Applying the Concept of Public Utility in Petrol Stations Placing: Geo-Marketing Approach

The problems of reasoning of placing the petrol stations with the help of the concept of public utility by means of geo-marketing analysis are studied in the article. The theoretical basis of defining and interpretation of territory marketing is formulated. The geo-marketing aspect of applying the concept of public utility in placing the petrol stations is revealed.

Key words: geo-marketing; geo-marketing analysis; public utility; marketing of territories; geo-marketing approach; geo-information systems.

Formulation of Scientific Problem and its Significance. With the development of market relations in the world and in particular in Ukraine, the competition increases, within which executives must make the best
decisions to preserve and develop their own businesses in the short term, while minimizing the costs of searching for these solutions. One of the instruments, which proved effectiveness in finding the optimal business decisions, were marketing researches. The founder of the theory of marketing Philip Kotler gives the following definition of marketing: it is the art and science to choose the right target market, to attract, retain and increase the number of customers by means of creating the buyer’s confidence in the fact that he is the highest value for the company [4].

Thus, marketing research is designed to answer the questions concerning the appropriateness of introducing the business, the opportunities for its further development, and the need for diversification or coagulation (elimination). In the context of that, the main task of marketing research is the organization of the most mutually beneficial relationships between producers of goods and services and their consumers. To solve this problem marketing established strong links with sociology, psychology, management, statistical analysis and other sciences. However, without geographical analysis it was impossible to fully reduce the economic cost, use and allocation of resources more efficiently and take definite tactical and managerial decisions. Therefore, the synthesis of Marketing and Geography in form of geo-marketing has become the key to performing set tasks.

Geo-marketing – is one of the disciplines of marketing analysis, the technology of decision-making with using spatial data in the planning process and implementation of activities in the field of sales, management of spatially distributed objects, which are characterized by the consumer, competitive situation and (obligatory) the area infrastructure [2].

Geo-marketing is also the technology of conducting market research for making strategic, conceptual and management decisions, based on different methods of geographic analysis of different spatially distributed objects and phenomena [1]. Such studies allow to determine the target audience in the right territorial unit, conduct competitive analysis, determine the best location for the new facility, give a forecast of turnover of commercial real estate, develop a concept for existing or planned facility, assess the use of land better and much more. We believe that for the study of land there should be a greater use of geo-marketing and topographic approaches, complementing them where necessary with traditional methods.

Analysis of the Research. Theoretical background of marketing research is the question of marketing of places or areas. This is because the effectiveness of the promotion of petrol and other fuels and lubricants depends on the area (areas) for the location of the petrol stations, the activity of competitors in the area, the movement of traffic and its intensity. On the other hand, taking into account the strategic importance of fuel, and hence its great social utility, the decision on the placement of stations should be based on the concept of public utility.

The extent of an elaboration of a problem is characterized primarily by fundamental works of Adam Smith, David Ricardo, Karl Marx, and the works of John Maynard Keynes, John. B. Clark, A. Marshall. They made a major contribution to the development of the theory of utility and value. Further study of the process of forming the monetary value is associated with the works of S. Strumilin, A. Mendelsohn.

J. Kronrod and others. The theoretical basis and practical developments in the field of public utility are outlined in the work of supporters of the theory of optimal planning B. Novozhilov, S. Shatalin, V. Volkonsky, and V. Pugachev. A significant contribution to the study of utility in correlation with the cost value was made by S. Kirillov, P. Belousov, A. Zavyalov, N. Vodomyriv and others. In foreign economic literature, particularly in the works of Karl Menger, E. Bohn-Bawerk, William Jevons, the question of utility was considered primarily as subjective evaluation and preferences of consumers. The subjective interpretation of utility is reflected in the concept of indifference curves developed by J. Hicks and deepened in the works of R. Allen, F. Edgeworth, Pareto, JI. Walras and E. Slutsky.

However, these aspects of the solution of the problems lie in the area of economic theory not practice. The article offers to consider the question of possible practical application of geo-marketing analysis of the concept of public utility to analyze the optimal placement of petrol stations in the Khmelnytsky oblast.

