INFORMATION AND ANALYTICAL SUPPORT OF MARKETING ON THE PRINCIPLES OF APPLIED STATISTICS

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ABSTRACT

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

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

Using statistical methods enables to consider many problems in management from the angle of exact quantitative representation with a qualitative content based on real information support for calculations according to user needs.

This guarantees a creative approach to performing 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 of the scientific concept of marketing and the manufacturing and sales activities management system resting on it.

Review of recent advances and papers. The issue of building and using a system of information and analytical support for management of the economy is dealt with in a significant number of papers.

In particular, a sizable contribution to solution of these issues was made by such scholars as Blank, I. O. [1], Heiets, V. M. [2], Holovach, A. V., Zakhozhay, V. B. [3], Hrytsyak, N. V. [4], Bazylevysh, V. D. [6], Yerokhin, S. A. [7], Mantsurov, I. H. [8], Osaulenko, O. H. [9], Serkutan, T. V. [10]. Their works contain methodological provisions used when appraising the status of socioeconomic development, stages, methods and organization of building an information base, system of indicators and techniques for analysis of development mechanisms and trends as a base for rationale for managerial decisions.

Previously unsolved parts of the general problem. 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 a socially-oriented market economy, in particular, in conformity with the marketing concept, the manufacturing and sales activities management system resting on it.

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

The research goal is to deal with the 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 the statistical analysis methodology in the course of substantiating and supporting managerial decisions regarding manufacturing and sales activities.

Paper's objective. The set goal made it necessary to solve **scientific problems** of theoretical, methodological, and practical nature, in particular:

• proving the importance, necessity and feasibility of utilizing the statistical analysis methodology to build and use a system of information and analytical support for marketing;

• rationale for the program-methodological principles of a statistical study within the marketing system;

• proving the necessity and ways of taking the system approach when studying processes and phenomena, which enables to take account of direct and inverse relationships among 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 as to the essence of management, purpose of building a system of statistical key figures, identifying factors, building information and methodological support, using statistical analysis findings to substantiate and back managerial decisions.

The research methods are based on general scientific principles and basic concepts of economic theory, philosophy, marketing and statistical science.

The methodological background consists in a methodological approach according to which processes and phenomena of socioeconomic development are analyzed in their interrelation, interdependence and development.

The research subject determines using statistical methods and models and statistical analysis findings to identify the major thrusts in management improvement in order to increase their efficiency with due account for real reserves.

Key findings. Marketing can be defined as systematic influence on a certain object or on its units in order to ensure the vital activity and achieve the ultimate goal (outcome). Such objects are termed managed, and the package of measures meant to support or improve their operation 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 inherent distributions, as well as in combination of distributions according to the management functions. Information interaction between managed and managing systems is carried out primarily based on the activity statistical analysis findings. The operation purpose is to maintain the development set-up parameters. The purpose of the appropriate information processes is to ensure efficient marketing management of a predefined object subject to the desired goals [3].

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

Defining clear goals is a condition of results based marketing. Appraisal of results provides for division of a phenomenon into single parts in interrelation with appropriate factors and means towards ends; determination of the impact of factors on results, as well as comparison of results with an appropriate base, in particular, criteria [6]. The latter underlies feedback, which means an inverse effect of marketing results on the process of such marketing.

Goal (criteria)-based appraisal of results is associated with appraisal of resources utilization 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 [6].

On that ground, measures are developed that are 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 a system approach to marketing in the form of interaction of the system's single parts in certain integrity to achieve the set goal of individual subsystems, and on that basis — the goal of the system on the whole and the mission performance.

The marketing objectives within the system can achieved through performance of its certain functions, namely those of 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 selection of a structure of communications among subsystems, planning of behavior of subsystems and the system on the whole, the system behavior analysis, analysis of the results of its operation.

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

Scientifically grounded marketing provides for:

• learning economic laws and specifics 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; and

• availability of skilled competent personnel able to use in practice all new offered by science.

Consider the executive summary of the marketing activity management program of a manufacturing enterprise [8]:

Mission — provision of consumers of own and other countries with products.

Chief goal — transformation of the firm into a recognized supplier of products into the foreign and domestic markets and ensuring recognition of the trade mark in these markets.

Marketing objectives:

• strategic — improving competitiveness in the domestic and foreign markets, foreign markets share gains;

• financial — ensuring integrity of their investments to the firm owners and growth if their profitability, increase in financial stability of the enterprise up to the statutory indicators and standards;

• manufacturing— increase in output, in particular, due to export of products, rise in the manufacturing quality level up to the international standards, decrease in the level of manufacturing costs;

• social — attainment of an optimum staff number level and structure, rise in the level of productivity and interest of personnel in the firm's performance results;

• organizational — changes in the enterprise's organizational set-up in conformity with the development strategic objectives.

