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The development of electronic personnel document management of enterprises in the conditions of digitalization

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***Abstract* — The article deals with the problems of effective organization of electronic personnel documentation at the level of an economic entity. The purpose of the work was to analyze the problems of implementation and determine the prospects for the development of electronic personnel turnover in the modern Russian economy. The main methods of research were the method of abstraction and the method of generalization (in the analysis of scientific literature, the formulation of recommendations and conclusions). The paper concluded that Russian enterprises are attempting to switch completely to electronic personnel workflow. Effective development of electronic personnel turnover at the micro level should be based on the creation of an appropriate information support system at the state level. The objectives of the implementation of personnel electronic document management at the level of economic entities are: simplification of work with personnel data, the formation of a coherent system of functioning units within the organization, increasing the efficiency of information processing, increasing the overall labor productivity of employees. The main directions of optimization of the documentary flow system are substantiated, including organizational, technical, software and technical components, the authors note that the optimization will allow to establish the structure of the documentation, identify the structure of the organization's documentary flows and their internal content, establish patterns of documentation movement within the documentary flow. The advantages and disadvantages of the electronic document management systems currently used on the Russian market, such as the ECM Logic; 1C: Document; DocsVision system; DIRECTUM; SED Case; EMC Documentum; Corus –Consulting, Codex: Document flow. All considered programs have a personnel block and can be used in working with frames. The unification and lack of industry specificity are identified as the main shortcomings in the use of these systems.**

Keywords* — *workflow, workflow electrons, workflow optimization, personnel electronic workflow, digitalization, electronic workflow systems.

I. INTRODUCTION

The use of modern information and communication technologies is one of the main conditions and signs of the innovative development of both individual economic entities and specific industries and countries as a whole. The emergence and development of mobile Internet. "Internet of things", "cloud computing" and the use of big data significantly affect the production of economic goods and the distribution of resources. In terms of innovative development, approaches to information processing are changing qualitatively. Currently, the problem of organizing effective work with documents is relevant not only for government and large commercial structures, but also for small and medium-sized businesses.

II. EASE OF USE

The purpose of the research is to identify problems and justify the main directions of development of personnel workflow for enterprises in the conditions of digitalization. The theoretical and methodological basis of the research was composed of the works of modern domestic and foreign researchers, devoted to the study of the essence of digitalization processes and the content of electronic personnel workflow. A survey of the current state of the use of software by Russian enterprises was based on statistical research methods. In this case, the collection and analysis of statistical data, grouping and synthesis of results was carried out. As a statistical toolkit, we used regression analysis, as well as methods of tabular and graphical representation of statistical data. The processing of the initial statistical information was carried out using the Excel and Statistica application packages. The development of recommendations for the development of electronic personnel workflow was based on such research methods as abstract logical and monographic.

III. LITERATURE REVIEW

Most scientists believe that the concept of "digital economy" emerged in the 90s of the twentieth century. This term was introduced in 1995 and substantiated by the American computer scientist Nicholas Negroponte [4,5, 7-11]. It is necessary to agree with scientists [15], who assert that, firstly, the digital economy marked the onset of the new information age, secondly, it includes everything that can be formalized, and thirdly, it is designed to raise the level and quality of life of the population, Fourthly, it is closely connected with the processes of new industrialization. According to researchers [15–19], the concept of "industry 4.0", currently regarded as the fourth industrial revolution, has emerged and is developing under the influence of the deep integration of information technologies into production and social processes. Digitalization of production processes as a direction for the development of modern technologies is the basis for the formation of industrialization processes of production. Work

with personnel is an integral part of the activities of any enterprise [15]. The content of this work, its efficiency and labor intensity depend not only on the specifics of the technological processes occurring in the enterprise, but also on the social orientation of the enterprise's activities. Work with personnel involves the use of a whole array of information, it is inextricably linked with the general document management of the enterprise. Work with frames can be fully formalized.

