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MARKETING RESEARCH BASED ON THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES

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Окландер Т.О. Маркетингові дослідження на основі використання інформаційно-комунікативних технологій.

Розглянуто причини зниження ефективності традиційних методів маркетингових досліджень. Виділено атрибути і функції соціальних мереж при проведенні маркетингових опитувань. Розглянуто можливості та алгоритм технології Big Data в дослідженні та аналізі напівструктурованих і неструктурованих даних. Наведено методи для обробки інформації при роботі з великими базами даних. Обґрунтовано необхідність використання сучасних методів маркетингових досліджень, що грунтуються на інформаційних технологіях, в діяльності підприємств.

Ключові слова: інформаційна економіка, маркетингові дослідження, соціальні мережі, технологія Big Data

Окландер Т.О. Маркетинговые исследования на основе использования информационных и коммуникационных технологий.

Рассмотрены причины снижения эффективности традиционных методов маркетинговых исследований. Выделены атрибуты и функции социальных сетей при проведении маркетинговых опросов. Рассмотрены возможности и алгоритм технологии Big Data в исследовании и анализе полуструктурированных и неструктурированных данных. Приведены методы для обработки информации при работе с большими базами данных. Обоснована необходимость использования современных методов маркетинговых исследований, основанных на информационных технологиях, в деятельности предприятий.

Ключевые слова: информационная экономика, маркетинговые исследования, социальные сети, технология Big Data

Oklander T.O. Marketing research based on the use of information and communication technologies.

The article discusses the reasons for reducing the effectiveness of traditional methods of marketing research. Highlighted the attributes and functions of social networks in conducting marketing surveys. The possibilities of technology and the algorithm Big Data in the study and analysis of semi-structured and unstructured data. The methods of data processing when working with large databases. The necessity of the use of modern methods of marketing research based on information technologies in enterprises.

Keywords: information economy, marketing research, social networks, technology Big Data

Managerial decision making in the enterprise should be based on reliable and timely information. One of the important components of the formation of information base for marketing decision-making is marketing research. Traditional marketing research is based on the principle of forming a representative sample. The results obtained with a small but manageable sample, marketers have learned how to extrapolate with the margin error on a General population. However, in complex systems, which include the market system, when a significant number of factors, investigated factors interact with each other unpredictably and illogically. Moreover, it`s not possible to express and take into account all existing factors mathematically in models. Therefore, in market research conducted by the classical schemes we often get incorrect results, i.e. the level of sales forecasts is low. It is an objective component of the unreliability of the results of marketing research. There are problems of subjective nature. There is no system of training and accreditation of interviewers, they have not formed the ideology of the profession in shaping the mission of the ethics of research, the methods of the interviewer. There are frequent cases unscrupulously collected information and clearly falsified approach to the implementation of projects, failure of complying quotas and methodologies, missed deadlines in research. Therefore, a low level of training of interviewers and organizers of marketing research locally leads to the low quality of primary information. And this fact naturally ensures incorrect results and distrust in the business community.

Analysis of recent researches and publications

Problems of implementation of new tools of marketing research in the activity of enterprizes study G. Hast, D. Gartner, E. Kelly, D. Campbell [1,2,3,4]. In Particular, G. Geist predicts the following list of changes in the industry of marketing research, which will be the result of "creative destruction" of traditional methods in marketing research [1].

Limitations of using the method of focus groups. Traditionally, focus groups are conducted by a moderator in a sterile environment. Artificial conditions of the study, are abstractness, neglect of situational factors, difficulty in recruiting participants distort the results and levelling their value. In prospect, expected the growth in the use of virtual on-line focus groups that, in the first place, will be

conducted from mobile devices. Online focus groups will become the standard, because the new technology will allow marketers to interact with consumers at different corners of the planet.

Replacing the use of PowerPoint for presentations in research results. Now PowerPoint is the main format for these purposes, however, it is not optimal or effective form for such tasks. PowerPoint presents information linearly and statically, but modern technology can provide interactive and multi-dimensional view. New formats will allow marketers to analyze, model, experiment at once with several streams of research data,, use analytical data to instantly predict the effects of marketing decisions on a company's activities.

