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DIGITAL TOOLS FOR ACCOUNTING AND ANALYTICAL SUPPORT OF ENTERPRISES: INNOVATION AND MANAGEMENT ASPECT

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Introduction. The modern global economy requires the digitalization of all spheres of enterprise activity, including accounting and analytical processes. This creates new synergistic effects on all related production, management, and business processes and new opportunities and business directions. The analytical process begins to include new information resources, which gives an impetus to the systematic development of support for decision-making by the management of enterprises, increasing the level of relevance of management decisions, and providing opportunities for operational restructuring of market tactics and strategies.

Aim and tasks. The study aims to introduce digital tools for analytical accounting support for Ukrainian enterprises based on innovative management aspects and develop a mathematical model for using digital resources to optimize the architecture of enterprise information systems.

Results. A mathematical model of the use of digital resources was developed to optimize the architecture of the company's information systems. The process of introducing digital tools for accounting and analytical support of enterprises in Ukraine was also studied and compared with the practice of their implementation under the conditions of "Economy 4.0" in developed countries. The advantages of introducing digital tools for accounting and analytical support were determined and obstacles to this process are named. It is indicated that the main guarantee of the effectiveness of the use of digital tools in view of the innovation-management aspect of their implementation is adaptability to internal and external influences, technological innovations, changes in tasks, goals, and even the sphere of economic activity of the enterprise. It is noted that this largely depends on the architecture of the information systems. According to estimates, the annual "cumulative effect" growth rate from introducing IT technologies in accounting and analytical processes may exceed 19%.

Conclusions. The developed mathematical model makes it possible to propose a new approach to the transformation of the system of digital accounting tools and analytical support instead of the traditional eclectic approach, which ensures effective auxiliary functionality or implements new functionality of the entire information management system, the elements of which are digital accounting tools. Factors that prevent the implementation of digital tools, which will increase the competitiveness of Ukrainian enterprises, are indicated.

Keywords: digital tools, innovation, accounting and analytical support, mathematical model, diversification.

1. Introduction.

The conditions of "Economy 4.0" lead to a significant diffusion of modern technologies into established production processes (Khmel, 2021; Sokiran et al., 2023). Integrating digital technologies, accounting, and analytical activities creates a new level of enterprise efficiency, from a competitive and technological perspective. Digitization of accounting and analytical support of enterprises creates prerequisites for forming an integrated information system of the enterprise, which can combine all production and management processes.

This, as well as the ability to process huge volumes of structured and unstructured data, finding interesting patterns that can satisfy a wide range of information needs of enterprise management, leads to the emergence of the latest decision-making preparation systems, which determine a new level of enterprise management. This determines not only the efficiency of enterprises, but also the emergence of new types of business, in particular, thanks to the monetization of the data itself, intensification of existing business flows, and formation of new income streams due to optimal market policy.

At the same time, the digitalization of accounting and analytical support of enterprises leads to the need to change innovation management policies and significant organizational restructuring. In particular, there is a need to increase the power of employees due to increased responsibility in accounting and analytical activities, both given changes in the technologies of accounting for operational processes and in ensuring decision-making at various management levels (Ma & Hou, 2021; Gibradze et al., 2022).

The implementation of a complex system of digital tools for accounting and analytical support of enterprises cannot be carried out by simply copying similar systems implemented in other enterprises, as it requires an assessment of the effectiveness of the use of digital resources to optimize the architecture of the information system of a particular enterprise (Ingram et al., 2022). Therefore, such assessments require an appropriate methodology.

The process of integrating digital technologies, accounting and analytical activities, and Ukrainian realities is accompanied by obstacles with both international and national peculiarities. These obstacles must be identified and overcome because failure can result not only in not receiving potential benefits, but also in the final loss of the company's competitiveness, not only in the world market but also in local markets, leading to bankruptcy.

