INFORMATION SYSTEMS – CONSTRUCTION PRINCIPLES AND METHODICAL PRINCIPLES OF USE

ІНФОРМАЦІЙНІ СИСТЕМИ – ПРИНЦИПИ ПОБУДОВИ ТА МЕТОДИЧНІ ЗАСАДИ ВИКОРИСТАННЯ

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Балан О.С., Самброс С. А. Інформаційні системи – принципи побудови та методичні засади використання. Оглядова стаття.

Стаття присвячена висвітленню використання інформаційних систем у сфері публічного управління . Проаналізовано зарубіжний досвід використання інформаційних систем , а також перспективи їх запровадження в Україні. Визначено основні переваги та недоліки цих технологій. Зроблено достатньо висновків та були представлені пропозиції , щодо вдосконалення та впровадження нових інформаційних технологій та використання старих добрих методів передачі інформації . Задля цього було проведенно достатньо обгрунтоване дослідження цієї складної та на сьогоднішній день невирішеної проблеми для нашої країни та усього світу загалом . Тому саме сьогодні , саме зараз дослідження у цих дуже складних темах повинні бути оприлюднені , цьому і присвячена дана стаття.
Ключові слова: інформаційні системи, публічне управління, адміністративні послуги, електронне урядування, інновації, база даних

Balan O.S., Sambros S.A. Information systems – principles of construction and methodical principles of use. Review article.

The article is devoted to the coverage of the information systems usage in the field of public administration. The foreign experience of the information systems usage, as well as the prospects for their implementation in Ukraine, is analyzed. The main advantages and disadvantages of these technologies are determined. Conclusions and proposals have been made regarding the improvement and implementation of new information technologies and the use of old good methods of information transmission. In order to do this, a sufficiently substantiated study of this complex and currently unresolved problem for our country and the world as a whole has been conducted. Therefore, today, right now, research in these very complicated topics should be made public, this article is devoted to it.
Keywords: information systems, public administration, administrative services, electronic governance, innovations, database

Today, when we live in a rapid development era of information technology, it is impossible to imagine an effective work in any industry without the software usage. Every day emerge new tools that allow to optimize all areas of human activity. Specialists in the field of information and telecommunication technologies, lawyers, politicians, civil servants, business structures are widely discussing the new information systems introduction for the circulation, transmission and reception of information, servicing consumers or partners, or even other structures or countries of the world. The issue of implementing information systems in the field of public administration in Ukraine is very relevant, because the country has a problem of trust in public authorities. In addition, information systems can solve a number of problems that arise in the work of state bodies at present, in particular, it is the fight against bureaucracy, corruption and the level improvement of administrative services provision. Therefore, the aim of this article is to determine the introduction prospects of information systems in Ukraine in the field of public administration, outlining the advantages and study the shortcomings of these information systems, as well the international experience analysis in the use of information systems. So the problem of information systems protection in public administration and state regulation is also relevant today.

Analysis of recent research and publications

To this day information security is essential for the vital arteries provision and the interests of any state. A developed and protected environment creation is an indispensable condition for the development of society and the state, which should be based on the latest automated technical means [1]. Recently in Ukraine there have been some qualitative changes in the management processes at all levels, which were conditioned by the intensive introduction of new information technologies. A rapid informatization improvement, its penetration into all spheres of vital interests, besides undeniable advantages, and the appearance of a number of strategic

problems. The danger of unauthorized interference with the work of computer, information and telecommunication systems is increasing [1].

The aim of the article is to determine the prospects for using information technologies in Ukraine in the field of public administration, to identify the advantages and define the shortcomings of these technologies, as well as to analyze the international experience of using information systems.

The main part

Consequently, one of the potential threats to information in information systems should be targeted or a personnel's accidental destructive actions (human factor, and it is considered one of the most important) since they comprise 75% of all cases [1].