The increase in the number of on-line research. In today's mobile culture computer poll , which lasts more than 30 minutes ceases to be relevant. This practice is in conflict with principal trends grocery and technological changes. The time constraints in making decision stipulates the use of micro-studies (studies over a short period of time): mobile surveys based on geolocation, indirect measurements, observing consumer reactions (e.g., facial expression), mobile neuro-research.

The formation of the qualitative-quantitative dualism in research. The existing theory of marketing research is characterized by a radical split into two methodological areas: qualitative and quantitative research. Traditionally, the stage of qualitative research is preceded by a phase of quantitative research. "Qualitative or quantitative" will be replaced with "qualitative and quantitative".

Going beyond the "rational". Modern marketing theory is based on the theory of "rational choice of the consumer". That is, the idea that consumers react to events and phenomena rationally. One of the proofs of this is that respondents are asked to rate the attributes of products by specific scales to explain the motivation of behavior. The growth of interest in behavioral economics is a manifestation of the emergence of a new trend: the theory of "rational choice of the consumer" in its pure form does not fully reflect the market and explains the reality. There is a growing need to better account for the emotional (irrational) factors. The study of the complex of rational and emotional motives will allow marketing research to explain and predict consumer behavior. more correctly

Also to factors that reduce the effectiveness of traditional methods of research a number of authors include the following [2]:

— changes in mentality, the way and quality of life of modern man, the new vector of consumer motivation. For example, well-known brands cease to be a priori value, the new generation are formed other motives to buy: not a demonstration through the brand of their solvency, but self-identification;
— the emergence of new opinion leaders in the Internet space;
— the expansion of the contact audiences due to the emergence of communities of Internet users: successful performance in the blog makes a popular blogger and he carries the impact on users opinions of the blog, Facebook, Twitter;
— the market development of specialized applications, tablets and smartphones;
— improving the system of management of relations with consumers in the direction of reconciling its relevance, simplicity, ease of use, integration of subsystems internal and external information.

Unsolved aspects of the problem

The spread of information and communication technologies allows to obtain the necessary information faster and with greater accuracy, reduces the value of traditional methods of marketing research. There is therefore a need to study and develop recommendations for the implementation of modern tools of marketing research in the activity of enterprises.

The main part

Technological developments of the post-industrial nature, increased competition, rapid change factors external and internal environment, the exponential increase in the volume of information, the need to accelerate the process of complex decision-making, improving the culture in the field of information and communication technologies are forcing companies to adapt to operating in online mode and apply new analytical tools for analyzing the competitive environment and demand. As a result of the increasingly complex tasks of the analysis of growing volumes of information, marketing activities in the Internet, social networks, monitoring the markets and stimulate the supply of such analytical tools.

For making decisions marketers need to know the lifestyle of the consumer from the point of view of information consumption, namely:

— what information channels used and which of these channels it is advisable to concentrate;
— information thatinterests;
— what information the consumer believes;
— what the consumer has tactical and strategic problems.

That is, it is important to know what parameters and priorities of the consumer will be provided to analyze the proposal and by what criteria is selection. The main areas of information in modern conditions is: 1) The Internet space; 2) the primary documents that accompany the transaction; 3) reports for sales managers. The main problems for the use of such information is:

— establishing fast feedback from customers;
— structuring data;
— finding correlations between all forms of information;
— personalization information;
— providing a convenient form for the use of the information.

With the advent of social networks have created new methods of collecting marketing information, provide opportunities to facilitate the processes of formation of databases:

1) Organization of opinion poll – in social networks it has become a built-in mechanism. The option "Poll" allows research through the formulation of questions and answers;

2) personalization, visualization, obtaining demographic, personal and social attributes respondents – without the use of additional software perceived individual information, conducted analytical processing of the responses, created a profile of the target market segment;

3) analysis of marketing environment – in the "news" section when you click the option "Advanced search" at certain criteria to collect information about the preferences of potential customers; the option "Geolocation" allows you to segment them on a territorial basis; the option "Reference links" allows you to monitor the activities of competitors in references addresses community, webpage, website;

4) communication with respondents in the form of SMS messages that come into account – receive a request to participate in the survey, which can be configured on the frequency, time, market segment;

5) broadening the base of respondents – simultaneous survey of users of various social networks, which, ideally, allows you to cover a survey of the entire population.

