

Technologies of Information Systems in Internet Marketing

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ABSTRACT : *The importance of taking into accounts the methods and approaches of information systems in the implementation of Internet marketing is generalized. Features of application of information systems as a means of formation of Internet marketing are considered. Criterion signs of construction of information systems for the needs of functioning of Internet marketing are determined. The structure of multicriteria functions, which allows classifying a plurality of goods and services offered to consumers through the Internet, is presented.*

KEYWORDS -information systems, internet marketing, optimization criteria, network communications.

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I. INTRODUCTION

The development of the Internet and modern means of communication provide ever-greater opportunities for achieving the goals set. Particular attention is paid to such opportunities by business entities that use existing tools and means of modern communication in their daily activities, such as Internet marketing [1]. The main component of such a direction of activity of individual economic entities, the implementation of the goals set is the application of various methods and approaches that have found a pre-distribution in various information systems [2–6]. Such attention to the information systems, methods and approaches of operation of information is determined by the fact that there is the possibility of obtaining additional information that is absolutely necessary in the fast-moving conditions of making management decisions [7, 8].

The availability of additional information allows us to build an expanded knowledge base, which is a guarantee of the effectiveness of the decisions taken, achievement of the set goals in accordance with the tasks that need to be addressed. In addition, it should be borne in mind that any business entity, any company that uses the Internet to conduct its activities has a certain form of information system. This is determined by the fact that general information about clients, products, and transactions is usually stored at different levels of detail. Therefore, there is a need not only for the processing of information for each level of detail, but also the combination of such information between different levels, the definition of conditions of coherence and the possibilities of using such information.

Therefore, any research questions of information systems, methods and approaches that are used is an important achievement in terms of theory and practice of the development of modern means of communication and Internet marketing.

II. INTERNET MARKETING AS A TOOL OF COMMUNICATION DEVELOPMENT AND MODERN MEANS OF COMMUNICATION

The concept of marketing is applied completely to everything. Marketing idea – this is not a functional activity, but a way of business life [9]. Therefore, Internet marketing is considered a product of the development of classical marketing, which is engaged in the supply of products and services to end users, develops motivation for their sale [10].

Like any other kind of marketing, internet marketing has retained the key principles of this kind of activity, adapting its tools to the Global Network. However, its success is also due to a number of important differences. First of all, Internet marketing has completely transferred the main role to consumers, finally, leaving the model of the average buyer.

In comparison with traditional marketing, modern marketing has a number of advantages. Modern marketing elements are less expensive and allow you to establish close contact with the target audience. Classic marketing tools have fairly wide audience coverage, but do not always achieve the necessary target group division.

The traditional way of marketing is to classify goods according to their characteristics, nature and needs, as well as the behavior of the consumer [10]. However, this classification may be suitable for a traditional marketing environment, but it is not appropriate to classify products or services in an electronic market. The best way to group products or services online is by dividing them into searchable products or products with a specific consumer experience. That is, from the point of view of the formalization process for the construction of the classification system, we move away from the classical representation of a plurality of goods and services (T) with some defined attributes (a) and add to the classification feature of such a plurality of goods ($\{T_a\}$) a sign of the direction of the search for goods according to consumer preferences and experience (d). Therefore, in this case, we have a variety of goods and services ($\{T_a^d\}$), which is characterized not only by a plurality of classification features, but also by a plurality of distribution of such features across several levels according to consumer preferences and customer experience.

Searchable products are goods that are evaluated using external information. If a product is quickly found at a search system, then it will be better suited and sold on the Internet.

On the basis of product characteristics, a set of factors identified for decision making is determined. The topics for online marketing are: product configuration, availability, logistics and transaction complexity. The individual functions of the information channel are in good agreement with the proposed dimensions. In particular, online advertising can lead to extreme price competition when goods or services are not capable of significant differentiation. The availability function considers the frequency of use, the time of consumption and the replacement rate, and is related to the first aspect, which varies from cheap to frequently purchased goods and expensive.

That is, marketing on the Internet – is placing advertising on websites, web pages; contact with the target audience; demonstration of a clear statistical picture of the effectiveness of a marketing company.