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

The prerequisite for the efficient use of the marketing tasks consists in availability of information on the quantitative description of marketing objects coupled with the qualitative content, most notably — 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 modern economic development trends, enhancement of integration processes in all spheres of human activity. Economic, political, social and information processes become more closely intertwined; manufacture 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 the world market, as well as into intergovernmental projectsa 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 and the like); it is essential to take account of numerous direct and inverse relationships. This makes it necessary to a system approach, which provides for studying an economy as a whole, enables to take into consideration numerous direct and inverse relationships, interaction among individual structural pieces, identify the role of each of them within the general process of operation 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 the structural pieces 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 versed in economics and able to [7]:

• collect statistical information on socioeconomic development at the macro-, meso- and micro-levels, systematize and sort it through;

• develop and use techniques for economic information procession, consolidation, and analysis;

• creatively use information and analysis findings, draw conclusions and generalizations on its basis, substantiate marketing decisions;

• assess in real time implications of marketing decisions made; and

• make good use of information resources and latest achievements in the area of computer technologies.

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

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

• work at program-methodological and organizational issues of statistical observation;

• organization and maintenance of statistical observations and conduct of monitoring of social and economic phenomena and processes according to the needs of public administration and social reproduction entities;

• adoption of modern information technologies for statistical information gathering, processing, analysis and dissemination according to the marketing needs;

• consistent improvement of the methodology for statistical information and analytical support for strategic marketing and entrepreneurship; and

• development of methodological support for analysis and forecasting of activities at pdifferent levels of marketing management.

The control function provides for:

• conduct of verification of the match between statistical reports and requirements of instructions and standards;

• statistical information reliability, relevance and timeliness assurance;

The analytical function provides for:

- assessment of efficiency and risk of activities of marketing activity objects;

- analysis of competitiveness of goods, services, enterprises, branches, types of activity, regions, national economy in accordance with international standards; and

- analysis of the market situation, market 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 the planning and forecasting functions;

- forecasting of activities of the 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 with allowance for risk at different levels of management of the economy.

Scientific cognition represents purposeful, cognitive activities composed of 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 be practically applied.

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

- 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 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 carried out; empirical relationships and regular relations 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 a *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 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 in conjunction with problems and 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 socioeconomic one. Any enterprise does not exist only for itself. It performs certain functions within the system of social production. Consequently, considering possible decisions options regarding individual objects of marketing, it is necessary to take account of their relations to other objects. Interrelation of processes characterizes internationalization of economic development. At the present stage, interrelation of such processes as globalization and economic regionalism, integration and disintegration etc. is peculiar to it [10]. Study of these processes, assessment of interrelation among them; in particular, through statistical methods give an opportunity to assess their dynamic change. This, in its turn, creates a base for system-based assessment of the impact of the above-noted processes on the national economy and, on this basis, for development of measures aimed at ensuring its competitiveness. Studying an object with due regard for its relationships with other objects represents the essence of the system approach.

Real-world objects are interrelated to each other, and change of 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 to making a marketing decision concerning a certain object.

In its turn, the system can be defined as a certain collection of objects of different composition integrated by systematic essential interdependence, in particular, from the perspective of the goals set. At the same time, special emphasis 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, existing classifications.

Correlation relationship is subjected to essentiality test through statistical methods [6].

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

The system and system elements are conditional notions. The collection of marketing objects that are 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 loss of opportunities to improve efficiency of resources use, in particular, in the long run, even with today's benefit at hand. Hence the understandable importance of an objective definition of the system's purpose and appropriate performance criteria for scientific substantiation of marketing decisions.

This is the basic prerequisite for sustainable effective economic development of both the 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 procedure is a base 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 opportunities for informational-methodological fulfillment of marketing purposes based on statistical characteristics.

The system approach, as a methodological foundation of MSS provides for identification of existing relationships between internal and external factors that determine the system behavior, consideration of temporal change in the system properties under the influence of external environment. Such an approach is effective when performing system analysis tasks 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 mass social phenomena, description and measurement of relationships of 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 that follow from the general content

MSS provides for differentiation of analysis techniques and methods by marketing objects, with account of operation of individual subsystems in distribution by their functions and links according to user needs.

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

The system approach to MSS building means that one should specify purposes of and criteria for operation of the system and carry out structuring that unveils a totality of problems. Solution to these problems should make that the system being designed and studied in the best way 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, clear up potential for marketing effectiveness improvement, and on this basis – performance results as well.

Marketing statistical support differentiates in accordance with its functions: planning, organization, and control [5].

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 to assessment of its impact on performance of long-term tasks.

Statistical forecasting with account of uncertainty elements holds a prominent place in the planning process.

It is statistical forecasting based on determination of the confidence belt of forecast values that diminishes the danger of possible losses that can occur as a result of unforeseen circumstances, in particular, a risk inherent in obligations incurred for the future. Statistical forecasting performance enables planning calculations to change their orientation with minimum expense, adjust plans content-wise due to changing circumstances, and act in accordance with a probable measure of possible error.

