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RECOMMENDATIONS FOR SELECTING DIGITAL TOOLS FOR ANALYZING AND ASSESSING ENTERPRISE PERFORMANCE

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Malyarets L. M., Budarin O. S., Holovko V. A. Recommendations for Selecting Digital Tools for Analyzing and Assessing Enterprise Performance

Ukraine is undergoing a rapid transition to a digital economy. Digital tools are widely used in the activities of all enterprises. Businesses are faced with the need to substantiate and select these tools, which have different characteristics and purposes. Practice confirms that it is not always advisable to purchase expensive foreign digital tools. Modern digital tools have been developed in Ukraine that are equivalent to or better than foreign ones in terms of functionality and technical characteristics. The list of modern main positive effects and unfavorable conditions for implementing digital tools in an enterprise is substantiated. Based on an analysis of the work of scientists and practitioners, a list of digital tools is presented that are recommended for implementation in domestic enterprises and involve the improvement of methods and technologies for analyzing and assessing their activities. It is proposed that the main criterion for selecting digital tools in an enterprise should be the level of development of the existing digital potential. Using the example of analyzing the information system of JSC «Ukrainian Energy Machines», the choice of digital tools for improving the technology of enterprise activity analysis and evaluation is substantiated. Further research and addressing the problem of choosing digital tools within an enterprise involves determining the level of development of the existing digital potential.

Keywords: *digital tools, positive effects of implementation, unfavorable conditions for implementation, digital potential, level of digital potential development.*
Fig.: *2.* ***Tabl.:*** *3.* ***Bibl.:*** *20.*

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Малярець Л. М., Бударін О. С., Головко В. А. Рекомендації щодо вибору цифрових інструментів для аналізу та оцінювання діяльності підприємства

В Україні відбувається стрімкий перехід до цифрової економіки. Цифрові інструменти широко застосовуються в діяльності всіх підприємств. Підприємства стикаються з необхідністю обґрунтування та вибору цих інструментів, які мають різні характеристики та призначення. Практика підтверджує, що не завжди доцільно намагатись купувати дорогі іноземні цифрові інструменти. В Україні розроблено сучасні цифрові інстру-

менти, які за функціональними, технічними характеристиками є аналогами або кращими за іноземні. Обґрунтовано перелік сучасних основних позитивних наслідків та несприятливих умов упровадження цифрових інструментів на підприємстві. На основі аналізу робіт учених і практиків наведено перелік цифрових інструментів, які рекомендуються для впровадження на вітчизняних підприємствах і передбачають удосконалення методів, технології аналізу й оцінювання їх діяльності. Запропоновано основним критерієм вибору цифрових інструментів на підприємстві розглядати рівень розвитку наявного цифрового потенціалу. На прикладі аналізу інформаційної системи АТ «Українські енергетичні машини» обґрунтовано вибір цифрових інструментів для вдосконалення технології аналізу та оцінювання діяльності підприємства. Подальшим дослідженням і вирішенням проблеми вибору цифрових інструментів на підприємстві є визначення рівня розвитку наявного цифрового потенціалу.
Ключові слова: *цифрові інструменти, позитивні наслідки впровадження, несприятливі умови впровадження, цифровий потенціал, рівень розвитку цифрового потенціалу.*
Рис.: *2.* ***Табл.:*** *3.* ***Бібл.:*** *20.*