Taking into account the scientific and applied nature of the problem and experience in conducting similar studies by the Center of marketing initiatives of Khmelnytsky National University, we can affirm that the theory and methodology of this issue is in the period of making. Thus, the article highlights the issues as actual and opportune in both scientific context, and in terms of implementation.

The Purpose and Objectives of the Article. The purpose of writing this article was to prove the theoretical and practical aspects of geo-marketing approach in the concept of public utility concerning the optimization of placement stations.

During the writing, the article the following tasks were solved:

- to formulate theoretical basis for defining and interpretation of geo-marketing and its components;
to consider the methodological aspects of performing the geo-marketing research in the concept of public utility;
reveal the applied aspects of geo-marketing analysis on the example of evaluating the effectiveness of placing stations on territorial areas in Khmelnytsky and Khmelnytsky oblast.

The Main Material and Foundation of the Results of the Study. For the effective use of geo-marketing in the practice of management, it is necessary to identify the main opportunities and challenges of this new for Ukraine direction of marketing research. Publications in this area of research are mainly applied in nature, they are in the form of reviews of geo-marketing implemented projects (foreign edition of the journals on geo-information technology, for example, ArcReview). In published studies, there are some common techniques and methods, but there is no single methodology that would unite their considerable parts. Almost every project includes the development of methods of geo-marketing research and research itself. But published reviews of geo-marketing implemented projects can be the starting material for the systematization of experience in such projects.

From the analysis of geo-marketing implemented projects it can be noted that the research, conducted in the process of implementation, often answers one of two questions:
1) where to place the new point of retail sale of goods or services (or logistic center);
2) how to optimize logistics costs in the existing distribution network?

To answer these questions we must analyze the spatial distribution of a number of factors such as population density, its sex-structure and purchasing power, transport access of own existing or planned facilities, allocation of factors of competition (objects of competing companies and their own that may be in the position of domestic competition) and others. All these data are spatial, and the best way of their analysis is GIS technology.

In fact, the fact that the success of the retail point (and this includes the petrol station as well) depends on its location does not require any proof. Therefore, the basic concept of geo-marketing is the marketing of areas.

The main subjects of marketing in any field of activity are manufacturers of a product (goods and services), its customers (buyers, users) and intermediaries. Governments, certain economic sectors, the media, educational and scientific institutions, organizations and their systems can have a significant effect on the development of market relations. The most active participants of market relations traditionally are the producers and the entities that enjoy special attention to them are the consumers.

Target groups (markets), «the consumers of territories» may be classified according to certain features (criteria). The most important of these are the pairs of «residents-non-residents» (criterion of territorial identity, residence location) and «individuals — legal persons» (criterion of legal status). Final or intermediate consumers may be interested in the promotion of products (services) in marketing of areas.

The subjects who are actively engaged in promotion («selling territories») are the territorial authorities and management, local economic development agencies, tourist agencies and operators, trading houses, sports committees and federations, and any other structures located in the territory and those that use active steps to draw attention to their potential consumers (clients and customers) and keep the present. The main purpose of these subjects of marketing of areas is to create, support or change attitudes, intentions and behaviors of subjects — the consumers of territories, including:
- attractiveness, prestige of an area in general, conditions of life and business activity in the area;
- attractiveness of based natural, logistical, financial, human, organizational, social and other resources on the areas as well as possibilities of their realization and reconstruction.

To realize its target orientation marketing of areas produces a set of measures that ensure:
1) formation and improvement of the image of the territory, its prestige, business and social competitiveness;
2) increasing the participation of the territory and its subjects in the implementation of international, federal, and regional programs;
3) attraction of state and other external orders, concerning the territory, to the area;
4) increasing the attractiveness of investments, implementation of external resources on the territory;
5) stimulating the purchase and use of own area resources outside for its benefits and according to its interests.

