Valerii B. Zakhozhai[1]

INFORMATION AND ANALYTICAL SUPPORT FOR MARKETING IN THE FRAMEWORK OF APPLIED STATISTICS

The article explores the theoretical and methodological principles of the statistical support for marketing activities – SSM. The principles of marketing, its mission, goals and the ways of achieving them are described. The role of statistical research in the information and analytical support for the objectives achievement is covered. The essence, content, stages of construction and use of SSM according to the principles of system analysis, the role in certain management functions are presented.

Keywords: *marketing; statistics; system approach; managerial decision-making support.*

Валерій Б. Захожай

ІНФОРМАЦІЙНО-АНАЛІТИЧНЕ ЗАБЕЗПЕЧЕННЯ МАРКЕТИНГУ НА ЗАСАДАХ ПРИКЛАДНОЇ СТАТИСТИКИ

У статті висвітлено теоретико-методологічні засади побудови і використання системи статистичного забезпечення маркетингової діяльності – СЗМ. Описано принципи маркетингу, його місія, цілі та способи їх досягнення. Висвітлено роль методології статистичного дослідження в інформаційно-аналітичному забезпеченні досягнення поставлених задач. Дана характеристика сутності, змісту, етапів побудови та використання СЗМ за принципами системного аналізу, ролі останнього у використанні окремих функцій управління.

Ключові слова: *маркетинг; статистика; системний підхід; підтримка управлінських рішень.*

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Валерий Б. Захожай

ИНФОРМАЦИОННО-АНАЛИТИЧЕСКОЕ ОБЕСПЕЧЕНИЕ МАРКЕТИНГА НА ПРИНЦИПАХ ПРИКЛАДНОЙ СТАТИСТИКИ

В статье рассмотрены теоретико-методологические основы построения и использования системы статистического обеспечения маркетинговой деятельности – СОМ. Описаны принципы маркетинга, его миссия, цели и способы их достижения. Освещена роль методологии статистического исследования в информационно-аналитическом обеспечении достижения поставленных задач. Дана характеристика сущности, содержания, этапов построения и использования СОМ по принципам системного анализа, роли последнего в использовании отдельных функций управления.

Ключевые слова: *маркетинг; статистика; системный подход; поддержка управленческих решений.*

Problem statement. In the current context of economic development, new requirements are reasonably imposed on statistical science and practice to make statistics become an efficient tool in efficient management. There is a certain urgency of multiple and integrated use of statistical methods in solving management tasks based on the system of statistical support for management and the principles of applied statistics methodology.

Statistical methods enable considering many problems in management from the perspective of exact quantitative representation of qualitative contents based on actual information support for calculations according to users' needs.

[1] Interregional Academy of Personnel Management, Kyiv, Ukraine.

This guarantees a creative approach to specific management tasks, seeking out new methods for improvement of quality and reasonableness of managerial decisions, developing measures aimed to improve efficiency in all fields of activity.

The above is also true to a certain extent as applied to manufacturing marketing and sales activities and the general management system resting on them.

Review of recent research on the issue. Building and using systems of information and analytical support in management is dealt with in a number of papers. In particular, a significant contribution to the solution of these issues was made by such scholars as V.D. Bazylevysh et al. (2008), I.O. Blank (1995), V.M. Heyets (1998), A.V. Holovach et al. (2005; 2006; 2010), V.I. Kolesnik (2007), I.H. Mantsurov (2011), O.H. Osaulenko (2008), S.A. Yerokhin (2002) and some other Ukrainian authors.

Their works contain methodological provisions used for the evaluation of socio-economic development, its stages, methods and organization of information base, system of indicators and techniques for analysis of development mechanisms and trends as a basis for rationale behind managerial decisions.

Unresolved issues. At the same time and with minor exceptions, there remain unsolved and call for studying the problems of building and using information and analytical support for management based on statistical principles with respect to individual types of economic activity according to the needs of socially oriented market economy, in particular, in conformity with the marketing concept, manufacturing and sales activities and the related management systems.

There is a lack of well-trained specialists and experts with deeper knowledge of techniques for statistical analysis in the course of substantiating and supporting managerial decisions.

The research goal is to deal with theoretical and methodological framework for building and using a system of marketing statistical support (MSS), in particular, the possibility of correct and purposeful use of statistical analysis methodology for substantiating and supporting managerial decisions regarding manufacturing and sales activities.

