

UDC 352.354:303.094.7

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### **THEORETICAL FOUNDATIONS OF FORMATION AND DEVELOPMENT OF INFORMATION SYSTEMS IN PUBLIC ADMINISTRATION**

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### **ТЕОРЕТИЧНІ ОСНОВИ ФОРМУВАННЯ ТА РОЗВИТКУ ІНФОРМАЦІЙНИХ СИСТЕМ В ПУБЛІЧНОМУ АДМІНІСТРУВАННІ**

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### **ТЕОРЕТИЧЕСКИЕ ОСНОВЫ ФОРМИРОВАНИЯ И РАЗВИТИЯ ИНФОРМАЦИОННЫХ СИСТЕМ В ПУБЛИЧНОМ АДМИНИСТРИРОВАНИИ**

*The article examines the functioning and development of information systems in public administration and local government. The system of principles of creation, operation and development of information systems in public administration is analyzed. Ways of improving the system of public administration and local government by implementing theoretical positions, methodological approaches and practical recommendations for the design, operation and improvement of automated systems that ensure the interaction of various economic objects and their normal activities have been suggested.*

**Keywords:** information systems, computer technology, information support, Principles of information systems, analytical components of the information system

*У статті досліджується функціонування і розвиток інформаційних систем в системі державного управління та місцевого самоврядування. Аналізується система принципів створення, функціонування і розвитку інформаційних систем в державному управлінні. Запропоновано шляхи вдосконалення системи державного управління та місцевого самоврядування шляхом реалізації теоретичних положень, методологічних підходів і практичних рекомендацій з проектування, експлуатації та вдосконалення автоматизованих систем, що забезпечують взаємодію різних економічних об'єктів і їх нормальну діяльність.*

**Ключові слова:** інформаційні системи, комп'ютерні технології, інформаційна підтримка, принципи інформаційних систем, аналітичні компоненти інформаційної системи

*В статье исследуется функционирование и развитие информационных систем в системе государственного управления и местного самоуправления. Анализируется система принципов создания, функционирования и развития информационных систем в государственном управлении. Предложены пути совершенствования системы государственного управления и местного самоуправления путем реализации теоретических положений, методологических подходов и практических рекомендаций по проектированию, эксплуатации и совершенствованию автоматизированных систем, обеспечивающих взаимодействие различных экономических объектов и их нормальную деятельность.*

**Ключевые слова:** информационные системы, компьютерные технологии, информационная поддержка, принципы информационных систем, аналитические компоненты информационной системы

**Problem statement.** The current state of the transformation of the global economy is characterized by two processes: globalization and regionalization. Globalization combined with computerization, i.e. escalation of the industrial economy to the post-industrial. Until recently traditional information technologies were used but the amounts of information in modern society are growing rapidly and we cannot use these technologies efficiently. Against this background new information and computer systems are of rapidly developed. They are a prerequisite and core of globalization. The governance system is characterized by a rapid increase in management information. However, despite the large number of documents, managers often lack the information to make decisions. Resolving this issue is associated with the introduction and development of information systems in public administration, which can increase the efficiency of public authorities and reduce wasted time and resources to perform routine work. The formation and development of information infrastructure and integration into the global information society are prerequisites for sustainable development. The urgency of solving this problem and its complexity determine the need for new scientific study methodology and research methods of the formation and development of information and analytical support in public administration.

**Analysis of recent research and publications.**The problems of economic development of Ukraine, under the conditions of informatization of public authorities were studied in many scientific works of domestic scientists including: Amosha O., Bakumenko V, Bandur S., Borschevsky P, Heyets V, Yepifanov A., Koretsky M, Kutsenko V., Lisiecki A. Oliynyk Y, Fashevsky M. The issues of improvement Information support of public administration examined in researches such scientists as Klimenko I, Lysenko J, Osaulenko O, Panczuk A, Ralduhin E, Sendzyuk M.

**Allocation of the unsolved earlier parts of the overall problem.**Degree of the study the operation and development of information systems in public administration does not meet the need of a modern practice. That does not allow operatively and constructively solve the current problems. The issues of theoretical and methodological foundations of governance in terms of informatization are not researched enough that reduces the effectiveness of information systems in public administration. Therefore, problems of improving information support of public administration in Ukraine are particularly relevant.