In General, effective use of social media in marketing requires that the following attributes:

— individual profile of the enterprise – this is a brief description of the enterprise with keywords that target audience uses and informative and entertaining individual background (image that forms the consumer image of the enterprise);
— the use of hashtags – is a label that begins with a special character (#) and does not contain spaces. By placing a hashtag in your tweet, the company designates the tweet, and now anyone who searches for the hashtag, will see the whole tape of messages from different users. For example, the supply of services for consumers Odessa region provides for the inclusion of the hashtag # "metal products", and now anyone who is actively interested in the information about the hardware, go to this tweet;
— the controlling interests of the target audience – it tracked events and reference groups that are of interest to the target audience and control of the supporters of the competitors. There are programs that allow you to automate this process, for example Twidium. Specialized software allows you to streamline the whole process;
— social networking with geographically close to customers through their precise location of ip-addresses: indicating the point in the form of geographical latitude and longitude and a radius around the specified point.

Thus, the use of social networks provides a new features poll:

— survey as a hidden advertisement – questions and answers can tell you about goods with the provision of instructions for use;
— the survey as entertainment to increase the number of respondents – questions and answers can be submitted in the form of entertainment (humor, photo), because social networks are a popular venue time;
— the survey as a viral marketing – form for submission of questions and answer options can create viral traffic.

Throughout its history, the marketing was based on creative ideas. Pioneer marketing concept, relied on significant expenditures on advertising in the media, have ensured the success of the product. Entering the market with the product-innovation it is largely based on the belief in success and intuition. Only 20% of innovations in the field of consumer goods (and possibly around 40% of innovations in the field of capital goods) will be successful, and the chances of success are very dim [5].

One such technology is the technology of Big Data (Big data) – this large data volume. According to global trends such technology is becoming increasingly important. Nowadays there are many solutions in accordance with the classes of problems that arise when working with big data, including technologies to work with them in the "cloud storage". Over the past five years mankind has produced more information than in the entire history of existence. And the growth is exponential. In the beginning of XXI century was predicted that in 2011 the volume of generated information will be 1.75 zettabytes, and in the period between 2009 and 2020, this amount will increase 44 times and will be 35 zettabytes[9] (Fig. 1).

It is seen that the dynamics of growth of information is exponential in nature and due to the revolutionary technological changes in computing tools, applications, and the increasing number of users – from millions in the era of mainframe computers to hundreds of millions in the era of personal computers and billions of users in the era of mobile devices, mobile Internet, social networks, cloud technologies (Fig. 2).

The concept of big data was born in the XVII century, when Pascal B., one of the founders of mathematical analysis and probability theory, laid the theoretical framework for the analysis of large amounts of data The aim of his work was the creation of a method of making effective decisions based on the analysis of events, the number of which tends to infinity. The next important stage in the mid-twentieth century to analyze unstructured data have become works of G. Fischer, the founder of modern statistics. He proposed the idea of correlation data based on point and interval statistical estimates, has developed a methodology for planning experiments, laid the foundations of the theory of statistical testing of hypotheses [6].