2. Literature review.

Recent research has been devoted to studying the problems of digitalization of accounting and analytical support for enterprises in the conditions of "Economy 4.0". Thus, Schiavi et al. (2020), researching the experience of Brazilian companies, analyzed the innovative opportunities gradually opened up by the digital transformation of the accounting and analytical activities of enterprises on the path "from technology development to transactions". Druzhynina et al. (2020) indicated the significant diffusion rate of digital tools in accounting and analytical support and the resulting need for organizational changes in Ukrainian enterprises. In a literature review, Kroon et al. (2021) confirmed the global character of the diffusion of digital tools. Khorunzhak and Lukanovskaya (2019) studied the changes caused by the development of the digital economy in Ukraine and the features of innovation in implementing digital accounting tools.

Bonsón and Bednárová (2019) assessed the impact of cloud technologies on management efficiency. Spilnyk and Palukh (2019) stated that digital tools form a new paradigm of accounting, which constantly requires research into this process and the introduction of new algorithmic approaches. El-Dalabeeh et al. (2021) researched the mutual influence of expert systems on the effectiveness of controlling digital accounting tools. Ahmad (2019) studied the effectiveness of digital tools in detecting accounting errors using electronic control mechanisms. Meiryani et al. (2020) investigated the impact of digital tools on improving managerial decision-making and ensuring the proper efficiency of operational activities.

Kravet et al. (2018) and Dankevych et al. (2023) investigated the innovative and managerial aspects of increasing the effectiveness of accounting activity control using digital tools. Li (2021) studied the same aspects given the application of specific tools such as cloud technologies and neural networks. Calinescu (2019) researched innovative and creative approaches to increasing the efficiency of accounting and auditing activities and indicated their perspective on Ukrainian conditions. Skrynkovskyy et al. (2019) considered information tools as a means of "data systematization and information processing for the automation of accounting and other forms of analysis and proved the effectiveness of digitalization of accounting in Ukraine based on international standards".

This was confirmed by Toporkova and Kasianiuk (2022) in a study on the specific implementation of digital tools in railway transport in Ukraine. Hladun and Kret (2018) detailed the theoretical and methodological peculiarities of implementing digital audit as an element of strategic management.

The experience of using digital tools in the "big seven" countries for the formation of relevant reporting and the peculiarities of this process for Ukraine were studied by Storozhuk and Doionko (2019) and Silakova et al. (2022).

Petchenko et al. (2023) pointed out the imperfections in the set of digital tools used in Ukrainian enterprises' accounting and analytical support. In view of this, one should consider the study by Tsygankova et al. (2023), where the sequence of implementation of specific digital tools in the enterprise management process using the universal information space is proposed.

Al-Dmour and Al-Dmour (2020) developed a mathematical model of innovative management activities using multiple linear regression and a neural network. Unfortunately, the application of this mathematical model is limited by its characteristics. Increasingly, mathematical methods in technical sciences are used for innovative management improvements in accounting and analytical support.

A vivid example is the study by Stavroyiannis et al. (2019), where the multifractal modelling method was used to analyze the accounting activity of Bitcoin, and it was found that the Bitcoin market still needs to be more efficient. The review of literary sources indicated the need for a detailed study of the innovative management aspect of the implementation of digital tools for accounting and analytical support of Ukrainian enterprises in the conditions of "Economy 4.0"; development of a mathematical model of the use of digital resources to optimize the architecture of the enterprise's information systems; study of the process of implementing digital tools for accounting and analytical support of enterprises in Ukraine and comparing it with the practice of implementing digital technologies in developed countries.

3. Methodology.

Using the method of comparison and synthesis, the process of introducing digital tools for accounting and analytical support for Ukrainian enterprises was investigated and compared with the practice of implementing digital accounting technologies in developed countries. Using the method of theoretical analysis, the advantages of implementing digital tools of accounting and analytical support are determined, and the obstacles to this process for Ukrainian enterprises are indicated.