**The objectives of the article.**The aim of this work is to study the functioning and development of public administration with using modern approaches to information support of government bodies. The object of the study is the process of improving the information systems in governance. The subject of the study is theoretical, methodological and practical components of improving the information support of public administration in Ukraine.

**The main results of the study.**Formation of information support system of governance is one of the strategic directions of public authorities' development at the international, national, regional and district levels as well as levels of cities and towns. Information is a specific product of information systems that provide consumers with necessary data, information, messages used by citizens, organizations, public administrations and society in general. An important task today is to create a common information space in Ukraine, which will allow for the effective management actions at all levels of government and will integrate into the global information space. Such large-scale problem can be solved only on the basis of new information technologies with the use of advanced computer systems and telecommunications.

The creation and development of modern information systems in government needs participation in these processes experts in public administration, specialists in computer technology and direct users that use information technology in their professional activities. Also, there is an important task of training civil servants of the latest advances in computer systems. This work is carried out centrally by implementing state programs of informatization, as well as programs of local government that shapes the direction of creation information systems from lower levels to higher levels systems in the formation of government, regional and branch information systems. These works are carried out by the central government and local administrations, with involving in the process of local government. In Ukraine established an appropriate legal framework that regulates relations in the information sphere. A number of necessary regulatory documents are under development.

Ukraine has a three-level system of information systems according to the territorial criterion. At each level, there are functional, industry information systems and information systems of organizations. At the lowest, local level are information systems of state and local governments, institutions and organizations that are designed for the collection and processing of information coming from the environment and are used for the performing of their tasks and functions within their powers. These include systems of information and analytical support which allow forming an information infrastructure of the executive and local authorities at district-region. Infrastructure is a set of geographically distributed data warehouse, which are connected to each other. The system has functional subsystems that interact via the local network, which in turn are linked to the core through a global regional network and further with national and international networks. An important factor is the typing of the systems. That can reduce the cost of implementation these information systems at all stages of the project.

At the regional level there are regional information systems providing information regional executive authorities, local governments, institutions and organizations of regional level. These systems are designed to support the efficient management of the vital functions of regions. At the state level there are information systems that are designed to solve the most important issues of the country. They include: automated system of state statistics, automated system of economic calculation, the automated system of financial calculation and other systems.

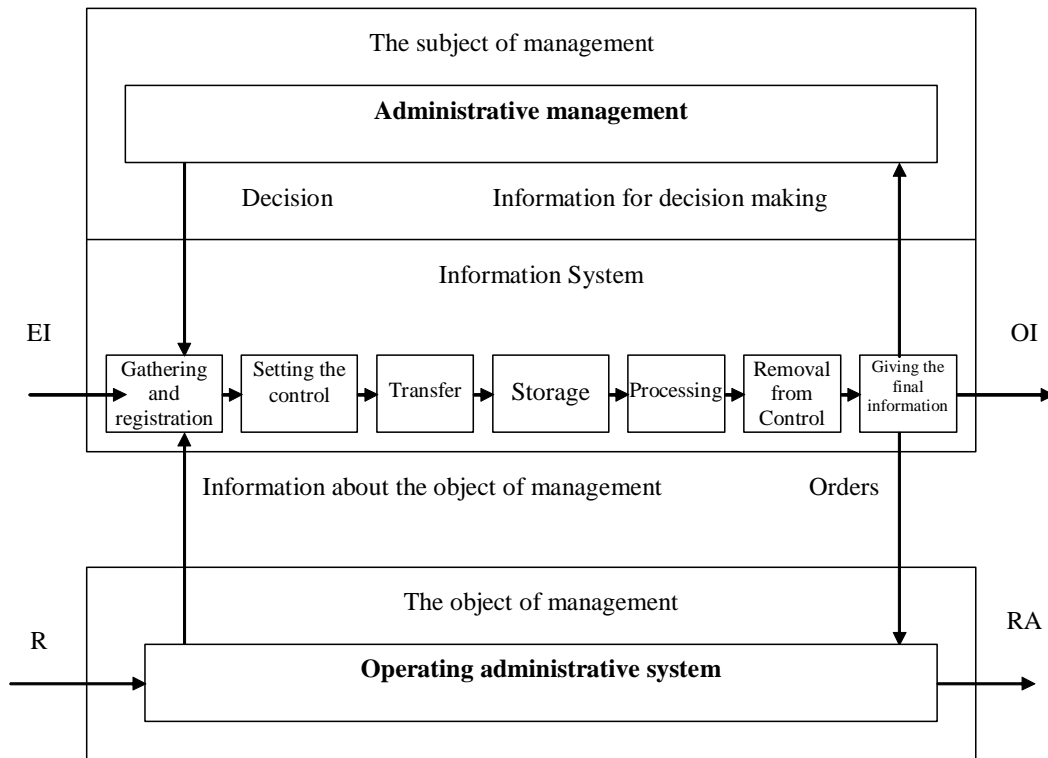
There are different types of information systems in public administration. They are management information systems, decision support systems, expert systems, information retrieval systems and information and referral systems. Information-analytical systems are performed the most important role among them. Generating information support of public administration needs to develop theoretical and methodological basis for the creation, operation and development of information-analytical system of executive power. This requires the study of the principles of formation, functioning and development of information systems and modeling of information processes in public administration.

