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MODERN MARKETING WITH THE APPLICATION OF BIG DATA

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In the article, the author presented an analysis of the state of modern marketing, taking into account when the dynamics of processes in the economy are high enough and a quick analysis of multidimensional data is required, where the strategy of product production and market promotion, as well as pricing, depend on consumers. The author determined that the activity of trading floors is aimed at forming an assortment of goods and their nomenclature with the most advantageous characteristics of the goods. These requirements directly affect the marketing strategy and pricing on the Internet market. In the article, the author proposed the concept of building a marketing system using big data, based on the theory and practice of market segmentation, which takes into account many factors: geography, cost, time and others. A unifying factor in marketing research is the formation of similarities in consumption and pricing on the Internet market. In this concept, the author applied the method of evaluating consumer efficiency, which is based on the use of rating ratings obtained on the basis of ranking expert opinions. Thus, the proposed concept and method for assessing consumer demand in the target market is aimed at the prospective management of trading floors using big data technologies.

СОВРЕМЕННЫЙ МАРКЕТИНГ С ПРИМЕНЕНИЕМ БОЛЬШИХ ДАННЫХ

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Ключевые слова:
цифровая экономика, системы маркетинга, интернет-маркетинг, большие данные.

Автор приводит анализ состояния современного маркетинга, когда динамика процессов в экономике достаточно высока и требуется быстрый анализ многомерных данных, где стратегия производства товара и продвижение на рынок, а также ценообразование зависят от потребителей. Автор определил, что деятельность торговых площадок направлена на формирование ассортимента товара и его номенклатуры с наиболее выигрышными характеристиками товара. Эти требования напрямую влияют на маркетинговую стратегию и ценообразование на Internet-рынке. Автор предлагает концепцию построения маркетинговой системы с применением больших данных, основанную на теории и практике сегментирования рынка, которая учитывает множество факторов: географические, стоимостные, временные и другие. Объединяющим фактором в маркетинговых исследованиях является формирование сходств по потреблению и ценообразованию на Internet-рынке. В данной концепции автор применил метод оценки потребительской эффективности, в основу которого положено использование рейтинговых оценок, полученных на основе ранжирования экспертного мнения. Таким образом, предложенная концепция и метод оценки потребительского спроса на целевом рынке направлен на перспективное управление торговыми площадками с применением технологий больших данных.

Statement of the problem

It should be noted that modern marketing is aimed at ensuring the growth of profitability of business entities by satisfying consumers with goods and services in a specific period of time. Due to the rapid variability of market conditions, marketing research does not exceed a period from 1 to 5 years. In conditions of economic instability, this research period can reach up to 3 years. In this case, it is necessary to predict such unforeseen factors as consumer solvency in the target market, changes in his requirements and desires, as well as behaviour, demand level in the planning period, development prospects of competitors producing not only similar products, but also interchangeable goods. The effective work of modern marketing can be considered when business entities that take into account these factors achieve the desired results in production and marketing activities.

All the activities of modern trading floors are aimed at forming an assortment of goods and their nomenclature with the most advantageous characteristics, which are aimed at meeting the needs of the consumer. These requirements directly affect the marketing strategy and pricing on the Internet market. Therefore, modern marketing has direct links with the consumer, where the incoming information in real time from consumers allows you to quickly respond to the rapidly changing demand.

Analysis of recent studies and publications

The basic concepts of marketing management underlie marketing, which were expressed by Philip Kotler in 1984 [1]: "The task of marketing management is to influence the level, time and nature of demand in such a way that it helps the organization to achieve its goals..."

The digital economy opens up new directions using the Internet market, among which modern marketing occupies one of the leading places.

Ten years later, K. Smith [2] suggested that by 2010 the number of Internet users in the world will exceed 2 billion. And as a result, with the rapid development of the Internet, the use of marketing will grow, which is considered as a strategic task of any company.

In 2015, studies by J. Armitage [3] confirmed the hypothesis that a marketing strategy should be the main focus in the market strategy of any company. J. Armitage also expressed the idea that fast-paced technology will take the business to new forms.

M. Gaikwad [4] in his research in 2016 examined modern marketing and found that marketing deserves special attention for companies.

Significant contribution to the formation of scientific areas of marketing research, marketing functions of marketing, business process management, information system models, models for optimizing prices and sales in consumer markets, marketing management functions and approaches, problem-oriented business process management, modelling of cooperative relationships in the digital economy was contributed by: V. Galitsyna [5], V. Kravchenko [6], V. Lukyanenko [7], Yu. Lysenko [8, 9], S. Ivanov [10], M. Ivanov [11] and others.

