomarketing · Marketing analysis · GIS

JEL Classification: M30 · C81

1 Introduction

Undeniable fact of the present time is that the progress, which we meet with every our step and see it all around us, is a driving tool for many processes of the present-day life. Employing modern procedures in successful development of companies is an important aspect of a business philosophy of each company. From the marketing point of view, we see a successful activity of retailing unit as a complex of the right decisions which influence each other in many cases. The more influencing factors are included in this process the more complicated this process is. Territory is included in every single process of functioning of retailers and it influences their decisions. Based on the philosophy of distributing management, we will analyse a large amount of data, containing the spatial aspect, in this paper. This means that we will link acquired geographical information with spatial information, and then process it by means of specific application of spatial economics (Cliquet, 2006).

For processing and analysing data we will use one of the tools which links dimension of territory with geographical information and this is geomarketing. Some authors define geomarketing as a specific application of spatial marketing. Geomarketing and its application GIS enable us to process acquired geographical data, link it with spatial data with a possibility of graphic illustration in the form of various kinds of outputs e.g.: cartographical maps, tables, graphs etc.

We will focus on the analysis of retail units, from the local data of already existing stores within particular districts of city Bratislava, in this paper. The goal of processing acquired data, localizing consumers in connection with the spatial data of particular area on the level of retail unit, will be the understanding of consumer's purchase streams in the ontext of increasing population's mobility. Afterwards, it will help us for example with the right setting of marketing mix of store, or with more effective communication with existing or alternatively potential customers. These aspects influence the whole realization process of the right marketing decisions necessary for successful managing of small companies on the level of retail trade.

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2 Methods and Data

Marketing research can be understood as a sequence of follow-up activities or steps which are focused on determination, gathering, processing and interpretation of the data for the use of marketing management. This sequence is called the process of marketing research (Richterová, 2007). In this paper we will proceed from the theoretical and practical findings about the work of distributor within retail trade and also from the data provided by company Queen's optik Ltd. - from its three specialized opticians' stores.

Main aims of this paper are the analysis of consumer's behaviour and gradient fields of particular already existing stores within relevant districts in the area of city Bratislava, and the analysis of available geographical and spatial data in the area of the store location. In the first part we will analyse the place of retail store according to the purchase stream of consumers by the application of geomarketing GIS and we display it in a cartographic way; then in the second part we analyse this data by statistic software. The database is composed of existing or potential customers arranged according to selected criteria. Every customer of opticians' store who will come for the examination or he will come with a prescription is registered in customer's system of the opticians' store. This way he will provide us priceless information necessary for analysis of consumer's behaviour through geomarketing. We acquire not only address, or more precisely post code, but also customer's age, phone number, e-mail address, amount of the purchase, number of purchases for a certain period, sort of a purchase. All this enables us to not only keep in touch with customers, by means of e-mails, sending the catalogues and more direct advertisement; but it also enables us to keep detailed history of their mutual communication and response in addressing each other. Such form of created relationship with customer offers us to draw up a specific typology of customer and his profile.

All data acquired for time period 01. 11. 2013 - 31. 10. 2014 has been processed per each store separately by graphic information software GIS and afterwards by statistic software. Chi-square test of independence was used for the research and testing of stated research questions.

3 Research results

3.1 Analysis according to territory

Figure 1 Location of the stores in the area of city Bratislava



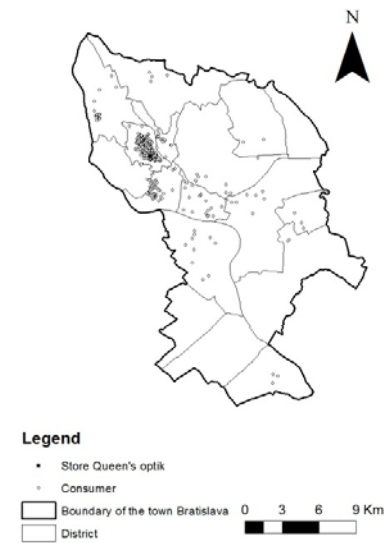
Source: Own processing

Store on the street M.Sch. Trnavského 8- MUSITZOVA

In the picture 2 we can see a buying gradient of opticians' stores, concentrating in the area of district 4, Dúbravka. The opticians' store is situated at the health centre Paracelsus and cooperates with two ophthalmologists. One ophthalmologist works directly at the health centre and focuses her work more on medical processes and thus she has less time for commercial activities. The other one, children's ophthalmologist, not far from the place of operating of the opticians' store, mainly takes care of children's patients. The range of products, presentation and also communication with customers is adjusted to the fact that this store, which has no its own medical practitioner for examination and thus has to relay on outside ophthalmologists, concentrates on less solvent customers and children. It is

not possible to engage commercial examination in the future in this store mainly because of the potential interference of cooperation with ophthalmologists. Concentration of the competition is low in district 5 which is partly caused by small spatial options of this store.