The main role in public administration information support belongs to the solving the problem of gaining efficiency of the process of collection, processing and transmission of information. Subordinates prepare information for supervisor and these actions are the basis for the exercise of his functions. Therefore, the main problems to be solved to improve the efficiency of the supervisor are: reducing the search time information, increase information accuracy, timeliness of data processing. But information received by executives often not useful from the point of view of decision-making, in addition it is not always presented in an easy to use form and does not correspond to the tasks facing managers. There is a deficiency of information in such circumstances. Therefore there is a situation where with the information overload executive must make decisions under risk, based not on facts but on intuition.

Analysis of information systems in public administration shows that there are several factors that reduce their effectiveness: poor technical support, the increase in the number of information, coming in government and sent to other structures, the problem of improving the quality of decisions. Improvements in this area can be achieved by appropriate coordination of the processes of creation, functioning and development of information systems in public administration.

Construction of modern information systems in public administration also requires improvement and organizational structures of government, not just functional subsystems and software of the computer system. The system should provide an appropriate level of interaction with businesses, citizens and other public authorities. But existing information systems, unfortunately, do not fully meet these requirements. The exchange of documents between the government and other sources of information is slow and costly.

The primary link of a multi-level complex of information systems in public administration is the information system of the executive body of the basic level (local government). The scheme of such an information system is shown in Figure 1. The scheme used notation: EI - external information; OI - output information; R - resources (material, energy, information); - RA - Results of activities - management decisions, reports to the higher authority, answers to letters from citizens and so on.



*Fig.1. Schematic diagram of the information system of executive authority*

Information systems consist of structural subsystems. The subsystems that support the management process aimed at achieving certain goals throughout the system are called functional subsystems. Subsystems that provide adequate resources for the information system are called Support Subsystems. A common theoretical positions and methodological approaches are needed for creating, effective functioning and development of information systems that ensure the interaction of various economic objects and their normal activities.

During the process of establishment information systems were formulated scientific and methodological provisions and recommendations for the design of information systems, which now are positioned as the principles of their creation. In the literary sources [2,3,5] the principles of creation information systems, principles of management automation and requirements for the formation of organizational structure of government are proposed. Analysis of existing theoretical and methodological approaches to information systems enables form a system of principles, which consists of three groups principles: of creation, operation and development.

