Automation and Accounting

Name

Institutional Affiliation

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The current level of computer technology development made it possible to process primary documents, credentials, account management, and reporting using a computer. Computerization is possible for all levels of accounting: collection and registration of fundamental information (accounting for finished products, raw materials, and materials in warehouses, working hours and non-attendance of employees), maintenance of accounting registers of economic operations, etc. Computer accounting systems allow quickly generating information on various aspects of the financial condition of the enterprise, necessary for managers to make current decisions on enterprise performance. Complex automation of accounting, providing full processing of all accounting information, primary economic analysis for individual indicators, efficient planning of upcoming tax payments, increases the information capabilities of an enterprise. Also, accounting with computer systems provides an opportunity to save one of the most critical resources - time that can be used to make decisions, for more in-depth analysis of the economic activities of an enterprise, planning, and forecasting.

Currently, every company seeks to utilize computer programs in their activity (Blake, 2016). Most often, when buying software, such as of a specific accounting program, the company acquires non-exclusive rights. That is, it becomes one of many users of a similar software product, but does not receive the right to replicate, resell or otherwise derive revenue from the possession of this software product. Moreover, by purchasing a single-user (local) version, the management of the company does not have the right to install the program simultaneously on several computers - for this, it is necessary to purchase a network version or several "local" kits. Today, the accountant is expected not only to keep accurate records, correct calculation of wages and taxes, accurate reflection of postings on documents, timely submission of reports to the tax inspection and extra-budgetary funds, but also qualified advice in the field of enterprise management in the search for ways to reduce costs, for more rational use of available funds, to increase turnover and profit. However, it takes a lot of time and effort to process a considerable number of documents, to control the registration of a particular business transaction or to perform tedious arithmetic calculations, to check data on adjacent areas of accounting, not to mention the search for the causes of various inaccuracies and inconsistencies (Keenoy, 1958). Also, the accountant needs to regularly monitor numerous changes in instructions and laws governing the conduct of accounting and taxation, and if necessary, promptly make the necessary adjustments. It is especially difficult to do this if a particular legislative act takes effect "retroactively." Recently, there has been a trend towards universal computerization, covering all areas of activity. It is easy to explain - the computer performs calculations much faster, allows automating complex operations. Computerization has affected the financial and economic sphere of human activity. The financial and economic analysis of the enterprise's activities and the maintenance of accounting are greatly simplified when applying new computer technologies. By using a computer, one can present information in a user-friendly form, significantly speed up and simplify the operations of its input and processing, increase the visibility and simplicity of the final reports. Enterprise management in modern conditions is defined as a change in the state of the system, leading to the achievement of a permanent goal. The enterprise management system interacts in a constant relationship with the external environment (Dull & Gelinas, 2009). The interconnection is carried out using information that transmits the goal of a

functioning, various control commands from the higher level system to the low-level systems via direct communication flows, and all the information necessary for regulating the information process on feedback flows. Management information serves the processes of production, distribution, exchange, and consumption of material goods. Its most important component is economic information, which reflects the production and financial activities of any economic objects using a system of natural value indicators. In all cases, quantitative values, numerical values are used. This feature of economic information predetermines the possibility of wide application for its processing by computer technology. The main reasons predetermining the use of computer technology in the organization of accounting are large amounts of information, various groupings, hard processing times, high requirements for accuracy and reliability (Dull & Gelinas, 2009). Accounting tasks before other economic problems began to be processed by technical means. Computerization of accounting is closely related to the above reasons, allowing on this path to distinguish two stages - mechanized and automated. When it comes to the stages of development of automation of accounting, the first stage (1950-1960s) is characterized by the use of electronic mechanical machines, the organization of machine-accounting stations at large enterprises, where the main role was played by the complex mechanized processing of the accounts of the tabular system of accounting on the basis of standard programs (Deshmukh, 2006). The transition to the second stage - automated (from the beginning of the 1970s) - was caused by the appearance of computers adapted to solve problems in the economic sphere (Deshmukh, 2006). The automation stage has several periods in its development, depending primarily on changes in the forms of interaction between machines and the user, as well as the modes of operation of the computer. The initial period is connected with the centralized processing of accounting tasks at the computer center, where a single-program operation mode of the computer was used (Deshmukh, 2006). The accountant had the opportunity to influence the course of the solution of the problem. The operator, having received the accounting documentation, processed it on a computer under the program and returned to the user free accounting data - statements of analytical and synthetic accounting, by which management decisions were made. The development of computer architecture and their operating systems have created the prerequisites for user interaction with the program (Deshmukh, 2006). Having received the results of calculations, an individual quickly made decisions about further work with the program.