Figure 2 Graphic illustration of purchase gradient of the store M.Sch. Trnavského 8- MUSITOZOVA



Source: Own processing

Store on the street Saratovská 28- OD Saratov

In the picture 3 we can see a graphic illustration of purchase gradient of the store situated in shopping mall Saratov. It is a store located in in shopping mall. This store provides an examination and contact lenses application. Opticians' store operates in the area of district 5 and its product portfolio is diversified from the range of products and offer of the opticians' services at the health centre M. Sch. Trnavského 8, which is also situated in this district. The product range of these two opticians' stores, operating close to each other, is diversified so that mutual cannibalism would not appear- this means sale decrease of one store at the expense of the other one. That is the reason why the opticians' store in OD Saratov focuses on the sale of more expensive and brand goods, and ready-made products for example branded sunglasses. Even though, competition in district 5 is not high we can observe that opening the second store in this district larger area has eliminated for it.

Figure 3 Graphic illustration of purchase gradient of the store OD Saratov

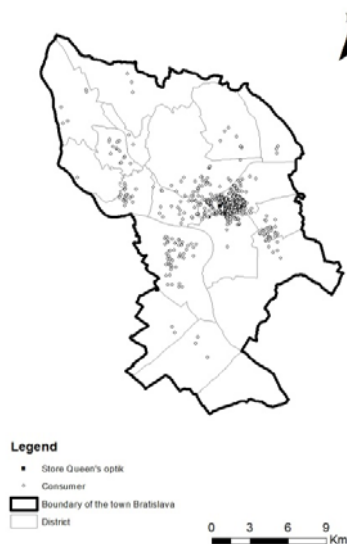


Source: Own processing

Store on the street Ružinovská 5

In the picture 4 we can see a purchase gradient of the opticians' store in district 2, Ružinov. This store as we can see in the cartographic illustration has a wide purchase gradient within the research area of the city Bratislava. The store is designed as a universal opticians' store with its own medical practitioner for examination, and contact lenses application. It is a classical type of store situated in multifunctional building opposite the health centre Ružinov. Therefore, we can say that this store covers the complex service offer. Due to the nearby hospital, where a larger number of ophthalmologists is situated, products' range of the store universally consists of the cheapest to the most expensive products, and from the children's to senior's products. As the independence from cooperation with ophthalmologists is store's advantage, so the great concentration of competition in the district is disadvantage.

Figure 4 Graphic illustration of purchase gradient of the store Ružinovská 5



Source: Own processing

Firstly we analyse acquired data from the territory point of view. We observe number of orders, their total sum and average value of the order.

Table 1 Basic characteristic of the orders according to territory – MSch. Trnavského

	N	Σ	Φ
District 1	17	1314,3	59,28
District 2	19	1712,4	59,32
District 3	11	1721,6	108,92
District 4	731	64741,31	88,049
District 5	17	1197,6	43,21
Total	795	70 687,21	88,92

Source: Own processing

Table 2 Basic characteristic of the orders according to territory – Ružinov

	N	Σ	Φ
District 1	25	3264,3	91,2425
District 2	906	108721,4	119,7842
District 3	68	12082,77	162,1592
District 4	64	8237,11	113,1992
District 5	75	10594,29	121,1258
Total	1138	142899,87	125,57

Source: Own processing

In table 1 we can see that the most customers (731) are coming to the opticians' store M.Sch. Trnavského from the district 4. Total sum of the orders is 70 687,21 € and average value of one order is 88,915 €. The most customers, as we can see in table 3, are also coming from district 4 in case of OD Saratov. In OD Saratov total sum of the orders is 146 588,76 € and the value of average order is 155,78€ which is almost two times more than in opticians' store M.Sch. Trnavského. Only to opticians' store Ružinov the most customers are coming from district 2 (906). In table 2 we can see that the amount of orders is 1138 and their total sum is 142 899,87€. Average order value is 125,57€.

Table 3 Basic characteristic of the orders according to territory- OD Saratov

	N	Σ	Φ
District 1	17	4440,88	173,7017
District 2	7	2177,3	106,8042
District 3	17	3135,48	144,2892
District 4	883	132413,2	150,0175
District 5	17	4421,9	136,8542
Total	941	146588,76	155,78

Source: Own processing

Research question: Is there in particular opticians' stores reliance between orders and the districts which they come from?

