

**DIGITAL EDUCATIONAL
ENVIRONMENT IN INSTITUTIONS
OF HIGHER EDUCATION**

Monograph

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R e c e n z e n t s :

- N. Vasilieva* – Doctor of Science, Professor, Professor of the Department of Informational Technology and Communication at Dnipro State Agrarian and Economic University;
- V. Bozhanova* – Doctor of Science, Professor, Professor of the Department of Management, Project Management and Logistic at Prydniprovska State Academy of Civil Engineering and Architecture;
- M. Lytvyn* – Candidate of Sciences, Accosiated Professor, Accosiated Professor of the Department of Economic Theory and International Economic Relations, Head of Resource Center for Sustainable Development at Dnipro University of Technology.

Author's group:

Bondarchuk N. (introduction, 1.3), Dubrova N. (4.1), Bovkunova O. (1.4), Chernetska O. (4.3), Hubaryk O. (4.2), Karamushka A. (2.1), Krushelnytska T. (3.3), Minkovska A. (2.3), Nuzhna S. (1.2), Odnoshevna O. (2.2), Shramko I. (3.1), Sydorenko S. (3.2), Tsybulko Yu. (1.1)

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The monograph presents modern educational technologies that can be used in the educational process of a higher educational institution. The monograph is aimed mainly at students of various study specialties, teachers. The monograph collects the opinions of scientists and teachers regarding the possible use of information technologies in the learning process, considers the main services and tools for evaluating written works, conducting an oral survey, and organizing online testing.

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4.3. Digital technologies in accounting as a basis for the training of a competitive accountant specialist in higher educational institutions

In the conditions of the development of the information society, there is an active digitization of socio-economic processes, including accounting activities. An integral feature of digitization is the wide implementation of information technologies in the activities of business entities, state authorities, local governments, educational institutions and the public. The automation of business processes has not left aside accounting. New tasks in the management of business entities contribute to the formation of specific requests that require appropriate accounting and analytical support. The development of accounting under the conditions of digitization of socio-economic relations is mostly connected with the introduction of IT tools and technologies aimed at overcoming the shortcomings of the existing control, analytical and accounting system.

The active implementation of digital technologies in the accounting system affects not only the principles of its implementation, but also the accounting profession. The basic competencies of knowledge of state and international standards of financial reporting, legislative norms and regulations require accountants to possess specialized software, familiarity with special IT solutions. Since the educational training of an accountant is primary in the formation of his future professional worldview, an important issue is the use of digital technology in accounting in the process of training a competitive specialist accountant in higher educational institutions. It is necessary to train accountants, actively implement digital technologies at enterprises, develop a legal framework, and solve problems that arise in the implementation process.

From year to year, the profession of accountant is included in the ranking of the ten most popular professions in the labor market of Ukraine. A wide

field of application of their skills gives accountants a legal obligation to organize the accounting process of enterprises, institutions and organizations of any form of ownership and field of activity. As part of communication and interaction, the accountant must be able to use modern technologies, new platforms and services in the process of interaction with internal and external users of information, while observing the rules of etiquette and behavior that exist within this format of interaction. In the current conditions of digitization of the economy, the IT literacy of an accountant, the possession of IT skills, and the ability to master new digital technologies are gaining relevance. High-quality IT modernization of accounting will not only create a unified information space, but also improve the quality of management at all levels, which will allow business owners and their accountants to interpret financial statements more effectively, perform functional tasks faster and more accurately. Professionals must have the tools and competencies to be competitive in the digital socio-economic environment.

Accounting is one of the first to begin to feel the influence of new technologies, which require not only their theoretical understanding, but also practical adaptation. An important component of the digitalization of accounting information is the automation of the collection, exchange, analysis and use of information in electronic and digital form and the creation of a general information system of enterprises. The competitive advantage of enterprises that possess information and communication technologies is obvious, and today it is necessary to advance more actively on this path. The result can be achieved by working ahead of schedule: relying on the best global practices, developing “digital personnel”, introducing progressive information technologies and business models.

A comprehensive approach to digitization of accounting includes a list of digital skills and competencies of an accountant, access to modern IT technologies. The prerequisite for the emergence of digital literacy of an accountant as a specialist with a defined list of professional duties is the automation of accounting processes (individual accounting procedures), which evolved into computerization – the use of personal computers in the work of an accountant, which ended with the development and implementation of special corporate enterprise management systems . The latter covered not only accounting, but also inventory management, finance, marketing strategy and sales, information support at all stages of the product life cycle, etc.

Digitization has contributed to a change in the functional impact in relation to information, due to the fact that: paper media are rapidly losing their functionality, and the electronic form is becoming the main form of information presentation; the quality and volume of information has changed – the geometric growth of the volume of information contributes to the complexity of the processes of its processing, as well as orientation in general in the information environment; a significant amount of information is not reliable and up-to-date, which requires additional analysis and verification; the level of danger of leaking information has increased, which requires additional protection and the use of technologies for working with it that will guarantee its preservation and inviolability; the emergence of new accounting objects requires the formation of a new methodological basis for their assessment and accounting, which is necessary for the formation and presentation of information about them to stakeholders.

Digitization involves the emergence of a significant range of technical problems, which the accountant must also be able to solve in the course of his professional activity, so a creative approach to adapting digital technologies to one's own needs in order to solve accounting problems is a rather important ability.

The concept of IT literacy of an accounting specialist includes the following components:

- ability to use real-time services based on virtual assistants;
- ability to identify business processes, filter data, information and digital content;
- ability to evaluate data, information and digital content;
- the ability to use smart devices based on intelligent models and neural networks;
- the ability to analyze and solve tasks in the field of using infographics and infodesign as a tool for business promotion;
- ability to use and manage analytical data, accounting information and digital content in business processes;
- the ability to implement a system of budgeting and unified electronic document flow;
- the ability to provide accounting activities of enterprises with modern IT tools and mechanisms;

– understanding the essence of digital audit, modern technologies and tools for its implementation.

Modern challenges require an accountant to have at least a basic understanding of information and communication technologies, the availability of digital competencies is becoming a basic requirement for staff. The components of an accountant's digital literacy are very closely related to the skills of working with digital information, most of which is formed on accounting accounts and recorded in accounting documents and registers. However, nowadays all actions with such data are carried out to one degree or another with the use of digital technologies. That is, there was a kind of "imposition" of accounting, information, analytical, and computer skills, the synthesis of which gave rise to the phenomenon of digital literacy, which became the key to the success of an accountant's work. The components of an accountant's digital literacy are shown in fig. 4.4.

As you can see, digital literacy is related to critical thinking, communication, collaboration, technical skills of working with certain software. In the conditions of digitization of accounting, the role of the accountant will not change, only the emphasis will be shifted to issues that will require the accountant's own judgment: complex atypical operations, effective mechanisms of internal control, analytics and forecasting, evaluation. Therefore, the quality of education of the future accountant becomes relevant in the context of digitalization of accounting activities, since the educational process should be practice-oriented, close to real business processes and take into account the current state of development of digitalization of socio-economic processes. That is why digital technologies in accounting should become the basis for training a competitive accountant specialist in higher educational institutions.