Before analyzing the notion of automation, it is worth to define the concept of accounting itself and the methods that countries use to regulate it. Accounting is an orderly system for collecting, recording and summarizing information in monetary terms about the property, liabilities of organizations and their movement through continuous and documented accounting of all business transactions. Accounting is carried out by economic entities in all countries of the world. The primary function of accounting is the accumulation of financial information. Accounting is maintained by enterprises and organizations continuously from the moment of their state registration. Accounting allows one to standardize the reflection of the company's operations, regardless of its type, as well as on who is the user of the information. The main tasks of accounting are:

- the formation of complete and reliable information on the activities of the enterprise and its property status, which is necessary for internal users of financial statements

(managers, founders, and owners of property of the organization), as well as external users of financial statements (investors, creditors, etc.);

- providing information necessary for internal and external users of financial statements to monitor compliance with legislation when the organization conducts economic transactions and their appropriateness, the availability and movement of property and liabilities, the use of material, labor and financial resources following approved standards;

- prevention of negative results of the economic activity of the organization and identification of internal economic reserves to ensure its financial stability.

Based on the general principles of accounting, the accounting department of enterprises and organizations provides all management personnel with information that is necessary for monitoring, analysis, management, and planning of economic activities. In accounting, the main principles are requirements for accounting, as well as assumptions, the use of which is assumed in the conduct of accounting. Principles of accounting in the countries of the world are very different. These differences are due to a variety of existing forms of organization of economic activity, as well as the influence on accounting of external factors (economic, political, social, geographical, etc.). In the first place is the provision of reliable information to government agencies that monitor the proper implementation of tax legislation. In some countries, the accounting system is formed based on the priority of macroeconomic goals, such as achievement of the set growth rates of the national economy, reducing inflation, etc. Accounting is focused on the needs of state planning bodies, and firms are forced to follow unified standards in accounting and reporting. The application of accounting depends on the methods of its regulation. Regulation of accounting as a concept is widely used in modern practice. Regulation of accounting is a set of legislative norms, regulations, and requirements in regulatory documents that are used to generate accounting and reporting information. Regulation represents a control function that provides controlled processes within specified parameters. Based on the understanding of the regulation as a function of management, it can be assumed that given following the hierarchical goals of this process. Accounting is, on the one hand, the object of state regulation, and on the other hand - its instrument. Through the regulation of the methodological foundations of accounting and financial reporting of all economic entities, the state establishes significant aspects of the information infrastructure of the national economy. In the world, there are two directions of the legal regulation of accounting, which differ in the type of legislation and the degree of its influence on various aspects of life, namely the countries that have a ramified code of laws relating to accounting, and the countries that use legislation of general legal orientation. In the first case, the laws are decisive, representing a series of prescriptions and obligations. It means that individuals and legal entities must follow the law impeccably. In most countries that use this approach, accounting standards are elevated to the rank of state laws. The accounting procedures are detailed and strictly regulated. In countries such as Germany, France, Argentina and others, the main task of accounting is the calculation of state taxes and control over the timeliness and completeness of their payment. In the second group of countries, laws indicate the limits within which individuals and legal entities have freedom of action. In such countries, accounting standards are not regulated by the state but are determined by various professional organizations of accountants. At the same time, the standards are more flexible and subject to the influence of various innovations. This group of