We will search for the answer to this research question through the analysis of data from the standpoint of the number of orders, amount (quantity, sum) of orders as well as from the point of view of average sum of order. For the detailed analysis we draw up following statistic hypothesis:

a) Number of the orders:

- H_0 : There is no reliance between the number of orders in particular opticians' stores and the district which the order comes from.
- H_1 : There is reliance between the number of orders in particular opticians' stores and the district which the order comes from.

b) The sum of orders:

- H_0 : There is no reliance between the sum of orders in particular opticians' stores and the district which the order comes from.
- H_1 : There is reliance between the sum of orders in particular opticians' stores and the district which the order comes from.

c) The amount of average order:

- H_0 : There is no reliance between the amount of average order in particular opticians' stores and the district which the order comes from.
- H_1 : There is reliance between the amount of average order in particular opticians' stores and the district which the order comes from.

We will decide about the acceptance of some of the stated statistic hypothesis based on the statistical analysis of acquired through chi-square test of independence for pivot table. We compare calculated figure p with the level of importance α (0,05). If it is true that $p < \alpha$ then we accept H_1 ; otherwise we accept H_0 .

Table 4 Results of statistical analysis according to district

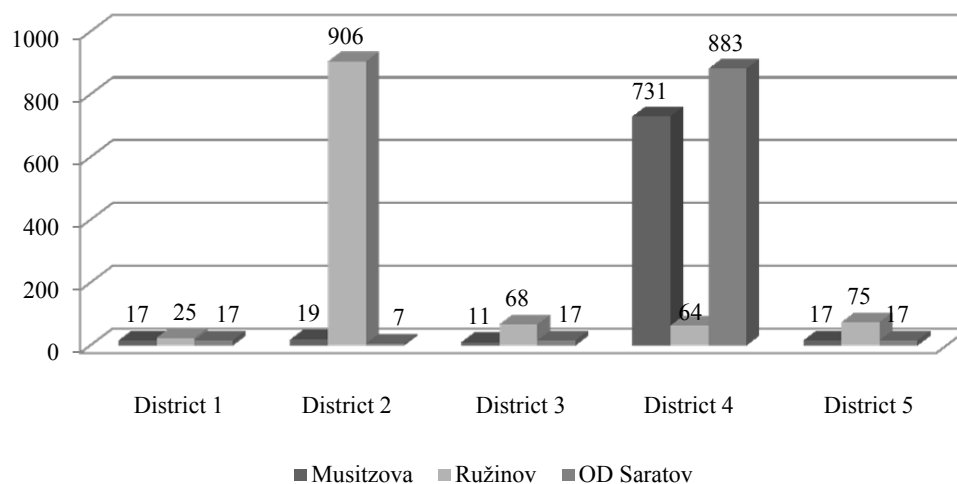
	p-value	α	Comparison	Accept
Number of the orders	000	0,05	$p < \alpha$	H_1
Sum of the orders	000		$p < \alpha$	H_1
Average order	000		$p < \alpha$	H_1

Source: Own processing

From the table 4 it can assumed that in all three researched levels of the statistical analysis we calculated the figure p lower than the level of importance 0,05. Based on this fact we accept H_1 in all three levels, and this confirms us that there is reliance between the number, the amount and the average value of the order, and the district which the customers come from (is relationship). On the basis of the results of the statistical analysis we can state that it has been confirmed that there is reliance between the orders and the districts, which the orders come from, in particular locations

of opticians' stores. Below in the picture 5 we can see distribution of the orders in particular stores according to districts.

Figure 5 Graphic illustrations of the orders' number according to district



Source: Own processing

4 Conclusions

Marketing researches are influenced by more and more factors which are necessary for doing them. We acquire great amount of information which directly influence each other. It is a very dynamic process in which the methods and solutions constantly change. Due to the globalization trends there are changes in distribution streams of particular products, and under the influence of the consumer's behaviour there are also changes in marketing activities of particular companies necessary for the provision of companies' progress and process of constant well-run. In many cases customers do not behave according to usual rules. Empirically acquired findings do not give us sufficient basic outputs for analysing of marketing activities very often. We have to take these and other influencing factors into the account when running small companies in retail trade.

Practical contribution of this paper is the knowledge that through the application of correctly selected marketing procedures, when running business activities, we can achieve an adequate development, and we can keep competitive advantage as a defence against always bigger globalization of markets and still increasing competition.

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