Virtualization of physical infrastructure IT systems and "digitalization" are currently the main trends in the global labor market. Changes in the theoretical plane of the development of accounting make it necessary to update the requirements for knowledge and the structure of professional competencies of accountants-practitioners and students of higher education in the relevant specialties of higher education institutions. The educational process within the programs of training and retraining of accountants should be oriented to the maximum approach to the real needs of business, constant

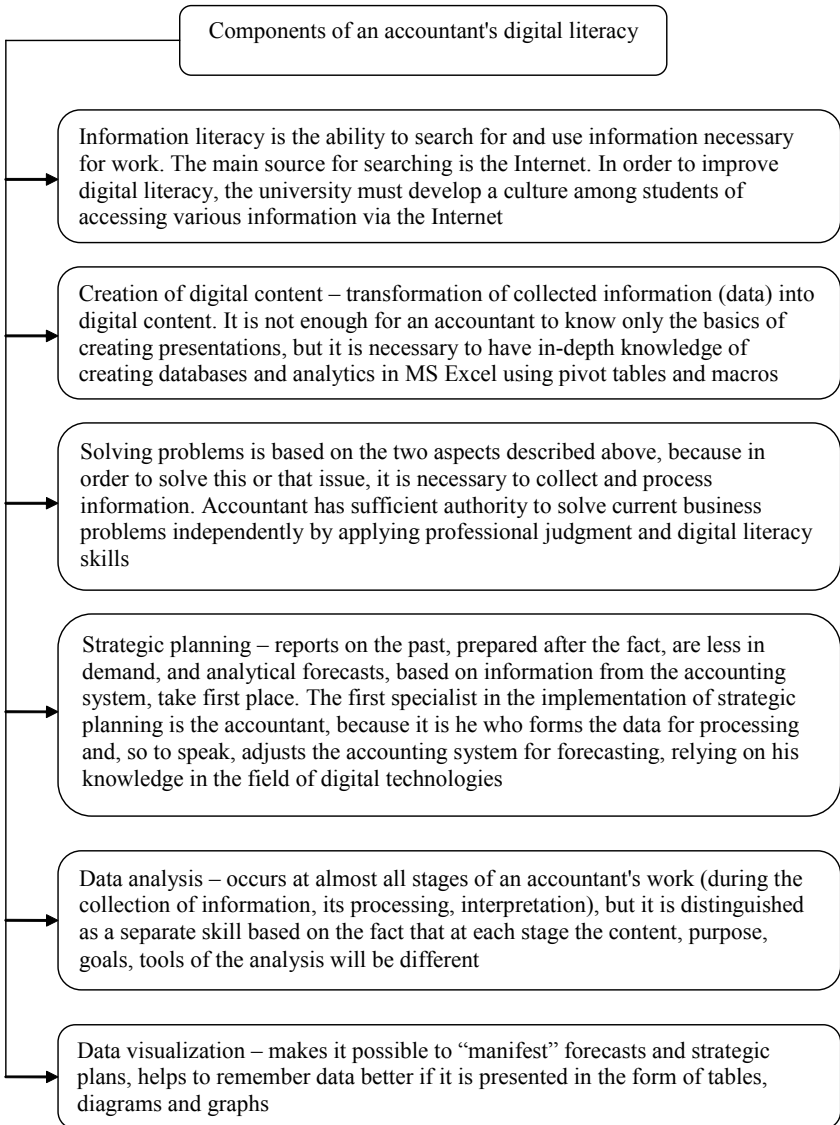


Fig. 4.4. Components of an accountant's digital literacy

monitoring of changes in the regulatory framework of accounting and ensuring their operational integration into educational courses.

Information becomes the main source of competitiveness. But the use of digital thinking is not exclusively focused on new technologies. The specialist's ability to evaluate, synthesize analytical conclusions and strategic proposals gains greater value. Therefore, the combination of technological innovations and accounting competences can be effective. At the institutional level, a set of measures should be implemented to ensure the readiness of all subjects and elements of the accounting system for digital transformations: from control bodies to accountants of enterprises. This should happen simultaneously with changes in the educational field, but also be complemented by the expansion of electronic information support of the accounting system. It is advisable to focus institutional transformations on the formalization of the powers of accounting subjects, taking into account the specifics of digitalization processes. The need to consolidate management processes and IT services is added to the usual accounting and reporting functions. As a result, the quality of information provision of individual divisions and users united by a single digital platform will increase.

The digitalization of the national economy is largely based on the development of science, in particular, it is the innovative results of research that make it possible to modernize activities and bring enterprises to a qualitatively higher level of functioning. In turn, for the national accounting system, this creates additional challenges related to accounting and analytical support for the commercialization of intellectual property objects. Such support will create the necessary prerequisites for the prompt collection and transfer of information about commercialization processes to the management of the enterprise, their entry into the accounting system and further analysis from the standpoint of the effectiveness of the implementation of intellectual property objects.

The prerequisite for the digitalization of accounting activities is the needs of both the enterprises themselves and users, as well as the availability of appropriate financial resources and technical means for their formation. At the same time, it is also important to cooperate with the companies-customers of the software with its suppliers, who provide valuable recommendations regarding the parameters for choosing a computer accounting program that will be most suitable for accounting and taxation

at a specific enterprise, based on the conditions, features and industry his activities, etc. The implementation of digital accounting technologies is carried out under the influence of relevant regulatory acts regulating accounting in the digital economy (Table 4.5).

Table 4.5

Normative acts regulating accounting in the digital economy of Ukraine

Regulatory act	The essence of regulation
Law of Ukraine on Electronic Commerce	determines the organizational and legal principles of activity in the field of electronic commerce in Ukraine, establishes the procedure for the execution of electronic transactions using information and communication systems, and determines the rights and obligations of participants in relations in the field of electronic commerce
Law of Ukraine on Electronic Documents and Electronic Document Management	establishes the basic organizational and legal principles of electronic document circulation and the use of electronic documents
Law of Ukraine on Electronic Digital Signature	determines the legal status of an electronic digital signature and regulates relations arising from the use of an electronic digital signature
Law of Ukraine on Electronic Trust Services	determines the legal and organizational principles for the provision of electronic trust services, including cross-border ones, the rights and obligations of subjects of legal relations in the field of electronic trust services, the procedure for state supervision (control) of compliance with the requirements of legislation in the field of electronic trust services services, as well as legal and organizational principles of electronic identification

One of the key directions of development in the era of digitalization is the improvement of information technologies in the accounting information processing system. The introduction of electronic services and modern information and communication technologies into the Ukrainian accounting system is slowed down by the problems of information protection, the complexity of information verification, insufficient development of the information infrastructure (including the parameters of citizens' access to the Internet, the number of users of electronic services), and the low level

of media literacy of the population. It is also worth emphasizing the low indicators of the development of e-business in the country and the limited investment in the processes of digitalization of accounting.

The main areas of development of the national accounting system in the context of digitization of socio-economic processes are:

- modernization of the terminological apparatus; modernization of the educational process in training future accountants;

- harmonization with European norms of domestic legislation on the development of the information society and in the field of accounting regulation;

- ensuring the flexibility of the accounting system in responding to challenges and threats; updating the material and technical base of enterprises;

- introduction of information and communication technologies and software;

- formalization of the powers of accounting subjects;

- integration of accounting modification aspects into the company's development strategy;

- improvement of information technologies in auditing in the accounting system; organization of accounting and analytical support for the commercialization of intellectual property objects;

- involvement of stakeholders in modernization processes;

- improvement of methodical approaches to the accounting of capital expenditures in intellectual property objects, etc.

