Ergashev Erkin Irokovich,
DSc of Economics, management, taxes and insurance department of Tashkent institute of finance, Tashkent, Uzbekistan.

Mamurov Samadjon Igamnazarovich,
Senior teacher of Management and marketing department of Tashkent institute of finance, Tashkent, Uzbekistan.

Sobirjonov Sanjar Sobirjonovich,
PhD of Economics, management, taxes and insurance department of Tashkent institute of finance, Tashkent, Uzbekistan.

MARKETING INFORMATION SYSTEM AS A FACTOR OF IMPROVMENT OF BUSINESS

Abstract. It is no secret that the importance of information resources in the activities of enterprises is increasing today. At the first stage of the marketing information system, information from the external environment comes separately, and then is gradually systematized on the basis of the process of collecting and processing marketing information, which helps to solve the problems associated with the analysis and use of data in the enterprise.

The main goal of the marketing information system in enterprises is to make available to the manager information about the state of the object under study and the processes taking place in the marketing environment.

Key words. MIS, Marketing intelligence system, data mining, customer relationship management, computer assisted telephone interviewing, online analytical processing.

МАРКЕТИНГ АХБОРОТ ТИЗИМИ БИЗНЕС РИВОЖЛАНТИРИШНИНГ БИР ОМИЛИ СИФАТИДА

Аннотация. Бугунги кунда корхоналар фаолиятида ахборот ресурсларининг аҳамияти тобора ортиб бораётганлиги барчамизга сир эмас. Маркетинг ахборот тизимининг биринчи босқичида ташқи муҳитдан келадиган маълумотлар тарқоқ равишда қабул қилиниб, кейинчалик аста-секинлик билан маркетинг маълумотларини йиғиш ва қайта ишлаш жараёни асосида тизимлаштирилади, бу эса корхона ичидаги маълумотларни таҳлил қилиш ва улардан фойдаланиш билан боғлиқ муаммоларни ечишга ёрдам беради.

Корхоналарда маркетинг ахборот тизимининг асосий мақсади ўрганилаётган объектнинг ҳолати ва маркетинг муҳитида содир бўлаётган жараёнлар тўғрисидаги мавжуд маълумотларни менежер томонидан мақбул шаклга келтиришдан иборат.

Калит сўзлар. MIS, Маркетинг разведка тизими, маълумотларни қидириш, мижозлар билан муносабатларни бошқариш, телефон орқали суҳбат, онлайн таҳлил.

Introduction. A huge impetus to the development of modern marketing information systems was given by the improvement of information technologies in the 90s, when systems were developed and widely used to significantly reduce the cost of storing a unit of information, increase the speed of data processing and

analysis, telecommunications and electronic means of information transmission were further developed, and the possibilities of working with the global information space of the Internet were expanded.

The growth of technical capabilities in the creation of information systems and the expansion of the range of tasks to be solved in the past few years have led to a significant increase in the number of companies using marketing information system (MIS) in developed countries. In 1991, in a number of studies on marketing information systems, it was found that already more than 90% of companies use MIS in their activities, while in 1985, 75% of organizations used marketing information systems, and in 1971 they used MIS systems. Only 30%. If in the early 1980s only 25% of American and European companies built their marketing strategy on regularly received information, then by the end of the same decade there were already about 80% of such companies (Bird J., 1991) [1].

A marketing information system is intended to bring together disparate items of data into a coherent body of information. An MIS is, as will shortly be seen, more than raw data or information suitable for the purposes of decision making. An MIS also provides methods for interpreting the information the MIS provides. Moreover, as Kotler's (1988) definition says, an MIS is more than a system of data collection or a set of information technologies: "A marketing information system is a continuing and interacting structure of people, equipment and procedures to gather, sort, analyze, evaluate, and distribute pertinent, timely and accurate information for use by marketing decision makers to improve their marketing planning, implementation, and control".[3]