Let's take a look at the requirements of the laws of Ukraine such as "On Information", "On State Secret" and "On Protection of Information in Automated Systems", the main object of protection in information systems is information with restricted access, which is state or other, provided by Ukraine's legislation , secret, confidential information that is a state property or transferred to the state in possession, use, disposal.

In general, the protection object in the information system is limited access information circulating and stored in the form of data, commands, messages that have some limitations and value both for its owner and for a potential abuser of technical protection of information [1].

An abuser is a user who carries unauthorized access to information.

An unauthorized access threat is an event that is qualified as an attempt by the abuser to commit unauthorized actions in relation to any part of the information in the information system [1].

Potential threats of unauthorized access to information in information systems are divided into purposeful (intentional) and random.

The requirements of national standards and regulations on the issues of technical protection of information in Ukraine, as well as the experience of developing international standards of safety, are investigated in the works of M.S. Vertuzaev, O.M. Yurchenko, V.V Domareva.

Let's consider possible information leakage channels and options for unauthorized access to it.

In the absence of a legitimate user, the control and delimitation of access to the terminal, an advanced intruder easily uses its functionality for unauthorized access to the information to be protected by entering appropriate enquires or commands.

In the presence of free access to the apartment , one can visually observe information on means of reflection and documentation, steal a paper carrier, make an extra copy, and steal other media with information: listings, magnetic carrier, etc.

A particular threat is the uncontrolled download of software that can change the settings, properties, data, algorithms, the introduction of the "Trojan" programme, or a rooted computer virus that perform destructive unauthorized actions. For example, recording information on a thirdparty media, illegal transmission in communication channels, printing of unauthorized documents, their integrity violation, unauthorized copying of important information whose weight is determined and limited to a very short or, conversely, long time [1].

The situation is critical is where the abuser is an authorized user of an information system who, in connection with his functional duties, has access to one part of the information, and uses another outside his authority. On the authorized user's part user there are many ways to disrupt the information operation system and obtain, modify, distribute or destroy the information to be protected. To do this one can first of all use privileged input/output commands, authorization uncontrollability or the inquiry legitimacy and applications to databases and data banks, servers, etc. Free access gives an abuser the opportunity to access other people's files and databases and change them accidentally or intentionally.

During the equipment maintenance, the information remains on its carriers (solid-state surfaces, magnetic tapes and other carriers) can be found. Erasing information by conventional methods (by means of operating systems, special software utilities) is ineffective in terms of information technical protection. An abuser can resume and read its remnants, that is why we need only special means of erasing information to be protected [1].

A penetrator may become an authorized user of the information system in time allocation mode, if he has previously determined the order of the authorized user's operation or if he works with him on the same communication lines. He can connect to the communication line between the terminal and the computer processor. In addition, without interrupting the operation of the authorized user, the abuser may extend it on his behalf by canceling the signals of the authorized user's disabling [1].

Analysis, transfer and storage hardware information system is provided by wear of logic elements based on semiconductor devices. The logic elements elaboration is caused by high-frequency levels displacement of voltages and currents, that leads to the emergence in the ether, power and ground links, as well as in parallel-placed links and inductances of a third-party equipment of electromagnetic fields that carry the characteristics of the information being processed in the amplitude, phase and their oscillations frequency. The abuser's using of different receivers can lead to the unauthorized leakage and interception of very important information stored in the information system. With displacement in the distance between the abuser's receiver and the information system hardware, the probability of receiving such information signals increases.

One type of very dangerous prospective threat of professional abusers is the so-called radio-frequency means of electromagnetic lesion which cause damage to the semiconductor element base due to the excessive power of

electromagnetic radiation of the radio frequency band, that may lead to a complete or temporary refusal of the information system in the most critical situations [2].

Illegal and unauthorized connection of the receiving equipment and special sensors to the power supply and grounding circuits, engineering communications and information channels in the data transmission paths can cause modification and violation of the information integrity in computer networks.