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IV. RESEARCH RESULTS

The transition to digitalization is impossible without the combined efforts of the state and business. The tasks of the state are to create and develop appropriate infrastructure, maximize the involvement of the population in the digital economy, improve the digital literacy of people, develop the processes of transition "to the figure" in the provision of public municipal services. The objectives of the business are: investing in new technologies, developing a corporate information structure.

TABLE I. DIRECTIONS OF INTERNET USE IN ORGANIZATIONS BY TYPE OF ECONOMIC ACTIVITY, 2017,% OF THE TOTAL NUMBER OF ORGANIZATIONS IN THE BUSINESS SECTOR

Types of activity of organization	Use of e-mail	Search for information in the network	Implementation of banking and other financial operations	Professional training of personnel	To control automated production	Subscription to data available to electronic databases	Internal or external recruitment
Business sector, total:	84,2	81,5	65,5	39,7	20,9	27,5	35,8
including mining	89,2	90,1	69,2	45,1	40,1	39,9	41,2
manufacturing industry	95,0	93,3	79,7	45,5	40,5	37,8	45,0
production and distribution of electricity, gas and water	87,6	86,8	66,1	43,6	25,7	28,4	25,8
building	88,6	87,0	70,5	36,3	19,0	29,7	36,5
wholesale and retail trade	93,0	85,7	69,2	51,2	18,7	34,0	58,2
hotels and restaurants	82,9	80,7	64,2	50,2	16,8	26,5	33,9
transportation	74,8	74,3	53,4	35,6	28,0	20,8	26,4
connection	91,5	91,6	65,4	64,8	44,4	41,1	55,7
real estate operations, rental and provision of services	73,4	72,8	56,9	30,0	9,9	21,2	20,8

Source: Indicators of the digital economy: 2018: statistical compilation / G. I. Abdrakhmanova, K. O. Vishnevsky, G. L. Volkova, L. M. Gokhberg, and others; Nat researches University "Higher School of Economics". - M.: HSE, 2018. - 268 p.

In 2017, enterprises of the Russian business sector continued to actively use Internet resources in solving various production issues (Table 1). To a greater extent, business entities were focused on using e-mail in their current activities (84.2% of the total number of surveyed organizations), searching for information on the network (81.5%), and banking and other financial transactions (65.5%). When working with the company's staff, Internet resources were also used. For example, 39.7% of all enterprises used Internet sources for staff training, while hiring staff used almost one third of Internet resources (35.8%) of the surveyed business entities . The activity of organizations in using Internet resources is differentiated depending on the sphere of activity of enterprises, the most active users of the Internet are enterprises of high-tech industries, including the organization of the sphere of mining, raw materials processing, as well as the organization of wholesale and retail trade.

TABLE II. USE OF SOFTWARE IN COMMERCIAL ORGANIZATIONS, 2017,% OF THE TOTAL NUMBER OF ORGANIZATIONS IN THE BUSINESS SECTOR

Types of activity of organizations Business sector, total:	Directions of use of software					
	Electronic document management system	Implementation of financial calculations in electronic form	Solution of organizational, managerial and economic tasks	Electronic reference systems	Management of purchases and sales of goods, works, services	Providing access to databases through global information networks
including mining	62,3	55,4	54,0	51,7	41,9	29,1
manufacturing industry	65,5	61,9	64,0	67,1	38,8	28,2
production and distribution of electricity, gas and water	68,9	70,0	64,8	65,4	51,0	31,4
building	69,6	59,4	56,5	57,1	44,2	31,6
wholesale and retail trade	64,2	62,5	57,3	59,9	32,9	26,8
hotels and restaurants	66,7	57,4	60,0	53,1	64,0	37,9
transportation	60,5	57,4	60,0	53,1	64,0	37,9
connection	60,8	51,6	56,3	53,8	35,7	24,2
real estate operations, rental and provision of	68,6	62,1	67,6	64,2	55,1	37,6

Identify applicable sponsor/s here. If no sponsors, delete this text box (*sponsors).*

services						
Types of activity of organization s	55,2	46,7	43,4	41,7	25,5	22,8

Source: Indicators of the digital economy: 2018: statistical compilation / G. I. Abdrakhmanova, K. O. Vishnevsky, G. L. Volkova, L. M. Gokhberg, and others; Nat researches University "Higher School of Economics". - M.: HSE, 2018. - 268 p.