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The digitalization of the economy has been recognized as a priority government policy in Ukraine, as reflected in documents such as the National Economic Strategy for the period up to 2030 and the Ukraine 2030 Global Innovation Vision [1]. Since small and medium-sized enterprises are the foundation of Ukraine's economy, the focus of addressing the challenges of implementing digital tools is on these enterprises. Large industrial enterprises, especially those with State ownership, differ both in the content and in the processes of implementing digital tools. The Entrepreneurship and Export Promotion Office (EEPO) provides consultations on solving digitalization challenges at enterprises. To accelerate digital transformation, the Organisation for Economic Co-operation and Development (OECD) has developed an action-plan system that includes the creation of digital «one-stop-shop» centers, conducting digital maturity self-assessments, developing sectoral digital plans to form a «digitalization roadmap», providing training and acquiring digital skills, and organizing financial support for implementation. For enterprises, it is important in implementing digital tools to be aware of the recommendations for using digital maturity self-assessment tools, which were developed by the Latvian Information and Communications Technology Association (LIKTA) (software product «Smart Latvia»/«Diginno»). Also well-known are the European Commission digital maturity assessment tools and the DREAMY digital readiness assessment model of the Polytechnic University of Milan. In Ukraine, digital competence frameworks such as DigComp4Entrepreneurs, EntreComp4Youth, and EntreGram4Youth have been developed and are in operation, which help enhance the digital skills of entrepreneurs and young people; programs like «Social Media Promotion – Boost with Facebook Bootcamp», «Business Digitalization: How to Grow During the War», and the «Meta-Educational Center and Various Training Modules» are also effective. The operational portal «Diia.Business» offers an online marketplace with an overview of financial support from the Ministry of Finance [20].

Initially, it should be noted that the implementation of digital tools for assessing enterprise performance is advisable to carry out as part of the overall digital transformation within the enterprise. Many foreign and domestic researchers have addressed the challenges of implementing digital tools in various enterprises and provided theoretical and practical recommendations. In Ukraine, the works of such scientists and researchers are known: D. V. Mangushev, A. V. Pykhtin [2], L. V. Verbivska, O. I. Burynska [3], T. Oleksiv [4], R. O. Miroshnyk, M. V. Derevoriz [5], V. V. Dergachova, Yu. P. Vorzhakova, O. I. Khlebynska [6], M. E. Shkurat and H. R. Uzbek [7], N. V. Proskurnina, V. V. Bordaiev [8], D. V. Doroshkevych, K. V. Tomko [9], R. O. Miroshnyk, I. M. Skabara, Yu. I. Artymyshyn [10], O. V. Kovalenko, O. V. Hlembytskyi, D. O. Koverha [11], V. V. Makedon, O. O. Baylova [12], O. M. Rozumnyy, E. Sh. Aliev [13], Yu. O. Romanenkov, K. A. Dolina [14].

Researchers D. V. Mangushev and A. V. Pykhtin believe that the main and most common digital marketing tools are online advertising and contextual advertising, search engine optimization (SEO marketing), mobile marketing, content marketing, social media marketing, email marketing, digital PR, web analytics, websites, WiFi marketing, SMS distribution, game marketing, app marketing, etc. As trending digital marketing tools, D. V. Mangushev and A. V. Pykhtin highlight social networks and messengers, multichannel marketing, video content, work with big data, and mobile content.

As digitalization tools that should be implemented, V. V. Dergachova, Yu. P. Vorzhakova, O. I. Khlebynska consider information and communication technologies, electronic data interchange, EDI technology for the structured transfer of data between enterprises, cloud computing technologies, intelligent tools, methods, and techniques for analyzing and processing large data sets [6]. The scientists point to significant results from the implementation of digitalization, namely: acceleration of document flow, increased level of analytical activity, and enhanced effectiveness of organizational activities.

M. E. Shkurat and H. R. Uzbek substantiated a conceptual scheme for the digitalization of business processes at an enterprise, and as digital means, they consider cloud technologies, artificial intelligence, methods for optimizing data collection and analysis, information security, the Internet of Things, and Big Data tools [7].

Studies conducted by D. V. Doroshkevych and K. V. Tomko indicate the necessity of using visualization tools to instantly convey complex information and emphasize the key points. Particularly valuable in the use of digital visualization tools is interactivity, which allows for allocating and working with individual data segments. The researchers recommend employing content marketing, which involves cross-channel diversity, branded series, storytelling, and video content [9].

Scientists recommend using production process planning tools to implement a system for operational planning, dispatching, and production accounting, labor resource analysis, financial planning systems, digital modeling, and business process optimization. They also recommend applying additive technologies, high-performance computing equipment, a high-productive supercomputer center, and a digital twin from production design tools. As for production management tools, these scientists recommend implementing CAD, CAM, CAE, APS, EAM, and MES systems.