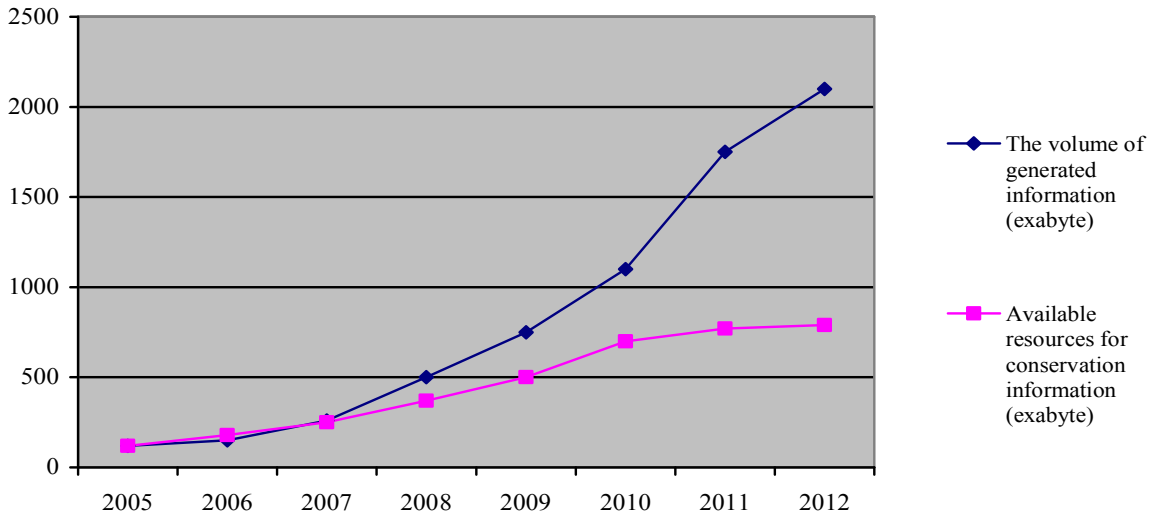

Fig. 1. Volumes created in the world of information and available resources for conservation information IDC [4]

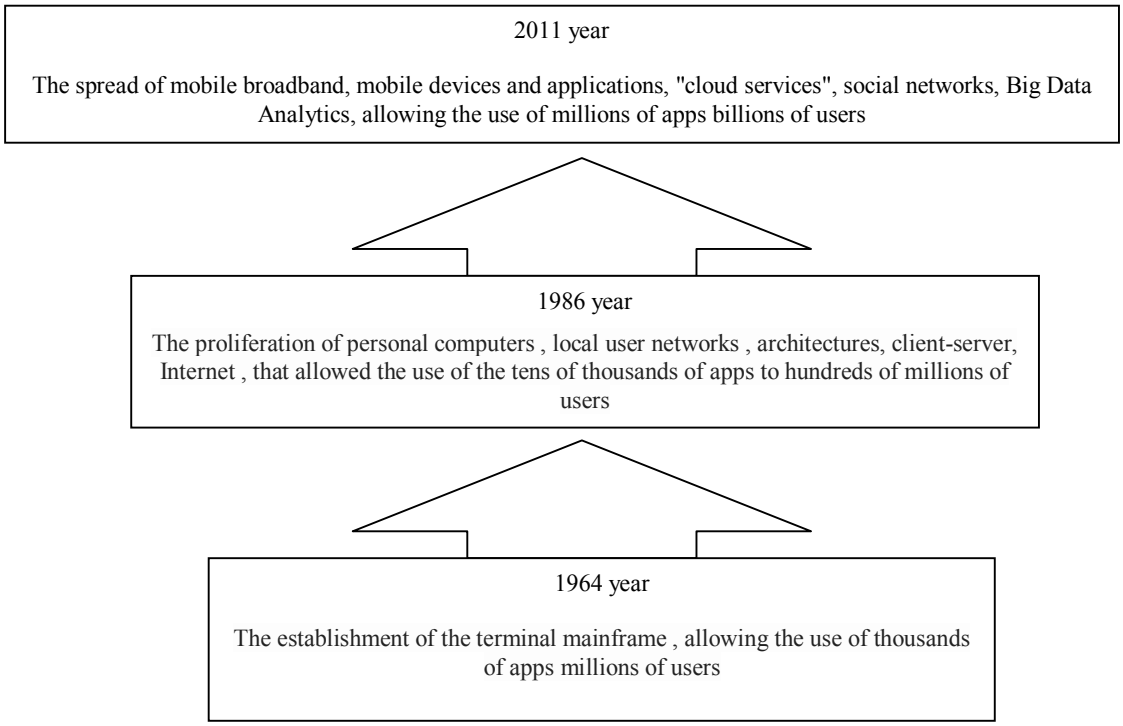

Fig. 2. The scheme of the growth of computer applications and their users

In an information economy has the opportunity to carry out marketing activities more efficiently. Modern information technologies allow to realize the concept of mass customization and conduct market research based on the study sample, and the analysis of the behavior of the General population. In these conditions, can significantly improve the accuracy of predictions and to minimize marketing risks.And this is a strong foundation for the realization of the most daring marketing solutions.