More than half (62.3%) of all surveyed enterprises in the business sector used the electronic document management system in their activities, and 54.0% of business entities used special software to solve organizational, managerial and economic tasks. The use of software in the management of purchases and sales of goods and services focused mainly on enterprises in the trade and hospitality industry.

TABLE III. DIRECTIONS OF INTERNET USE IN SOCIAL ORGANIZATIONS, 2017,% OF THE TOTAL NUMBER OF ORGANIZATIONS

Internet usage directions	**Health and social services**	**Higher education**	**Activities of libraries, archives, club-type institutions**	**Museum activities and the protection of historical sites and buildings**
Email usage	95,1	97,2	74,0	89,8
Information searching	94,2	95,5	76,2	91,1
Banking and other financial transactions	75,0	81,0	30,2	36,7
Staff training	53,0	66,8	24,2	31,7
Video conferencing	47,5	72,5	10,6	14,5
Internal or external recruitment	29,4	41,2	6,7	11,0
Telephone calls over the Internet / VoIP	22,2	45,9	5,5	9,7
Subscription to access to electronic databases, electronic libraries for a fee	27,7	64,4	9,4	12,9

Source: Indicators of the digital economy: 2018: statistical compilation / G. I. Abdrakhmanova, K. O. Vishnevsky, G. L. Volkova, L. M. Gokhberg, and others; Nat researches University "Higher School of Economics". - M.: HSE, 2018. - 268 p.

In social organizations, the most active users of the Internet were universities, healthcare institutions and organizations providing social services (Table 3). The absolute majority of social organizations searched for the necessary information on the Internet and used e-mail for correspondence. It should be noted a low percentage of use of Internet sources by enterprises in the social sphere with the aim of hiring staff. Personnel workflow presupposes mainly a circulation of organizational documents. Organizational documents are approved by the head with the statement on the approval or administrative document (decision, decree, order, decree) or a meeting of the collegial body [11-16]. Organizational documents are valid until the documents that replace them are accepted. In organizational documents, civil and administrative norms are implemented; thus, documents of this type constitute the legal basis for the organization's activities. In the preparation of organizational documents undergo a mandatory procedure for coordination with all interested departments and persons (with managers and their deputies, lawyers, etc.) [17-20].

The main organizational documents regulating and determining the personnel policy of an enterprise include: articles of association, various regulations, job descriptions, staffing, internal regulations, regulations. In GOST R51141-98 "Record Keeping and Archiving. Terms and definitions The concept of "document flow" is defined as follows: the movement of documents in an organization from their creation or receipt to the departure or completion of execution. Working with documents involves the implementation of their classification, which greatly simplifies the search for documents. The easiest and most common way to classify documents in enterprises is to combine them into business. With the help of a special classification reference book, which, in turn, determines the principle of the distribution of documents in affairs, is the business nomenclature. The nomenclature of cases - is a systematic list of names of cases that were filed at the enterprise, while storing the dates of their storage. All work with personnel is reflected in the relevant documentation, in order to improve the efficiency of the enterprise, it is necessary to ensure the optimal quality of the documentation flow, including through its optimization. Currently, the use of technical tools to optimize personnel workflow can be applied not only at these stages, where you need to apply a routine approach to operations, but also where there is creative work with documents. The technical equipment includes office equipment (folding, marking machines, etc.) and computer tools and equipment that provide ample opportunities in the process of preparing documents, provide opportunities for conducting electronic approvals, for providing for the organization of operational storage of documents. In the process of using computer technology, the company can use an electronic document management system, a text and spreadsheet editor (Word, Excel, etc.), e-mail, fax and other applications.