V. V. Makedon and O. O. Baylova suggest implementing Big Data, the Internet of Things, a system for objective monitoring of production equipment, a supplier assessment system, the Internet and web portals, as well as internal and external marketplaces as tools for monitoring, modeling material flows, logistics, and marketing. The researchers believe that these tools will generate both qualitative and quantitative effects and positively influence financial performance.

O. M. Rozumnyy and E. Sh. Aliev consider the components of the digitalization of economic processes to include the Internet of Things (IoT), Artificial Intelligence (AI), Blockchain, Big Data, and Cloud Computing [13].

Yu. O. Romanenkov and K. A. Dolina propose classifying digital tools for conducting financial analytical analysis into three groups. The first group includes modern financial analysis programs such as spreadsheets and data analysis software; the second group consists of the Internet of Things (IoT) and data collection; and the third group covers Big Data [14].

Thus, the analysis of research results from scientists and practitioners who studied and addressed the problems of implementing digital tools in enterprise activities indicates the need to consider both the positive effects and the unfavorable conditions of implementing this process (*Tbl. 1*).

Overall, there are many digital tools available for assessing performance, which can be grouped into the following types: management systems; analytical tools and data visualization; project planning and management tools; communication and collaboration tools. The main purpose of using digital tools to assess a company's performance is to provide modern services for data processing and storage, extract new knowledge for managing performance improvement, identify efficiency reserves, and develop well-founded, rational managerial decisions. The implementation of digital tools in enterprise management contributes to the development of import substitution potential. Certainly, when choosing digital tools, it is important to consider the specifics of the company's activities and development, as well as the costs of their implementation.

Regarding the stages of implementing digital technologies in an enterprise, researchers recommend carrying them out in the following sequence: 1) preparatory; 2) enterprise survey; 3) assessment of the level of penetration of these technologies among staff; 4) identification of priority areas for implementation; 5) final report. Researchers have substantiated the algorithm for calculating the added value at an enterprise from implementing digital technologies. We agree that the researchers' well-founded proposals will enhance the accuracy of assessing the economic efficiency of digital technology implementation in the enterprise.

Table 1

A list of the main contemporary positive effects and unfavorable conditions of implementing digital tools in an enterprise

Positive effects	Unfavorable conditions
– Increased labor productivity; – improved planning and management; – automation of routine processes; – optimization of communication between staff, suppliers, and consumers; – reduced transaction costs; – improved production management, including equipment, resources, and inventory; – reduced operational risks; – integration into global markets; – simplified access to all types of resources; – access to up-to-date information; – provision of new services; – marketing automation; – fostering innovative development; – creation of service-oriented systems; – improvement of personnel qualifications; – increased competitiveness; – enhanced economic security	– Increased cost of digital tools and their implementation; – complications in the implementation processes related to adapting to the specific conditions of the enterprise; – inability to forecast and build long-term strategies; – inability to increase employee salaries; – disruption of supply chains; – lack of funds for salaries; – lack of turnover, access to credit; – lack of raw materials; – loss of experts; – inability to repay loans; – loss of some assets, equipment; – need to replace russian software; – supervisory inspections, lack of knowledge to change the profile; – weakening of corporate culture due to online work

One of the main criteria for selecting digital tools is the level of digital potential present in an enterprise, which is understood as the combination of capabilities and skills created by the existing information system and the digital competencies of staff to enhance the efficiency of all processes, create new products, and improve communications through the use of data, software, and networks to achieve specific goals. *Tbl. 2* provides a list of digital tools that researchers and practitioners recommend for managing operations, including conducting analysis and assessment, and visualizing results within the enterprise.

Fig. 1 shows the dynamics of the number of enterprises engaged in e-commerce in mechanical engineering during 2018–2024 [19].

An analysis of Fig. 1 indicates a significant drop in the number of enterprises engaged in e-commerce and in mechanical engineering in 2022, which is understandable, but there is a growing trend in the following years.