Statistical multifactor models of relationship between performance results, on the one hand, and enterprise resources, on the other one, 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 performance of the major factors enables develop measures, which depends on diminishment of the impact of limitations associated with the effect of 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 effectiveness of planning and management, the degree of achievement of desired efficiency.

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

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

Statistical models of cause-and-effect relationships in conjunction with adequate marketing purposes and socioeconomic efficiency criteria also serve control goals. Using these models is an essential prerequisite for achievement of the marketing overarching 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 that provides for development of goals and policy, long-term orientation to market needs in order to ensure a desired performance level is at the upper level.

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

The process of MSS building comprises the following components [3]:

• defining the essence of the marketing category, its development current problems and tasks;

• defining the essence of category management, marketing purpose and ways to fulfill this purpose;

• defining the essence of MSS, its purpose and objectives;

• identifying distributions used in the MSS process;

• building a system of MSS indicators;

• identifying the factors that determine development of the marketing category;

• defining information users;

• building MSS statistical tools;

• building MSS information support;

• building MSS methodological support;

• conducting a statistical study of the marketing category;

• developing proposals as to substantiation of and support for marketing decisions based on the statistical study findings.

Proving the necessity and feasibility of assessment of MSS characteristics through statistical methods is an indispensable prerequisite for its building as a system.

Experts with such skills need substantial training in system statistical analysis of the socioeconomic component of society as an integrated system in different aspects; economic, social, international statistics etc.; primary data collection methods with the use of modern information and telecommunication n technologies; information processing by means of modern methods and tools of mathematical-statistical analysis, data mining, and computer technologies.

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 of the general marketing system. Using statistical methods enables to quantitatively and qualitatively assess the essentiality of these relations when developing practical recommendations.

When covering these functions, the statistical analysis methodology uses a suite of statistical methods and methodologies, which makes it possible to character such important aspects of management as dynamics and forecasting, assessment of the impact of structural transformation, risk, balance relations, proportionality of distributions on performance results and, on this basis, determine integral performance appraisal.

The process of building management statistical support includes a number of stages, in particular, building a system of indicators, statistical tools, information and methodological support, conduct and generalization of statistical analysis findings and development, on this basis, of proposals as to substantiation of and support for managerial decisions.

References

1. Blank, Y. A. (1995). *Ynvestytsyonnii menedzhment. [Investment management.]*. Kyiv: MR. «YTEM» LTD [in Ukrainian].

2. Heiets', V. M. (2008). *Restrukturyzatsiia ekonomiky v konteksti perekhodu Ukrainy na pryntsypy staloho rozvytku. Problemy staloho rozvytku. [The restructuring of the economy in the context of Ukraine's transition to sustainable development principles. Problems of sustainable development]*. Kyiv: BMT [in Ukrainian].

3. Holovach, A. V., Zakhozhay, V. B., Mantsurov, I. H. & Holovach, N. A. (2010). Informatsiino-analitychne zabezpechennia derzhavnoho finansovoho menedzhmentu. [Info-analytical support of public financial management.] Kyiv: KNEU [in Ukrainian].

4. Hrytsyak, N. & Poprots'kyi, O. (2013). Informatsiino-analitychna diialnist' yak skladova stratehichnoho upravlinnia [Info-analytical activity as a part of strategic management]. *Visnyk Ukrayins'koi Akademii derzhavnoho upravlinnia pry Prezydentovi Ukrainy, 3,* 53-58 [in Ukrainian].

5. Halushka, V. V. (2013). Analitychne zabezpechennia upravlinnia finansovo-ekonomichnymy rezul'tatamy diyal'nosti pidpryyemstv [Analytical providing of financial management and economic results of enterprises]. *Extended abstract of candidate's thesis.* Donets'k: DVNZ Donets, nats. tekhn. un-t. [in Ukrainian].

6. Bazylevych, V. D. (Eds.). (2008). *Ekonomichna teoriia: politekonomiia [Economic theory: political economy]*. Kyiv: Znannya-pres [in Ukrainian].

7. Yerokhin, S. A. (2002). *Strukturna transformatsiia natsional'noi ekonomiky. [The structural transformation of the national economy]*. Kyiv: Svit znan' [in Ukrainian].

8. Mantsurov, I. H. (2011). *Instytutsiine planuvannia v systemi derzhavnoho rehuluvannia ekonomiky [Institutional planning in the system of economy state regulation]*. Kyiv: NDEI [in Ukrainian].

9. Osaulenko, O. H. (2008). *Natsional'na statystychna systema: stratehichne planuvannia, metodolohiia ta orhanizatsiia. [The national statistical system: strategic planning, methodology and organization]*. Kyiv: DP «Informatychno-analitychne ahenstvo» [in Ukrainian].

10. Serkutan, T. V. (2001). Mekhanizm upravlinnia informatsiynym zabezpechenniam marketynhu promyslovykh tovariv [The mechanism of information management, providing of marketing industrial products] *Candidate's thesis.* Mariupol': Priazovs'kyi derzh. tekhnichnyi un-t. [in Ukrainian].