

Digital Information Security: Coronavirus Crisis Impact on the Accountants, Business Analysts and Auditors Training

Cyfrowe bezpieczeństwo informacji: wpływ kryzysu spowodowanego przez COVID-19 na szkolenie księgowych, analityków biznesowych i audytorów

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Abstract

The article considers the impact of transformation processes on business in the context of digitalization. Equally important is the study of the impact of these processes on the training of professionals whose work has had a direct impact on these transformations – accountants, business analysts and auditors. These specialists are faced with the task of analyzing the impact of the facts and determining the change in business development strategy in the context of global digitalization. The field of audit both in the world was able to adapt extremely flexibly to the new realities of functioning in the digitalized world. In this article, the authors reveal the main trends of digitalization of audit in the conditions of economic transformation and limited business practices caused by this global pandemic of 2019-2020. At the same time, the processes of digital transformation are the driving forces of the

economy. Computer technology is becoming increasingly involved in reforming the audit institution and changing the trajectory of the auditor's role in such a society.

Key words: information security, COVID-19 impact; business in the context of digitalization; audit institution; cybersecurity

Słowa kluczowe: bezpieczeństwo informacji, wpływ COVID-19; biznes w kontekście cyfryzacji; instytucja audytu; bezpieczeństwo cybernetyczne

Introduction

The global financial crisis, which resulted from the extremely dynamic spread of COVID-19 at the beginning of the year, effectively reformatted all areas of socio-economic relations into two key vectors (depending on how much a particular industry has been affected by the pandemic). There was a clear distinction between the spheres of human activity that were significantly affected by these processes and those that found innovative approaches to their continuous activities, but in fact almost did not succumb to this impact (Oliynyk et al., 2017). At the same time, there is an incredible impact of COVID-19 not only on the health but and the budgetary security of the national economy (Strilets et al., 2020).

The transition of many companies to online mode and digital transformation processes are the driving forces driving change in the corporate world, based on the introduction of new technologies for analyzing large databases, Internet products, cloud technologies or 3D printing. Analog information is being converted to digital data. The constant convergence of the physical and digital worlds encourages companies to integrate, for example, the Internet of goods and services into production processes, create value through analysis and management of big data, which can be used as a competitive advantage. Most of the changes caused by digitalization are destructive and radically change existing industries, companies that occupy a dominant position in the market, face new competitors, existing business models become obsolete and replaced by new ones.

Issues of accounting, analysis and audit and their automation have been studied by many domestic and foreign scientists. In particular, theoretical and practical problems of centralized and decentralized accounting were studied by F. Butynets (Butynets et al., 2002) the advantages and disadvantages of centralized and decentralized accounting in budgetary institutions are covered by M. Kharchenko (2017). K. Naribaeva (1983) in his works expresses the opinion that centralized and decentralized accounting can not exist separately, and T. Popitich (2010) assumes the existence of a combined type of accounting. Such a scientific position certainly deserves attention, but it is not indisputable. Thus, a slightly different position is set out in the work of M. Lazareva (2018) where she concluded that *transaction costs of centralization and integration form system effects, the value of which reflects not only the level of efficiency of the firm, but also the level of its dynamic stability*. She also proposed a formula for calculating the synergistic effect that occurs when centralizing functions. In addition, the issues of centralization and decentralization in their works consider: V. Gorbachuk and A. Lyashko (2019), V. Boyko (2019), A. Fedorenko (2019), S. Kozlovskiy (Kozlovskiy et al., 2019), E. Khodakivskiy (Khodakivskiy et al., 2019), L. Horoshkova (Horoshkova et al., 2018), L. Ivanchenkova (Ivanchenkova et al., 2019), O. M. Yaroshenko (Yaroshenko et al., 2018), O. Kurbatov (Kurbatov et al., 2019), A. Guliyeva (Guliyeva et al., 2018), V. Aleksashin and H. Mykhalchuk (2019).

At the same time, the available scientific works do not fully reveal the specifics of centralized and decentralized accounting, analysis and audit in the context of the impact of general globalization processes, the latest trends in the impact of digitalization on the organization of accounting of enterprises. And although the praxeological significance of the use of new opportunities of digital technologies for accounting, analysis and audit is quite high, the dynamics of innovation contributes to the fact that there is a significant lag in the development of competencies of accountant, analyst, auditor.

The purpose of the article is to substantiate the feasibility of centralizing procedures to improve information security in the digital world and the effectiveness of accounting, analysis and audit in the context of the impact of the crown crisis and digitalization on the training of accountants, business analysts and auditors. In accordance with the defined goal, the main objectives of the study are to identify the main disadvantages and advantages of a centralized and decentralized model of accounting, analysis and audit; research of possible directions of use of digital technologies for accounting procedures of the enterprises; development of recommendations for changing the decentralized accounting model by the company to a centralized one, formulating a general conclusion on this study.