Google Analytics is a free tool that provides the ability to analyze and track website and various application visitors, specifically by generating real-time reports on user behavior, traffic sources, conversions, segmenting the audience, allowing you to define specific tracking goals, creating custom reports with set metrics and parameters, and easily integrating with other Google tools. Business intelligence tools such as Power Business Intelligence (BI) and Tableau are also well-known. The advantages of the Power Business

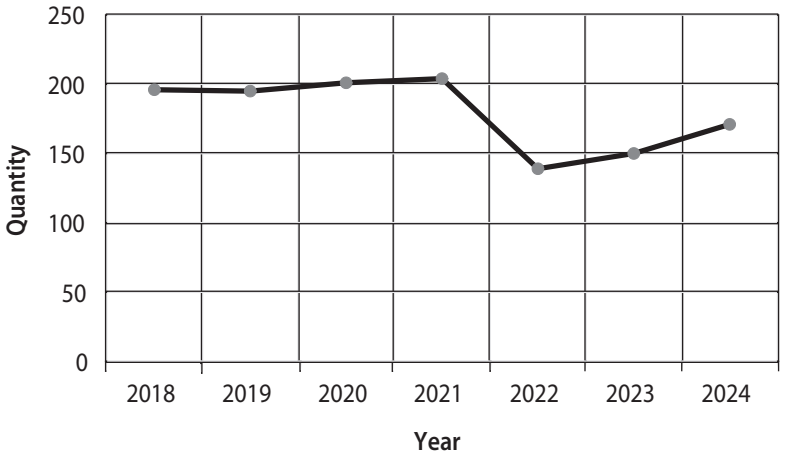

Fig. 1. Dynamics of the number of enterprises engaged in e-commerce in mechanical engineering during 2018–2024

Table 2

Digital tools recommended for implementation in enterprises and intended for analyzing and assessing their performance

Tool	Tool category	Purpose	Level of tool prevalence in Ukraine
1	2	3	4
Management systems			
ERP (Enterprise Resource Planning)	SAP, Oracle, IC-PRO	Combine and integrate business processes into a single system, providing the ability to simultaneously analyze data from all departments within the enterprise	Gaining widespread popularity
CRM (Customer Relationship Management)	Salesforce, Zoho CRM, HubSpot	To manage customer interactions, track sales, marketing processes, and customer service	Used by domestic enterprises
SCM (Supply Chain Management)	Oracle SCM, SAP SCM	To optimize supply chain management processes	Gaining popularity
Analytical tools and data visualization tools			
Big Data	Apache Hadoop, Spark	For processing large volumes of data, identifying patterns, and making informed decisions	Data analysis tools are successfully applied in various fields such as banking, medicine, manufacturing, logistics, energy, and telecommunications
Google Analytics		For detailed information about website traffic, user behavior, the effectiveness of marketing campaigns, and integration with other Google services	The tool is popular for digital marketing and data analysis in various economic entities
Power Business Intelligence (BI), Tableau		For creating interactive dashboards, reports, and data analysis	Used by domestic enterprises, high license cost
Google Data Studio		For creating customized reports and dashboards	Used by domestic enterprises
Project planning and management tools			
Asana, Trello, Jira		For planning, tracking, project management, task allocation within a team, and deadline monitoring	Actively used by large domestic enterprises
Microsoft Project (included with Microsoft Planner)		For planning complex projects with a large number of tasks and resources	Used by domestic companies
Figma		For creating visual content and interface prototypes	Used by domestic companies for specific purposes by graphic, product, or web designers
Tools for communication and collaboration			
lack, Microsoft Teams		For quick exchange of messages, files, and organizing video conferences	Used by domestic companies for communication, teamwork, and holding online meetings

End of Tbl. 2

1	2	3	4
Google Workspace	Google Docs, Sheets, Slides	For collaborative work on documents, spreadsheets, and presentations in real time	Used by domestic companies, provides AI suggestions
Zoom, Google Meet		For conducting video conferences and online meetings	Used by domestic companies, sometimes as part of Google Workspace
Surveymonkey, Google Forms		For conducting surveys and collecting feedback	Widely used by domestic companies for surveys
Yaware.TimeTracker		For tracking work hours and analyzing employee productivity	Widely used by domestic companies for surveys