Therefore, I consider that if we talk about information systems and e-governance and, in general, improving the management and technical equipment modernization in public administration, we should not forget about information security. So to this today if you own information from other countries, legal entities or special services, you can influence the situation in general and in some aspects. Information is a great power, because it can be disposed of and manipulated as you like. Do you want panic in the stock market? Do you want the opponent to be disinformed about issues that he or she should be misunderstood? Do you want the people of that region or country not to trust the authorities and nationalism? This can be done with the help of information systems and information in general. Therefore at present day we have not only to improve the protection of the information systems themselves, but also to learn new methods to do with information systems.

Information system is a set of organizational and technical means for the storage and processing of information in order to ensure the information needs of users [2].

According to the DSTU 2392-94: Information system is a communication system, which provides collecting, searching, processing and forwarding information.

The Law of Ukraine "On the Protection of Information in Information and Telecommunication Systems" defines information system (automated) as an organizational and technical system, in which the technology of information processing using technical and software tools is implemented. The most important principles for building effective information systems are the following. The integration principle that consists of the fact that processed data, once entered into the system, are used repeatedly to solve a large number of tasks. The systemacity principle is a process data in various aspects in order to obtain the information necessary for decision-making at all management levels. The complexity principle consisting in the mechanization and automation of procedures for converting data at all stages of the functioning of the information system. Information systems are also classified: for functional purposes: production, commercial, financial, marketing, etc.:

— on management objects: automated designing information systems, technological processes control, enterprise management (office, firm, corporation, organization), etc.;
— by the nature of the resulting information usage: information retrieval, intended for collecting, storing and issuing information at the request of the user; inform and advise, offer the user certain recommendations for decision making (decision support systems); information controllers, the resultant information of which is directly involved in the formation of management influences.

The information systems structure is a set of its individual parts, which are called subsystems [2].

The subsystems contents usually consists of:

— informational support is a construction methods and means of the information base of the system, including information classification and coding systems, unified document systems, information flow diagrams, principles and methods for creating databases;
— technical support is a complex of technical means involved in the technological process of information transformation in the system. First of all, these are computing machines, peripheral equipment, equipment and data transmission channels;
— software includes a set of regular applications needed to solve functional problems and programs that allow the most efficient use of computing, providing users with the greatest convenience in operation;
— mathematical support is a set of mathematical methods, models and algorithms for processing information used in the system;
— linguistic support is a set of language tools used in the system in order to improve its development quality and facilitate communication between man and machine [3].

Organizational subsystems are essentially also related to providing subsystems, but primarily aimed at ensuring the staff's efficient operation, and therefore they can be allocated separately. They include:

— staff assistance is the composition of specialists involved in the creation and operation of the system, staffing and functional responsibilities;
— ergonomic assistance is a set of methods and tools used in the information system design and operation of that creates optimal conditions for personnel, for the rapid development of the system;
— legal support is a set of legal norms regulating the information system creation and functioning, the procedure for obtaining, transforming and using information;
— organization support is a complex of decisions regulating the processes of creation and functioning of both the system as a whole and its personnel.

In accordance with the system approach principles, any system must first be investigated in the relationship with the environment, and then inside its structure. This principle is a consistent advancement in the stages of the system – must also be observed in the design of logistics information systems [3].

From the viewpoint of the system approach in the logistics processes one distinguishes three levels. The first level is a transportation system and movement in general, covering the chain of events, at the beginning of which you can take the moment of shipment of raw materials supplier. This chain ends when finished products are consumed in final consumption. The second level is an area, a workshop, a warehouse, where the transportation processes of goods, workplaces are located. The third level is the workplace where the logistics operation with the material flow is carried out, that is moving, unloading, packing the cargo unit, part or any other element of the material flow.

In scheduled information systems, tasks are solved that connect the logistics system with the aggregate material flow. In this case, through-line planning in the chain "sales-production-supply", which allows creating an efficient system of production organization, built on the market requirements, with the necessary requirements issuance in the logistics system of the enterprise. These scheduled systems as though "compact" the logistics system into the external environment, into the aggregate material flow [3].

