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GEOMARKETING: NEW CONCEPT OR APPLIED BUSINESS TOOL?

GEOMARKETING: ¿NUEVO CONCEPTO O HERRAMIENTA DE NEGOCIO APLICADA?

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Abstract

This study discusses the issues involved in the application of geomarketing as a decision-making tool for establishing or expanding a business. The development directions of the marketing mix concept with the modification of “the place” tool are offered. Several factors (i.e., geographical and marketing) used for analysis in conducting geomarketing research are described as well. A matrix grouping is presented as a comparative analysis of the most common geomarketing models, while their capabilities and limitations are highlighted. A methodical approach to conducting geomarketing research is developed, including a model for determining the probability of a client visiting a particular place (real estate object). Conclusions on the possibilities of using geomarketing for forming real estate objects from available locations for lease (purchase) and choice of the optimal variant are formulated. Results of authoring approbation are presented by the example of selecting a place for opening the city’s new barbershop.

Keywords

Geomarketing – Geographical and marketing factors – Geomarketing models
Location assessment of the real estate objects

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Introduction

The geomarketing methodology is based on the dualism of marketing analysis and geographical simulation, visualization of a combination of market driving forces, and local territory factors. These factors allow the assessment of development possibilities of a particular business (company) in terms of choosing an office, warehouse, production or retail spaces location, and other possible contact points with customers. The accuracy of this factor assessment in the business function is constantly in conditions of high decision uncertainty and unsettled situation in the field of urban building, municipal taxes, and urban infrastructure development. These factors are capable of changing the commercial landscape of any urban area, there by possibly leading to the reduction of customer traffic or discrimination of maintenance costs of real estate in the medium term. The tools based on the geomarketing methodology are effective in solving such problems.

Purpose of Research

The traditional marketing concept of marketing mix contains the geomarketing that describes the tool element “Place” (Fig. 1).

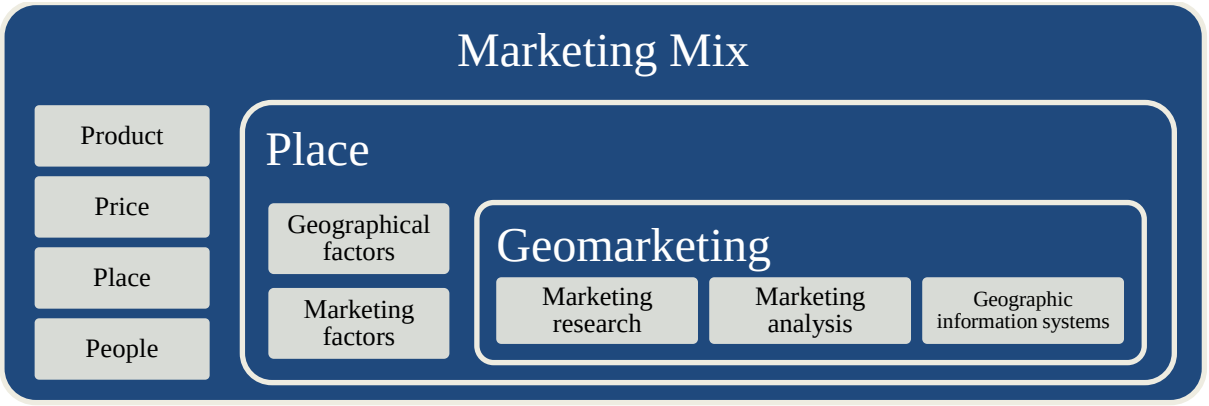

Figure 1
Geomarketing in the marketing mix concept

Geomarketing aims to define and establish informative and unique description to each sphere of business characteristics related to the element “Place” thereby stimulating and (or) restraining the following company activities:

- Geographical factors – immutable real estate object parameters (e.g., area of the premises, location in the city, transport accessibility)
- Marketing factors – mutable activities related to geography (e.g., room design, goods, or services assortment).

This uniqueness is revealed using marketing research, marketing analysis, and data processing in geographic information systems (GIS).