Intelligence (BI) tool include its ease of use, integration with Microsoft, accessibility, availability of a free version, and the ability to automatically update data. Disadvantages of Power Business Intelligence (BI) include limitations in data volume and analytical capabilities. The advantages of Tableau are its powerful visualization capabilities, ability to handle large volumes of data, in-depth analytical analysis, and popularity among users. Disadvantages of Tableau include: a steep learning curve, higher price, and better integration with Salesforce. The well-known free tool, Google Data Studio, offers the ability to monitor key metrics, quickly generate reports, collaborate with other users, automatically update data, save time, participate in report creation, and track key performance indicators.

At the enterprise JSC «Ukrainian Energy Machines», a unified information system for planning and resource management, IS-PRO (ISpro), has been integrated, providing a single information space for the interaction of the enterprise's structural units in implementing the business logic of interconnected business processes [16]. *Fig. 2* shows the list of IS-PRO system modules put into operation at the enterprise.

The use of the IS-PRO system, which is a Ukrainian automated management system of the global ERP standard developed by «Intellect-Service», enables the enterprise to automate management and optimize all key business processes, ranging from logistics and warehouse resource management to accounting, managerial, and tax reporting. The IS-PRO system utilizes modern DBMS: Microsoft SQL, Oracle, supports an open REST API, cross-browser web client functionality, provides compatibility with BI systems from various vendors, and incorporates modern data encryption technologies.

Tbl. 3 presents the functional capabilities of each IS-PRO module implemented at the enterprise under study.

Therefore, to enhance its digital potential, it is recommended that the enterprise expand the IS-PRO system by introducing the «Financial planning and analysis» module, as it provides capabilities to create, calculate, and monitor arbitrary interrelated budgets, as well as to collect indicators based on specified analytical attributes for designated accounts. This is all crucial for conducting a comprehensive and systematic analysis and assessing the enterprise's performance. The operation of the IS-PRO system is further complemented by integration with several external information systems, such as the Polynet ACS, which imports data from the access control system to track working hours and employee attendance; M.E.Doc, which enables the exchange of electronic tax and financial reports, including payroll calculations; and Client-Bank, which supports direct exchange of payment orders, bank statements, and other financial documents with banks. The enterprise, using the most modern communication tools, maintains quick contact with customers. The enterprise also provides support for orders from design work, manufacturing, delivery, installation supervision, equipment operation control, providing maintenance and repair recommendations, as well as proposals for improving and upgrading units; a professional manager is assigned to each project, among other things.

Additionally, in the enterprise's information system under study, the DocNet, CKYD, AWIS «Production Management», and ASCON systems are used. The internal electronic document management system DocNet, developed by Intecracy Group, improves the handling of electronic documents and ensures document registration, monitoring the execution of instructions and orders, document storage, and provides transparency, manageability, and efficiency in operations. The DocNet system is the most widely used by public sector economic entities. The CKYD control system consists of a set of hardware and software secu-