Because the effectiveness of the use of digital tools for accounting and analytical support of enterprises depends to a large extent on the architecture of information systems (AIS), there is a need for mathematical modeling and optimization of the enterprise's digital resources. To do this, the task of effectively distributing structured and unstructured information on cloud resources and transferring it to computers will be considered. Cloud resources are considered one of the most promising digital tools for accounting and analytical support. Information on cloud resources is considered as an information hypercube. The integral information transfer time $\varphi_1(r, y)$ and the integral qualitative load factor $\varphi_2(r, y)$ are chosen as the optimization functions of this process.

To do this, q areas of the hypercube are selected, the set of which is Q_i, where $i = 1, 2, \ldots q$, with which users exchange information. Also let H_k be a linear matrix of these types of information, where $k = 1, 2, \ldots p$. Let the number of units of information r_i^k of the form Q_k be transmitted from each of these areas to the areas of users C_j with the quality of transmission s_{ij}^k (which is the inverse of the information entropy index according to Shannon) with the rate of transmission of a unit of information ω_{ij}^k of the form Q^k:

$$\varphi_1(r, y) = \sum_{k=1}^{p} \quad \sum_{i=1}^{q} \quad r_i^k \sum_{j=1}^{n} \quad \frac{y_{ij}^k}{r_{ij}^k} \rightarrow$$
$$in\ case\ \{y_{ij}^k = 1\ if\ H_k(Q_k) \in C_j \quad y_{ij}^k =$$
$$0\ if\ H_k(Q_k) \notin C_j \qquad (1)$$

$$\varphi_2(r, y) = \sum_{k=1}^{p} \quad \sum_{i=1}^{q} \quad r_i^k \sum_{j=1}^{n} \quad s_{ij}^k\ y_{ij}^k \rightarrow$$
$$in\ case\ \{y_{ij}^k = 1\ if\ H_k(Q_k) \in C_j \quad y_{ij}^k =$$
$$0\ if\ H_k(Q_k) \notin C_j \qquad (2)$$

subject to restrictions on the amount of information flows

$$\sum_{k=1}^{p} \quad r_i^k y_{ij}^k \leq H_{ij} \qquad (3)$$

and limitations of data download volumes of appropriate types in the user area C_j:

$$\sum_{i=1}^{q} \quad y_{ij}^k \geq C_i^k \qquad (4)$$

Since the difficulties of effective construction of AIS often lie in its eclecticism due to the fact that new digital tools are combined with already functioning tools, enterprises must transform innovative technologies during their implementation in such a way as to provide effective auxiliary functionality or implement new functionality of the entire information management system, the elements of which are digital accounting tools. To solve the specified problems, the specified mathematical model was developed.

4. Aim and tasks.

This study aims to substantiate the implementation of digital tools for accounting and analytical support for Ukrainian enterprises using the innovative management aspect.

This determines the formulation and solution of the following tasks: develop a mathematical model of the use of digital resources to optimize the architecture of the enterprise's information systems; investigate the process of implementation of digital tools for accounting and analytical support of enterprises in Ukraine and compare it with the practice of their implementation under the conditions of Economy 4.0 in developed countries; determine the advantages of implementing digital tools for accounting and analytical support and indicate obstacles to this process.

5. Results.

The effectiveness of the organization of accounting and analytical activities under the conditions of the proper level of its integration with digital technologies directly forms the competitiveness and economic stability of not only individual enterprises but, in the conditions of "Economy 4.0", the regions where they are located and even countries. Digital tools for accounting and analytical support of enterprises can be considered according to their purpose:

– Support of databases, both on the state of the enterprise and on the state of the external economic environment, collection, organization, and structuring of information.

– Methods, tools, and models to ensure information processing, analysis, and reliability of data flows.

– Ensuring the efficient functioning of accounting infrastructure and analytical support for enterprises.

– Effective use of received information, particularly reporting.