The vast majority of the accumulated and ever-growing amounts of information is essentially marketing information, which from a professional point of view is of great value to marketers. Each network user is a consumer. Therefore, browsing, advertising, taste, price preferences, social circle, dating, cultural, social, personal, psychological factors user allow marketers to reach its characteristics as a consumer.

New to the Big Data technology is the study and analysis of semi-structured and unstructured data. Have the opportunity to analyze e-mails, PDF files, videos, instantly distributed and scalable storage system with lower costs, use and store all the data created. Analyzed the statements of users, comments, ratings, photographs, etc..Monitoring objectives may be: negative statements, termination of the leaks, the definition of rapidly spreading information and its

sources, the definition of chains of influence and authoritative users. Monitoring popular social networking gives a large amount of information. When a large number of users and their high activity the solution to this problem involves the collection and processing of large volumes of data in a unformalized manner. For example, a study of users Facebook left on the basis of likes, that is, unstructured data has allowed to reveal their psychographic, demographic, personal, cultural characteristics. So, racewaspredictedin 95% of cases, Paulis 93%, politicsin 85%, religious beliefs is 82%.When this was analyzed not obvious cursing markers, and large amounts of less informative but more popular likes.For example, high IQ corelase with the movie "the Lord of the rings" and the music of Mozart, loneliness – with Maria Sharapova [7]. Now every shopping center are equipped with security cameras. The establishment of programs, fixing the movement of consumers to the time that they spent near the shelves allows you based on the Big Data technology to develop maps of "cold" and "hot" retail zones, to evaluate the effectiveness of the display of goods.

To huge databases have been useful enterprises need to integrate information about customers in terms of Finance, sales, product range, production needs, social networks, demographic information, information about competitors. In particular, loyalty card appeared as a tool for gathering information and tracking of consumer behavior in the 70-ies of the last century. The emergence of the Big Data technology provides additional arrays of structured marketing information to analyze and predict consumer behavior.

The use of Big Data technologies suggests that one legal entity and is user solutions, and manufacturer of data that must be processed, and the contractor for analytical data processing. As you reduce the Big Data technology among its users is added more and more customers. Businesses who need to store and access large amount of data, there are two options:

1) vertical scaling – adding more resources to a single compute node by acquiring a more powerful computer with a large number of processors, RAM, disk space;

2) horizontal scaling – adding more compute nodes, that is, adding more computers, the distribution of work between them. A lot of low-power computers that are networked together, can provide the computing power of a supercomputer.

Big Data technology uses the second option and reveals the commercial potential magnesium data by finding patterns and facts. It allows you to massively identify individual demand analyzing marketing information obtained from the Internet. In addition, Big Data stores, processes, analyzes large amounts of data. Automates the following processes: collection and processing of data, support the adoption and execution of decisions. These processes consist of suboperations: monitoring, detection, measurement, alert, purification, analysis, archiving. The Big Data technology can be viewed as a stack of technologies: it infrastructure, systems, organization and data management, analytical processing system and identifying patterns, systems support solutions with user interface. The cost of these operations has declined, the opportunity to analyze, at first glance, unrelated factors. The computer in a short time defines quantitative relationships and identify patterns that the human brain or is unable to identify, or does it need a lot of time. For example, it can detect the dependence between the color of the cover of a magazine with the sales.

International analytical company "Forrester Research" defines Big Data as technology in the field of hardware and software that integrates, organizes, analyzes the information, characterized by the "four V" [4]:

— volume (Volume) – according to consulting company "McKinsey" companies and organizations in the United States has accumulated more than 100 terabytes of data. Thus in various industries volumes of data are significantly different, respectively the relevance of the use of Big Data technologies in different;
— diversity (Variety) – Big Data technology is based on software that can handle large amounts of data from different sources (internal and external), in different formats (tabular data in a DBMS, data is ranked, text documents, images, videos and audio files), different degrees of structure (structured, substructural, unstructured);
— variability (Variability) – characteristics, volume and diversity can be implemented only if the appropriate applications of Big Data technology properties to consider the changes of information;
— speed (Velocity), respectively, the first three characteristics can be inherent in Big Data technologies only when high speed data processing.