So, Internet marketing is aimed at finding the target audience, promotion of new products in the market, the use of various types of advertising and improving purchasing power.

III. INFORMATION SYSTEMS AS A MEANS OF INTERNET MARKETING FORMATION

The traditional model of mass media states that mass communications is a process by which a company, a certain business entity transmits meaningful information through the medium to a large group of consumers.

In addition, modern Internet marketing defines the functions of analysis, planning, organization, motivation, implementation, control, consumer typology and market segmentation, product characteristics, choice of sales regions, level of product position, analysis of its properties and attitude towards them; forecasting competitiveness. Therefore, in this process, the leading role is assigned to information systems.

At the same time, the successful use of information systems in the development of Internet marketing depends on the creation of a proper database and the use of information using the latest technology.

According to J. Straus and R. Frost, the use of electronic databases and programs, the planning and implementation of concepts, distribution, pricing, and ideas are needed to create an exchange and meet individual and organizational goals [11].

S. Z. Ahmad, A. R. Abu Bakar, T. M. Faziharudean and K. A. Mohamad Zaki think that the use of the Internet or electronic tools in communicating with trading partners, state institutions, customers and end users of their products and services is more effective and relevant in the storage of long-term relationships [12].

According to R. Keen [13], information systems consist in assessing the success of a success, but the way they evaluate has changed over time, the contexts and goals that were dependent on the impact of information technology have changed.

Information is a subset of data that includes only data that has a context and purpose; involves manipulating unprocessed data to receive a purposeful indication of trends or data schemes. The degree of use of information technology contributes to the success of people, groups, and organizations. For example: decision-making, increased productivity, increased sales, reduced costs, improved profits, market efficiency, consumer welfare, job creation, and economic development affect the measurement of IT investment and productivity that is determined at the level of companies, organizations, firms.

Knowledge management also contributes to the infrastructure of information technology, the

development of information systems, and, consequently, the formation of Internet marketing. Certain information technologies and systems are developed for knowledge management; general information technology infrastructure of companies, organizations, designed to support the needs of information systems. Information technology infrastructure includes data processing, storage of communication technologies and systems. It covers the entire spectrum of information systems, including transaction processing systems and information management systems, consisting of databases and data warehouses, as well as resource management systems for companies, organizations that are essential for the effective implementation of online marketing.

Therefore, the use of information technology and information systems in marketing is to change marketing, promote the development of new search tools to meet the requirements of users and the needs of companies, businesses.

According to J. Deighton [14], marketing is formed by a set of marketing tools, which depends on the amount of innovation. Although the marketing strategy remains unchanged for generations, but with the advent and development of information systems, it is changing [15–17].

IV. INTERNET INFORMATION SYSTEM TOOLS IN INTERNET MARKETING

Sustainable development of information systems has led to the use of a variety of methods and approaches used as tools in Internet marketing. These developments include, in particular, operational research (OR).

OR is, first of all, a method of managing organized systems. That is, OR is used to solve managerial and administrative problems that focus on the performance of organized systems in general, and not on their parts separately.

The main stages of the traditional OR should be: the creation of a model that meets the problem; choice of the criterion of optimality; choose the desired result [18].

Due to the expansion of technology and its impact on the environment, the use of OR is widely distributed. Knowledgeable stakeholders: Society, government and academics require solving problems based on several criteria. This approach to problem solving allows you to make high-quality solutions. The difference between OR methods and decision-making methods is that ORs have several different methods for assessing the quality of the decisions taken. A compromise between several criteria may be determined by the person or group of decision makers. An example of the use of OR in Internet marketing can be the construction of the classification of goods and services offered through the network. In particular, if we consider the classification according to the characteristics of the goods and according to the consumer preferences and experience of customers, then as a criterion, it is worthwhile to choose a multipurpose function, which allows taking into account the multilevel construction of the classification accordingly. For example, this may be a function that minimizes the cost of the selected product or service against the background of maximizing the demand for such a product or service:

$$F(\{T_a^d\}) = \begin{cases} \min(\{T_a^d\}), \\ \max(\{T_a^d\}). \end{cases} \quad (1)$$

The OR extension should include the use of MCDM as a part of operational research related to the design of computational and mathematical tools to support the subjective evaluation of performance criteria for decision makers [19].