The advantages of digital tools for accounting and analytical support of enterprises allow the optimization of accounting, analytical, and management activities, particularly in the following directions:

– Ensuring the relevance of accounting and analytical information, for both internal use and reporting.

– Significant reduction in the processing time of the accounting and analytical information arrays;

– Consolidation of various types of accounting and analytical activities and structuring of the enterprise's operational activities.

– Reducing the cost of resources for audit and providing the possibility of a permanent audit, since the objects of accounting and analytical and management activities require constant control;

– Providing an opportunity to free qualified personnel from routine activities, such as processing primary documentation and preparing reports.

– Reducing the cost of processing standard volumes of data.

– Detection of implicit convergence and inconsistencies in large arrays of accounting information.

– Identifying market trends and trends in the development of one's own enterprise, offering options for management decisions, and developing forecasts of their consequences for regional and analytical preparation of large amounts of information for decision-making support systems.

– Identification of internal and external threats and analysis of their impact factors, which allows timely proposal and implementation of management actions to neutralize threats.

– Ensuring the formation of relevant forecasts and activity planning.

– Permanent analysis of compliance with the financial and economic indicators of the company's activity with the planned results.

At the same time, a more significant advantage of the integration of digital tools and accounting and analytical support is the radical changes in accounting methods, especially accounting and analytical support for the registration of economic transactions. This is confirmed by a study by Deloitte Touche Tohmatsu Limited (2023): "Instead of forming and locally storing individual transaction records, entities can record them in a unified register, creating a distributed and interconnected system of reliable accounting information".

The distribution and cryptographic protection of accounting information makes it extremely difficult to attempt to criminally change or destroy it. With effective data protection, such a system of accounting information in the global information environment can contribute to the formation of a hypercube of accounting, financial, and non-financial data with an extraordinary level of relevance. The practical implementation of this approach has already been observed with the introduction of the technology of tokenized assets, cryptocurrencies (Blockchain 2.0), which is expanding into a global virtual industry.

From the point of view of digital technologies, the blockchain is implemented precisely as a distributed register (hypercube) of data. The specified hypercube accumulates information about any transaction implemented by the client in the peer-to-peer system. Since information about a transaction is accumulated as a sequence of hypercube blocks to criminally change them, it is necessary to change the data in the entire chain of blocks. Digital tools of this level require an appropriate level of digital infrastructure. At the same time, it should be noted that blockchain transactions and transactions in the everyday practice of Ukrainian enterprises are not identical concepts. Therefore, the digital tools that serve these transactions have certain differences.

Also, the integration of digital tools and accounting and analytical support with regard to the innovative and management aspects contributes to the transition of accounting and analytical activities to digital financial and management reporting. A peculiarity and prerequisite for the implementation of digital reporting is the use of structured digital information. For this purpose, the use of the eXtensible Business Reporting Markup Language (extensible business reporting markup language) standard is standardized in Ukraine. The XBRL standard, introduced by the order of the Ministry of Finance of Ukraine (2019) allows to automate the formation of financial statements, provides additional advantages in the processing and analysis of accounting information, in particular, simplifies the use of reports to related parties (investors, analysts) through the use of metadata and meta-metadata tools.

The main guarantee of the effectiveness of the use of digital tools in view of the innovative management aspect of their implementation is adaptability to internal and external influences, technological changes, changes in tasks, goals, and even the sphere of economic activity of the enterprise (Ostapchuk et al., 2021).

This largely depends on the architecture of the information systems. The importance of integrating enterprise information in AIS in all directions is a consequence of the connection between accounting and management accounting, the reporting of all types, and ensuring the decision-making process. AIS should cover not only intra-organizational but also inter-organizational digital tools, such as banking and the tools of suppliers, consumers, and owners. Considering the innovative management aspect of AIS formation, its effectiveness should depend on the level of management support. Therefore, for the implementation of the AIS, communication with all interested parties must be ensured. For its implementation, a company's management must realize that effective management must be based on innovative principles, IT architecture, investments, and management structure.