The obtained data enables the solution of various business problems:

– Segmentation and ranking of urban areas by attractiveness for opening new outlets and choosing the optimal locations that consider the existing restrictions;

– Development (adjustment) of a marketing plan for an existing real estate objects;

– Geodemographic map production, in which the layers with socio-demographic characteristics of the people living or visiting selected area(considered temporary changes in their movement) are superimposed on a map with geographic objects;

– Targeted offline and online advertising plan, including areas located at a significant distance from the analyzed object;
–Consumer behavior analysis that considers the places they visited before or after the company is under review visit;
– Route study of the potential customer's movement to determine the possibilities of their change; and
– Optimization of logistic decisions for the traded goods delivery.

Methodology

A variety of tools are used to achieve the tasks listed. The common records mentioned in the scientific literature are the Huff Model of gravity[1]; Reilly's gravity law of retail[2]; multiplicative interactive choice (MCI)[3]; McFadden's model (multinomial logic model (MLM)[4]; analog and customer mapping methods (customer spotting) developed by Applebaum[5]; central place theory (CPT) model suggested by W. Christaller[6] and A. Losch[7]; allocation–distribution model[8]; Gautschi's model[9]; competing destinations model (CDM) proposed by Fotheringham[10]; spatial-diffusion model of Allaway, Black, Richard, and Mason based on diffusion theory[11]. Reilly–Converse model[12]; spatial interaction model of Batty[13]; Luce's consumer choice axiom[14] and Rust and Donthu's model[15].

Table 1 presents the matrix grouping that illustrates the advantages and limitations of the listed models. Its use in business cannot be called common in all varieties of geomarketing tools. This situation is due to the fact that the choice of geomarketing tools

[1] D. L. Huff, "A Probabilistic Analysis of Shopping Center Trade Areas", Land Economics, num 39 (1963): 81-90 y V. D. Vinogradova; A. V. Molochko and V. A. Morozova, "Geomarketing opportunities to determine the optimal bank branch location (in the case of the branch network of Sberbank in Saratov city)", News of Saratov University, Earth Science Series, Vol: 18 num 1 (2018): 4-9.
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and their application in solving applied business problems for the majority of entrepreneurs is associated with particular challenges caused by insufficient professional competence.

Geomarketing Tools	Selling space size	Assortment	Travel time	Object distance	Attractiveness from the client	Customer benefit	Possibility to choose an individual set of research parameters	Descriptors (identifiers) of shopping centers	Driving conditions in transport	Content and limitations in model using
30s of the 20th century										
Reilly's model				+						It allows establishing the limits of the potential coverage of a retail store. However, the presence of only one variable, which does not accurately reflect the people's perception of the traveled distance and time investment, restricts the possibility of use.
W. Christaller's and A. Losch's model	+	+								It allows determining the trade zone border of the store on the basis of two factors: the rank of the store and its distance from each point of the studied city. Used for conditional division of the city into shopping areas by considering the size of competing shops.
60s–70s of the 20th century										
Huff model	+		+							Used for attractive estimating of retail outlet for residents and assessing the probability of visiting but failed to reflect the utility function of the goods for various customer categories.
Model of Nakanishi, Cooper(MCI)					+		+			Includes a wide range of variables, including the attractiveness parameters of retail outlet. The ability to set the parameters has caused the widespread popularity and its use. Moreover, a low accuracy of

										the obtained values are available.
McFadden's model					+					The resident's opinions of the studied areas on the attractiveness parameters are used for calculations. Does not imply the location study of relative points.
Model of Batty				+	+					It allows to approximately determine the shopping area boundaries of the competing stores by considering their geographical location. However, perceived attractiveness has low accuracy.
80s–90s of the 20th century										
Gautschi's model								+	+	Covers a wide range of spatial parameters but no unique understanding of the driving conditions estimation in transport represented. Moreover, it has choice limitations of the study object.
Fotheringham's model				+		+				Attractiveness evaluation of the store is determined by calculating the average distance between the study object and alternative objects. The model is based exclusively on spatial variables.
Rust's and Donthu's model					+					Attractiveness evaluation of retail outlet organized by consumers interviewing in each area considering the sensitivity coefficient of consumers to the values of the attractiveness parameters.