Digitalization of accounting is accompanied by the emergence of new threats and risks for enterprises and their partners, clients, related to the potential possibility of violation of intellectual property rights, cyber security, information protection, ensuring its relevance and accuracy.

The use of special software products developed for accountants, analysts and specialists in the field of taxation has not been uncommon for a long time, and it was their use that formed the term digital accounting. From that moment, such concepts as “paperless office” began to appear – a company that conducts all document circulation exclusively in electronic form or with minimal use of paper media, which allows not only to get rid of paperwork, but also, in principle, to speed up the process of creation, coordination and document processing. To speed up digitization and create

convenient services for citizens, Ukraine is starting to go paperless. Documentless collection of primary data with the help of peripheral devices and their transfer via remote communication means to computers is the main way of documenting business operations.

The implementation of digitization in accounting is carried out at the level of all components, in particular:

- digitization of accounting data – digitization (transfer into electronic format) of accounting documents and accounting information;
- digitalization of accounting tools – implementation of digital technologies for processing accounting data;
- digitization of accounting processes – transfer of communication processes to the digital plane and introduction of appropriate communication technologies;
- digitalization of accounting – creation of a complete system of accounting space based on digital technologies of interaction with the management system.

It should be noted that communication links in the accounting system of any business entity are implemented in a dynamic information environment. Intensification of the capacities of the accounting system in order to establish communication processes and solve the outlined problems, in our opinion, becomes possible through the use of IT tools and digital technologies, which will translate accounting works into a digital format, modernize the existing tools for processing and transmitting information. At the same time, the most effective elimination of communication gaps and minimization of losses of accounting information should be based on the existing developments of modern digital technologies together with the achievements of fundamental and applied science. It is not just about the automation of the existing mechanisms for building an accounting system, but about the use of technological innovations, digital thinking together with the professional abilities of accounting specialists for evaluation, synthesis of analytical conclusions and strategic planning.

Digitalization has penetrated so deeply into all spheres of everyday life and business that the average consumer cannot imagine his existence without digital technologies. Related to this is the desire of company managers at all levels to have operational information quickly, clearly and regardless of location. This requirement is especially relevant for accounting

information, on which almost all management decisions are based. The relevance of the digital transformation of the communication component of accounting will increase due to the fact that innovations in the field of digital technologies make it possible to improve systems for processing and transmitting information, and ensure high efficiency of accounting processes. The implementation of digitization in the accounting of Ukrainian enterprises is carried out thanks to:

- introduction of electronic document flow;
- submission of reports in electronic form;
- communications in chats, blogs;
- use of Microsoft Excel tables;
- making payments via the Internet;
- digital data exchange with counterparties;
- use of scanned documents.

It is especially important to use IT innovations to improve document flow. Thanks to the IT modernization of accounting procedures, the following tasks are solved:

- collection, grouping and ordering of information flows (real-time accounting of economic transactions);
- quick access and issuance of information (exchange of electronic data – from primary to reporting);
- reduction of the interval between receiving information and entering it into the database;
- reducing the risks of errors in accounting and in decision-making processes, which allows the enterprise to avoid distorting information in accounting;
- integration of all levels of accounting to create a single information base (extended language of financial, management, tax reporting of various areas of business);
- automatic generation of reports (“cloud computing” technologies, cloud-based accounting operations);
- ensuring effective operational control (artificial intelligence, modernization of mathematical modeling with modern innovations).

Among the advantages of digitalization of primary accounting, the following should be highlighted: instant electronic processing of large data sets; automatic filling of details in primary documentation; formation of

reporting registers (settlement and payment information, turnover and balance information, cash book); getting rid of a significant amount of paper media; avoidance of errors by the accountant related to filling in data in the documentation; instant exchange of information between the manager and subordinates at the enterprise; presentation of analytical data in a form convenient for perception (tables, schemes, diagrams).

The differences in documentation technology in computerized accounting systems are as follows:

a) the accumulation and primary processing of accounting data is based on the use of computers directly at the workplaces of accounting employees (in shops, warehouses, in the accounting department). At the same time, the flow of paper documents is reduced and the transition to paperless accounting technology is carried out;

b) processing of documentation data is carried out according to the principle of combining the processes of compiling the primary document and entering it into the computer database;

c) the possibility of automatic registration of primary information with the help of such means as technological sensors, barcode scanners (for accounting of goods and production stocks), cash registers (for accounting of revenue from sales in retail trade), smart cards (for accounting of labor and wages boards), scales, clocks, counters, measuring containers, etc. This technology of primary accounting allows you to obtain all the necessary reporting data directly on the basis of primary documents without any prior registration of accounting data and their manual accumulation.

On the basis of incoming primary data, recorded once on electronic data carriers, integrated processing of accounting data is carried out with such a level of detail and efficiency, which is necessary to provide information to the managers of the enterprise. At the same time, a single information database is used, which, based on the principle of double recording, accumulates all the information necessary for the accounting system. At the same time, the accounting system is considered as a single system and there is no division of accounting by types into operational or accounting, managerial, financial or tax. It enables centralized document storage, easy access, and allows team members to collaborate on file changes, review, and sharing in real-time.

Data processing with the help of digital technologies is faster and allows you to avoid errors that often occur when processing documents manually.

Also, the use of digital technologies allows you to quickly find the information you need at the moment. This is especially relevant in the modern era of digitalization, because the success of the enterprise in general depends to a large extent on the speed of making balanced decisions.

Digital services are used to obtain high-quality information about the processes taking place in the company's activities in a timely manner, as well as to minimize the human factor during decision-making in the accounting environment. This allows accounting specialists to not perform the duties of a network switch to transmit information to end users. The beneficial effect of the introduction of social, mobile, cloud technologies, data analysis technologies, and the Internet of Things as a whole consists in the emergence of positive transformational changes in the exchange of information between participants in the communication process, increasing its value for management processes.

The digital accounting system provides remote access to the institution's financial data. Cloud services, software packages for digital accounting allow you to log into the system from anywhere and at any time to track results and data. Flexibility with other business tools, applications will ensure free exchange of data, and will be able to update each other in real time, daily or on demand through automatic data synchronization. The simplicity of future business processes will depend on such successful integrations.

The accounting information system contributes to the creation of organizational models aimed at meeting the needs of senior strategic management, middle managers and operational personnel. At the same time, it should not be equated with a computer system, which is its material component, that is, a set of hardware and software tools necessary for collecting, processing and displaying information.

Modern computer programs greatly facilitate the process of accounting, given the range of software offered: from calculators to automated registers and reporting forms. Accounting procedures in the conditions of the use of digital technologies are applied with appropriate features (Fig. 4.5).