Similar, but not identical set of attributes of the "four V's" of Big Data technology allocates an international marketing research Agency "IDC":

— Volume;
— Variety;
— Velocity;
— Value.

That is, the parameter "Variety", which applies the company "Forrester", is replaced by the parameter "value". "IDC" emphasizes that the parameter "value" is one of the main that allows you to highlight Big Data as a new phenomenon. He refers to the economic effect that Big Data technology provides users. The difference between the Big Data technology is that as a result of processing the input information is obtained, the resulting information is of such value that it creates a valid and reasonable basis for making marketing decisions.

D. Gartner proposed an alternative set of attributes, which is called a three-dimensional model of the "three V" [1]:

— Volume;
— Variety;

— Velocity.

So, in this version of Big Data technology is a high-speed operation with large amounts of diverse information.

Experts in the field of information and communication technologies emphasize the existence of objective reasons the mass adoption of Big Data technologies to effectively perform marketing research [8].

Kelly E. main managing unit of SQL Server "Microsoft" believes that: "Big data can take the form of extensive tables of structured data, huge files of complex unstructured data, or small amounts of machine-generated data at a speed that does not allow them to comprehend. "Microsoft" aims to help all companies make better and faster decisions and to deliver tools that facilitate the study of both large and any other data. The sentence "Microsoft" can be compared to a tool that allows you to draw water from the ocean, pass it through the filter and to make it suitable for drinking instead of doing the same artisanal way according to some vague memories of a University chemistry course. Although big data is often see a big problem, they open and incredible opportunities". He notes that in the next five years, humanity generates more data than in the previous five thousand years.

The Wesset D. Vice President program "IDC" for research in the field of business intelligence concludes that: "Our daily lives generates countless data Favor of data depends on where and with whom you are in contact. In close up they open a previously unattainable opportunity to identify potential links and foresee potential outcomes. In the past you could consider these things except in retrospect».

Campbell D. researcher at Microsoft, notes that; «...the placement of huge volumes of data now is much cheaper than in the past. Thirty years ago, a terabyte of memory could cost millions of dollars, and today at Office Depot it will cost about $ 30». According to Campbell, D., the transition in new quality: "there's no reason to throw something out. There is a strange revolution, in which many things takes a digital form, even such originally analog data such as voice communications and photography".

"Microsoft conducted a study titled "Global Enterprise Big Data Trends: 2013" on the assessment of the implementation of solutions related to Big Data technology" [3]. Were surveyed more than 280 managers involved in the adoption of it solutions to medium and large companies in the United States. The results have identified key trends in implementation of the Big Data technology to achieve competitive benefits. Revealed the following:

— the greatest demand for big data exhibit it services companies (52%), customer service departments (41%), sales (26%), marketing (23%), finance (23%);
— intend in the next year to implement the Big Data technology 75% of medium and large companies;
— the stages of decision-making on implementation of Big Data technologies were distributed as follows: 17% of respondents are at the stage of decision making on the implementation, 13% took this decision, 90% of respondents allocated an appropriate budget;
— a major impetus for the implementation of the relevant decisions was: 49% increase in data volumes, to 41% – the desire to integrate disparate business intelligence tools, for 40% – the desire to acquire means that can select information to insight's business situation.

Big Data technology is based on cluster analysis and in General is carried out according to the following algorithm:

— conducted content analysis to identify the characteristics of potential consumers;
— carried clustering, that is allocated to homogeneous groups consumer segments;
— estimated correlation between the different processes;
— forecasts are based on extrapolation and the use of regression models.

To streamline and improve the speed of information processing when working with large databases can be used the following methods [4].

1) The combination of models — the essence of the method lies in using a combination of mathematical models. Data passes through the set of models: from the simplest to the most complex (Fig. 3).