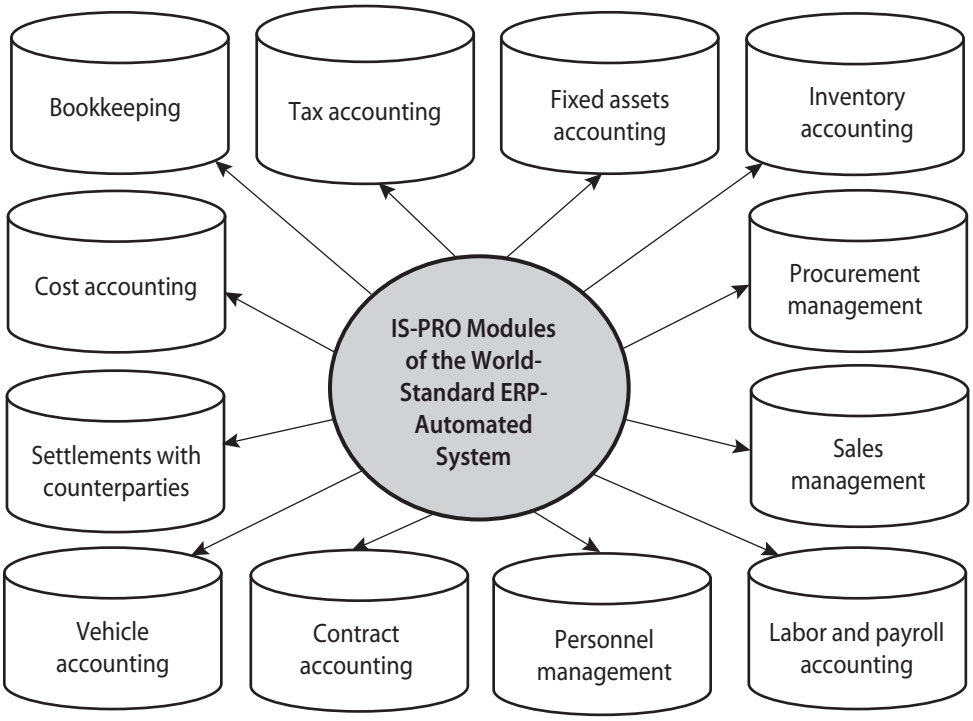

Fig. 2. The composition of IS-PRO modules put into operation at JSC «Ukrainian Energy Machines»

rity tools designed to monitor and enforce restrictions, as well as to register employee entry and exit through checkpoints. The Automated Workplace Implementation System (AWIS) «Production Management» allows the automation and optimization of production processes at the enterprise. This system allows you to track the production process, manage resources, perform quality control, integrate with other systems such as ERP, CRM, and others for data exchange, optimize processes, generate reports and analytical data for managerial decision-making, ensure increased production capacity, reduce costs, improve product quality through control at each stage of production, provide up-to-date information on production, and enhance competitiveness by controlling production costs and product quality.

The company needs to replace the ASCON system, which automates engineering activities and production management. Currently, large enterprises are considering the possibilities of implementing a Big Data system, which allows them to search and analyze data from both the domestic and foreign markets, identify promising directions for product diversification, market expansion, and integrate into value chains. This system is compatible with other systems and programs operating at the enterprise under study. Big Data systems have weaknesses because they require processing a large amount of data, which leads to risks regarding confidentiality, data security, and the possibility of cyberattacks. The characteristics of data analysis using Big Data are the use of modern techniques and analytical tools such as Data Mining – obtaining new knowledge, crowdsourcing – obtaining data from various sources, machine learning – the ability to self-learn based on the analysis of existing data, the use of neural networks – extracting new knowledge based on previous experience, data blending and integration, analytical forecasting, simulation modeling, and analytical data visualization [17].

The criteria for this Big Data are volume, velocity, value, veracity, variety, variability, and interconnectedness [18]. The use of Big Data provides opportunities to access a large, organized volume of information that is integrated with previously obtained data, and it requires a high level of user expertise. Experts state that Big Data is very useful in the service sector and social life, but it also plays a significant role in marketing and other business activities, as it provides not only comprehensive information about an object but also the possibility to analyze and assess it using modern analytical tools. Implementing Big Data allows access to extensive information about both the internal and external markets, creating competitive advantages and specifying the potential for import substitution. Big Data analysis methods include Data Mining, which enables the discovery of useful and new knowledge within large datasets. Machine learning methods make it possible to predict, classify, and apply neural networks to both structured and unstructured data. Network analysis provides opportunities to

Table 3

Functional capabilities of IS-PRO modules at JSC «Ukrainian Energy Machines»