Modern digital technologies have significantly changed accounting and auditing activities in developed countries. An example of the significant integration of business processes with digital technologies, in particular, is one of the options for the implementation of AIS, or Robotic Process Automation (RPA), which uses so-called "software robots" and artificial intelligence. The definition of "artificial intelligence" covers a significant group of digital tools.

In particular, in the field of accounting and analytical support for enterprises at various stages of the development of their markets, there are: machine learning, which is characterized by a maximum of inflated expectations of consumers; neural networks and virtual assistants of accountants and auditors, which will reach the peak of sales in the next 2–5 years. This leads to the separate implementation of individual artificial intelligence (AI) technologies by the management of enterprises in developed countries, while their greatest effectiveness lies in their integrated application. This phased use of individual tools is due to the fact that management sees the benefits of their selective use, for example, in cash audits, analytical studies of large volumes of information, and processing of primary accounting documentation (the advantage of artificial intelligence is that it allows automating not only the processing of paper documents but also their images), but does not see the effectiveness of the complex application of AI. Selective use of artificial intelligence tools is also characteristic of Ukraine, but this can also be explained by the lack of working capital for the comprehensive implementation of artificial intelligence technologies. In general, Ukrainian enterprises are still at a fairly low level of using digital tools (Fig. 1).
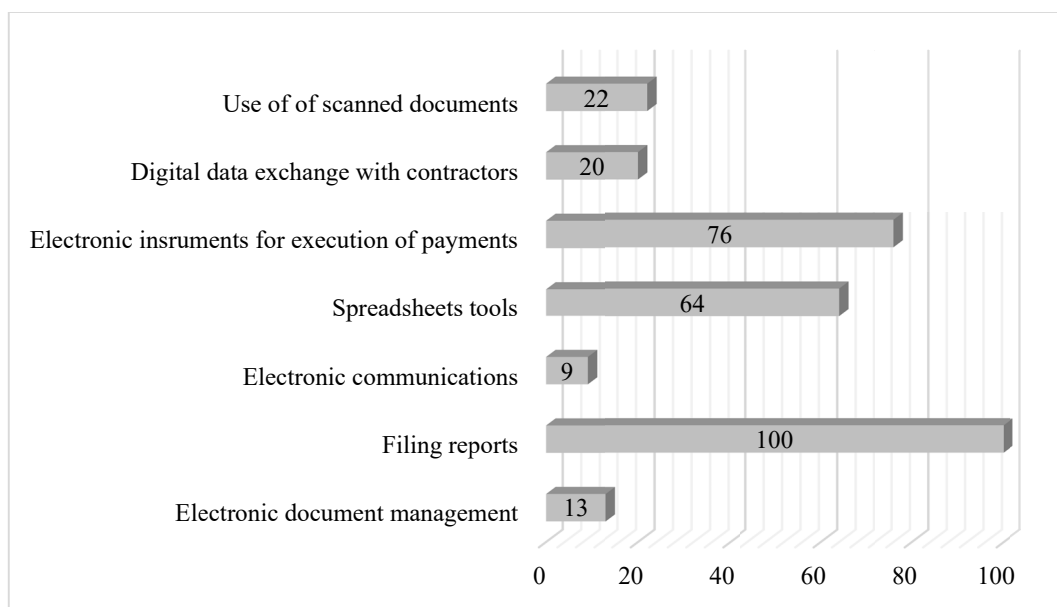

Fig. 1. Use of digital tools at Ukrainian enterprises, % of the total number of enterprises.
Source: based on Tenyukh and Pelekh (2023).