Research of global trends in information security

In 2018, the annual global survey of the CEO of PwC (2020) revealed a record level of optimism about global economic growth. In 2020, there is a record level of pessimism. For the first time, more than half of the surveyed executives believe that world GDP growth will decline. This caution has led to low confidence in the worldview of their own organization. Only 27% of CEOs are very confident in their revenue growth prospects until 2020, which have not been low since 2009. For the first time, more than half (53%) of business leaders believe that

global economic growth will decrease (Fig. 1). The share of managers who are confident in their growth prospects for 12 months has fallen to 27%, the lowest level since 2009 (Fig. 2). Declining confidence in the CEO contributes to uncertainty over regulation, trade and economic growth. CEOs are divided over whether government legislation will spread online. Only 18% of organizations worldwide report significant progress in developing a training program. Today, leaders globally recognize the greater potential of climate change initiatives than they did ten years ago.

The study of global information security trends (Nazarova et al., 2020) reflects the strengthening of the digital environment against cyber threats. Cybersecurity incidents have become more frequent and regularly appear in the headlines, causing growing concern among consumers and business leaders. Despite the close attention to such cases that has been drawn in recent years, most organizations around the world still find it difficult to grasp and manage emerging cyber risks in an increasingly complex digital environment.

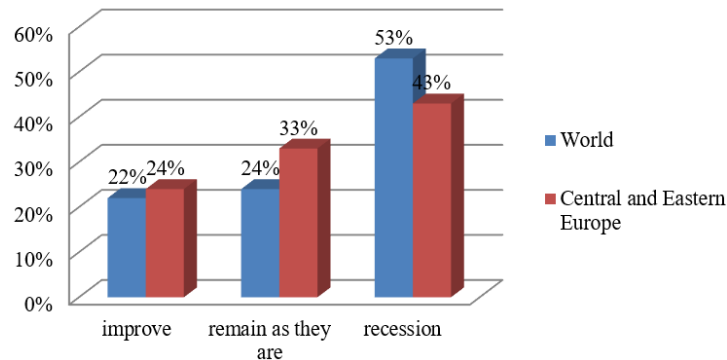


Figure 1. The pace of global economic growth in 2020, developed by the authors based on PwC (2020)

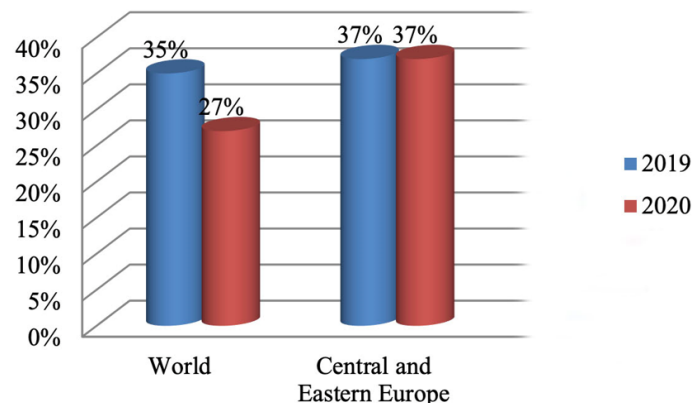


Figure 2. The share of managers, who are confident in the company's prospects for growth over the next 12 months, developed by the authors based on PwC (2020)

Given that the digital environment is becoming more complex every day and our dependence on data and networking is growing, the development of resilience to cyber threats – large-scale events with devastating consequences that develop on a cascading basis – has never been so important. In a study of global trends in information security PwC (2020), 40% of respondents from organizations that use automated and robotic systems, say that disruption of operations will be the most critical consequence of cyberattacks on these systems. Despite the growing awareness and publicity of the events and consequences of cyberattacks, many companies are still not prepared for real countermeasures. Most key cyber risk detection processes in business systems are implemented in less than half of the respondents (Fig. 3). Achieving a higher level of cyber resilience within individual enterprises or society as a whole requires greater efforts to identify and manage the new risks inherent in modern technologies. Organizations need the right guidance and procedures to implement the information security measures that digital progress requires.

When conducting digital transformation, special attention should be paid to the protection of technologies and processes that are implemented, and in some cases to include the transformation of cybersecurity in this process. 29% of respondents claim that the responsibility for ensuring the security of the Internet of Things is the responsibility of the Director of Information Security. Most corporate boards do not take a precautionary approach to developing cybersecurity strategies or investment plans. Only 44% of respondents stated that boards of directors are actively involved in developing and implementing the overall security strategy of their company. Top managers of companies must take responsibility for ensuring cyber resilience. Building a vertical strategy for managing

cyber risks and privacy risks is essential throughout the enterprise. The concept of sustainability must be integrated into commercial activities.