The set goal made it necessary to solve the following ***scientific problems*** of theoretical, methodological and practical nature:

- proving the importance, necessity and feasibility of statistical analysis methodology to build and use a system of information and analytical support in marketing;
- rationalize for the methodological principles of statistical study within marketing system;
- proving the necessity of the system approach when studying processes and phenomena, which enables taking into account direct and inverse relationships between the marketing system structural constituents;
- describing the body of knowledge needed to build and use a system of information and analytical support for marketing;
- dealing with the content and key features of statistical support for marketing in order to building the system of statistical key figures, identifying factors, building information and methodological support, using statistical analysis findings to back managerial decisions.

The research methods applied rest on general scientific principles and basic concepts of economic theory, philosophy, marketing and statistical science. All processes and phenomena of socioeconomic development are analyzed in their interrelation, interdependence and constant dynamic development.

Key research findings. Marketing can be defined as systematic influence on a certain object or its units in order to ensure the vital activity and achieving the ultimate goal (outcome). Such objects are termed "managed", and the package of measures meant to support or improve their operations subject to the desired goals is called "management".

Objects of management in economy include the state, regions, types of activity, branches, population, enterprises etc. in their distribution as well as combination according to management functions. Information interaction between managed and managing systems is carried out primarily based on the statistical analysis findings. The key purpose is to maintain the development of the set-up parameters. The purpose of the appropriate information processes is to ensure efficient marketing management of a predefined object/subject (Holovach et al., 2006).

According to strategic marketing principles, the marketing object's mission covers notions, instructions, tasks and challenges.

Defining clear goals is a condition of result-based marketing.

Goal (criteria)-based appraisal of results is associated with the appraisal of resources use and generally of the marketing system effectiveness. Also, appraisal of the situation of a marketing object in a competitive environment and of own competitive ability holds a prominent place (Holovach et al., 2006). On that ground, measures are developed related to flexible response to effects of factors of the external and internal environments to achieve the set goal.

Division of a system into subsystems makes it possible to ensure the system approach to marketing in the form of interaction of the system's single elements in certain integrity to achieve the set goal of individual subsystems, and on that basis – the goal of the system as a whole and the mission performance.

Marketing objectives within the system can be achieved through the performance of its certain functions, namely planning, organization, regulation, control, accounting and analysis.

Marketing tasks can be divided into two classes – strategic and tactical.

The *strategic ones* include tasks associated with the selection of a structure of communications among subsystems, planning of subsystems behavior the whole system behavior analysis, analysis of the results of its operation.

The *tactical tasks* embrace mainly the ones related to implementing plans and strategies identified as strategic tasks under the circumstances of inevitable situations unforeseen by planning.

Scientifically grounded marketing provides for:

- learning economic laws and peculiarities of their operation under specific conditions;
- using scientific analysis techniques and methods based on statistical methodology;
- using up-to-date facilities for acquisition, processing and efficient use of information;

- availability of skilled, competent personnel able to use in practice all novelties offered by science.

The marketing activity management program of a manufacturing enterprise includes (Holovach et al., 2006):

– *Mission* – provision of consumers of this and other countries with products.

– *Chief goal* – transformation of the firm into a recognized supplier of products at foreign and domestic markets and ensuring recognition of the trademark at these markets.

– *Marketing objectives:*

- strategic – improving competitiveness at domestic and foreign markets, foreign markets share gains;
- financial – ensuring integrity of investments to firm owners and growth of their profitability, increase in financial stability of the enterprise up to the statutory indicators and standards;
- manufacturing – increase in output, in particular, due to exports, increase of manufacturing quality up to the level of international standards, decrease of manufacturing costs;
- social – keeping the optimum staff number level and structure, while rising the level of productivity and interest of personnel in firm's performance results;
- organizational – changes in enterprise's organizational set-up in conformity with the strategic development objectives.

– *The ways of achieving marketing objectives are as follows:* development of a product strategy, improvement of the financial marketing system, development of a marketing strategy, introduction of cost analysis, up building production capabilities, development of resources-based and innovation strategies, development and implementation of a quality management system, employees incentives program, personnel selection system, implementation of the strategic marketing system and adaptive organizational set-up, improvement of the labor protection system.

The prerequisite for efficient use of marketing consists in the availability of quantitative information on marketing objects coupled with the qualitative one, most notably – the development trends under the influence of factors of the internal and external environments (Yerina, 2004).

