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NOTES TO THE RESEARCH METHODS OF THE INFORMATION SYSTEM FOR ORGANIZATION MANAGEMENT

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Abstract: *The choice of research methods essentially depends on the basic concept which corresponds to the nature and structure of the researched object and it suggests identity of the choice with their nature and composition.*

Key words: *conducting an interview, survey, personal observation, document research and data analysis*

A system is defined as an aggregate of interconnected, interchangeable and interacting elements which are united by common goals and functional integrity, which has integral properties and principles. It has new properties which are not inherent to any of its compound elements and its functioning has a specific purpose. This property of coordinated joint interaction between every single element from the system is defined as synergism and in this case the extent of the internal orderliness in the system increases. In turn, the scientific method is a system of developing and changing principles through which objective knowledge is achieved. It is a combination of the mental activity and the mind's functioning, i.e. this is a process and its product is knowledge [1, p. 167; 2, p. 34; 3, p. 1, p. 2; 4, p. 27; 5, p. 85; 6, p. 37; 7, p. 5; 8, p. 18; 10, p. 13].

Through cognition, we acquire new knowledge to the old one and from here we get that knowledge is a prerequisite for the cognition process. In turn, the criteria for the value of the knowledge are its significance and its truthfulness, and the following is characteristic of the scientific knowledge: logical validity, provability, reproducibility of the results, verifiability, the strive to diminish errors and to overcome discrepancies.

It is important that the exploration process is based on research approach. Step by step the problem is approached by means of combination of activities

and analysis for the application of a specific model (or a few models) for achieving the goal, which is a way to theoretically research and practically apply something. In tun the choice of research methods substantially depends on the basic concept which should correspond to the nature and structure of the researched objects and the above mentioned suggests identity of the choice with their nature and structure.

Research and analysis are among the primary activities to be performed when launching a new information system for organizational management (ISOM) or when improving the existing one. During this stage an answer should be given to the following questions: what are the characteristics of the existing ISOM; which are the strengths and weaknesses, the disproportions in the information support, the new information needs; what are the suggestions for the scope and structure of the ISOM, as well as the conditions for its construction [3, p. 13; 9].

In the research (the overall study) and analysis (decomposition of the whole into its elements and finding its interconnections) of ISOM, practice has established the following widely and successfully used methods:

- conducting an interview (discussion). It is used to obtain initial information. When preparing the interview, it is necessary to define the questions and the topics, as well as to divide them according to the managerial level and the performed functions of the interviewed managers, functional leaders and specific contractors. The managers should be asked questions in connection with the information support of the strategic decisions – the organization development, the new products and markets, production structures, innovations, etc. The functional leaders could be asked questions which clarify issues about planning, reporting, control and analysis of the organizational activities. By conducting the interviews, the scope of the informational needs, the deadlines, the sources of information, the methods of providing the information are found, and also, we can notice unsolved problems and possibilities for improvement of the information support of a specific managerial function. The designated questions for specific contractors aim at clarifying the methods for processing and the ways to obtain the information, as well as problems in this regard. When conducting the interviews, it is advisable to follow some rules: to ask for the manager's permission before interviewing the personnel, to preliminarily clarify the purpose and the subject of the interview, the obligations of the interviewed and to agree on the time and place of the interview; if it is possible, the interview should be individual and not very long; to make a summary at the end of the interview. With this research method we gather valuable information for the existing ISOM, which represents points of view and evaluations by managers and experts about the information support of the different managerial functions and tasks at the different managerial levels, i.e. the following questions should be answered: What? – this type of questions

is supposed to clarify the volume and the scope of the information needs, the types of information indicators, which are used or which are needed but are not given; the extra ones or the unused ones are defined. The conclusions are foundation for evaluation of the existing information base, as well as the design of a new one; Why? – these are questions which intend to study the role, usefulness and value of the used information, what is the effect upon the managed activity, the presence or absence of the respective indicators; Who? – the questions of this type clarify which structural branches receive the existing documents, if the received information corresponds to the functions of the branch, who else needs it and the reasons why they do not receive it; When? – these questions serve to define the periodicity of when the information is received and used, they seek relevancy between the periods for receiving and using the information and the deadlines for decision making and they help evaluate the timeliness of the information; Where? – this type of questions clarify the sources of information – from the outside (suppliers, clients, credit organizations, etc.) or from the inside – (production units, functional departments, administrative or business offices). The plausible alternatives for receiving the information are analyzed and also the suitability of the existing sources is evaluated; How? – these are questions, related to the methods and forms for receiving information – like documents, orally, on a technical device, monitor, etc. The existing and plausible methods for information delivery are compared and the proper ways for every single case are defined – according to the volume, content and requirements of the data, as well as for the speed of the technical resources.