Figure 1 illustrates the major components of an MIS, the environmental factors monitored by the system and the types of marketing decision which the MIS seeks to underpin.
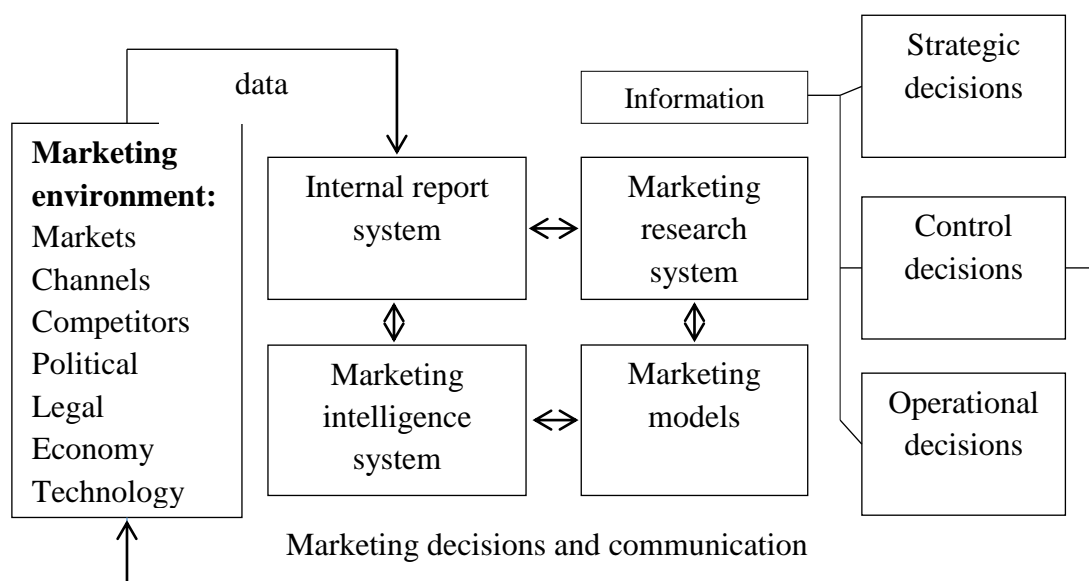
Figure 1. The MIS and its subsystems in enterprises (done by author)

The explanation of this model of an MIS begins with a description of each of its four main constituent parts: the internal reporting systems, marketing research system, marketing intelligence system and marketing models. It is suggested that whilst the MIS varies in its degree of sophistication - with many in the industrialized countries being computerized and few in the developing countries being so - a fully-fledged MIS should have these components, the methods (and technologies) of collection, storing, retrieving and processing data notwithstanding.

Traditionally, marketing information systems (MIS) are viewed as systems that provide support in making marketing decisions. The first definition of MIS was given in the work of Bazzel et al. (1993) [3], according to which MIS can be considered as a set of procedures and methods of routine planned analysis and presentation of information for decision-making. Marketing information was divided into control, planning and research information. The goals of such information systems were to collect, sort, analyze, evaluate and distribute timely and accurate information for making marketing decisions, as well as improving the planning and control system. Schmidt K.P. defined MIS as a dynamic combination of marketing information, computer technology and the ever-changing consciousness of the company's management. According to researchers, the use of MIS resources can be a critical factor in the success of an organization, and should become an integral part of the strategic planning process.

The development of marketing information systems in enterprises and an increase in the processing and analysis of data have led to an increase in the role of MIS in information support for decision-making at high levels of the management

hierarchy. If earlier high-level managers relied more on their intuition than on the information available in the company when making decisions, and information systems were used mainly to meet the information needs of lower management, nowadays the use of marketing information systems by senior and middle managers the link is growing steadily.

In its most general form, MIS can be divided into 2 groups in enterprises, based on the type of use and user status: managerial MIS (management and decision-making systems) and operational MIS (systems of operations, sales and marketing activities). Users of management and decision-making systems are managers, executives, experts, analysts. The second group includes the operational systems of ongoing sales and marketing activities, which are necessary in the daily marketing activities. The main task of the MIS is to transform the available information about the state of the marketing object, as well as about the processes taking place in the marketing environment, into a form necessary and perceived by the manager, which allows him to assess the state of the marketing object, assess the development of the situation, and simulate its change [4].