Taking into account the set of alternatives (options) and a number of criteria in decision making, the purpose of MCDM is to provide a choice, description of classifications, sorting cases of alternatives, from the most desirable to the least desirable options.

The MCDM method has the ability to provide a full ranking of alternatives that indicate the position of each alternative. In addition, the method has the ability to regulate utility criteria and costs, as well as quantitative and qualitative characteristics. The ease of use and understanding of MCDM technology is an important consideration so that any interested parties can easily accept the proposed method.

So, if we have a set of goods and services ($\{T_a^d\}$), where such a set can be characterized by separate subgroups of goods ($T = \{T1, T2, \dots, TP\}$), then the function for the classification of such a group of goods (according to formula 1) can gain a more structured form:

$$F(\{T_a^d\}) = \begin{cases} \min(\{T1_a^d\}), \max(\{T1_d^d\}), \\ \min(\{T2_a^d\}), \max(\{T2_d^d\}), \\ \dots\dots\dots \\ \min(\{TP_a^d\}), \max(\{TP_d^d\}). \end{cases} \quad (2)$$

It also should be taken into account that weight criteria are usually established on the basis of professional perception, which may be somewhat subjective and accordingly change. Therefore, the effect of the possible deviation of the weight value should be estimated. Alternative MCDM methods should be used thoroughly to evaluate decision-making. Therefore, from the point of view of Internet marketing, it is also advisable to use DCE technology [20].

DCE is the identification of preferences based on choice, the theory of consumers, observing the choice of respondents in the experiment, which reveals the benefits of individuals. The decision of the consumer can be divided into a discrete or continuous choice: what choices can be chosen and how much the selected product is consumed. In the context of choosing a solution, it is constructed in such a way that the discrete choice is isolated, taking into account the nature of many non-market goods, each person can choose only one alternative in terms of choice (taking into account the value and continuity of the product).

The DCE consists of several sample sets, each containing a set of mutually exclusive hypothetical alternatives; respondents are asked to choose the preferred unit.

Alternatives are defined by a set of attributes; each attribute contains one or more levels. The choice of individuals involves implicit compromises between the attribute levels that are part of the selection. When value or price is considered as an attribute, useful evaluations can easily be converted to a readiness for payment (WTP) evaluation for change. Experimental constructions are used for selection sets, so that the attributes do not correlate and give groundless estimates of the parameters. The resulting choice is analyzed to evaluate the contribution of each attribute as a generic utility.

However, the development of the Internet and modern communication tools allow the audience to interact with one another, to create a powerful informative tool that quickly spreads and becomes more cost-effective in adapting. The use of information forms for the limits of the personal communication network significantly affects the increase of the target audience.

The Word of mouth (WOM) [21] method is how consumers develop their relationships, taking into account the fact that marketing messages are not unidirectional messages and are actively exchanging content in the consumer network. This method uses new types of tactics and measures that affect the target audience.

The main purpose of WOM is to increase the target audience. WOM has more long-lasting effects than traditional practices and elastic response characteristics, but can quickly become a driving force for all marketing companies as the diversity of social networks that are considered to be critical information is growing.

Another approach is Customer Relationship Management (CRM) [22]. The purpose of using the CRM method is marketing combinations that depend on strategic planning and integration. This method focuses on the interconnection of interventions to build loyalty among consumer audiences that require personalized efforts for individual consumer groups and will be effective in increasing the profitability of companies in the event that these efforts are implemented.

Consequently, the management of marketing relations begins with the definition of the required client, accurate assessment of the value of each client and the distribution of marketing resources for the development of these relations.

V. CONCLUSION

Various tools of information systems that are used in Internet marketing and aimed at improving the information environment from the point of view of individual business entities, companies and potential consumers are considered in the paper. Particular attention is paid to the methods of the criteria selection of a plurality of goods for their presentation to consumers in accordance with the characteristics of such goods and preferences, the benefits of customers. In particular, the structure of multicriteria functions, which allows classifying the plurality of goods and services offered to consumers through the Internet, is determined. This allows you to improve the processes of managing internet marketing and build an effective structure of it.

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