Similarly to classical marketing, marketing of areas/territories creates its own complex «marketing mix»:
1) territorial product is a range, quantity and quality of the resources of the territory, demanded by its customers: its location, people (staff), quality of life, infrastructure, ability to work with high technology, raw materials, the level of business activity, access to «cheap» money, the level of development of business support, advertising market, audit, public relations etc.;
2) price of the territorial product is the costs the consumers of a territory spend. For the residents it is the cost of living, income and social benefits, the cost of specific products and services in the territory; for tourists it is the cost of tours, the value of daily pocket expenses; for corporate customers at the preliminary stage it is the transportation costs, meals and accommodation of groups of experts and executives, the time and effort required to obtain the necessary information, the project cost in terms of materials and equipment, site preparation, construction and so on. A special role is played by tax benefits and exemption rules for product distribution and revenues export, as well as the degree of company comfort of being in the city;

3) placement, and distribution of the territorial product – material resources, personnel or consumers, intellectual potential, the ability of modern information technology, network and virtual organizational structures;

4) promotion of the territory – is primarily advertising and PR-campaigns, including the identification of recipients and channels of promotion of information, its optimal form, media, volume, temporary modes of its presentation [3, p. 430].

In carrying out the marketing analysis of the area or place, one should remember that each region has its own specifics. Business strategy that leads to success in one area may not work on another (within major metropolitan areas these are areas, within the country they are cities). Marketing tools for market analysis helps to determine which products and services best suit the lifestyle and income of residents of a particular locality. In this manner, you can get a multidimensional cut of the local market for optimal retail space planning, forecasting sales volume, holding marketing events and more. Geo-marketing has already helped thousands of businesspersons to turn statistical and geographic data into information that has deep meaning and, at the same time, is easy to understand, has the form and is used in decision-making.

The purpose of geo-marketing analysis in business is as following:

1) an increase of business efficiency through spatial and temporal study of actual heterogeneous data – monitoring, prognosis, management of spatially distributed businesses by identifying hidden patterns of behavior in demand for products in the spatial and temporal context;

2) making decisions aimed at maintaining effective business in terms of socio-economic environment that is changing rapidly [3, p. 432].

This approach makes it possible to solve such problems in marketing:

1. Defining the territorial areas of effective sales in different business areas. The task of spatial zoning by this or that feature helps to analyze and make decisions in various spheres of human activity. Examples are medical and sanitary areas in public health sphere, or property areas in the analysis of the situation on the real estate market, the places for placing petrol stations and more. Development and construction of such zones is usually based on:
   - spatial distribution of residential areas (living places of potential customers);
   - distribution of population quantity and density;
   - availability (in terms of transport infrastructure, architecture and other features of the city);
   - distribution of competing points of sale in the city;
   - belonging to territorial district of a city.

   In our case – the intensity of traffic flow and road tension.

   After elaboration and construction of such zones for this or that particular purpose, they can be used as a topographic base for conducting analytical calculations, «tying» economic and other indicators and more to them.

2. Reasoning of the sales outlet opening.

   In our case, two problems are solved:
   1. The question is discussed where exactly to place the stations in the city – in terms of space efficiency criteria.
      2. Spatial factors of «attraction» of potential customers are considered.

   The main criteria for space efficiency are the following:
   1) market load with vehicles;
   2) high population density;
   3) presence of wholesale and retail warehouses and other commercial enterprises nearby;
   4) the intensity of motorways;
   5) presence (absence) of direct competitors.

   The main factors of attraction of groups of potential customers are:
   1) places of work or service;
   2) places of residence (e.g. «sleeping areas»);
   3) places of entertainment (such as kindergartens, parks);
places with certain characteristics – the consumer goes to a certain place specially with a certain frequency (e.g. hyper – or supermarket, clothing (food) market, coffee shops or a stadium).

The objective is achieved:

- by means of application of Geographical Information Systems (GIS);
- having the necessary information resources that meet the criteria of efficiency of the spatial effectiveness of location of the petrol station;
- by organizing proper algorithm of building digital models of spatial efficiency and attraction of groups of potential consumers of stations in accordance with the criteria (construction zones suitability);
- topographical bindings models to geo-objects of the city (neighborhoods, roads, etc.);
- construction of cartographic records with digital models and indicating the necessary additional information.

The generalized model, that describes the method of construction of the GIS report to justify the opening (closing) of stations, is based on:

- information resources, selected considering the model;
- technical capabilities of GIS tools.

Analysis of suitable areas is carried out in two stages:

Stage 1. Construction of suitability zones of existing petrol stations in the city of Khmelnytsky and Khmelnytsky oblast.