Objectives of the article

The purpose of this article is to develop methods of marketing research, methods of processing and analysis of information using big data.

The main material of the research

Big data are understood to mean structured and unstructured data of large volumes and a large variety of formats (digital, linguistic, video and others). It should be noted that this is due to the emergence of technological capabilities to analyse large amounts of data in the socio-economic fields (the global Internet market – the global amount of data) [12].

The concept of three "VVV" stands out as defining characteristics for big data: volume (volume – data volume), speed (velocity – high-speed processing and obtaining results), variety (variety – the ability to simultaneously process various types of structured and unstructured data).

The application of approaches and tools initially included means for parallel processing of different types of data, primarily database management systems. Modern technologies make it possible to process ultra-large data arrays.

The concept of building marketing research based on the theory and practice of market segmentation, which takes into account the multidimensionality of factors: geography, cost, time and others, is proposed. A unifying factor in marketing research is the formation of similarities in consumption and pricing on the Internet market. These similarities are associated with the principles of similarity [7], which make products similar and form substitute products. This fully applies to goods and services that can be considered by consumers as a target market.

The goods and services sold in this market have a number of specific economic and social characteristics. Firstly, they have lower prices [10]. Secondly, the range of products is not limited, only limited by the specifics of the trading platform.

Modern marketing puts forward a number of requirements for the target market, which were analysed from the perspective of the possibility of their implementation on the trading floors (Table 1).

Table 1 - Requirements for the target market during segmentation.

The target Market Requirements	The limitations
The profitability	The profitability is limited.
The volume of sales	The limited sales
The competitors	The number of competitors is limited.
The substitute Availability	The volume of substitute products present in the target market is limited
The lack of a "strong" consumer position	The consumers are closely related
The assessment of demand and customer satisfaction	The technological opportunities of trading floors

The choice of the target market is based on the task of increasing sales. In this case, digital marketing is used, which is a multidimensional structure. This is due to the fact that manufacturers and consumers are united on the trading floor in the global Internet.

Therefore, the concept of building a digital marketing system using cloud technologies (Fig. 1) includes not only the study of the target market for goods, but also the solution of the analytical function of marketing (analysis, evaluation, forecasting).

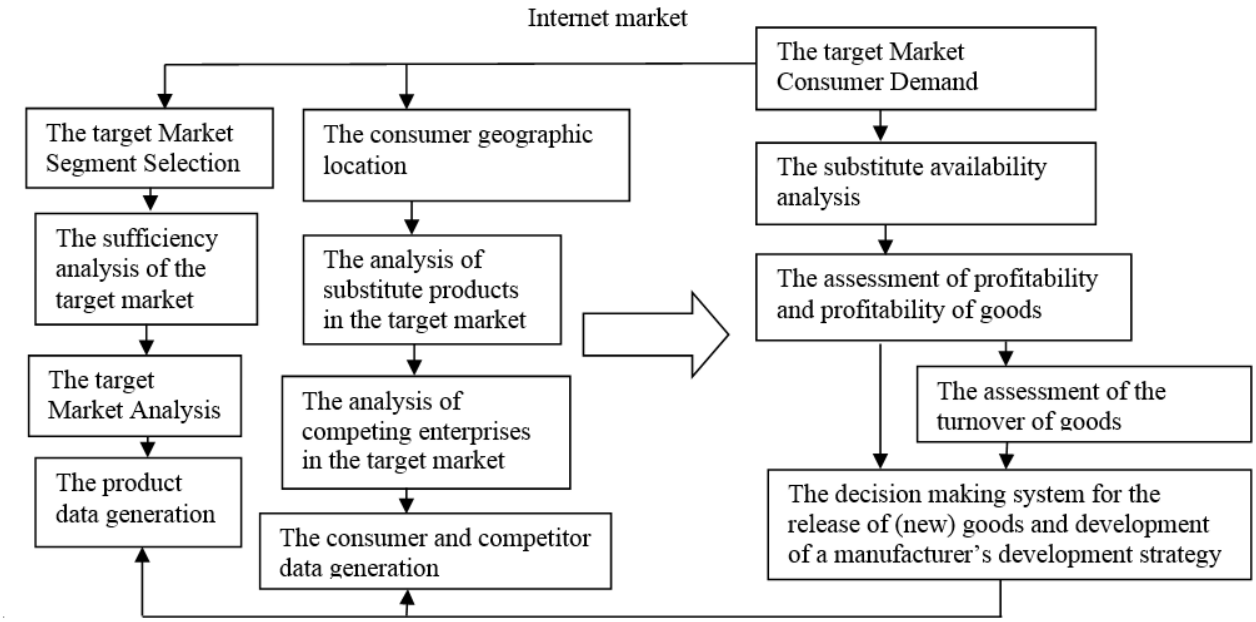

Fig. 1. The concept of building marketing systems using big data.