The use of computers brings significant changes to the organization of documentation, which consist, firstly, in the use of electronic media of primary information, and, accordingly, electronic primary documents and, secondly, in the automatic compilation of primary documents. In the process of digitalization, it is important to combine the functions of accounting and

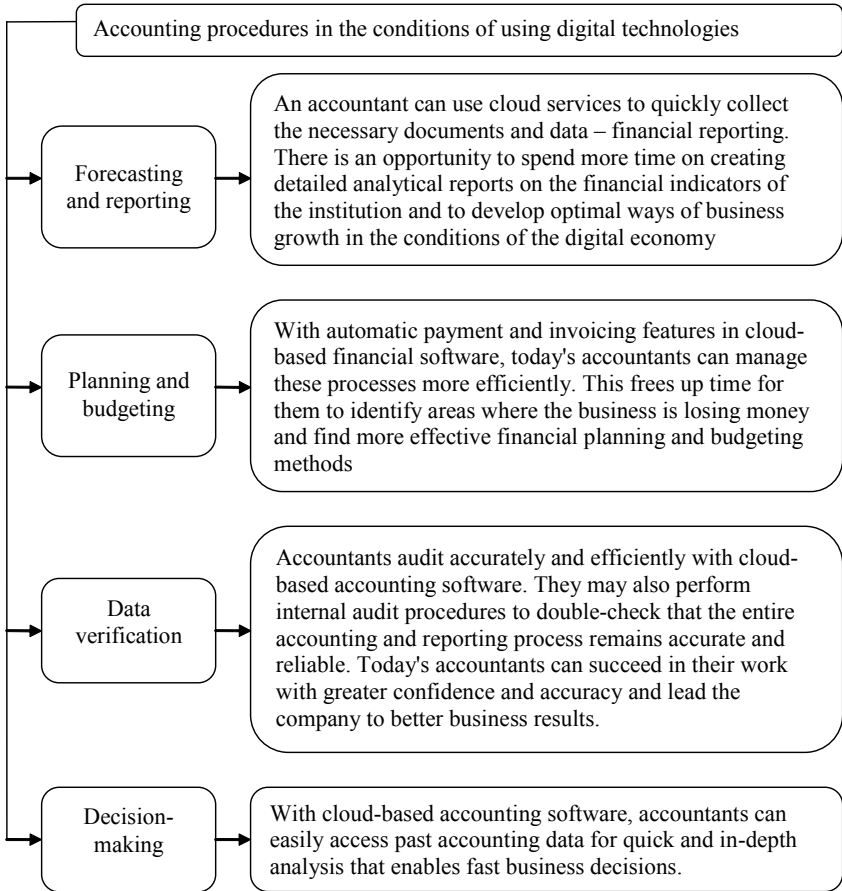


Fig. 4.5. Accounting procedures in the conditions of using digital technologies

electronic document management for business operations of the enterprise in one system, or their integration. According to the Law of Ukraine “On Electronic Trust Services”, a qualified electronic signature is an advanced electronic signature that is created using a qualified electronic signature tool and is based on a qualified public key certificate. It enables full-fledged legally significant document flow with the state (reporting, tax administration) and counterparties (exchange of invoices, acts, etc. primary

documents). A qualified electronic signature has the same legal force as a handwritten signature and is presumed to correspond to a handwritten signature.

The process of forming and submitting reports in most business entities is automated, direct accounting is quite often conducted using Microsoft Excel and Word software products. This significantly reduces the quality of the accounting process, since the use of any of these programs is not able to ensure accounting as a complete, integrated system. Thus, based on the use of Microsoft Excel and Word applications, it is possible to ensure only the performance of certain functions, in particular: the formation of analytical indicators, documents, display of economic transactions, planning of income and expenses, as separate accounting operations, and not as a complete accounting system.

The application of technological IT innovations in accounting methodology changes the form of its organization, increases the level of professional competencies and responsibility of personnel, brings the information support system to a qualitatively new level of transparency, security, efficiency, and relevance. Analytical and technological IT tools will provide opportunities to accelerate the implementation of accounting procedures, speed up the documentation and processing of individual operations, and ensure operational internal control.

In the conditions of the digital economy, it has become possible to prepare accounting (financial) reporting online, which is generated and published on the official website of the economic entity at any time after the registration of each business transaction by the method of double entry directly in the reporting articles. At the same time, financial reporting articles simultaneously play the role of synthetic accounting accounts. Analytical information about accounting objects is entered into the system separately on special cards that are created for each object when registering economic transactions related to the respective objects. When a financial statement is carried out in an article, an analytical card automatically appears on the screen, which should be filled in for each accounting object involved in the transaction. The digital system uses information that is formed in the framework of accounting, which in its essence is a special information system, which is used to recognize and value such key groups of indicators as assets, liabilities, capital, income and expenses.

The accounting automation process should be comprehensive and aimed at improving accounting and processing technologies. accounting information. In addition, the effective application of modern accounting automation technologies will enable the rational use of available resources. In the conditions of the application of computer technologies and software products in the process of accounting automation, the accounting system and accounting procedures are transformed, which leads to an increase in the quality and level of efficiency of the management process. Application of accounting automation programs will provide an opportunity to significantly improve the quality of accounting information processing. In addition, the use of computer technology changes the content and organization of the work of accounting personnel, in particular, the number of manual operations for processing primary documents and systematization of accounting indicators decreases. Accounting work becomes more creative, aimed at organizing and improving accounting procedures.

For the effective implementation of digital accounting technologies in various areas of business, management personnel should apply a set of measures, in particular:

- compliance with the technical and economic requirements for the installation of digital technologies;
- financial and resource compliance with innovations;
- increasing the professional competence of the executors of accounting operations;
- compliance with the company’s development strategy;
- providing feedback from users of digital information.

The application of digital technologies is a priority area of accounting development, it leads to transformations in the “information processing algorithm from the moment of receipt of the primary document to the preparation of reports” (accounting forms), significantly improves the quality of accounting information processing, ensures the optimization of enterprise costs, expands stakeholders’ access to financial information, provides a higher speed of work with accounting information in real time, ensures an increase in the level of trust on the part of clients, leads to an increase in the amount of saving accounting data.

Digital accounting also allows you to receive consultations in real time. More and more accounting professionals are abandoning the advice of tax

specialists and using opportunities to provide advice to entrepreneurs by consulting companies in real time. Thanks to the digital accounting system, the data remains relevant. Using the available data, a financial expert can analyze the numbers and in real time suggest the easiest and fastest way to improve them.

Profound consequences of digitalization of accounting are possible under the condition of synergy of new concepts of information processing and transmission:

- real-time accounting of economic transactions;
- exchange of electronic data – from primary to reporting; – expanded language of financial, management, tax reporting of various business areas;
- “cloud technologies” computing, accounting operations based on clouds;
- artificial intelligence – modernization of mathematical modeling with modern technological innovations (assessing stocks in warehouses using software-controlled drones);
- BigData – use in calculations to increase efficiency, accuracy and speed;
- blockchain – systematization and effective control;
- soft digital infrastructures (infrastructure of identification and trust, infrastructure of open data, infrastructure of interoperability, infrastructure of electronic payments and transactions, infrastructure of e-commerce and online interactions of business entities).

A separate area of digitization of accounting is the use of modern cloud technologies. Cloud technologies (Cloud computing) represent a set of technologies that are interconnected, constitute a single complex of data processing and provide for the permanent storage of information on servers on the Internet with its caching on PCs or gadgets (client side). In general, it is a digital technology in which capacity and resources are provided as an Internet service. Cloud computing technologies are implemented in the process of implementing measures to increase the level of information security, its backup, control, expansion of access to it, and scaling. Such technologies provide access to information in real time, guarantee the integrity and safety of data thanks to encryption procedures and multi-factor authentication. The specifics of cloud computing allow you to significantly save time, capital and operating costs for IT infrastructure. The use of these technologies has the following advantages (Fig. 4.6).