In particular, this is evidenced by shallow indicators of electronic document flow, digital data exchange with contractors, and non-comprehensive use of electronic tools for making payments. Manual collection and processing of primary data, which require a lot of time and the involvement of qualified personnel, often leads to errors, the number and significance of which will increase due to the growth of the volume of accounting information. The use of modern digital tools for accounting and analytical support by enterprises in developed countries is diversified by the types of specified tools and is far from comprehensive, which is explained by the preliminary management assessment of their effectiveness in the AIS of these enterprises. This is confirmed by the data in Fig. 2, where the share of enterprises whose management plans to introduce artificial intelligence as a tool for accounting and analytical support is 5.75 times greater than that of enterprises whose management does not.
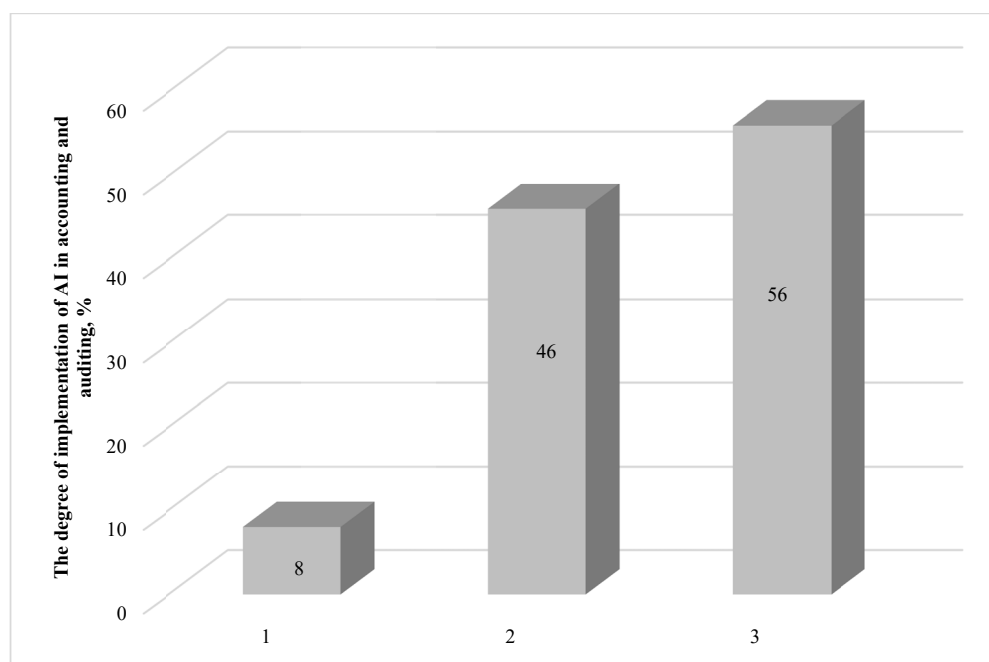

Fig. 2. The share of enterprises in developed countries whose management is solving the issue of introducing artificial intelligence as a tool for accounting and analytical support.
(1) Enterprise management does not plan to implement AI;(2) Enterprise management plans to introduce AI;(3) The company uses AI.
Source: based on Berdiyeva et al (2021).

According to the index assessment of the AI Readiness Index 2020, which indicates various aspects of the implementation of artificial intelligence, Ukraine ranks 57th among 172 countries with a rating of 49.901, which is half as much as the USA (1st). According to the components of the AI Readiness Index 2020, the data availability rating is 66.56, the innovative potential rating is 41.53, the infrastructure rating is 41.35, and the personnel potential rating is 42.39. This indicates a significant lag for Ukrainian enterprises in the implementation of this tool.

This can be explained by the significant cost of these digital tools. Therefore, Ukrainian management uses various methods of reducing the cost of using artificial intelligence technology. Such a method, in particular, can be the use of cloud technologies under the concept of "cloud accounting" because it leads to the possibility of implementing the AI PaaS mechanism, "digital platform as a service". This creates an opportunity not to spend funds on licensed software, including artificial intelligence software, but to use it as a cloud service.