The dispositive and executive systems detail the scheduled plans and ensure their implementation at individual production sites, in warehouses, as well as at specific workplaces.

In accordance with the concept of logistics information systems, belonging to different groups, are integrated into a single information system. One distinguishes vertical and horizontal integration [3].

Ukraine's formation as a legal democratic state requires from the civil service institution the effectiveness, flexibility and dynamism. Ukraine's transition to market relations, the further deployment of state-building processes, the socio-economic reforms implementation, the expansion of international cooperation, the society's democratization development are caused by a sharp increase in requirements for the level of society's informational support and information and analytical support of the state authorities and local self-government bodies. At the present stage of the transition from the industrial to the information society in all the leading countries of the world, the utilization degree of information space and information technology is a direct factor in economic growth [3].

The creation example of national information and analytical systems for various purposes is the activity of the USA, the EU countries and Russia. Ukraine's integrated information and analytical system of state authorities and local self-government bodies is aimed at ensuring the efficiency, reliability, information availability and confidentiality in state authorities, as well as increasing efficiency and achieving a qualitatively new level of decision-making in the state management system. The problem urgency of increasing the efficiency of public administration through information technology is not in doubt, because the use of automated systems will improve the quality and speed of processing and information transfer, the flow of which is constantly increasing. The peculiarity of the public administration system is the law priority, therefore this system information is based on the relevant legislation. According to Article 4 of the Law of Ukraine "On Information", Ukraine's legislation on information consists of: the Constitution of Ukraine, this Law, legislative acts on certain branches, types, forms and means of information, international treaties and agreements ratified by Ukraine, and principles and norms of international law. In recent years, the general information volume of public administration bodies, as well as the flow of administrative documents and the entire clerical process, has significantly increased [3].

Within the given context one more contemporary notion should be considered: e-democracy is an informational interaction system between public authorities and society, in which the task of obtaining state information is considerably simplified by providing citizens with access to the web-sites of state structures. Such a system ensures the activities transparency of higher authorities, allows citizens to participate more fully in solving state issues. It makes sense to agree with the opinion of the scientist M. Pavliutenkova who believes that informatization also affects the political situation in the world, distinguishing four information factors: the possibility to use the most intellectual potential of both own country and other countries; the opportunity, using all types of information technologies, to successfully form the social culture; the deep foundation of the nation, the state, to disseminate and introduce their spiritual and ideological values, their culture and language; the ability to inhibit the spiritual and cultural development of other countries, transform and even undermine their spiritual and moral principles; the ability, along with open power (economic, diplomatic and military) methods and means large-scale and purposefully use hidden, subtle information methods and tools. In particular the information-based and analytical systems usage positively influences public administration and creates opportunities for improving and enriching the practice of public administration. The negative impact of the information technology introduction has been noted in the main working document of the 2nd UNESCO International Congress "Education and Informatics" (Moscow, July 1-5, 1996): "There is a danger that technologies, in all their usefulness, may entail unification and loss of culture and the languages of many peoples of the world. The expansion of INTERNET and other internationally accessible communications networks mainly focuses on general points of detriment to specificity, which exacerbates concerns about the possibility of losing their own culture" [4].

With the information systems introduction in public administration, the issue of protecting confidential information from unauthorized access and modification, which can cause significant not only economic but also material damage. In the Ukrainian legislation, there are certain developments in the field of information security, in particular, the Resolution of the Cabinet of Ministers of Ukraine dated 16 February 1998, № 180 introduced the Regulations on the secrecy regime in the processing of information constituting State secrets in automated

systems. Protection against unauthorized copying and distribution of programmes is carried out with the help of special software measures that are protected by preprocessing programmes. By the decree of the President of Ukraine dated 22May 1998, № 505/98, approved the Regulation on the Procedure for the Implementation of Cryptographic Information Protection in Ukraine, which specifies the subjects of the state that organize and regulate the use of the cryptographic protection system. The information system creation of public administration – is not the use of new technical means for the "swollen" bureaucratic state machine, but a conceptual new system construction of public administration. The Russian experience in creating information and informational analytical systems deserves attention [4].