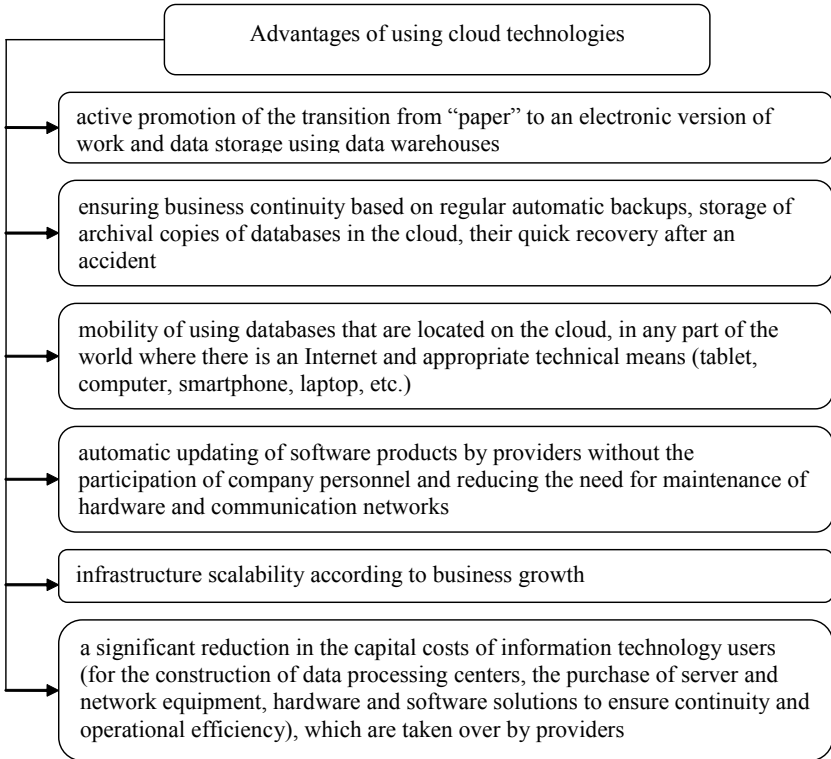


Fig. 4.6. Advantages of using cloud technologies in accounting activities

The process of registering business operations has reached a new level. Given the possibilities of cloud technologies, an accountant can work anywhere from any device (which provides access to the Internet) in a specialized program that uses feedback in the process of processing information and receiving incoming documents. All information is entered once and processed immediately.

The main disadvantage of using cloud technologies is the lack of absolute confidentiality, which is guaranteed only by service providers. The expediency of placing hardware capacities and software that make up the “cloud” is conditioned by the close connection of the business entity with the bodies of the State Fiscal Service, social insurance bodies, other

controlling bodies, etc. At the same time, the state, in the form of the state fiscal service, has the ability to monitor the calculation and payment of tax payments in real time.

Blockchain has the potential to improve accounting and the accounting profession. The main advantages of blockchain technology include:

- ensuring transparency and absolute certainty regarding the ownership and history of assets and the existence of liabilities;
- ensuring the integrity of accounting data as a result of the integration of this technology with typical accounting procedures;
- increase in efficiency due to the automatic execution of the task of control of operations during the implementation of this technology, rejection of systematic duplication of labor-intensive manual operations, their periodic control;
- reduction of errors due to the minimization of human participation in the implementation of accounting tasks;
- reduction of fraud due to the fact that blockchain technology makes it impossible to manipulate credentials.

The use of technology for working with big data can provide tangible competitive advantages to companies. The accounting information system as a whole does not meet the criteria of Big Data. However, the following principles of working with them are relevant for her, such as: horizontal scalability (differentiation and detailing of data on accounting objects leads to an increase in the number of computing nodes on which this data is distributed, while processing should take place without performance degradation); fault tolerance (the number of computing nodes in the information system of an individual enterprise is incomparably limited in comparison with clusters in Big Data, and the probability of failure of computing equipment exists, which requires the use of preventive measures); data locality (as in Big Data, credentials are distributed among numerous computing nodes, physically located on one server, and processed on another). Therefore, it is necessary to consider the approaches and technologies of working with Big Data for their application in the field of accounting and, in particular, management accounting.

Artificial intelligence is an intelligent computer system endowed with speech recognition, learning and problem solving capabilities. Artificial intelligence and machine learning technologies can be successfully applied

to automate regularly repetitive and structured tasks. Priority areas: management of receivables and payables, coding of accounts, expense management, cash flow management. The use of these digital technologies will make it possible not only to automate, but also to increase the efficiency of the processes of forming reports, inventory, audit, payment of value added tax. Artificial intelligence is a technology that is quite applicable for solving non-standard and unstructured tasks. For example, such non-standard tasks as building predictive models (in particular, when forecasting income and cash flows), procurement management, improving access to unstructured data, as well as detecting fraudulent schemes.

The advantages of this technology include:

- ensuring round-the-clock operation of the system and operational development of current business processes;
- ensuring the correctness of data entry and assessment of activity results;
- ensuring compatibility (that is, the ability of the robot to cooperate) with any applications used by the company;
- automation of the most time-consuming, standardized, rule-based actions (tasks) that are easily structured;
- freeing accountants from routine tasks and freeing up time for intellectual work;
- release of the enterprise from the need to purchase, maintain and update information technologies (appropriate software and technical means);
- availability for all companies.

Prospects for the development and implementation of cloud technologies, artificial intelligence technologies, blockchain, and Big Data in accounting meet today's requirements, which are dictated by the development of information technologies. A clear understanding of cloud technologies, blockchain, automation software and other related technologies will contribute to increasing the professional value of accountants in today's world and their successful careers. The use of the latest technologies requires the reorganization of accounting at the enterprise, leads to the automation of certain spheres of professional activity of accountants and auditors and sets the task of acquiring new skills and abilities, constant improvement.

Modern challenges of the globalized economy encourage the further spread of information technologies aimed at increasing the productivity of

the accounting service and, accordingly, the reliability of accounting and analytical data. The emergence and development of various digital services and digital technologies leads to a reduction in time spent on the process of collecting and processing information and an increase in the amount of their storage. The introduction of digital tools leads to a change in the technique of collecting and processing accounting information. Although all elements of the accounting method are preserved when using accounting software, they are transformed in form and substance. Let's analyze the most common digital tools of accounting activity in Ukraine (Fig. 4.7).

Specialized accounting computer programs differ in degrees of freedom. Thus, in some programs, it is allowed to choose components of information technologies, such as database management systems, network architecture, design tools, in others, technical and software solutions are closed, not subject to modification. The trends in the development of information technologies in general indicate that computer programs for accounting and taxation, oriented to multi-platformity, which allow the replacement of components of basic and general software, are viable. The market of digital accounting and taxation technologies is associated with the following specialized computerized accounting programs: IT-Enterprise, Parus-Enterprise, Accent-accounting, Best Report Plus, M.E. Doc, BAS Accounting.