This is due to the fact that market transformation of Ukraine's economy and its further integration into the global economic area take place in the context of enhanced integration in all spheres of human activity. Economic, political, social and information processes become more closely intertwined; manufacturing and science, culture and everyday life interact more intensively. The present-day organizations, enterprises, corporations are integrated into transnational companies, into information systems that provide services to world markets, as well as into intergovernmental projects covering quite a number of state-owned and private corporations.

Today, it is impossible to consider economic processes separately from more general processes (ecological, political, social etc.); it is essential to take into account numerous direct and inverse relationships. This makes it necessary to apply the system approach, which sees economy as a whole, enables considering numerous direct and inverse relationships, interaction among individual structural units, identifying

the role of each of them within the general operations of economy and, vice versa, observe how the system in general influences its individual components.

At the same time, it is important to use statistical analysis of economic processes that should be based on the system approach principles, which creates conditions for optimization of both structural elements of the economic system, and the economy overall. Therefore, using system analysis tools in the course of a statistical study is a necessary foundation for substantiation of marketing decisions.

Contemporary society needs certified analysts, statisticians, experts, advisors and consultants able to (Holovach et al., 2006):

- collect statistical information on socioeconomic development at the macro-, meso- and microlevels, systematizing and sorting it;
- develop and use techniques for economic information processing, consolidation and analysis;
- creatively use information analysis findings, drawing conclusions and generalizations to further, substantiate marketing decisions;
- assess in real time implications of marketing decisions made;
- make good use of information resources and latest achievements in the IT area.

This is ensured through the performance of certain tasks of the statistical study differentiated with respect to the particular functions.

Thus, the following tasks should be completed within the organizational and methodological function:

- work at program-methodological and organizational issues of statistical observation;
- organization and maintenance of statistical observations and monitoring of socioeconomic phenomena and processes according to the needs of public administration and social reproduction;
- adoption of cost advanced information technologies for statistical information gathering, processing, analysis and dissemination according to marketing needs;
- consistent improvement of the methodology of statistical information and analytical support for strategic marketing in entrepreneurship;
- development of methodological support for analysis and forecasting of activities at different levels of marketing management.

The control function provides for:

- verification of the match between statistical reports and requirements of instructions and standards;
- statistical information reliability, relevance and timeliness.

The analytical function provides for:

- assessment of efficiency and risk of marketing activity;
- analysis of competitiveness for goods, services, enterprises, branches, types of activity, regions, national economy in accordance with international standards;
- analysis of the market situation, infrastructure, foreign-economic activity, demographic and ecological situations, social aspects of development etc.

The design function provides for:

- development of information and statistical support for planning and forecasting functions;

- forecasting of activities of marketing objects consistent with strategic marketing and entrepreneurship tasks;
- based on the findings of statistical studies, identification of opportunities for fulfillment of strategic tasks and development prospects, potential for performance and competitiveness improvement at different levels of marketing management;
- based on the statistical analysis findings, development of measures aimed at substantiating and supporting marketing decisions on performance, competitiveness allowing certain risks at different levels of management.

The theoretical framework for marketing statistical support (MSS) rests on the logic and methodology of scientific cognition (Nadolniy et al., 2002).

Scientific cognition represents purposeful, cognitive activities and interaction of the following elements: cognitive activity of trained groups of people, objects of cognition, subject of cognition, special methods and means of cognition, developed and established logical forms of cognition and linguistic means, results of cognition; goals designed to attain reliable framed knowledge able to explain phenomena, foresee possible changes.

Depending on the nature of objects of cognition, methods and means of their study, problem-solving specifics, there can be three main types of scientific studies:

- fundamental theoretical studies designed to look for fundamentally new ideas, ways and means of cognition and interpretation;
- targeted theoretical studies with a major purpose of differentiating verified and hypothetical knowledge;
- applied scientific studies focused on the practical use of formulated laws and theories, searches for methods of practical application of study results; they bear a direct relation to building a system of marketing statistical support in terms of the use of statistical study findings in the course of development of and support for marketing decisions.

Scientific cognition consists of two levels – empirical and theoretical. At the *empirical level*, statistical observation over objects is conducted regarding the MSS; facts are recorded and experiments are carried out; empirical relationships between individual phenomena are established.

At the *theoretical level*, laws and regularities are formulated in their systemic unity and integrity based on rational processing of data resulting from empirical cognition, the knowledge system, theories that unveil general and necessary relations.