In the first stage, which uses the simplest models of the highest rate of information processing and therefore a large amount of information is processed as quickly as possible. Data for the treatment of which simple models are eliminated after the first stage of further processing.The remaining data is transmitted to the next stage of processing, which uses more sophisticated algorithms, and so on. The processing time of the entire data set is significantly reduced.

2) Parallel processing – the method consists in dividing the data into arrays (information about market segments) and build models for each array separately, and then combining the results. Instead of building a complex model for processing all of the information creates several adequate models for each array of information. This allows you to increase the speed of analysis, to reduce the time, reduce the memory requirements of the hardware (Fig. 4).

3) A representative sample–the method consists in building a model is not all the information, and a subset is a representative sample (Fig. 5).

The vast majority of cases, Big Data technology does not provide for selection from a General population sample. But there are exceptions. In these cases, the method used is a representative sample. The processing time of the sample is smaller than the processing time of the whole data.

Improving the effectiveness of marketing activities through the use of Big Data technologies involves precise positioning (targeting) market on the principles of individual approach to the client. Traditional methods of forming a client base that require a considerable investment.

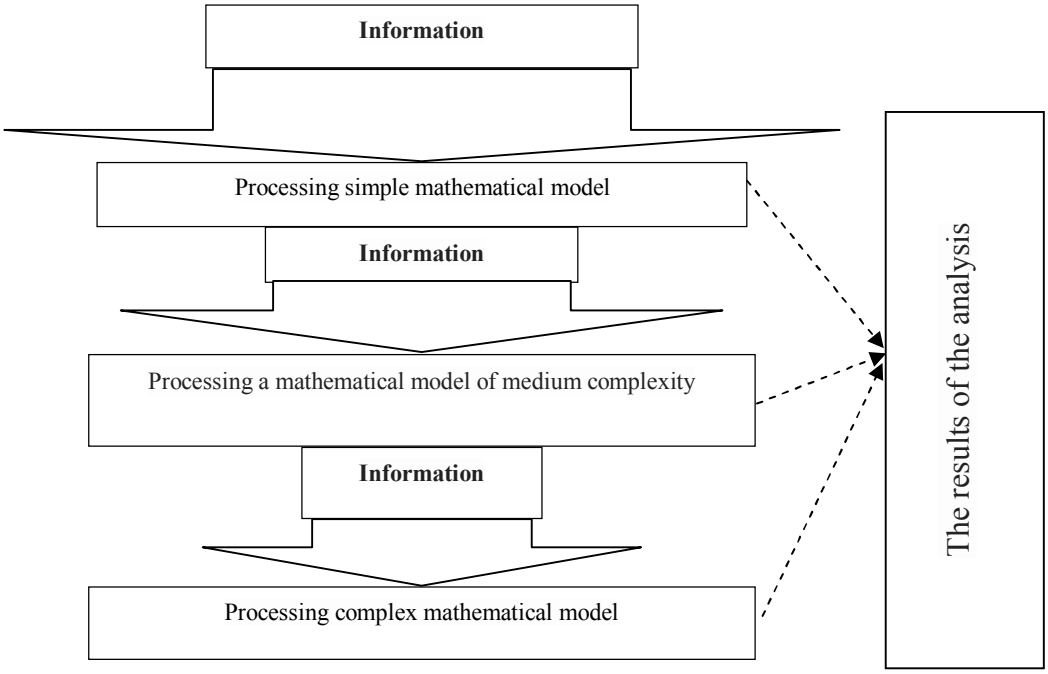

Fig. 3. The algorithm of the method of combining models

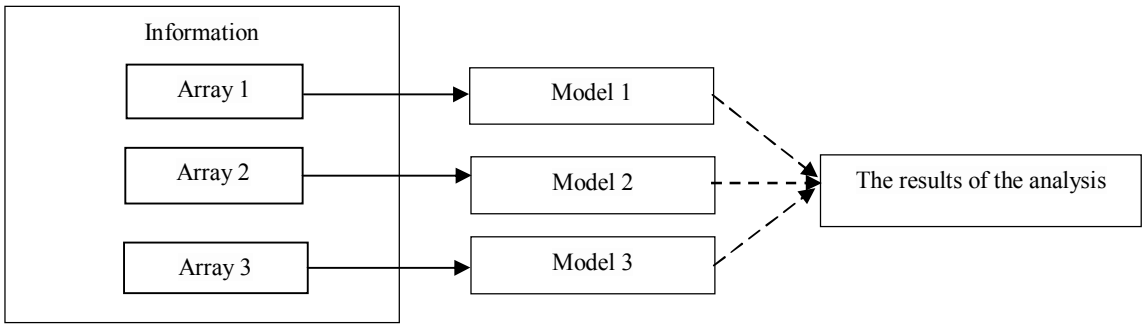

Fig. 4. The algorithm of the method of parallel processing

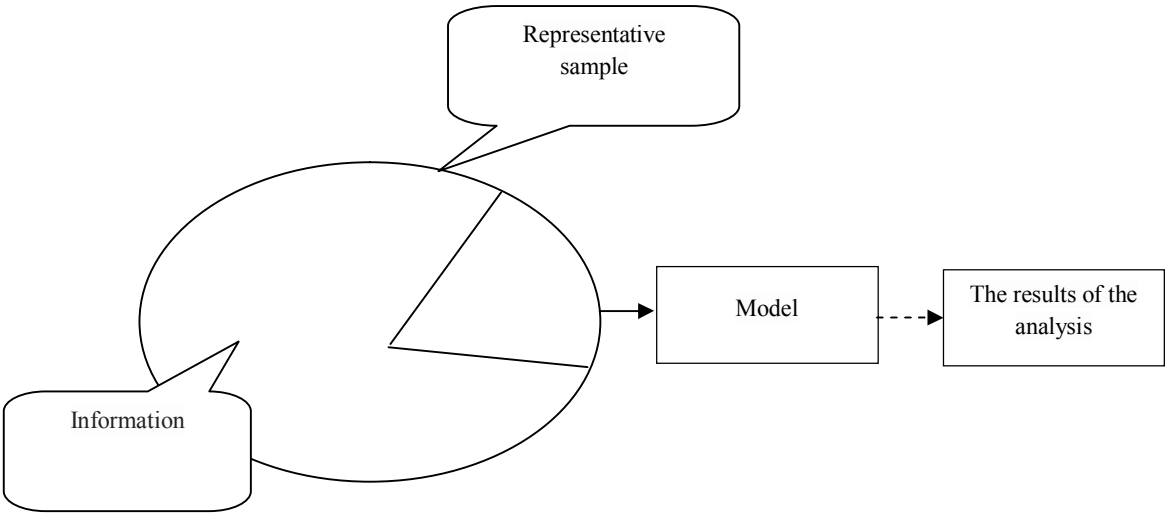

Fig. 5.The algorithm of the method of representative samples