BAS Accounting is a program that fully automates accounting and tax accounting, preparation and registration of tax documents, as well as preparation and submission of mandatory regulated reporting. It is a recognized standard among solutions for automating work at enterprises and organizations engaged in various types of activities and on various taxation systems. With the help of this program, you can create regulated reporting, primary documents. In addition, the BAS functionality provides for data access management for different users and a convenient search for data by word.

IT-Enterprise is a modern enterprise management system, a powerful tool for reengineering and optimization of business processes. This is the only domestic system focused on complex automation of enterprises or groups of enterprises. The IT-Enterprise system covers all aspects of the enterprise's production, financial and economic activities and consists of many modules, each of which automates certain tasks.

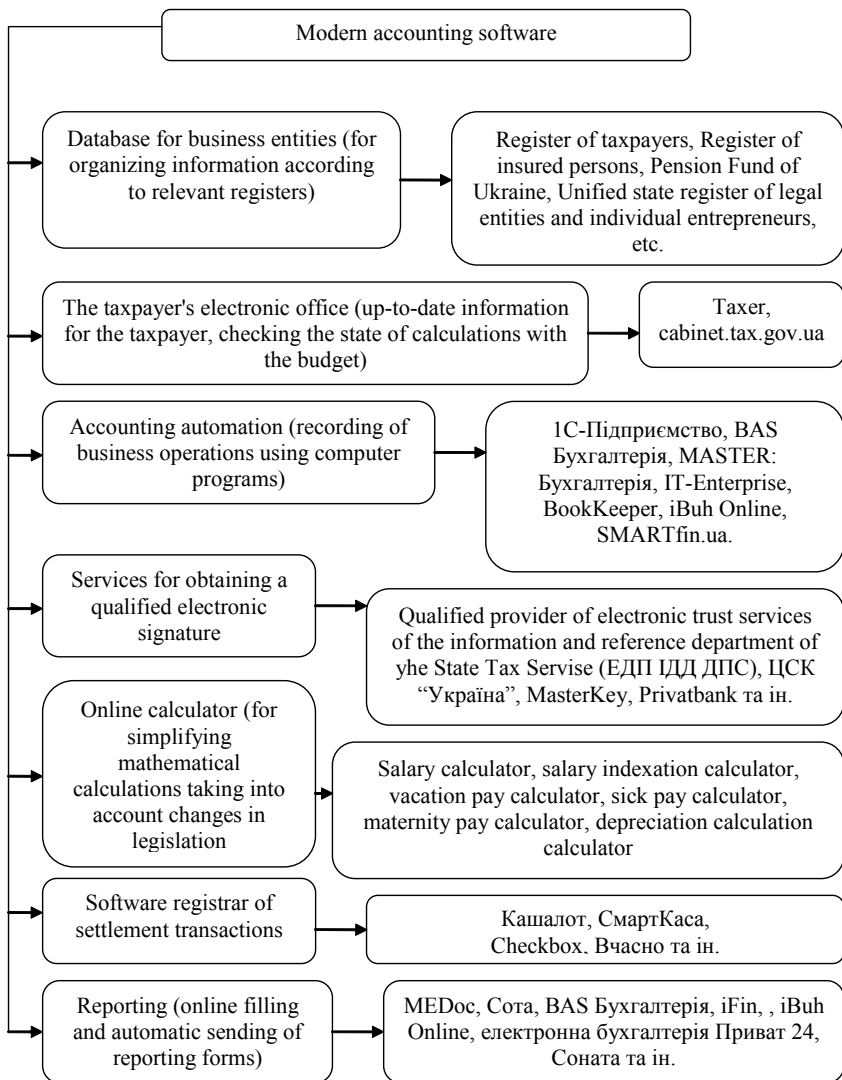


Fig. 4.7. The most common areas of digitization and digital tools of accounting activities in Ukraine

Parus is a series of software products of the private enterprise “Parus”, designed for the automation of business tasks of small and medium-sized enterprises, large corporations and holdings, as well as budget institutions and organizations.

Automated information system Accent is similar to 1C: Enterprise in that it is also a base for performing “configurations” in the built-in programming language. The Accent program is a class of programs that can act simultaneously in two roles: as an accounting program, and as a designer, with the help of which you can create a system for accounting of any kind. Accent construction tools include: forms of primary documents, dialogs and an electronic spreadsheet. Accent levels are the same as in 1C: Enterprise, but if in 1C: Enterprise level B implements the basic part of business logic, then in Accent the logic is transferred to “configurations” or “settings”.

Best ZVIT Plus is modern technologies for working with electronic documents, preparing and submitting reports in electronic form using an electronic digital signature. This software complex is designed to automate the processes of working with reporting documentation of the established model. It ensures the organization of electronic document flow among all business entities without exception of any form of ownership and sources of financing or between them and state control bodies, the reporting of which is provided for by current legislation. This is the ability to integrate data from any accounting program (1C, etc.) Reporting by e-mail using the encryption and forwarding subsystem.

M.E.Doc is Ukrainian software for submitting reports to regulatory bodies and exchanging legally significant primary documents between counterparties in electronic form. This is a mobile compact complex; an effective electronic document management system, not only for working with electronic reports, but also documents of various purposes and types – tax invoices, reports, contracts and much more. Provides instant and legal exchange of any electronic documents with counterparties

Sonata is a multifunctional, modern program for creating and submitting electronic reporting that supports the standards of the Fiscal Service, the Pension Fund, and the State Statistics Service. It is a tool for creating, signing and sending reports and Tax invoices, as well as viewing received receipts.

The taxpayer’s electronic office is a service that allows you to send electronic documents, tax statements, get certificates of no debt, necessary

information from publicly available registers, and send requests or applications to obtain the necessary data to the DPS authorities.

“Privat24 for Business” is a mobile application for legal entities and entrepreneurs. 24/7 access to bills and payments in real time. All financial transactions in your smartphone. To enter the application, it is enough to be a client of PrivatBank.

The software registrar of settlement operations is a digital analog of cash registers, i.e. classic cash registers. Instead of purchasing expensive equipment and spending on its maintenance, an entrepreneur can buy a much cheaper license for PRRO. You can even use a free software registrar from the tax office. PRRO is installed on a computer, smartphone, tablet or any other device with a suitable operating system. After that, the entrepreneur can create and fiscal checks using the program. PRRO allows you to create electronic checks, which are equivalent to regular ones. They can be sent to the messenger or to the client’s e-mail.

Online calculators are quite limited for the use of IT tools – a universal tool for simple accounting operations.

As you can see, the list of digital accounting tools used in Ukraine is quite significant. Modern digital technologies greatly facilitate the process of accounting, given the range of software offered: from calculators to automated registers and reporting forms. When leaders and managers of an enterprise are faced with the problem of choosing, implementing and using computer programs for accounting and taxation, they cannot always unambiguously and clearly assess the economic effect of this. They need certain information that would enable them to evaluate the effectiveness of investments in the computerization of accounting. The quantitative approach to assessing the economic efficiency of the implementation of digital accounting and taxation technologies involves the calculation of a number of indicators that make it possible to objectively assess the financial benefits from the implementation and use of this or that computer accounting program. When comparing computer programs for accounting and taxation, it should be borne in mind that you cannot compare programs that belong to different classes; the list of requirements for programs should be changed (added to or shortened) depending on which parameters are most important for the accounting needs of the enterprise; the technical parameters of the programs can be compared only if the same software and hardware platforms are used.