The development of marketing information systems and the increase in data processing and analysis capabilities have led to an increase in the role of MIS in information support for decision-making at high levels of the management hierarchy. If earlier high-level managers relied more on their intuition than on the information available in the company when making decisions, and information systems were used mainly to meet the information needs of the lower management level, nowadays the use of marketing information systems by top and middle managers the link is growing steadily.

Among the modern directions in working with marketing information systems in foreign countries, three main ones can be named: the first is the introduction of new methods of collecting and analyzing data, the second is the formation of new approaches to market analysis using micromarketing and database marketing, and the third is the application of innovations in the organization of existing marketing data, embodied in the concept of knowledge management[5].

Materials and methods. Recently, new approaches to data collection have become widespread: CATI (Computer Assisted Telephone Interviewing), CAPI (Computer-assisted personal interviewing), scanners, Peoplemeters (devices for assessing the popularity of various television programs), EPOS (electronic point of sale) - devices based on barcode scanning technology, allowing to receive complete information about sales and prices from each point of sale, and other electronic devices. The application of these innovations has greatly contributed to the increase in the efficiency of marketing information systems and made it

possible to increase the speed of response to changes in the external environment. In addition, with the help of such tools, the objectivity of the information collected has significantly increased.

Improvement of the tools for working with information took place not only at the level of data collection, but also at the stage of their processing. New technologies in working with databases, thanks to which it became possible to reduce the costs of storing information and significantly increase its volume and processing speed, have created the necessary conditions without which companies would not be able to take advantage of all the benefits that have arisen from these new methods of data collection. Some companies began to use in marketing such sophisticated tools as neural networks and artificial intelligence, which allow not only to determine fairly obvious relationships between consumers, products and markets, as suggested by standard analysis methods, but also to calculate various variables for each individual consumer and, thus more accurate data.

One of the new methods of working with information that is becoming more widespread is database marketing, which has gained particular popularity in connection with the transition from mass marketing to targeted marketing. Over time, the market in industrialized countries has become so thinly segmented that reaching the smallest segments using traditional marketing methods has become almost impossible. In a saturated market and fierce competition, each individual consumer has become the object of close attention of consumer goods companies, which, in order to maintain market positions, began to work with customers using integrated communications, telecommunications and databases, the main function of which is to establish feedback with the market.

At the heart of database marketing is the creation and maintenance of a database that contains information about each consumer. Modern databases are not just an address list of buyers, as it was before, but complete information about consumer behavior over a relatively long period. This information includes what products and in what combinations a given customer bought, at what prices, in what stores, in what incentive events he participated, etc. The content of the database is updated with each subsequent purchase, the company has the ability to track the behavior of each individual customer over time, maintaining a constant dialogue with the consumer.

The advantage of interactive marketing is that it allows you to track data on the consumption of individual buyers and link various market activities and the entire marketing mix with this data, analyze the reaction of a particular buyer to these events, taking into account his socio-demographic characteristics and, thus, increase the effectiveness of marketing activities, more fully satisfying the existing

market needs. As a result of this approach, communication and promotion become a single information flow for the company.

Currently, there are various ways to maintain a dialogue with customers using databases. Address databases can be formed on the basis of postal addresses, phone numbers, various coupons for the purchase of products. One of the popular methods is to create regular customer cards, which, for example, is actively used by the KLM airline (2021) [6].

Thanks to the latest information technology, the amount of data entering the information system has increased significantly, so that the existing marketing information systems were unable to process all the available data and provide in time the data that the company needs most. Only the formation of a system of marketing knowledge gave companies the opportunity to use all the data they had accumulated.

The information that is stored in the company, over time, becomes obsolete, lost or loses its value and, therefore, is not of particular value to the company in the long term. The value of information for a company increases only when it is generalized and becomes knowledge stored within the company and forming the basis for making the most effective decisions.