To optimize them, to enhance their impact at lower costs help Big Data: it is possible to carefully analyze customer information, unstructured information from the Internet, in particular information from social networks, blogs, comments, data for purchases carried out, to identify relationships between consumers. When you consolidate information from accounting systems and the Internet, is a more clear picture of the customer base, which makes it easier to solve marketing problems.

Conclusions

The experience of world leaders in the field of information and communication technology companies “Google”, “Amazon”, “Yahoo!” suggests that the ability to analyze big data gives companies a competitive advantage because it leads to a better understanding of customer needs. Enterprises are faced with the need to predict, and in fact is to predict which group of potential customers will purchase certain goods. Classical methods of analysis can use to analyze a limited number of sources. Analysis all available sources enables us to give a deeper slice of important information, to play a key role in marketing decision making, to identify the demand, promptly to influence buyers. Global market solutions for big data analysis, according to the "IDC", in 2010 was about $ 3 billion. The company estimates that by 2015 it may reach us $ 17 billion.

A promising direction of using the technology of Big Data is also the cooperation of enterprises with the activities of mobile operators. Creating information alert systems consumer creates new approaches for selection of individual channel of conveying information, establishing individual contact with the consumer. The formation of loyalty requires individual work. Marketers get a large database for decision making, because the results of traditional marketing research collected included marketers informal data from the blogosphere, social networks.

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