- questionnaires. They are used to get information in the form which is suitable for follow-up systematization and analysis. The complications when using this method are in formulating the questions and the creation of the questionnaires. The usage of the questionnaires is appropriate when: the system analyzer is far away from the studied subject and interviewing is expensive; there is a large number of people who would not be able to be interviewed in the wanted period; the questions are simple and the answers are one or a few exact and direct choices; the information, received by other methods for research and analysis should be controlled. When creating the questionnaires, the following should be observed: the questions should be short, clear and unambiguous; the questionnaires should not cause confusion or subjectivity in the answers; they should contain short explanation of the purpose of the questionnaire and how to be filled out, as well as a deadline; they should consider the intellectual level and the interest of the people who answer the questions, etc.
- personal observation. The method is designed to gather primary information (which cannot be obtained in any other way) or empirical statements about the system. It is suitable when researching branches with different tasks, in which non-routine activities. The purpose of the personal

direct observation is to study the irregular information – telephone queries, oral exchange of information with visitors from other branches or external organizations, preparation of unofficial documents, distribution of the load among the colleagues in the branches, among the different branches, in the different periods of the day, week, month, etc.;

- study of documents and data analysis. This is a basic method for establishing the status and development of the organization, the strengths and weaknesses of its organizational system, the directions and possibilities to improve the organization. The normative documents which regulate the functioning of the organization – contracts, regulations, decisions, managerial structures, etc. should be researched. Evaluations of the condition and the level of the planned and reported work, details, the completeness and reliability of the planning and reporting documentation. The analysis of the data would permit quality evaluation and visual presentation of the status and tendencies in the development of the studied object [3, p. 13 – 14, p. 15 – 16; 9; 11, p. 197; 12, p. 184].

The tendencies in which the research and analysis are conducted take the following main directions:

- research and analysis of the managed system (the object of management), i.e. development of production and economic activity, specifics and requirements of the production-technological process, material flows, etc. Here the aim is to define the tendencies in the development and specifics of the production and business activities of the organization, its influence and its requirements towards the information system. A major point is finding flaws and disproportions in these activities, which have been caused by difficulties in the information support of the decisions; and the research and analysis of the managed system is conducted in the following directions: research and analysis of the specifics of the production – including the issues with the specifics of the products or services, the duration of the production cycle, batches, nomenclature, used technologies, variety of the technological operations, machines and equipment, cooperative supplies, processed raw materials, etc.; research and analysis of the production and economic activity – it includes the dynamics in the development of the organization and the change in the product list (the activities in the organization). Indexes for general characteristics of the organization are included – capital structure, indicators for the financial status of the organization, investment efficiency, efficiency of the long-term assets, profitability, profit, types of production, long-term assets, partnerships, profit, number and structure of the personnel, wage fund, etc.; research and analysis of the material flows – the purpose is to define the volumes and itineraries of the raw materials flows, basic and supplementary materials, semi-finished products, finished products, etc. as well as an estimation of the rationality of the

movement of the material flows, the organization of the internal transportation and the use of the transportation vehicles;

- research and analysis of the interaction of the management system (MS) with the environment, i.e. the material and information flows at the input and output of the system. It is performed in the following directions: research of the market conditions in which the organization functions. The influence of the market on the organization and its information system is presented by the market conditions for the delivered products or services, the market conditions for the delivered material resources, the labor market, etc. After that information should be gathered about the domestic and international markets to which the organization sells, the relative share in the total sales volume, prices, competition, sales expenditures, transportation distances, periods for selling the products, etc. In connection with the market conditions for the materials, raw materials, semi-finished products, etc. which the organization uses, it is necessary to have information about the markets from where to obtain them, quantities, price dynamics, expenditures for the delivery, possible new suppliers, timeliness of the deliveries, etc. The research of the labor market is essential in connection with decisions about the organization development, as well as for productions with shorter production cycle or with seasonal character – information is gathered for the sources or providing workers and specialists, managers and employees with the corresponding qualification, the wages, the requirements for social security, etc.; research of the contracting parties. It is designed for gathering information about the number of customers and their characteristics, the number of suppliers, the types of deliveries and their timeliness, the number of partners, debtors and creditors, frequency of the estimates, etc.; research or the regulatory documents. It includes the regulatory documents by which the activity of the organization is regulated and it contains getting acquainted with laws, rules, regulations, instructions, etc., as well as an estimation of the volume of the used information, its variability, frequency of usage, etc.;