Table 1
Matrix grouping of the geomarketing models

Results and Discussion

The authors developed an approach to expand entrepreneurs' practice of using geomarketing by considering the following limitations: a sequence of stages and a

mathematical framework of choosing a real estate object for business use purposes or updating the company's marketing plan (Fig. 2).

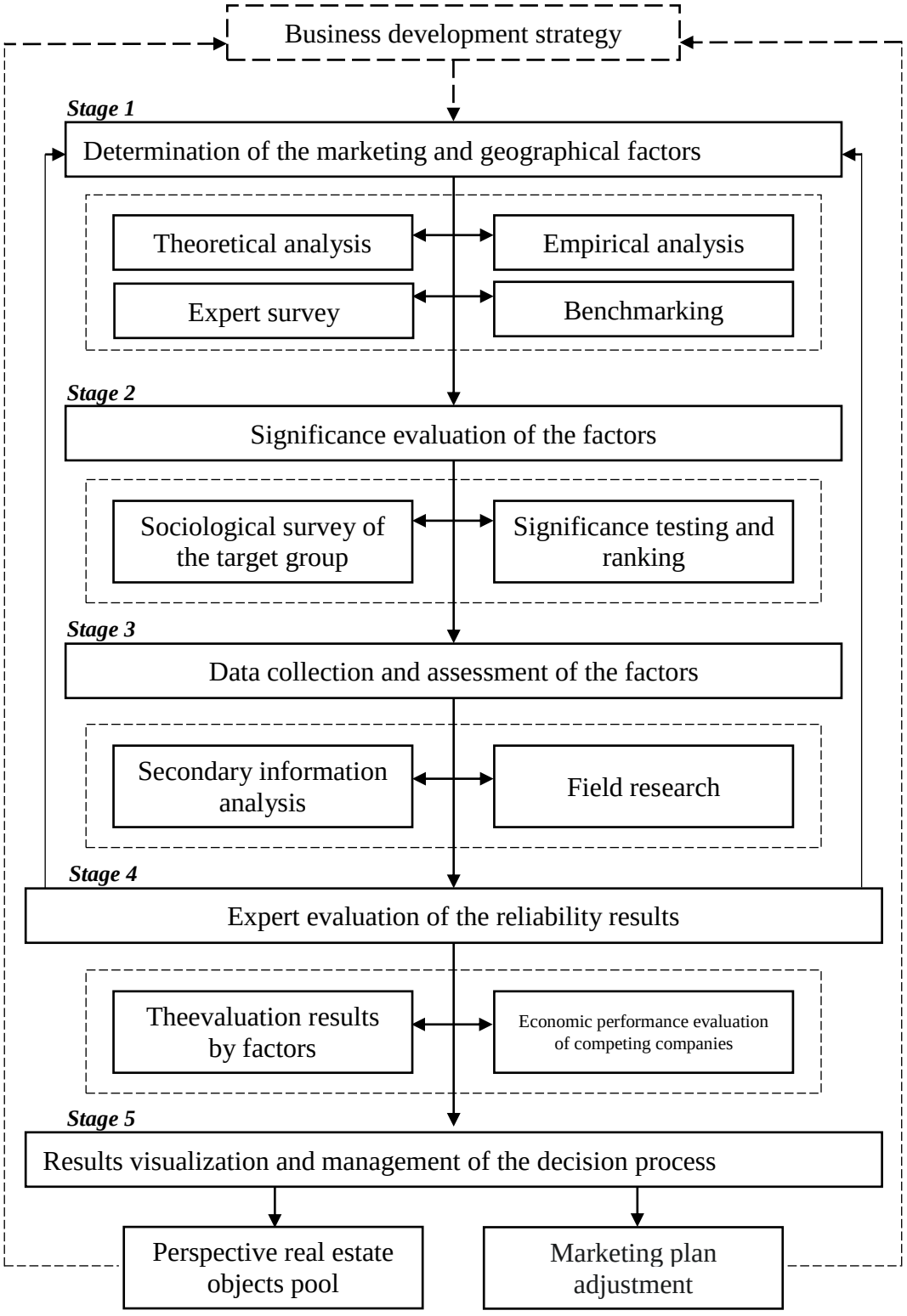

Figure 2
Conducting algorithm of the geomarketing research

The marketing and geographical factors of the "Place" element, which have significant influence on a company's work, should be established *at the first stage*. The following factors are selected on the basis of one or a set of several instruments:

– Theoretical analysis – the identification of substantial relations and attitudes (including cause–effect) between various business aspects and often answers the question "why";
– Empirical analysis – the factor selection based on the personal experience of people interested in the results of the study or the performers and generally answers the question "how";
– Expert survey – the factor collection based on the competent specialist group opinions that mainly enables the determination of geomarketing factors, which will be relevant in the future; and
– Benchmarking –the study of competitors' activities to determine the factors and provides the positive experience in work.

At the second stage, the selected factors are ranked by significance (importance) using a sociological survey of the target audience (TA) representatives.

At the third stage, field research (e.g., business owners interviewing, covert observation, economic intelligence, and other methods) enables the collection of information and evaluation of the selected factors related to competing companies operating in the city.

At the fourth stage, an expert result assessment of the field research is recommended to determine the factors' validity by comparing their obtained receive values and current financial position of the competing companies. An acknowledged city specialist in the analyzed business field or representatives of friendly competing companies is preferred as an expert. Moreover, the procedures of the first three stages should be reconducted in case of discrepancy between the obtained assessment and actual economic situation of the competitor's majority. The results are also necessary for possible exceptions from the analysis of companies with marketing and geographical factor values that are atypical or significantly differ for the worse from the estimates of other companies that simultaneously demonstrate low (compared witho ther analysis objects) average monthly revenue. The presence of such companies reduces the forecast accuracy of the probability calculation of a TAto visit a place chosen to open a new business.

If the results of the fourth stage are correct, then *the fifth stage* (i.e., final stage) is the graphical data interpretation, which facilitates the formation of the potential real estate objects pool with the optimal combination of the necessary geographical factors and having the potential for development (i.e., marketing factors). If a geomarketing study was conducted for an existing property, then the obtained information can be used to pursue internal redevelopments, showcase decoration, adjust to a unique selling proposition (offer), and supplement promotion programs, among others.

The use of the author's model is proposed to determine the probability of a client visiting specific place (P_{ij}) to form a prospective real estate object pool from the ones available for rent (buying) and choose the optimal variant. The model is based on the principle of the geometric probability calculation, in which the ratio of the conventional circle area (S_{AC}) is calculated. This condition reflects the real estate object attractiveness (j) for TA(the circle radius will vary depending on the magnitude of geomarketing factors) to the other conventional circle area (S_{PC}), thereby covering the area of the highest

concentration of TA representatives in the city (i) and including the real estate object to be analyzed.

Therefore, the model assumes the following form:

$$P_{ij} = \frac{S_{AC}}{S_{PC}}, \quad (1)$$

Where P_{ij}isthe probability that a client located in zone *i* will select an object *j* located in the same zone (*i*).

S_{AC} – The conventional circle area, which characterizes the potential attractiveness of the analyzed real estate object for target audience, is expressed in square meters (m^2):

$$S_{AC} = \pi R_1^2 = \pi\,(\tau * k * \mu * \theta)^2, \quad (2)$$

Where R_1isthe circle radius and calculated as the product over the following conventional indicators values:

– "Distance of indifference" (τ) – the distance that TA representatives are ready to overcome from the public transport stop (parking) to the object, which is expressed in meters and calculated empirically.

– "Distance from the reference center" (k) – distance of the analyzed real estate object from the conventional reference center (proposed to use central area of the city), which is expressed through the coefficient (e.g., from 1,0 to 0,1) and calculated empirically or by an expert method.

– "Object size" (μ) – characteristics of marketing factors selected for the study (e.g., number of simultaneously working specialists and range of services) expressed through the coefficient (e.g., from 0,3 to 1), which is calculated empirically or by an expert method.