Analysis of suitable areas is carried out in two stages:

Stage 1. Construction of suitability zones of existing petrol stations in the city of Khmelnytsky and Khmelnytsky oblast.

The analysis was conducted in the city and oblast. «Not interesting» or unsuitable for the analysis territories were found, i.e. those that do not meet the criteria described and models developed. On the other hand, life zones suitable for effective work of petrol stations were revealed.

During the geo-information analysis of Khmelnytsky oblast Information Map was formed (see. Figure 1).

![Fig. 1. The Map of Geo-information Analysis](image1)

![Fig. 2. Projected Location of the Petrol Station](image2)
The result of a narrower market research is a cartographic product with the drawings of all potential selling points, which are interesting to the customer, data layers and modeled surfaces. Mapping product is sufficient for making decisions about the attractiveness of selected sites and allows you to make projecting calculations as to the appropriateness of the construction of new petrol stations in Khmelnytsky oblast (see, Figure 2). By means of over-placement of heterogeneous data using GIS tools, the resulting areas suitable for petrol stations with clear outlines obtained according to the spatial efficiency criteria, and by the models of attracting the consumers are revealed.

Stage 2. Detailed analysis. The most «suitable» for the location of the petrol station area is selected according to the criteria of described models (models of attraction of the consumers and models of opening point of sale) by means of a detailed spatial analysis within these zones, due to topological model. During the implementation phase of detailed analysis of location evaluation of potential areas for opening petrol stations some accompanying information, that was non-priority when building models, may be required.

It is on the above principles that we conducted market research on placement of stations in Khmelnytsky and Khmelnytsky oblast, as well as the calculation of economic feasibility and payback period of these objects.

Conducted geo-marketing studies give reason to believe that petrol stations built in Khmelnytsky and Khmelnytsky oblast are highly effective and, in the absence of a significant number of direct and potential competitors, are economically beneficial, which was proven after the construction of 5 recommended stations.

Conclusions and Prospects for Further Research. In the course of writing the article, the following results were achieved:

1) the theoretical basis for defining and interpretation of geo-marketing and its components are formulated. Thus, we propose to understand geo-marketing as the new direction of marketing research which is based on the use in traditional marketing research of geographical information systems (GIS) and spatial data which are used for marketing analysis of areas. It is determined that the main object of geo-marketing research is the marketing of areas;

2) the methodological aspects of carrying out the geo-marketing research in the concept of public utility are considered, for which the use model of attraction of the population is justified;

3) applied aspect of using geo-marketing analysis on the example of evaluating the effectiveness of placing petrol stations on land areas in Khmelnytsky and Khmelnytsky oblast.

Thus, conducted scientific and practical studies give the reason to state that during geo-marketing research the spatial techniques should be used more. The techniques include GIS analysis that enable to illustrate the results better. At the same time, theoretical and methodological study of actual marketing of areas needs to be processed better, which may become the content basis to determine their attractiveness.

Literature


Ковальчук Світлана. Застосування концепції громадської корисності в розміщенні АЗС: геомаркетинговий підхід. У статті розглянуто проблеми обґрунтування розміщення автозаправних стацій за допомогою концепції громадської корисності засобами геомаркетингового аналізу. Сформульовано теоретичні основи щодо визначення й трактування маркетингу територій. Розкрито геомаркетинговий аспект застосування концепції громадської корисності в розміщені автозаправних стацій.

Ключові слова: геомаркетинг, геомаркетинговий аналіз, громадська корисність, маркетинг територій, геомаркетинговий підхід, геоінформаційні системи.

Ковальчук Світлана. Применение концепции общественной полезности в размещении АЗС: геомаркетинговых подход. В статье рассматриваются проблемы обоснования размещения автозаправочных станций с помощью концепции общественной полезности средствами геомаркетингового анализа. Сформулированы теоретические основы по определению и трактованию маркетинга территорий. Раскрыт геомаркетинговый аспект применения концепции общественной полезности в размещении автозаправочных станций.

Ключевые слова: геомаркетинг, геомаркетинговый анализ, общественная полезность, маркетинг территорий, геомаркетинговых подход, геоинформационные системы.