countries includes the United Kingdom, the United States, and others. In particular, the regulation of accounting in the United States is significantly affected by the spread of common law on the territory. Common law is the US legal system, which develops in the process of considering cases from one precedent to another and does not establish general rules that can be applied to several cases. Therefore, the rules that relate to the financial statements of companies are not part of the law, and accounting and reporting are regulated by professional private sector organizations. In the US, information generated in the accounting framework is aimed at meeting the needs of investors and creditors. The main users of financial statements in the United States are shareholders, as they primarily provide the necessary funds to finance the development of companies. Consequently, the accounting system of this country is unquestionably oriented on the interests of shareholders. In the US, not only does not exist a single document or a set of documents in which the principles are formulated, there is not even a single accepted definition of what it is. The determination of whether one particular principle is accepted or not still remains an issue of discussion. Even the criteria for assigning this rule to the accepted ones are not settled. The SEC requirements are only a set of GAAP (Gnanarajah, 2017). Unlike IAS, GAAP is a complex and ramified system of rules and procedures that are arranged in a hierarchical sequence (Gnanarajah, 2017). The complexity of regulation very often leads to the fact that experts who provide advice or prepare financial statements for GAAP are forced to specialize in one or more aspects of accounting (Gnanarajah, 2017). This is due to the fact that, unlike the International Standards and National Accounting Regulations, each of which defines approaches to reflect certain significant elements of financial reporting (fixed assets, intangible assets, inventories, etc.), each of GAAP components regulates, as rule, only a separate aspect of their evaluation or accounting (Gnanarajah, 2017). In the hierarchy of GAAP, more attention is paid to the issue of accounting and reporting in enterprises of various industries and spheres of activity (Gnanarajah, 2017). For investment and insurance companies, financial institutions, software developers, as well as oil companies, certain standards and other regulatory documents that take into account the specifics of their business operations are provided. The financial statements of companies whose shares are quoted on US exchanges should be confirmed only by an audit firm that obtained the license of the Supervisory Board for the Accounting of Public Companies (Gnanarajah, 2017). The audit committee of such companies should be independent (Gnanarajah, 2017). The importance of the United States in the world economy was due to the fact that their accounting principles and practices significantly influenced the national accounting systems of several countries (primarily Latin American countries) and IAS / IFRS. But some aspects sometimes do not meet the requirements of international standards.

When talking about automation of accounting, it is worth mentioning that in the non-automated system of accounting, the processing of data on economic operations is easily traced and is usually accompanied by documents on a paper medium - orders, accounts, and accounting registers. Similar reports are often used in a computer system, but in many cases, they exist only in electronic form. The computer system includes the following elements, such as hardware and software tools. The hardware consists of the equipment and devices that make up the computer, in particular, the CPU, hard drive, CD-ROM reader, printers, network cards, and so on (Dull & Gelinas, 2009). System programs that perform common functions are usually referred to as operating systems that control hardware and allocate their resources for maximum efficiency, a database management system (DBMS) that provides standard data

processing functions, and the service programs that run on the computer basic operations, such as sorting records (Dull & Gelinas, 2009). System programs are usually developed by hardware vendors or software firms and modified to suit individual requirements (Dull & Gelinas, 2009). Application programs are sets of machine instructions for processing data that an organization or a particular user develops independently or acquires from an external supplier. Documentation is a description of the management system and structure concerning data entry, processing, and output, message processing, logical and other commands. Personnel includes workers who manage the system, design it and supply programs, operate and monitor the data processing system. Data are information about economic transactions and other necessary information that is entered, stored and processed in the system. The way of processing business operations while maintaining the accounting records has a significant effect on the organizational structure of the firm, as well as on the procedures and methods of internal control (Dull & Gelinas, 2009). Computer technology is characterized by many features that should be taken into account when assessing the conditions and procedures for control. There are the differences in computer processing of data from manual. First of all, computer processing involves the use of the same commands when performing identical accounting operations, which virtually eliminates the appearance of random errors, usually inherent in manual handling. On the contrary, software errors (or other systematic errors in hardware or software) lead to incorrect processing of all identical operations under the same conditions. Secondly, a computer system can implement many internal control procedures that are performed by different specialists in non-automated systems. This situation leaves the specialists with access to the computer the possibility of interfering with other functions. As a result, computer systems may require the introduction of additional measures to maintain control at the required level, which in manual systems is achieved by a simple division of functions. Such means may include a system of passwords that prevent actions that are not permissible on the part of professionals who have access to information about assets and records through the terminal in an interactive mode. Compared to non-automated accounting systems, computer systems are more open to unauthorized access, including those who exercise control. They are also open to covert data changes and direct or indirect information about assets. The less a person intervenes in the machine processing of accounting operations, the lower the possibility of detecting errors and inaccuracies. Errors in the development or adjustment of application programs may go unnoticed for an extended period. What is more, computer systems give the managers a wide range of analytical tools that allow evaluating and monitoring the activities of the company. The availability of additional tools ensures the strengthening of the internal control system as a whole and, thus, reducing the risk of its inefficiency. So, the results of the usual comparison of the actual values of the cost factor with the planned ones, as well as a reconciliation of the accounts, are received by the managers more regularly in the computer processing of information. Also, some application programs accumulate statistical details on the operation of the computer, which can be used to monitor the actual course of processing of accounting transactions. The computer system can perform some operations automatically, and their authorization is not necessarily documented, as is done in manual accounting systems since the very fact that the managers take such a system into operation is implicit in the availability of appropriate sanctions.