It is worth noting that modern information technologies are widely used in the taxation system. As of today, electronic approaches and services for working with taxpayers are already implemented in the activities of the fiscal service. Electronic services make it possible to simplify and make the process of paying taxes for individuals more comfortable. Such services provide users with online access to data, support the functioning of analytical services, make it possible to conduct convenient communication and, what is especially important, to form and submit reports. Automation in the tax system creates opportunities for taxpayers to carry out transactions at any time of the day, rather than being limited to the working and reception hours of fiscal service employees, to adjust their own schedule to their work regime.

Along with this, the use of modern information technologies in the accounting system does not solve the problems of data verification, ensuring their completeness, accuracy and relevance. Separately, it is worth emphasizing the aggravation of the problem of guaranteeing the safety of information from third parties. Currently, a number of tools and techniques have been developed to solve these problems, but none of them gives the desired result or is not reliable enough in the long term. Accordingly, when working with modern technologies, it is necessary to monitor their changes on a permanent basis and track technological innovations in the accounting system. This will provide the enterprise not only with the ability to be competitive on the market and keep up with the times, but will also allow to minimize the risks of hacker attacks, loss of information, part of the income or reputation.

The activity of an accountant is not reduced to technical procedures for recording business transactions and further processing of information, but is a conscious control, analytical, consulting activity, the result of which is the optimization of the process of making managerial decisions by the management of the business entity. Automation of business processes can remove the laboriousness of data search and processing, in particular, in the conditions of regulatory changes, reduce the time of management decision-making, and increase the reliability of their information support. Accounting is more digitized than other business processes, thanks to the automation of payments and reporting.

The introduction of a single electronic data exchange format for accounting (financial) reporting is a strategic tool for the harmonization of accounting, which will enable:

– to eliminate the duplication of reporting data, which will contribute to the reduction of costs for the preparation of reporting; – increasing the openness and transparency of information by providing access to the knowledge base of the international community of users;

– increasing the reliability and comparability of accounting (financial) reporting indicators by means of standardization and automation of data collection and processing processes;

– implementation of fast, high-quality, meaningful analysis of financial information. Thus, with the help of electronic document management, accountants submit reports to state fiscal bodies, the State Pension Fund, the Social Insurance Fund, and the State Statistics Service.

The active implementation of electronic document flow accounting involves the digital format of all documents. They can be stored in the cloud, accessing the data through web applications. Also, an important aspect of the digitalization of accounting is ensuring the transparency of the accounting process of all economic transactions. Transparency will allow the state to effectively implement the fiscal function – if all enterprises submit reliable reports, then taxes will be calculated and collected from a reliable taxable base, and there will be no opportunity for abuse and avoidance of non-payment.

The management model of digitalization of accounting is complemented by the analysis of the situation – conducting an independent study on the availability of digital skills among employees of the accounting-analytical and control-management sector, determining the criteria for the influence of factors on the development of digital skills, the main obstacles to the use of digital technologies and specific tools. The main challenges and the “tree” of problems, the response and solution of which are expected within the framework of the direction, are outlined. The transition to analytical forms of reporting with the use of digitization is important today for the justification of management decision-making at different levels of management – for the justified choice of investment investment strategy, forecasting of financial results, and identification of reserves. At the same time, external stakeholders can quickly find their way when making decisions related to interaction with the analyzed business entity.

However, taking into account the negative state of the national economy, political, social and legislative transformations, on the way to the active

and widespread use of modern automated information systems, which will ensure the automation of accounting at most domestic enterprises, especially small and medium-sized businesses, there is a certain range of problematic issues, the main ones of which is:

1. Mindless informatization of accounting can lead to their automation, which will lead to a number of errors and omissions.

2. The risks associated with the use of automated information systems for processing input information can be significant (incorrect data processing; loss of part of information, etc.).

3. Development of accounting software is a rather time-consuming process that requires significant financial costs.

4. Unsatisfactory level of computer literacy of users and the need to incur additional costs for training accounting personnel.

5. Different industry specialization of domestic enterprises, which does not allow to create a universal, one-size-fits-all computer program.

6. Ensuring the appropriate level of security of the automated accounting and reporting information system of a particular enterprise.

7. The problem of managing information resources: adapting the procedure for keeping records and reporting to new opportunities, training employees in working with information systems, maintaining the quality of software tools, the cost-effectiveness of using information systems and computer programs, etc.

Today, the accounting methodology has been enriched with the latest information, software and digital approaches, but this is not enough to make accounting relevant to the modern challenges of the development of the digital economy. IT-modernization of accounting in accordance with the requirements of the information economy should consist of a programmatic, informational, organizational and methodical component. These components become the main information systems integrated around the web system and among themselves. A reliable and scalable information and analytical system provides support and automation of management processes of all components of the organization's activities. The sequence of creating a reliable and scalable digital accounting system is shown in fig. 4.8.

The preparatory stage allows you to establish a general goal and local tasks, to assess the scope and limitations of implementation – technological ones in the first place. Implementation requires adjustment of the structure,

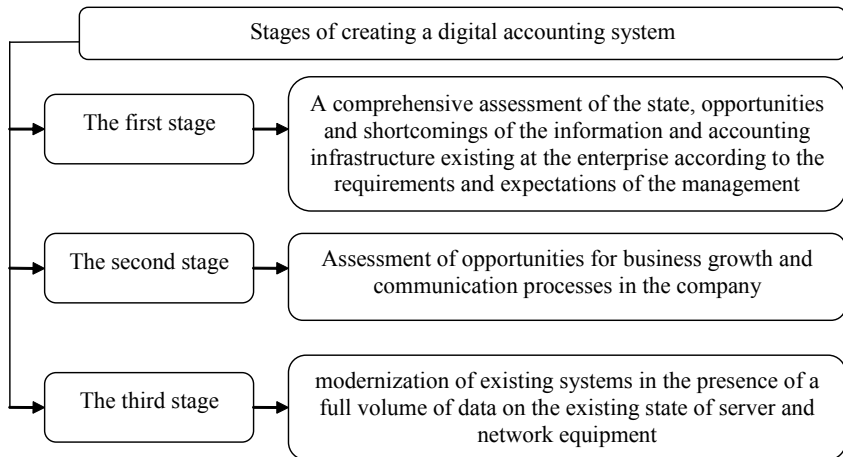


Fig. 4.8. The sequence of creating a reliable and scalable digital accounting system

information flows between divisions, internal standards and accounting regulations. The implementation stage involves obtaining a synergistic effect from the improvement of the organizational structure and document flow, the rationalization of interactions in the accounting system with the detailing of accounting protocols and standards. At the same time, transparency and manageability are increased, prompt correction of deviations and individual elements during the implementation of the IT modernization project is ensured. The stage of use is characterized by a combination of professional aspects of accounting and IT infrastructure, outlines prospects for solving problems of fraud, distortion of information about economic reality, satisfaction of the interests of individual users in quality information about internal and external processes of the management entity.

The implementation and use of digital technologies should be based on the following principles:

- economic feasibility;
- flexibility;
- CONTROL;
- protection and security;
- compatibility;

- versatility;
- continuity of development.