Module name	Implemented functional capabilities of the module
Bookkeeping	Maintaining the general ledger, multi-currency accounting, multi-level analytical accounting, operational analysis of the balance sheet, turnover, analytical accounting objects, internal and external accounting reports, etc.
Tax accounting	Calculation of taxes, automatic generation of tax invoices based on shipping (payment) documents and entry of records into sales (purchase) registers, accounting for gross income and gross expenses, etc.
Fixed asset accounting	Functions for maintaining a fixed asset card index, registering movement documents, calculating depreciation, revaluing fixed assets, inventorying fixed assets, maintaining special directories, generating and outputting fixed asset accounting reports, etc.
Inventory accounting	Inventory accounting, both in physical and monetary terms, allows for conducting inventory and revaluation, calculating the actual cost using the chosen method, and so on
Procurement management	Placing orders with suppliers for the supply of goods and services, registering supplier invoices for the supply of goods, registering supplier invoices and managing settlements on invoices, maintaining accounting records for procurement, etc.
Sales management	Creating primary documents for shipping goods and finished products to customers, accounting for returns of goods and finished products by customers, managing settlements with customers based on sales invoices, reserving goods, maintaining accounting records for sales, generating reports on sales and settlements with customers, etc.
Vehicle accounting	Accounting for the availability and operation of motor vehicles, including the provision of transportation services; accounting for fuel and lubricants, drivers' working hours, tire mileage, batteries, etc.
Cost accounting	Managing the organization's expense budget, multi-level analytical accounting, handling legal and financial obligations, accounting for cash turnover of the general and special budget funds, preparing bank and cash payment documents, preparing advance reports and accounting for settlements with accountable persons, payroll disbursement according to payroll statements (cash orders), preparing reports including the General Ledger, trial balance with analytical breakdowns, etc.
Settlements with counterparties	Maintaining records of mutual settlements, managing payment and receipt accounts, preparing reconciliation statements, preparing acceptance and work completion certificates, handling tax documents for the organization's off-budget activities, etc.
Contract accounting	Maintaining a contract file for suppliers, contractors, and customers, generating documents based on contracts, monitoring settlements and contract performance, etc.
Personnel management	Maintaining employee personal files, creating and managing vacation schedules, creating a staffing table, generating orders based on templates, generating various reports, transferring data to the Labor Accounting and Payroll subsystem for salary calculation, etc.
Labor and payroll accounting	Maintaining employee personal accounts, maintaining time sheets, automatic calculation of accruals, deductions, contributions to funds, exporting lists for transfer to client-bank, generating journal entries and transferring them to the General Ledger subsystem, generating certificates and reports, exporting data to the M.E.DOC system, etc.

identify connections and interactions between objects within networks. Big Data methods also provide opportunities to process natural language and visualize data. In Big Data, you can perform crowdsourcing, data integration, and distributed computing. Big Data implements the logic of processing a large dataset: data collection – data cleaning (preprocessing) – data processing – data analysis – big data visualization – data storage and management – continuous learning and improvement. The main analytical methods for data analysis are mathematical methods, which provide the ability to describe, identify cause-and-effect relationships and patterns, forecast, and optimize connections. These methods allow for the identification of patterns, forecasting of trends, data classification, and informed decision-making. Thus, according to official statistics, in 2022 the share of enterprises conducting big data analysis among all enterprises was 8.2%, in 2024 – 21.4%, and in 2025 – 17.6% [19]. An objective reason hindering the implementation of big

data in State-owned enterprises is ensuring the economic security of these enterprises and the high cost of software. In today's complex conditions of limited enterprise activity, it is recommended to implement low-cost digital tools such as Google Analytics and Google Data Studio.

Therefore, to enhance the technology of analyzing and assessing enterprise performance, existing digital tools should be used more extensively, taking into account their advantages and disadvantages. If modern information systems are operating in industrial enterprises, then to enhance the efficiency of information-analytical and communication processes, digital tools should be implemented, considering their configurability and integration capabilities. The criterion for implementing digital tools in an enterprise should ideally be the level of the existing digital potential. Well-grounded recommendations for digital tools for analyzing and assessing performance are formed on a scientific basis, taking into account the existing information system of the enterprise, which ensures their effectiveness and rationality. ■

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