Most large foreign companies are now actively involved in the creation of marketing knowledge systems about the market. For example, Henkel has created a system called IDIS, which analyzes all available information and selects solutions based on the criteria of "the most successful solution from experience." Since 1997, Coca Cola has been using Inform Cascade, a system that, according to the company's management, is an integral part of its infrastructure. This system is aimed at organizing information flows in areas such as brand promotion, planning, global marketing. Inform uses not only internal sales data, but also materials from numerous studies and statistical materials, which can be both quantitative and qualitative. When developing new brand promotion programs or a new advertising campaign, the system draws on the results of existing research and experience gained in various markets [7].

Results. As well as information systems that provide effective market orientation are currently CRM (customer relationship management) systems. Such systems appeared only in the mid-90s and are in the development stage.

Besides of these methods marketing information systems use new tools and methods for data analysis based on modern approaches to knowledge management. First of all, these are BI (Business Intelligence) tools, data warehouse technologies, data mining and OLAP (Online Analytical Processing). Data warehouses enable you to integrate and consolidate data from a variety of sources. Data mining

technologies make it possible to use the most modern mathematical apparatus to solve marketing problems: models and methods of linear, nonlinear and stochastic optimization, decision trees, regression and discriminant analysis, cluster analysis, factor analysis, neural network technologies, as well as other models and methods of operations research, probability theory, mathematical statistics, artificial intelligence. The most flexible and efficient technology platform for data analysis and scripting is the OLAP / MOLAP (multidimensional OLAP) architecture, which allows you to model data, delve into details and generalize, filter, sort and rearrange data during analysis. Modern BI tools are included in complex systems designed to automate the management of a modern enterprise (such as Oracle e-Business Suite, SAP Business Suite, Microsoft Dynamics solutions), in Performance Management class systems, in database management systems (Oracle Database, Microsoft SQL Server, IBM DB 2). The leading manufacturers of specialized BI systems and PM-class systems are Cognos, Hyperion-Oracle, Business Objects, etc [8].

Let's discuss a small example. If we single out the indicators (facts) and sections (measurements) that the entrepreneur manipulates, trying to develop or optimize his business, then you get a table suitable for analyzing sales as a universal template. The table fields contain time, product category, product name, region, seller, buyer, quantity (physical units), sales volume (currency units).

Time. Several time periods are considered - year, quarter, month, decade, week, day. At the same time, OLAP tools automatically calculate major periods based on the date and calculate the totals for them.

Product category. There can be several categories - sort, model, type of packaging, etc. If one product is sold, then the category is not used.

Product. Either the name of the product (service), or its code, or article is used.

Region. Under the dimension "region" there is in the form} 'continent, group of countries, country, district, region, city, district, etc.

Seller. This dimension depends on the structure and size of the business. There may be a branch, dealer, store, sales manager, etc.

Customer. In retail, the shopper is usually impersonal and there is no measurement. In other cases, customer information is available and important to sales. This dimension can contain the name of the buying firm or many customer groups - industry, enterprise group, enterprise.

After setting up an OLAP system on data taken, for example, from Excel or a special database, the user is able to quickly find answers to questions of interest from an OLAP table using standard analysis methods.

For a deeper analysis, other tools are intended, such as Data mining - a modern technology for searching and analyzing information in order to find previously unknown, practically useful knowledge necessary for making decisions in numerical and textual data.

Data mining is often used in retail to identify products that customers purchase in a single purchase. Knowing such goods, store workers put them on the shelves next to them. Thus, the buyer, having bought one product, will not forget to purchase another.

Below are examples of tasks for finding information necessary for decision-making when using OLAP and Data mining technologies (Table 1). From those given in Table 1 the query examples show that OLAP jobs, as well as statistical methods, are used to test pre-formulated hypotheses, while data mining finds interdependencies in non-obvious data and sought-after patterns[9].

Data mining technology is built on the concept of patterns (patterns) reflecting fragments of diverse relationships in data. In essence, patterns are patterns inherent in subsamples of data that can be compactly expressed in a human-readable form.