In addition to the empirical and theoretical levels of scientific cognition, there also is the *metatheoretic level*, which is a prerequisite for theoretical activities in science. At this level, based on certain philosophical attitudes, generalization of the findings of empirical and theoretical studies and general prerequisites for theoretical activities are identified, in particular, with respect to the structure of objective reality that is studied at a specific historical stage of science development applying certain tools of theoretical cognition, a certain world outlook, and means of its reflection in scientific cognition.

General relationship and interdependence of phenomena and processes is the most typical regularity of reality, including the socioeconomic one. Any enterprise does not exist only for itself, it performs certain functions within the system of social reproduction. Consequently, considering possible decisions options regarding indi-

vidual objects of marketing, it is necessary to take into account of their relations with other objects. For the present stage, interrelation of such processes as globalization and economic regionalism, integration and disintegration etc. is inherent (Bakhov, 2014). Study of these processes, assessment of interrelation among them; in particular, through statistical methods give an opportunity to assess their dynamic changes. This, in turn, creates a basis for system assessment of the impact of these processes on the national economy and, on this basis, the development of measures aimed at ensuring competitiveness. Studying an object in the context of its relationships with other objects is the essence of the system approach.

Real-world objects are interrelated with each other, and change in one of them affects operation of the others. Making a decision on one certain object, one should trace its relationships with other objects. Assessment of possible implications based on the interests of a collection of objects assembled to a system is the basic feature of the system approach into making a marketing decision a certain object.

In turn, system can be defined as a certain collection of objects of different composition integrated by the systemic essential interdependence, in particular, from the perspective of the goals set. Special emphasis here should be made on the importance of dependence, which is a sign upon which the system is built.

The assertion as to which relations are substantial and which are not is always relative. Therefore, making a decision in this regard, one should proceed from practical considerations.

Correlation relationship is always subject to testing through statistical methods (Holovach et al., 2006).

System structure can be defined in different ways, for example, dividing it into subsystems and the latter – into elements. An element can be regarded as a marketing object, which internal structure does not interest marketing bodies but its individual characteristics influence other elements and the entire system.

The system itself and system elements are conditional notions. The collection of marketing objects considered at a certain level as a system can represent an element of another system at a higher level.

Since in case of the system approach decisions regarding elements should be made according to the system's interests, there develops a chain of interrelated decisions. Each of them should be made according to the interests of a more general system. Therefore, to complete practical marketing tasks one should limit the size of the systems under consideration, that is, to identify the highest system. The activity of all system elements should be aimed at achieving the ultimate goal. When decisions concerning marketing of individual objects conflict with general interests, this leads to a loss of opportunities to improve efficiency of resources use, in the long run.

This is the basic prerequisite for sustainable and effective economic development for both state and individual enterprises.

Substantiation of marketing decisions through statistical methods is associated with the managed system's internal organization, that is, with its structure. The process of distinguishing system parts and connections among them is termed "system structuring". The system structure combined with the statistical analysis methodology and procedures is the basis for MSS structuring.

Structurally, MSS should be built so that the solution to a general complex problem could be broken down into a number of simple ones proceeding from the opportunities of achieving marketing purposes basing on statistical means.

The system approach, as a methodological foundation of MSS provides for identification of the existing relationships between internal and external factors that determine the system behavior, temporal changes in the system properties under the influence of external environment. Such an approach is effective when performing system analysis stemming from functions of the system and its elements.

The basic task of MSS consists in cognition, through statistical methods and models, of quantitative relations of causal relationships in social phenomena, description and measurement of relationships between the development mechanisms and trends under specific conditions of a place and time as a basis for development of measures aimed at performing marketing functions.

MSS provides for differentiation of analysis techniques and methods taking into account the operations of individual subsystems in distribution by their functions according to user needs.

This gives rise to a qualitatively new collection of interrelated functional groups by marketing activity areas and coordination among them is quantitatively reflected through statistical methods.

The system approach to MSS means that one should specify the purposes and criteria of system operation and carry out structuring that unveils a totality of problems. Solution to these problems should make the system being designed and studied in the best way to meet the set goals and criteria. The quantitative characteristics resulting from statistical analysis should show the degree of conformity of the system parameters with the set goals and criteria, the potential for marketing effectiveness improvement, and on this basis – performance results as well.

Marketing statistical support differentiates in accordance with its functions into: planning, organization, and control (Holovach et al., 2006).