Thus, one of Russia's most computerized departments of - the Ministry of Emergency Situations (MNF), based on modern information technologies, implements the concept of situational centers, which allows to quickly solve problems of forecasting and assessing the consequences of possible emergencies. From the scientist M. Tikhomirov's viewpoint, the civil service informatization system should serve as the computer central bank and local banks of personnel information. The information and analytical support analysis of CIS countries shows that, firstly, analytical services are not yet sufficiently equipped; and secondly, requirements for the quality of the decisions that are being taken are increasing and which depend on the analyst's professional qualities and on the modern information technologies implementation in the decision-making process; thirdly, the volumes and flows of information both in the states and interstate have grown so much that the information exchange process can not be effective without structuring the system agreements on telecommunication systems.

The state development analysis, information systems implementation and operation for public administration in Ukraine has shown that in recent years, considerable work has been done on the application of information technology. Almost all government bodies in Ukraine provide information support for ongoing work at the level of individual personal computers with a set of typical software products. Most executive bodies use local area networks [4].

For Ukraine, where, in the context of economic reforms, administrative reform is being expanded, the issue of the informational formation and analytical basis for government decision-making at the state level is particularly relevant. Public authorities are acutely inadequate in providing information for their activities. According to the survey conducted by Siemens Business Services in a number of companies: 30% of working time is spent on the search and approval of documents; 6% of documents are irretrievably lost; – each internal document is copied up to 20 times; 20-25% increase in the staff's productivity with the use of electronic document management – the cost of archival storage of electronic documents is 80% lower compared with their paper copies [4].

Conclusions

For today, information space in all aspects of state and non-state government, in economic sectors and in general in the country is very much needed. A number of researches and experiments were conducted on the subject and conclusions were drawn. That is why today, right now, research into these very complex topics should be made public, and this article is dedicated to this. Following the principles described in the article and hoping for a modern ideology of high technology development, we will finally be able to create an effective and working, high-quality, and most importantly, modern information system. The need for an alliance of Hi-Tech manufacturers and modern, sober-minded politicians who are aware of the true potential of the Ukrainian people is ripe in society. That is why it is one of the most important problems today.

Abstract

So, if we live in the era of the stunning development of information technologies, it is impossible to find an effective robot in a non-free gadget without software storage. The new tools are new, they allow you to optimize usability in the realm of people. The aim of the article is to determine the prospects for the use of information technologies in Ukraine in the field of public administration, to identify the advantages and outline the shortcomings of these technologies, as well as to analyze the international experience of using information systems. Fahinchs Nutrition in the field of information systems in the sphere of public administration in Ukraine is of current importance, as well as in Ukraine and in the framework of the problem of concern to public authorities. In addition, information systems allow virtual problems to be limited to problems, robots of state organs in Denmark, an ore, task, bureaucracy, corruption, and the administration of administrative problems. This metadan of statistics of Ukraine in Ukraine and Ukraine, in Ukraine and Ukraine, in the sphere of public administration, environmental and social management, and in other words, and information systems, as well as analysis, and innovation, and non-profit, as well as analysis, and innovation, and non-profit, as well as analysis, and innovation, and inaccurate education and technology. To that, at the same time, the problem of the information system in the organs of the public administration and the regal of state regulators is also topical.

Information security is of the greatest importance for safeguarding the life of important interests. Stvorennya rozvinenogo i zahischenogo seredovischa Je neodminnoyu Minds rozvitku suspilstva that Power, osnovi yakogo toil Buti naynovishi avtomatizovani tehnichni zasobi.Dlya Ukraine in yakiy on foni ekonomichnih reforms rozgortaєtsya administrativna reform, food formuvannya informatsiynoї i analitichnoї bazi for upravlinskih

rishen of acceptance on state-sponsored rivni Je Especially relevant. Organized by the state of the state, there is a lack of information about the security of their own actions. That is necessary in advance information systems.

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