– "Object location" (θ) – the characteristic of the geographical factors chosen for the study, expressed through the coefficient (e.g., from 0,3 to 1) and calculated empirically.

S_{PC} – the area of the conventional circle with the highest concentration of TA representatives in the city (3):

$$S_{PC} = \pi R_2^2, \quad (3)$$

Where R_2 is the radius, which is defined as the average value between the distances from the reference center (*k*) to the competing companies used in geomarketing research, which is expressed in $m^2$and determined empirically using GIS. Depending on the geographical features of the inhabited locality, another area may be selected analytically, including the highest number of potential customers.

The fundamental significance is the observance of inequality: $S_{PC} > S_{AC}$.

The results of the methodical approach approbation to geomarketing described in this study are characterized by the example of investigating the evaluation of the variants for opening barbershop buildings in Belgorod City.

Fashion trends and consumer preferences confidently stimulate the demand for such services, thereby enabling companies to survive even with the existing competition in the city barbershop market.

Stage 1. The combined application of theoretical and empirical analyses, expert survey, and benchmarking enabled the identification of marketing (N –5) and geographical factors (N – 5) typical for barbershops and represented by the qualitative and quantitative indicator form.

Stage 2. Using the sociological survey in the questionnaire form (December 2018, N – 143, sampling error is 8% with P = 95%), the information necessary for the variational analysis of the importance and influence degree of 10geomarketing factors was collected through the TA representatives (Table 2).

	Marketing factors					Geographical factors				
Preference	Master (barber)	Barbershop service prices (average ticket)	Recording availability at convenient hours	Carrying out barbershop celebrations and parties	Barbershop interior	Convenient parking near the barbershop	City location of the barbershop	Barbershop location on the first floor	Large area barbershop	Barbershop location in the mall
$\sum x_i$	615	459	558	388	485	306	458	317	341	305
$\bar{x}$	4,3	3,2	3,9	2,7	3,4	2,1	3,3	2,2	2,4	2,1
σ^2	1,27	1,53	1,71	2,59	1,76	1,78	1,97	2,45	1,49	1,47
σ	1,126	1,238	1,307	1,608	1,327	1,335	1,402	1,566	1,221	1,212
V_σ	**26,1**	**38,5**	**33,5**	59,3	**39,1**	62,4	**43,8**	70,6	51,2	56,8

Table 2
Geomarketing factors of barbershop attractiveness (Belgorod)

Barbershop visitors are males within the age groups 22–29 (47%), 30–35 (24%), and 17–21 (21%) years old. The following factors strongly impact their consumer choice: master (barber), recording availability at convenient hours, average ticket, barbershop interior, and city location of the barbershop.

Stages 3–4. Evaluations of the barbershop (N – 10) are performed using the deterministic geomarketing factors. Some of the obtained results are as follows. Figure 3 shows a comparison of two barbershops with nearly identical geographic factors, including the opposite location of each other. However, the barbershop “Basot” has a low value in terms of a key marketing factor (i.e., “master (barber)”) and its economic position is critical, thereby indicating the correctness of the selected geomarketing factors.

Notational conventions

Financial position

- Critical
- Stable
- Satisfactory
- ▲ The number of the chairs

0 0,05 0,1 0,2 KM

The name of the Barbershop	Address	Average ticket	The number of the chairs	Area, square metre	Maximum power, people day
OldBoy	38B Gubkina st.	900	3	25	33
Basot	17l Gubkina st.	650	3	25	33

Figure 1
Comparison of the geomarketing factor characteristics and economic situation of two study objects

The result validity is confirmed by the owner of a successful barbershop (“Salt”) in the city, which engages in continuous monitoring of the competitive environment. In addition, five objects, which received the lowest attractiveness estimate by the results of the sociological survey with low and atypical estimated values of most marketing and geographical factors, were excluded from further analysis.

Stage 5. A total of 15 objects were selected using online real estate search services.

– Potentially suitable for placing the barbershop in Belgorod City. The choice of the optimal variant is based on the probability of visiting each object.