To "teach" a computer to keep the accounting, one needs a specialized software product. There are several ways to obtain it: development of the software product by itself, a contract with a professional organization for the development of a software product, copying

of the finished software product from another user, and the purchase of the completed licensed version of the software product. The first option is related to the need to keep highly qualified programmers on the staff, which makes the resulting software product extremely expensive. The second option has a similar drawback - a high price because the execution of a single order is associated with a high cost of the product for a specialized computer firm. Also, with this option, it is unlikely to find a serious executor firm (large enterprises of this industry simply will not take up such an order), and small businesses are not able to provide the proper flexibility of the software product and its subsequent maintenance. The third option in addition to copyright infringement of the manufacturer of the software product is limited to the fact that in this case there is no technical support from the developer, which is provided only to official users. Therefore, from the point of view of saving money and time, as well as the efficiency of using the software, the fourth option is the most acceptable: the purchase of accounting software from a developer or dealer that provides the necessary service and updates the program as new versions are created. The choice of the many software products offered today in the market should be conditioned by those goals of automation of accounting. The product should help in solving formal issues without overloading additional functions and capabilities that are not needed. The required program must have a ready-made configuration and a rigid work scheme, which means that it does not require additional customization from the user. The seller of the program must provide updates as changes in legislation and accounting rules occur. If it is necessary to automate the accounting as thoroughly as possible and take advantage of all the benefits of such automation, then a software product is needed that can be adapted to the specifics of the activity and the individual characteristics of the enterprise. Such a product should have a setting not only on the chart of accounts used by the company, its accounting policies and automatic generation of accounting entries but also on the structure of accounting with the allocation of necessary sites and operations on them. Another direction of using computer technology in accounting activities is the use of primary accounting for automation of the initial stage of accounting. Here, computers are used to automate labor in warehouses of material values and finished products, taking into account the production and wages in the company's divisions. It allows the initial information without paper carriers to be transferred to further processing, improves the quality of accounting and its efficiency. Computers can be successfully used to read barcodes in the organization of primary accounting in stores, warehouses, etc.

It also needs to highlight the role and tasks of the accountant in accounting. When implementing an automated system of accounting, one can focus on the existing structure of accounting, with only the modernization of accounting methods, so that the costs and the degree of risk are minimal. The second option is to view the organizational and functional structure of the sub-division, redistribution of duties, and development of new information relationships. The efficiency of the sub-division can thus significantly increase. The choice of the direction of automation of the accounting service of the enterprise contains the previous choice of software. At the stage before the project survey, the task should be set, which consists in the formation of the initial references, the necessary results of solving the problem, and the description of its mathematical content. In the formulation of the task, the chief accountant must actively participate, attracting practically all the employees of his department. Setting the task is much easier if the company has such documents as the accounting policy and work plan of accounts, job descriptions for each employee, workflow schedule, approved procedure and deadlines for accounting work. Without such documents,