At the same time, the load on the computer equipment of employees of accounting and analytical services is reduced, which also allows for a significant reduction in capital costs. In general, this should contribute to the spread of cloud technologies as a tool for accounting and analytical support for enterprises. But the analysis of the dynamics of their implementation in Ukraine (Table 1) allows us to clarify this thesis.

Table 1. The use of cloud technologies at enterprises of Ukraine.

Parameter	Years*			
	2018	**2019**	**2021**	**2022**
1	2	3	4	5
Share of the number of enterprises that purchased cloud computing services of the total number of enterprises, %	9.8	10.3	10.2	9.8
Deviation from the average value by branch of economics	29.99	28.68	29.58	28.32
Including by the number of employed				
10-49 persons, %	8.6	8.9	9.0	8.7
50-249 persons, %	12.4	13.4	13.9	12.8
250 persons and more, %	19.6	21.5	22.2	19.6

* data for 2020 on the use of cloud technologies by enterprises of Ukraine are not available in the state statistics

Source: based on State Statistics Service of Ukraine (2023).

Analysis of the data presented in Table 1 indicates a significant level of sectoral disparity in the use of cloud technologies, which is almost 30%. Significant disparities are also characteristic of enterprises, depending on the number of workers. This can be explained by the fact that the increase in the number of employees is accompanied by an increase in the amount of accounting and analytical information, which, in turn, leads to the need to use digital tools.

Also, the data in Table 1 testify to the unevenness of the dynamics of the introduction of cloud technologies by Ukrainian enterprises. After the growth period of 2018–2021, the share of enterprises that purchased cloud computing services from the total number of enterprises in 2022 decreased to the level of 2018. This can be explained by the lack of financial resources of enterprises for innovative activities in the field of the implementation of digital technologies in accounting and analytical activities. Cloud technologies provide an opportunity to effectively apply big data digital tools for accounting tasks using the following peculiarities:

−the horizontal structuring of accounting and analytical activities, which is due, for example, to the fact that detailing information about accounting objects leads to an increase in the number of computer equipment (workstations, servers, etc.) where data is accumulated and processed, which results in a significant increase in the volume of auxiliary information;

−improving the resistance to failures due to the reduction of intermediate hardware and software, since its number in the company's AIS is much greater than the number of clusters in Big Data cloud resources;

−the possibility of localizing accounting and analytical information in a limited number of Big Data clusters, which reduces the need to transfer them from data storage blocks to data processing blocks.

At the same time, as shown in Table 2, for Ukrainian enterprises, there is a long-term trend of reducing the number of corporate users of big data digital tools, which indicates insufficient management appreciation of the above advantages.

Table 2. Dynamics of the number of Ukrainian enterprises-users of Big Data digital tools, units.

Years					Rate of change
2017	**2018**	**2019**	**2020**	**2021**	
10252	9188	9280	9206	9118	-486

Source: based on Silakova et al. (2022).

Obstacles to the implementation of digital tools for accounting and analytical support in Ukrainian conditions include the ill-conceived use of these tools, often by analogy with other Ukrainian enterprises, which leads to a decrease in their level of functionality. A significant obstacle to the digitization of accounting is the relatively high cost of digital tools and their unreliability in wartime. For example, the introduction of Bitcoin and cloud technologies is complicated by the irregularity of electronic communication with exchanges, counterparties, and cloud resources. This also reduces the security level of the data use and storage.

Factors that prevent the implementation of digital tools can be grouped as institutional, technological, mental, ecosystem, and security. Institutional factors include regulatory uncertainty, particularly regarding the implementation of "Economy 4.0" standards in Ukrainian accounting practice.

Technological factors are associated with the non-adaptability of technologies to Ukrainian realities and the limited capabilities of Ukraine's digital infrastructure.