The implementation of these principles will make the transition (full or partial) to the use of digital technologies efficient, rational and financially accessible. It should be noted that it is advisable to constantly improve the process of digitalization of accounting, in particular:

- constant improvement of qualifications of accounting specialists who use digital technologies;
- search and application of newer, modern computer accounting programs (their packages, configurations and modules);
- analysis of the use of digital accounting technologies by competing enterprises and industry leaders;
- further cooperation with suppliers of digital accounting technologies.

The rational organization of the accountant's "digital" workplace requires proper organization, use and management, as it must correspond to the content and nature of the work. It should not just be a zone equipped with the necessary material means and equipment, but information technology and communication support for the effective activity of accounting employees, creating more favorable working conditions for them. In the conditions of the digital economy, the workplace of an accountant involves the digitization of the organization and planning of the general management of the accounting process; digitization of the organization of accounting, control and analysis; informatization of management decision-making preparation. The accountant's digital workplace promotes flexibility in the methods of performing accountants' job duties, stimulates their interaction, supports decentralized and mobile work environments, and provides for the choice of technologies for work. The benefits of digital workplaces are reduced costs for hardware, office space, travel, etc.

Accounting employees should be provided with devices for the most effective way of obtaining information about business relationships. The organization of technological chains of information processing by technical means is becoming more and more widespread in individual accounting processes. Therefore, it is necessary to divide labor by function, to have two categories of accounting employees: accountants-operators, who enter data, and accountants-controllers, who implement logical accounting functions. The composition of accounting tasks remains unchanged for

different volumes of accounting work, but the list of performers differs significantly depending on the size of the enterprise and, accordingly, the volume of accounting work. Workplace tools greatly influence employee motivation and productivity. A significant advantage is the communication technologies that provide real-time presence and allow rich online meetings to be held.

Therefore, the elements of the accountant's cyber-physical space are access devices, communications infrastructure, business relations, and workplace telecommunication tools. Ordering and optimization of accounting based on digitization will allow not only to change individual accounting functions locally, but also to change the algorithms of actions, and to implement incentives for "digitalization".

IT modernization of accounting activities involves the implementation of a set of interrelated measures, which are coordinated in terms of time, the use of certain material and technical, informational, human, financial and other resources and are aimed at creating information systems, means of informatization and digitization of information resources that meet certain technical conditions and quality indicators. Compliance with the trends of the world market of electronic commerce and services during the IT modernization of accounting practices will be ensured by the use of an architectural approach in the description of processes within the organization and the coordination of joint processes, projects and sub-projects implemented on the basis of the aggregation of common accounting processes (from the compilation of primary documentation to the formation of reporting indicators) taking into account all components (directories, registers, mechanisms).

It should be noted about changes in the internal accounting structure. The main trends are both the convergence of already existing types of accounting, and attempts to highlight new types of accounting (strategic, adaptive, multi-purpose, creative, intellectual, etc.). Convergence of external and internal accounting allows to include in the corporate reporting information about the strategy of development and social responsibility, the creation of economic added value in terms of business segments and the factors of its creation, the effectiveness of the management system.

Financial analysts, specialists in the field of accounting are unanimous that accounting will soon go beyond the scope of one economic entity, will accumulate information about the external environment and will contribute

to the search for new opportunities for the development of business processes. Full automation of the accounting process will multiply the speed of obtaining all the necessary information, and data for making management decisions will be received online.

It should be noted that accounting requires the use of advanced information security systems at all stages. The creation of an integrated information control and accounting system taking into account technological IT risks will ensure the development of digital competences, will become the driving force of the digital economy, will ensure the transition to such a digitized structure of the economy, where the knowledge, talents, skills, abilities, experience, and intelligence of people will become the greatest value.

Thus, digitization of accounting and its integration into the company's information system is a requirement of the modern digital era. The actualization of the digital transformation of accounting will only grow in the future, because the use of IT innovations allows solving new tasks, modernizing the concepts of information processing and transmission, and contributes to the growth of the efficiency of accounting processes. The information system is aimed at increasing the efficiency of the company's activities, strengthening its competitiveness and turning accounting into an art that "ensures the success" of the company. A competitive accountant must be an experienced manager, analyst, strategist, free user of specialized software for accounting and enterprise management. The accelerated development of digital technologies determines the need for new knowledge of accounting and taxation specialists. The innovative approach consists in the introduction of disciplines that will form new professional competencies, the ability to work in a digital workplace. Digital literacy is not only the result of the educational process, but rather the response (adaptation) of the employee to the challenges of the rapidly changing external environment. In addition, the acquisition of digital literacy also acts as a competitive advantage in the struggle for a workplace (position). Therefore, an accountant needs to constantly improve and develop through lifelong learning, in particular in the field of digital technologies. Training in institutions of higher education should be aimed at the formation of such skills. Strengthening the perspective of digital technologies in accounting processes can bring the development of the profession to a new level.

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AUTHORS

Yurii TSYBULKO, graduate student of the Department of Management and Public Administration Dnipro State Agrarian and Economic University, Dnipro

Svitlana NUZHNA, associate professor of Information Systems and Technologies Department, Dnipro State Agrarian and Economic University, Dnipro, Ukraine

Nataliia BONDARCHUK, Professor of the Department of Management and Public Administration, Dnipro State Agrarian and Economic University, Dnipro, Ukraine

Oksana BOVKUNOVA, Teacher of the Department of English for non-philology majors, Dnipro National University named after Oles Honchar, Dnipro, Ukraine

Alexander KARAMUSHKA, associate professor of Information Systems and Technologies Department, Dnipro State Agrarian and Economic University, Dnipro, Ukraine

Olga ODNOSHEVNA, associate professor of the department of accounting, taxation and management of financial and economic security, Dnipro State Agrarian and Economic University, Dnipro, Ukraine

Aliona MINKOVSKA, Associate Professor of the Department of Accounting, taxation and management of financial and economic security, Dnipro State Agrarian and Economic University, Dnipro, Ukraine

Inna SHRAMKO, senior lecturer of Information Systems and Technologies Department, Dnipro State Agrarian and Economic University, Dnipro, Ukraine

Stanislava SYDORENKO, PhD student of the Department of Management and Public Administration, Dnipro State Agrarian and Economic University, Dnipro, Ukraine

Taisiya KRUSHELNYTSKA, professor of the Department of Management and Public Administration, Dnipro State Agrarian and Economic University, Dnipro, Ukraine

Natalia DUBROVA, Associate Professor of the Department of Management and Law, Dnipro State Agrarian and Economic University, Dnipro, Ukraine

Olha HUBARYK, Associate Professor of the Department of Accounting, taxation and management of financial and economic security, Dnipro State Agrarian and Economic University, Dnipro, Ukraine

Olga CHERNETSKA, Associate Professor of the Department of Accounting, taxation and management of financial and economic security, Dnipro State Agrarian and Economic University, Dnipro, Ukraine

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У монографії представлено сучасні освітні технології, які можуть бути використані в навчальному процесі вищого навчального закладу. Монографія розрахована переважно на студентів різних спеціальностей, викладачів.

У монографії зібрано думки науковців та викладачів щодо можливого використання інформаційних технологій у навчальному процесі, розглянуто основні сервіси та інструменти для оцінювання письмових робіт, проведення усного опитування, організації онлайн-тестування.

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