Recently, many business entities have used cloud computing, which allows the company to provide convenient, fast and easy work with different operating systems, based on application solutions on different client devices [11-17]. An example of the simplest cloud technology recommended for use by personal users is the use of a "cloud" embedded in an electronic personal box that allows you to organize and store documents in the Internet space without using additional technical means. The electronic system of personnel workflow should not be closed at the local level [4-6]. Much of the information related to labor relations (officially confirmed and included in the relevant register documents about the employee's education, the procedure for admission and dismissal from the job, information about the employee's work experience, payment of contributions from the employer's country to extrabudgetary funds, transfer to the income tax budget, etc. . e.) should be systematized and accessible to state bodies, primarily for the implementation of

control functions. It is necessary to agree with the researchers [4-8], who propose, in order to ensure the effective functioning of the electronic document management system, the creation of a unified information system operating at the state level, through which enterprises and citizens can obtain the necessary information.

The use of personnel electronic document management system makes it possible to send and receive important information promptly using telecommunication channels. The main advantages of using electronic information interchange are: a significant reduction in the cost of sending documentation, fast data retrieval by other organizations, simplicity and ease of operation, easy search for information, writing documents using templates, tracking data transfer, protecting information [10-20]. In the Russian software market in 2018, the following modern electronic document management systems were presented and actively used by Russian industrial enterprises (Table 1): ECM logic; 1C: Document; DocsVision system; DIRECTUM; SED Case; EMC Documentum; Corus – Consulting, Codex: Document flow. These systems have a personnel block and can be used in working with personnel; by the negative aspects of using these systems, their unification should be noted and the lack of industry specificity should be taken into account. The use of software allows to reduce the time and economic costs arising when working with documents, and to increase the efficiency of work with document flow of any level and complexity.

TABLE IV. CHARACTERISTICS OF SOFTWARE PRODUCTS OF INFORMATION AND ANALYTICAL SUPPORT FOR ENTERPRISE EDS

Programs names	Characteristics of the software package
System DELO	System «DELO», was developed by «Электронные Офисные Системы» (ЭОС). Registration of incoming and outgoing correspondence. Fast transformation of documents into electronic form. Reliable storage and quick search. Control of execution of orders. Collaboration and preparation of draft documents. Building complex traffic routes for different business processes. Unified working environment for remote divisions and branches
Docsvision	The system of document management, tasks and business processes of the organization. Office automation. Managing business processes and tasks. Search and analysis of information. Information Security. Methods of organisation UZEDO. Means of customization and development of solutions. Mobile work. Integration and Scaling
1C:Document	Integration with 1C. The software product "1C: Document 8" for the automation of document circulation, developed on the new technological platform 1C: Enterprise, is the successor to the 1C: Archive software product.
DocSpace	SharePoint electronic document management system. Web-oriented space for the daily work of employees, management of documents and tasks through the corporate portal of the organization (ERMS / ERP system).
Atlas	Using the system, the user can create new documents, add already existing documents (files) to the system, distribute documents into thematic folders, edit documents in the system, and the system itself keeps track of which documents are already in use by other users. Document routing

According to researchers involved in electronic personnel turnover [9-19], the main directions for the development of electronic staff turnover will soon be: 1) the use of electronic workbooks, which will be an effective electronic way for employers to interact with those employees of the company who are remotely employed ; 2) replacing the parties' signatures on paper versions of documents with an electronic signature; 3) development of standardized electronic forms of personnel records; 4) the introduction of the practice of entering into, changing and terminating employment contracts in electronic form, especially this will be relevant when interacting with remote and seasonal workers, as well as with those workers who leave for long-distance work on a rotational basis.

V. CONCLUSION

In conclusion, it should be noted that in connection with the transition to universal digitalization in all spheres of social activity, the creation of personnel workflow is a necessary and inevitable process. At the present time, at the micro level, attempts are being made (especially from large organizations) to completely switch to electronic personnel workflow. In small enterprises and medium-sized companies, electronic personnel documentation is part of the overall electronic turnover and is directly related to the functioning of the information computer system existing in the enterprise. Most Russian enterprises for the automation of personnel information enterprises use the personnel unit in their software products. For further effective development of electronic personnel turnover at the micro level, it is necessary to create an appropriate information infrastructure, the main element of which will be the information support system operating at the state level, which will contain information about the personnel status and will be available to interested users.

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