When ensuring the planning function, the need for coordination of short- and long-range plans is taken into account. Statistical analysis of completion of short-range plans is central in the assessment of its impact on long-term tasks. Statistical forecasting with account of uncertainty holds a prominent place in such planning.

It is statistical forecasting based on determination of forecast values that diminishes the risk of possible losses that can occur as a result of unforeseen circumstances, in particular, a risk inherent in future obligations. Statistical forecasting enables changing the orientation with minimum expenses, adjusting plans content-wise due to changing circumstances, and acting in accordance with probable errors.

Statistical multifactor models of relationship between performance results, on the one hand, and enterprise resources, on the other, serve as a basis for contingency planning, when alternative plans are developed for the purpose of prompt response to unforeseen circumstances and, accordingly, reduction of the risk associated with future uncertainties. In this case, statistical estimation of the impact of major factors enables developing measures, diminish the impact of limitations associated with external factors.

Goal definition is the starting point in planning.

When performing the planning function, marketing needs to know the actual state of things. Control exercises this function determining the effectiveness of planning and management, the degree of the desired efficiency achievement.

Statistical support for the control function rests upon the statistical analysis of dynamics series, compliance with standards, assessment of dynamics fluctuations and stability, determination of the main development trends, dynamic analysis and effectiveness evaluation.

At that, look-ahead control based on statistical preventive forecasting is of a paramount priority. It makes it possible to offer feedback from the expected system's output, as an effective control tool, in order to adopt prompt measures to achieve the set goals, standards, criteria on the ground of plans adjustment and elimination of shortcomings, sensitive response to new market conditions, new circumstances.

Statistical models of cause-and-effect relationships with adequate marketing and socioeconomic efficiency criteria also serve for control goals. Using these models is an essential prerequisite for achievement of the major marketing goal – maintenance of the enterprise performance quality at a certain level depending on changes in the internal and external environments.

Within the management system, strategic management with its long-term orientation to market needs in order to ensure a desired performance level is at the upper level of it.

Information and analytical support for strategic management rests on the principles of statistical methodology for diagnostics of marketing objects, the cause-and-effect mechanism in dynamics, the economic situation monitoring, forecasting and, on this basis, making optimal marketing decisions.

The process of MSS building comprises the following components (Holovach et al., 2006):

- defining the essence of the "marketing" category, its development current problems and tasks;
- defining the essence of the category "management", marketing purpose and the ways to fulfill this purpose;
- defining the essence of MSS, its purpose and objectives;
- identifying distributions used in MSS;
- building a system of MSS indicators;
- identifying the factors that determine the development of marketing;
- defining information users;
- building MSS statistical tools;
- building MSS information support;
- building MSS methodological support;
- conducting a statistical study;
- developing proposals as to substantiation of and support for marketing decisions based on the statistical findings.

Building MSS requires not only the substantiation of the contents of its tasks but also the solution to the issues of organizational and methodological compatibility, list adjusted to the time limits and executors.

Proving the necessity and feasibility of MSS characteristics assessment through statistical methods is a mandatory prerequisite for building any large economic system.

Experts with such skills need substantial training in: system statistical analysis of socioeconomic integrated systems in different aspects (economic, social, international etc.); primary data collection methods with the use of information and telecommunication technologies; information processing via mathematical-statistical analysis and data mining.

Such experts usually combine profound university economic education with advanced study of system statistical analysis and also latest information technologies.

Appropriate training should enable future experts fruitfully and effectively work in the public administration area, research and education institutions, and of course in business (Holovach et al., 2006).

Conclusions. The process of building marketing statistical support is based on the principles of system analysis, which provides for identification and evaluation of direct and inverse relationships of elements within general marketing system.

Using statistical methods enables assessing quantitatively and qualitatively the essence of these relations when developing practical recommendations.

The statistical analysis methodology uses a set of statistical methods and methodologies, making it possible to cover such important aspects of management as dynamics and forecasting, structural transformations, risks, balance relations, proportionality of performance results distribution and, on this basis, perform the integral performance appraisal.

This creates a basis for substantiation of managerial decisions, measures designed to support them, real-time assessment of managerial decisions, identification of potential for further performance improvement.

The process of up building management statistical support includes a number of stages, in particular, building a system of indicators, statistical tools, information and methodological support, generalizing the statistical analysis findings and, on this basis, providing proposals to support managerial decisions.

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