The proposed concept employs a method for assessing consumer performance, which is based on the use of rating ratings obtained on the basis of ranking expert opinions on several order scales. Experts can be both consumers and manufacturers. The use of expert assessments is necessary in conditions with the Internet market. The method of assessing consumer demand in the target market is presented in Fig. 2.

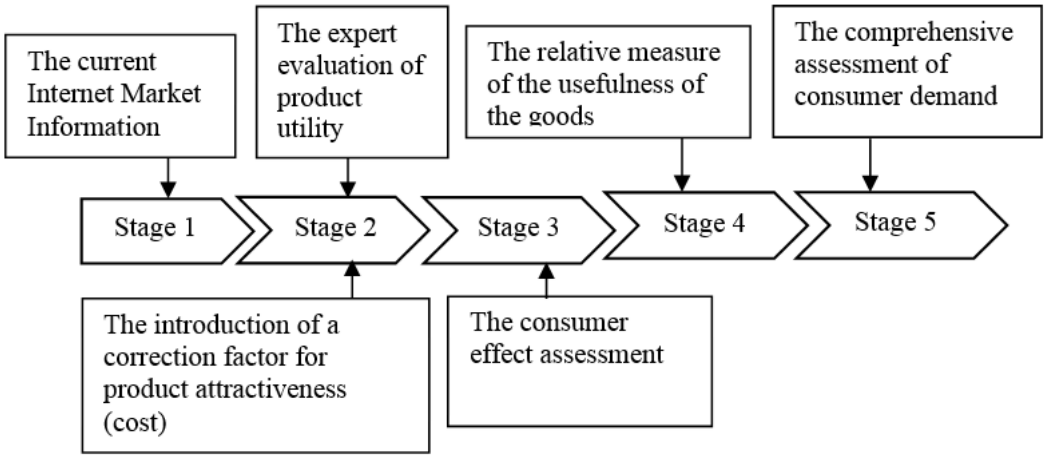

Fig. 2. The method of assessing consumer demand in the target market.

The implementation of the method begins with the formation of the source data. Further, each product is assigned an expert rating (P_i) on the following five point scale: 5 – very high utility; 4 – high utility; 3 – average utility; 2 – low utility; 1 – very low utility.

In addition, to take into account prices and costs, a correction factor of utility value (k_i) is introduced, which takes the following values: 1.5 – the consumer is willing to pay extra for utility; 1.2 – the consumer is interested in utility, but will be interested in price; 1.0 - the consumer will not pay for utility.

Absolute rating indicators of product usefulness are uninformative and poorly comparable for different products, so the relative indicator (utility index) is then used and is calculated by the following expression:

$$x_i = \frac{P_i \cdot k_i}{\sum_{i=1}^{n} P_i \cdot k_i}, \quad (1)$$

where P_i — is the rating score of the i-th utility (1 ... 5, integers);

k_i — coefficient taking into account the cost of utility;

n — is the number of product utilities;

i = 1,.., n.

The formation of utility indices is the next step in measuring the consumer effect of individual market segments. The following consumer benefits have been identified for the product in question: product quality, delivery time, pricing policy, form of payment.

The proposed list of benefits can be expanded and specified.

The next step in the implementation of the method is the formation of matrix columns that form innovations – both those available in the company's arsenal and the proposed ones: organizational, technical, service, etc. This list may include innovations described qualitatively and innovations expressed by the values of technical and economic indicators. The fundamentally considered method can be used for the synthesis of innovations. In this case, the activity of the trading platform is built on the principle of "what can be done (change, improve, supplement, etc.) to form a specific utility."

Elements of a matrix of volume *n* x *m*, where *m* – is the number of innovations considered, are filled with rating estimates of the strength of the influence of the *j*-th innovation on the *i*-th product benefit. The influence rating is established on the following ten-point scale of the order: 9 – strong influence; 3 – average effect; 1 – weak influence; 0 – innovation does not affect the individual benefits of the product.