Principles of information systems creation in public administration:

- Systemic principle- is the creation of IS must be based on a comprehensive study of the object on a single methodological approach that allows you to examine the object as a whole; on this basis, identify various types of relationships between the structural elements that ensure the integrity of the system;

- Integration - ensure compatibility of components to the data management system and means of communication with users in decision making;

- Leadership - provides direct involvement of senior management of the contracting authority to develop an information system in the development and approval criteria and the general concept of the system, fixing responsibility by establishing a system for the customer, i.e. future users responsible for introduction and functioning of information system ;

- The principle of decomposition - used in studying the characteristics, properties and elements of the system. It is based on the system dividing into pieces, isolating some systems work, creating the conditions for effective analysis of system and it's designing;
  - The principle of compatibility - is to provide the ability to interact information systems of different types, levels during their joint operation;
  - The principle of standardization and unification - is the need to use common uniform and standardized elements of the information system;
  - The principle of automation of information flow and workflow - provides a comprehensive use of technology at all stages of the flow of information from the time of registration to obtain result's indicators and the formation of administrative decisions;
  - Aided design principle - is intended to increase the effectiveness of the process of design and creation of information system at all levels of government, with the reduction provided time, labor and cost expenditure through the introduction of industrial methods;
  - The principle of hierarchy involves the construction of complex information systems, taking into account the multilevel structure of public administration, which considers the presence of a higher level of public authorities, regional, district, the level of towns and cities.
- The principles of information systems operation in public administration:
- Consistency of subsystems - the principle associated with the construction of a common model of object management, which establishes the relationship and degree of importance between the different issues of management within the objectives, criteria and restrictions;
  - Reliability - is the system's ability to perform the required functions for a given period of time;
  - Effectiveness - concerned with achievement maximum effect while minimizing costs to the information system;
  - Interactivity - the system responds to various actions that a person is going to affect the computational process;
  - Affordability - is the ability to provide issuing responses to user requests in the right form at the right time;
  - Robustness - means an system ability to recover itself in case of error situations both external and internal origin;
  - The unity of program-based, sectoral, cross-sectoral and regional governance;
  - Legality, which means the need for strict compliance with the Constitution and laws of Ukraine;
  - The principle of continuity provides rhythmicity and low variability modes of operation of an information system in stable external and internal environment.
- The principles of information systems development in public administration:
- Evolutionary - the system is open and capable of development and improvement;
  - Adaptability - the possibility to adapt to changes in terms of solving problems;
  - New tasks principle - information system is used not only to solve the traditional problems but also reconstructed in accordance with the need to solve new problems;
  - Typing - the need to unify such components as hardware and software, algorithms, functional components and sub tasks;
  - Phasing - the ability to gradual consistent development of system;
  - Improvement of governance structure - bringing the governance structure in compliance with the information system;
  - Priority - helps selecting the main goals and objectives of socio-economic development in accordance with the available resources, manufacturing capabilities and needs of the population;
  - Balance - solving administrative tasks given proportions between increasing production capacity and state of environment, creating new capacities and market conditions, innovation and price parameters;

- Historicism - makes it possible to assess the degree of completion of certain phases of social and economic development of the object in the time dimension.

The study of the principles of creation, operation and development of information systems in public administration proves that in addition to the processing subsystems of management information systems, is an urgent need for implementation of analytical component in the information system that achieves the requirements for decision making in modern conditions. Against the background of information processes occurring in society as a whole is growing need to improve the efficiency of public administration. Solving this complex problem associated with the development of new methods for decision making support, is concerned with the creation and use of modern means of implementation these decisions. This support requires the creation of information-analytical systems that except information processing tasks support analytical processes of management complex dynamic objects. Information-analytical system in government greatly simplify the structure of information flows, providing optimum movement of management documentation, reduces the number of documents in paper form, the use of which requires significant time and materials. This approach allows to accelerate processing and assimilation of information, decision making and ensure selection of the most effective decisions in public administration.

**Conclusions and suggestions.** For creating, effective functioning and development of information systems requires a common theoretical positions and methodological approaches that ensure the interaction of various economic objects and their normal activities. Based on analysis of the concept of information, role and purpose of information resources, cooperation of information systems at different levels of government, existing theoretical positions, methodological approaches and practical recommendations for the design, operation and improvement of automated systems, have been established the system of principles, comprising three groups: creation, operation and development of information systems in public administration. These principles provide a theoretical positions and methodological approaches process creation, operation and development of information systems at all stages of their life cycle. The analysis shows that for increasing the efficiency of the state management system appropriate to apply the information-analytical system that can simplify the structure of information flows, optimize the document flow, reduce information processing of making effective management decisions.

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