The following values of the used conditional indicators are defined to calculate the size of the conventional circle, thereby reflecting the potential attractiveness of the analyzed real estate object for TA (S_{AC}):

– “Distance of indifference” (τ) (820 m) - determined during the experiment (February 2019), in which 29 volunteers (i.e., TA representatives) were offered to walk a certain distance in a straight line from the public transport stop to the conventional barbershop. The experiment was stopped after the subject reported to the observer first signs of fatigue and loss of interest, among others. Thereafter, all the results were grouped and averaged.

– “Distance from the reference center” (k)-expressed by the coefficient presented in Table 3 and characterizes the remoteness of the analyzed real estate objects from the Cathedral Square of Belgorod City. The interval of a 100m step was determined using an analytical method by considering the obtained value of the indicator “Distance of indifference.”

	Distance intervals									
Meters	to 100	100–199	200–299	300–399	400–499	500–599	600–699	700–799	800–899	900 and more
The value of the coefficient	1	0,9	0,8	0,7	0,6	0,5	0,4	0,3	0,2	0,1

Table 3
Values of the indicator “Distance from the reference center”

– “Object size” (μ) and “object location” (θ) are expressed by the coefficients of geomarketing factors (Table 4).

Marketing factors		Geographical factors	
The number of the chairs, units	μ	The number of infrastructural facilities, units	θ
1	0,33	до 9	0,33
2	0,66	9–18	0,66
3	1,00	18–27	1,00
4 and more	1,10	28 and more	1,33

Table 4
Values of the geomarketing factors used in the calculation P_{ij}

The number of chairs directly influences such marketing factors as “master” (the number of the specialists working simultaneously) and “recording availability at convenient hours” (potential production capacity). These factors are important in selecting a barbershop for potential clients and a basis for determining the usable area barbershop at the rate of 5 m^2 per chair. Simultaneously, the results of the workload analysis of large barbershops with over three chairs are unambiguously specified at the marginal utility reduction of each additional chair, starting from the third.

The number of infrastructure (e.g., shops, sports clubs, banks, institutions providing public services, cafes, restaurants) located within a100m radius from the analyzed object was selected as a geographical factor. Field studies have shown that over 16 infrastructure facilities are located adjacent to the most successful barbershops within a100m radius. Moreover, this factor is associated with the current behavior pattern of barbershop customers. That is, before or after the visit to the barber, customers aim to visit other establishments.

The area of the conventional circle with the highest concentration of barbershop TA representatives (S_{PC}) in Belgorod City was 3108678.5 m^2; the circle radius (995 m) is determined by using GIS to calculate the average distance from the town central square (Cathedral Square) to 10 barbershops.

Overall, only 3of the 15 prospects were initially selected for the new barbershop locations, where real estate leases are slightly different in the S_{PC} zone. The visit probability was calculated for each prospect (Table 5), the best option of which is object number 2 (Fig. 2).

The number in Figure 4	Real estate object address	The number of the chairs, (units)/μ	The number of infrastructure objects (units)/θ	Distance from the reference center (м)/k	Probability of visiting
1	78 b Preobrazhenkaya st.	4/1,1	15/0,66	533/0,5	0,031
2	93 Belgorodski prospekt	4/1,1	34/1,33	808/0,2	0,047
3	4 Gostenskaya st.	3/1,0	9/0,33	915/0,1	0,001

Table 5
Probability calculation of a client visiting a particular place (P_{ij})

Figure 2
Visualization of the real estate objects location that is potentially suitable for a new barbershop opening

Conclusion

An approximately identical real estate object group managed to select the variant that is an optimal location to open a new barbershop. This research indicates the possibility of using a combination of marketing and geographical factors for choosing a real estate object, the values of which are determined based on the successful competitor functioning analysis.

Full-fledged competitive intelligence gathering is conducted in the geomarketing research process, thereby possibly forming the basis for a new business development plan. In terms of evaluative judgments, the unity of the methodological base of the proposed approach enables the flexible establishment of tools for conducting geomarketing research, including those related to the socioeconomic and geographical features of any territory.

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