Mental factors are associated with a lack of understanding by employees of the accounting departments of enterprises, management, and owners of the need to implement digital tools, unwillingness to significantly reorganize production processes and change established technologies for processing accounting and analytical information, and a lack of professional skills among old accounting personnel. This leads to a decrease in investment in innovative digital technologies. Ecosystem factors include those related to the need for the formation of digital competence in society, in particular, changes in educational approaches to ensure the professional competencies of specialists in relevant fields, and, in general, to increase the quality of education.

This group can also include factors related to the significant outflow from Ukraine due to the war of qualified IT specialists required for professional support in the use of digital tools for accounting and analytical support.

A significant probability of malicious data changes in information systems, and even destruction of databases, determines the need to reserve information, and the legislative and regulatory fields determine, in a significant number of cases, the need to save copies of documents in paper form. This significantly slows the introduction of digital tools for accounting and analytical support in Ukrainian conditions, limiting innovative and managerial components.

Using the evaluation approach, which is based on the methodology of Uzhva et al. (2022), the introduction of information technologies into accounting and analytical processes when the situation stabilizes will make it possible to ensure the growth rate of the annual "cumulative effect" in the country by more than 19%, although the synergistic effect is expected to be higher.

6. Conclusions.

Digital tools for accounting and analytical support for enterprises were stratified according to their purposes. These areas allow optimization of accounting, analytical, and management activities, thanks to the advantages of digital tools for accounting and analytical support of enterprises.

It was determined that the most significant advantage of the integration of digital tools, accounting, and analytical support is a radical change in accounting methods, especially accounting and analytical support for the registration of economic transactions and the formation of a unified register that allows the introduction of a distributed and interconnected system of reliable accounting information.

When implemented by such a system of effective data protection, it can contribute to the formation of a hypercube of accounting, financial, and nonfinancial data with an extraordinary level of relevance in the global information environment.

This indicates that the integration of digital tools and accounting and analytical support from the perspective of innovation and management contributes to the transition from accounting and analytical activities to digital financial and management reporting.

A peculiarity and prerequisite for the implementation of digital reporting is the use of structured digital information, which allows automation of the generation of reports and provides additional advantages in the processing and analysis of accounting information. In particular, it simplifies the use of reports for related parties (investors, analysts) through the use of metadata and meta-metadata tools.

This indicates that the main guarantee of the effectiveness of the use of digital tools given the innovative management aspect of their implementation is adaptability to internal and external influences, technological changes, changes in tasks or goals, and even the sphere of the enterprise's economic activity. It largely depends on the architecture of information systems. The importance of integrating enterprise information in AIS in all directions is a consequence of the connection between accounting and management accounting, the reporting of all types, and ensuring the decision-making process. This implies that AIS should cover both intra-organisational and inter-organizational digital tools, such as banking, suppliers, consumers, and owners.

In view of the above, a mathematical model was developed to optimize a company's digital resources by effectively distributing structured and unstructured information on cloud resources and transferring it to staff computers. The peculiarities of the implementation of digital tools by enterprises in developed countries were determined. Using the example of artificial intelligence technologies, it is indicated that their separate implementation, which is practiced in developed countries, reduces the effectiveness of their complex applications.

This indicates that the selective use of artificial intelligence tools is also typical in Ukraine, one of the reasons for which is the lack of working capital for the comprehensive implementation of artificial intelligence technologies. A significant level of sectoral disparity in the use of cloud technologies in the accounting and analytical activities of Ukrainian enterprises and the unevenness of the dynamics of cloud technology implementation has been established. The advantages of using cloud technologies for Big Data are presented, and at the same time, the long-term trend of reducing the number of corporate users of Big Data digital tools is revealed. The factors hindering the implementation of digital tools are indicated.

The data presented in the present study show that although the use of digital tools in accounting and analytical activities is of leading importance for the transition to the conditions of "Economy 4.0", their implementation by Ukrainian enterprises is at an inadequate level. This is because of the external and internal factors mentioned above, which lead to a decrease in the competitiveness of enterprises.

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