the task should be started from the study of the organizational and functional structure of accounting, the distribution of responsibilities, the formalization of the document management system, the study of information links and information traffic routes. Before the automation of accounting, it is necessary to put everything in order. It is necessary to analyze all forms of primary documents that are used in accounting, and the possibility of replacing non-standardized forms with unified ones, to analyze requisites and indicators of documents. Particular attention should be paid to sub-accounts and analytical accounts. For each account, sub-account, it may be necessary to maintain several types of analytical accounting. Analytical accounting is the most time-consuming, its data are used not only by accountants but also by all managers. It is necessary to compile local classifiers of arrays of constant (reference) information (subsections, employees, commodity-material values, etc.). The choice of constant information from the directory makes it easier to fill out the documents. Many classifiers (directories) are used for conducting analytical accounting, i.e., the indicators in them are analytical accounts. If possible, it is worth considering the use of unified forms, since they are designed taking into account automated processing, and most of them are already contained in accounting programs. Forms of documents that are absent in the program will have to be formed and introduced also. It is desirable that the introduction of primary documents occurred simultaneously with their preparation or receipt, and then they can be printed. The computer must enter all the requisites of the documents. One-time introduction of information should be carried out, and if documents are related to information, it should be noted by the accountant. Many accounting correspondences are of the same type. Therefore their introduction into the computer should be automated, although it is possible to enter any correspondence if necessary manually. But it will be more convenient and more correct if most of the accounting correspondence will be compiled automatically by the corresponding primary documents, which most of the accounting programs provide. It is necessary to consider how all correspondence will be introduced. Outgoing documents (registers and reporting forms) are generated automatically based on information entered into the computer. If the amount of accounting work is small, and the enterprise does not have sufficient financial resources, then it is possible to envisage performing part of the work manually (introduction of correspondence manually, rather than documents, distribution of overhead costs, the closing of accounts, etc.). To maximize the effectiveness of the implemented automated accounting system, one should automate the work on all its sections. The main book and turnaround balances should be formed automatically. At the stage of introduction of the automated system into operation, it is necessary to specify in the program the requisites of the enterprise, certain parameters of the accounting policy, adjust the chart of accounts, fill out the classifiers and enter the introductory balance. The introduction of balances on accounts should be made by one date for all analytical accounts, and then the balance of synthetic accounts will be received automatically. Of course, this is quite a large amount of work, and they need to be performed fairly quickly. That is why the introduction of the opening balance should be prepared, if possible, to involve in this routine work not only accountants but also special assistants. With a considerable amount of accounting work, the introduction of a new system can be done separately in accounting areas, but only after all previous works have been completed, since the accounting areas are interdependent and represent a single system.

The information system of accounting traditionally includes the following sets of tasks: accounting of fixed assets, accounting of material values, labor and wage accounting,

accounting of finished products, accounting of financial and settlement operations, accounting for production costs, consolidated accounting and reporting. The set of tasks contains information on qualitatively homogeneous resources of the enterprise. The organization of automated workplaces on the basis of personal computers, the creation of local computer networks of the enterprise, put forward new requirements for the organization of the information base and the formation of complexes of economic tasks. There are opportunities to create a system of distributed databases, information exchange between different users. There are interfunctional complexes of control tasks. New versions of software products for accounting combine the information of complexes of different accounting areas. In the process of accounting for the availability and movement of material values, specialists from three departments are involved: warehouses, accounting, and marketing. The software complex includes three parts: the storekeeper module (warehouse), the accounting module and the economist module of the marketing department. The software module of the storekeeper ensures keeping the file of the warehouse, registration. Arrival and consumption of material values, the accountant - filling in documents for the achievement of material values regarding accounting data, control of operations for the movement of materials, accounting for the movement of materials in quantitative and summary terms, financial calculations. The information connections of the complex of accounting problems allow distinguishing three phases of processing, which are inherent on the basis of computer programs. In the first phase, primary accounting, preparation of primary accounting documents, their processing and compilation of statements of analytical accounting for each site are carried out (for example, payment and settlement documents, arrears of accumulated and retained wages, etc.) are compiled for an accounting of wages. All conversion operations are performed on the basis of a package of application programs of a particular accounting area or an integrated module into a single accounting program. The second phase of processing is the preparation of postings and their placement in various analytical accounting registers, order logs to account numbers. Computer processing enables to fully automate this process, forming postings at the end of each site decision. The third phase of processing is the implementation of independent synthetic accounting: turnover-balance statements on the accounts of the General ledger, balance sheet, and financial reporting forms. There is an information exchange between the enterprise and the external environment, which consists of obtaining normative and methodological materials, as well as the transfer of consolidated financial statements to interested organizations: higher authorities, administrative bodies, tax inspection, statistical bodies, financial organizations, etc. For intercommunication with banks, exchange of information on the "Client-Bank" system. The bank that serves the company's settlement account offers services for the operational management of the current account directly from the office. Information support for computer processing of accounting data consists of non-machine and intra-machine. The main carriers of external information for automated processing are input and output documents, i.e., bearers of information of an approved form, having legal force. The input document contains the primary raw information reflecting the state of the control object; is filled manually or by technical means. The output documentation includes consolidated grouping data obtained as a result of automated processing and is manufactured mainly on printing devices. Intra-machine information support includes all kinds of specially organized information, presented in a form that is convenient for perception by technical means. These are files (arrays), databases, knowledge bases, and also their systems. Information is recorded on a magnetic disk in the computer