Table 1

Examples of queries used in OLAP and data mining [10]

OLAP Query	Data mining Query
What is the average number of unpaid invoices by customers for a product (service)?	Is there a typical category of non-bill paying customers?
What are the rates of reaction to a specific type of advertising for different age groups of the population?	Are there templates in the description of people exposed to a particular type of advertising?
What is the average daily purchases with credit card and cash?	Are there stereotypical shopping patterns for credit card fraud?

The development of technologies and services on the Internet has a huge impact on the development of marketing information systems.

Currently, a certain experience has been accumulated in the use of MIS in enterprises. Here are some results:

− analysis of customer needs, including segmentation and construction of detailed profiles of different groups of customers, for example, profiles of customers making large purchases, or customers for whom the quality of the goods is in the first place, etc. This allows you to understand who the clients of the firm are;

− identifying jointly purchased products enables you to identify groups of products purchased together, and with a grouping, for example, by time, by type of customer, and so on. Knowledge of co-purchased items helps to increase sales;

− analysis of product sales includes the construction of detailed profiles of various categories of products sold. For example, the sale of goods with high (low) volumes allows you to find out the patterns characteristic of leading or outsider products, to understand who buys certain goods;

− carrying out targeted marketing campaigns and optimization of the advertising budget. Profiles of various groups of goods and buyers allow conducting marketing and PR campaigns that are precisely targeted at a specific audience, which ultimately leads to an increase in their effectiveness, and also ensures an economical allocation of resources, including spending the budget;

− sales planning allows you to build both short-term and long-term forecasts of sales of various goods. This improves the quality of planning and reduces storage costs.

Discussion. The considered methods of marketing analysis allow you to get a complete picture of the enterprises' position in the market, assess its position in relation to rivals, as well as analyze the perception of its products by consumers, which, together with a set of information about the enterprises' internal environment, will allow making the right strategic decisions for the further development of the enterprise.

Usually, enterprises that make any forecasts tend to directly extrapolate data from previous periods. When making such primitive forecasts, the simplest smoothing methods are used, a moving annual sum or a moving average, for example, for three or six months. Using current software, managers can perform regression analysis, complex time series analysis, and even make forecasts based on complex models such as introduced by Ziegel et al.,(1995).

Any enterprise, going through changes, most often reacts to them by putting up certain barriers. Technological, organizational, and personal barriers may become possible barriers to the implementation of a new information system in the work of enterprises in various industries and spheres of activity.

Conclusion.

1. Among all the factors that influence the formation and development of marketing information systems in enterprises, there are two main groups: the underdevelopment of the market and the information opacity of market operations. In addition, they should include budgetary and intra-organizational restrictions, which are largely subjective and are more typical for companies, while the rest

have their impact on all companies operating in a market, regardless of their size, scope of activity, degree of foreign participation, etc.

2. The information opacity of the market space means the lack of information about all operations carried out on it — both by the state and by other market participants. This is primarily due to the low level of business culture and the lack of state control in the economic sphere, which leads to an almost complete lack of reliable data on production, imports, trade turnover, living standards of the population, etc., that is, to the lack of complete and relevant information about the market. In developed countries, official statistical reference books on production, consumption, export-import operations, and living standards are widely used and are one of the primary analysis tools.

3. In the information systems of enterprises, huge amounts of data are accumulated. At the same time, the more information is collected, the more difficult it is to identify hidden trends and patterns that can, and sometimes it is extremely necessary to use for making informed management decisions. Therefore, it is not enough for managers and marketers today just to collect large amounts of data, but it is necessary to have certain skills to work with them. For this purpose, special quantitative methods of information processing have been developed, which are programmed and included in various analytical packages of application programs.

4. The wrong choice of the source of information leads to an incorrect assessment of the economic situation, incorrect interpretation of data and, as a result, to the adoption of erroneous management decisions. Studying the types and sources of marketing information will help entrepreneurs navigate the world of information services, solve the issues of acquiring an enterprise information base and increase the efficiency of using information resources in marketing activities.

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