- research and analysis of the management system (the subject of management), i.e. the functional structure of the organization, information flows, the system of indicators, methods for planning, reporting and analysis, technical devices, used in management, etc. It includes:

  • research of the structure of the organization management: structure and composition of the managerial branches; distribution of the functions and tasks among the branches, the links and relations among them; content and regularity of the decisions which are made in the single branches. This research is basis for determining the document flow – the information flow. The essence of the information flow in general is the consistent movement of the documents from the moment of their creation or reception, through their processing or usage until the moment of archiving them or taking them out of

the organization. In this case we study: the interrelation among the documents; the timeliness of their creation; the rationality of their processing; the path which every document passes – here we include the successive operations which are performed on the document in the respective managerial branches, etc. In turn, the research and analysis of the information flows are usually performed using the method of the technological schemes. They are developed into tasks and they are tables in which every row presents the documents and operations on their processing. The managerial branches which perform the respective operations are presented in the columns. The tables include: the first documents on the basis of which the information processing is performed on a given task, the resulting documents; the operations and the managerial branches which perform them, etc. For every operation: the documents are defined at the input and the output; its character is defined; the calculation processes which give the indicators are defined; the managerial branches in which the operation is performed are defined. A graphic informational model (information graph) is built on the basis of the performed analysis of the documents and the system of indicators and the developed technological schemes. It reflects the links between the indicators in a graphical form. In turn the indicators connect with each other through their addresses. Here only the quantity characteristics are included which are basis for calculation of other indicators or are a result of calculations. The development of the information graph is from left to right and one quantity characteristic and its addresses can appear once in it. The information graph is developed separately for every technological scheme and the general information graph of the system is constructed on the basis of the separate information models according to technological schemes;

• research and analysis of the information system of the organization: research of the information base; research of the used technologies, methods and algorithms for data processing; research of the information support of the functions, the tasks and the different decisions in the managerial branches; research of the technical support; research of the organizational support, etc. A substantial relative share goes to the work of research and analysis of the information base. This includes the study of all the documents in relation to form and content, purpose, period of creation and reception, way to travel, keeping, etc. According to criteria, the documents are grouped into: external and internal – coming from the outside (suppliers, banks, customers, etc.) and ones that are created in the organization; compulsory and optional – regulated with norms (statistical, financial, institutional, etc.) and set with the decision of the organization; primary and derivative – depending on the characteristic of the data which they contain, i.e. primary or intermediate (derivative) data; single-row or multiple-row – with one row of data or with multiple rows of data; hand-processed or machine-processed; normative, planning, reporting or analytical – depending on their economic content, etc.

The quantity and quality characteristics are studied and the documents are evaluated: the form of the documents, the technique of their filling up and processing; purpose of the documents, the number of the created copies, names of the attributes and indexes, number of the symbols in every cell, periods for filling up; algorithms for forming the indexes, etc. the systemized documents are a prerequisite for creating a full list of indicators included in them with the full content of attributes (indications) and after that they are classified. The indicators which are found by the personal observations and interviews are added here and also all the indicators, used in the organization, are defined. In this process the links and relations between the indicators, documents and the management functions are defined. We can find the duplicates of the indicators in the different documents, used in the different branches. The existing indicators are compared with the necessities of the different management functions and branches and at the same time the discrepancies are noticed. Parallel with defining the system of indicators, the methods and algorithms for forming the different indicators are clarified. The methods and algorithms are researched and they are used in: planning and prognosis activities – for creating plans and prognoses, material and labor balances, budgets; accounting – to calculate the cost of the products, to find the depreciation quotas, the material prices, the accrual and distribution of labor costs, accounting for services from own ancillary activities, etc.; the operational management and regulation of the activity – to create the calendar plan schedules and to correct them, to regulate and control the reserves, for dispatching, etc.; financial-economic analysis – for usage of the capital, material and labor resources, financial condition, expenditures and costs, sales results, profitability, etc. [3, p. 16 – 17, p. 18 – 19; 9; 13, p. 41].

The result from the findings and conclusions in the research and analysis stage is a prerequisite for development of a suggestion (a concept) for improvement of the existing information system. In turn it includes: a suggestion for the system scope and decomposition (division of the system into subsystems while keeping the links with the surroundings) – basic elements (modules) and the technological connections between them, location, tasks and purpose, requirements for their functioning, etc.; suggestion for information support – input and output documents, content and structure of the information base, requirements for information compatibility, digital-code systems and classifiers, data control, etc.; requirements for the program support; requirements for the technical support; requirements for the organization of creation and functioning – expenses for technical and program devices, expenses for the exploitation, providing qualified personnel, management, expected result, etc. [3, с. 20; 9].

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