memory. The file organization of information support consists in the formation of various arrays. They can be classified according to various signs: by their semantic content, methods of use, purpose, a method of organization. For the role in machine processing and technology of use, arrays are classified as follows: permanent arrays; current (variable) arrays; intermediate arrays; output arrays; stored arrays; information arrays and service arrays. All types of arrays constitute the information fund of the computer system, which is a dynamic set of interrelated elements of information. The database is a specially organized storage of information resources in the form of an integrated set of files, providing convenient interaction between them and quick access to data. The data bank is an automated system comprising a set of information, software, and personnel that store, update, search, and issue data. The main components of the data are the database and software product, called the database management system. The main indicators of the databases are end users, i.e., specialists, leading different areas of accounting work. Their composition is heterogeneous, and they differ in classification, the degree of professionalism. Satisfaction of their information needs is the solution of a large number of problems in the organization of intra-machine information support. A special group of users of the data bank is formed by application programmers, who usually act as intermediaries between the database and end users, as they create user-friendly programs in the languages of the database management system. The centralized nature of data management necessitates the administration of such a complex system as a data bank. Both the bank and the database can be concentrated on one computer or distributed among several computers. For the data of one performer to be accessible to others or vice versa, these computers must be connected to a single computer system using computer networks. The composition of the information multilevel distributed database is determined in the course of drawing up a working project of the computerized information system of the enterprise. In typical projects, as a rule, a database is made that is uniform for all enterprises (chart of accounts, accounting types of wage payments and deductions, types of material movement transactions, etc.). The user can make changes to these arrays, creating other basic arrays, the composition of which is determined by the individual user and filled in manually (subdivisions, employees, materials, etc.). To date, the main idea of software development is the solution not only of directly accounting tasks, but also analysis, planning of the enterprise's activity, implementation of operational accounting. This is due to the orientation of today's systems not only to accountants, but also to warehouse employees, managers, etc. And the advantage is given to software products that allow automating the whole direction of the company. In a market economy, tough competition to achieve success simply requires the use of advanced technology. In the early 90's, these were simple programs, similar to a complex calculator, with functions not only of addition and subtraction, but also a balance output, just an assistant to an accountant. In the mid-90s, the scale of activity of many enterprises increased, as there was a need to establish management and operational accounting. Today, accounting automation greatly expands the capabilities of an accountant. With the help of automation tools, accounting becomes a more ambitious task, since it can be used in making real-time decisions. Therefore, software developers are interested in a program that would allow fully automating the activities of the enterprise.

All in all, if 20 years ago, the main tool of the analyst and accountant was a calculator, now almost no enterprise can operate without a computer. With the introduction of computers, there appeared a lot of unique computer programs that meet the needs of accountants and other financial workers; the computer became the chief assistant to the accountant. Of course,

for the disclosure of all the potential opportunities that the use of computers entails, it is necessary to apply a set of software and hardware to perform appropriate tasks. Therefore, at present, there is a great need for commercial companies in computer programs supporting the work of the company's management team, as well as in information on ways to optimally use the computer equipment available for the company to automate accounting.

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