Using the designation y_{ji} to assess the strength of the influence of the *j*-th product on the *i*-th benefit, we can calculate the conditional and unconditional indices of the consumer effect of each product. Then we write the conditional index as follows:

$$E_{ji} = \frac{\sum_{i=1}^{n} x_i y_{ji}}{\sum_{j=1}^{m}\sum_{i=1}^{m} x_i y_{ji}}. \quad (2)$$

The conditional index is useful for comparative evaluation of the product by the degree of its influence on its total value. However, the conditional index depends on the total volume of the product and shows the relative contribution of a single product to the formation of benefits and therefore cannot be used to quantify the consumer effect.

To measure a consumer effect that is independent of the total quantity, an unconditional index of consumer effect is used. When constructing it, the value of the consumer effect, which has the maximum impact on each consumer utility, is used as a base. Then, in accordance with the expression (2), the unconditional index can be written in the following form:

$$B_{ji} = \frac{\sum_{i=1}^{n} x_i y_{ji}}{\sum_{i=1}^{n} x_i y_{jimax}}. \quad (3)$$

Given that in the given dependence $y_{ji\max} = 9$ (according to the accepted point scale), the expression in the denominator also takes a value equal to 9, i.e. $\sum_{i=1}^{n} x_i y_{jimax} = 9$, and the consumer effect of the *j*-th product is estimated relative to the absolute value. The data obtained will allow the decision-making support management system to choose a promising direction for the production of goods.

For the goods in question in the Table 2, a list of key indicators is used, a matrix is formed, and conditional and unconditional consumer effect indices are determined from the above dependencies.

Table 2 - The formation of conditional and unconditional indices of consumer effect of the trading floor

The consumer benefits	x_i	The product volume	The demand	The assortment Marketplace	The logistics system	The dealerships
1. The product quality	0,36	8	9	9	7	5
2. The delivery time	0,19	7	6	9	8	7
3. The price policy	0,25	7	8	-	7	4
4. The form of payment	0,2	5	7	-	8	9
	1,0	6,96	7,78	4,95	7,39	5,93
	E_{ji}	0,21	0,24	0,15	0,22	0,18
	B_{ji}	0,77	0,86	0,55	0,82	0,66

The above calculation results (Table 2) show steady demand (0.82 logistics system, 0.86 demand) on the trading floor.

In the future, the Internet can be effectively used for various marketing research on the Internet market. The global network provides an opportunity to conduct market research based on current data on the product market presented on the Internet, as well as to study the composition of real and potential groups of customers.

The extraction of knowledge can be defined as the search and study of marketing information. The following approaches are used to solve these research problems: automatic search and analysis of data on Web sites, as well as data mining when detecting and researching information related to the interests of users in goods and services.

The increase in the amount of data available on the Internet is usually stored in an unstructured form, which contributed to the emergence of multidimensional databases, as well as tools for online data analysis (OLAP – Online Analytical Processing technologies). Today, systems with artificial intelligence are used, the task of which is the effective extraction and research data from the Internet.

The process of data mining is an integral part of the digital economy, which also analyses the activity of consumers of goods, and also explores the most popular ways to visit the Internet. To solve these problems, unstructured Internet data are used. Trading platforms analyse a large amount of information and store it in multidimensional databases using cloud technologies. Sources of information are also reference websites,

which contain information on each page that has a link. Sites are viewed by programs guides on the Internet and contain personal user data.

The main consumers of electronic banking systems are trading platforms that sell or provide services on the Internet. The main tasks for them are personalization of the consumer of goods and services, conducting effective advertising work and simplifying the work. Such systems are of interest to Internet providers. The main areas of application in this case are Internet optimization, traffic minimization and optimization of services provided using intelligent systems.

Modern Internet systems provide the ability to identify the user and obtain statistical information about the interests of the user. Such software applications allow you to determine the turnover, the intensity of access to different information, the addresses of individual users with the ability to analyse the relationship between links to data sources and information.

Today, obtaining information at the level of the trading floor is the main data for developing a product manufacturer's work strategy. This can be used to obtain information on the priorities and interests of consumers of goods.

Conclusions

The author has proposed a concept and method for assessing consumer demand in the target market, aimed at managing trading floors, taking into account marketing research and involving the use of big data in marketing systems and their analysis. This concept is based on the theory and practice of market segmentation, which takes into account the multidimensionality of factors: geography, cost, time and others.

The unifying factor of marketing research is the formation of similarities in consumption and pricing in the Internet market.

The proposed method for assessing consumer performance is based on the use of rating ratings obtained on the basis of ranking expert opinions on several order scales. Experts can be both consumers and manufacturers.

The proposed method fully applies to goods and services that consumers can consider as a target market.

In the article, the author analysed and proposed a trading platform system for displaying sales data using OLAP technology.

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