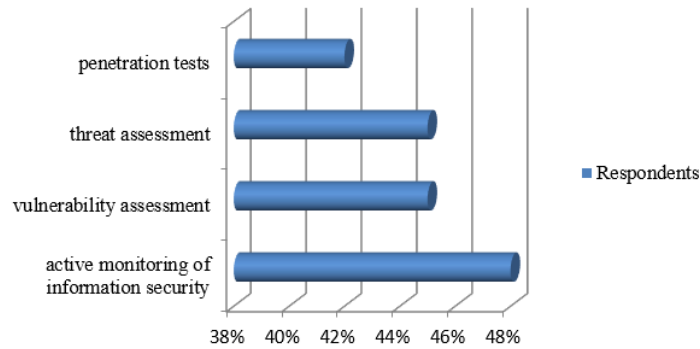


Figure 3. Key processes for detecting cyber risks in business systems, developed by the authors based on Nazarova et al. (2020)

The results of the EY Global Information Security Study (Kessel, 2018) show that the cost of cybersecurity has increased, but organizations need to take more and more action. Companies' spending on cybersecurity has increased – organizations have begun to allocate additional resources to protect information and make more efforts to create reliable security systems (Fig. 4).

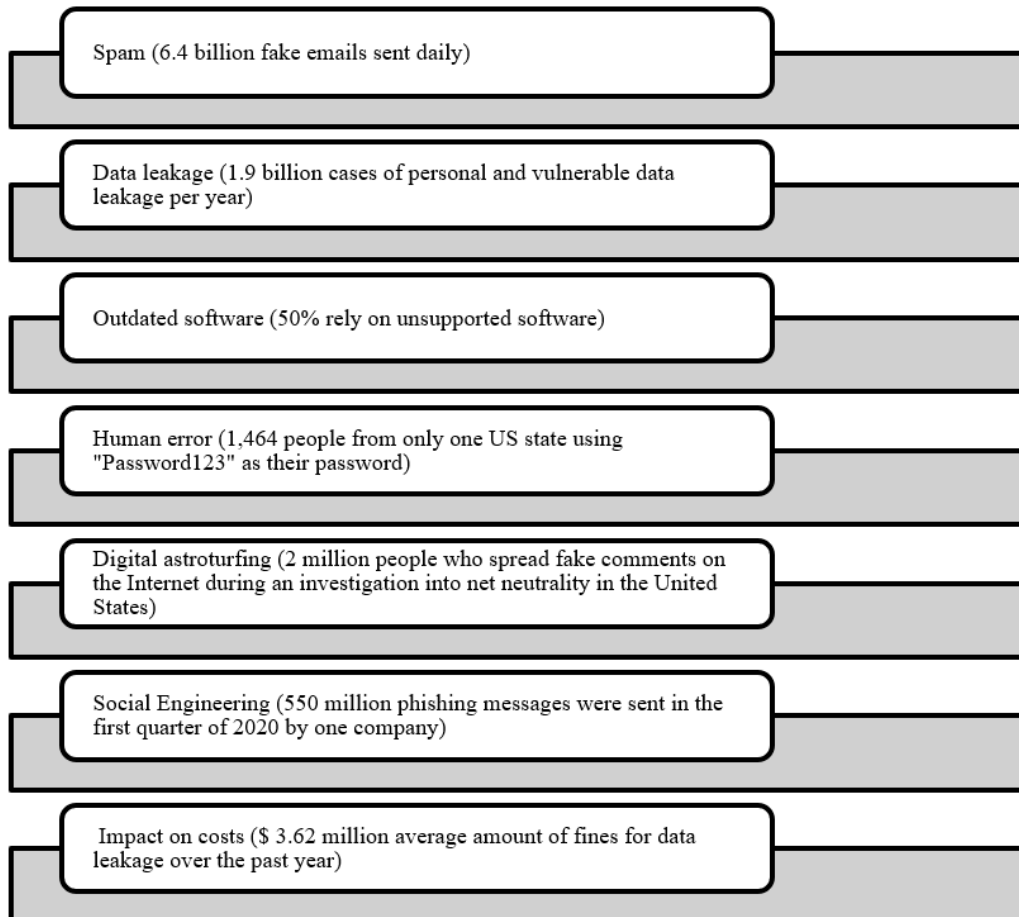


Figure 4. Cybersecurity 2020: how difficult is it?, developed by the authors based on Kessel (2018)

More than three-quarters of organizations surveyed (87%) do not have a sufficient budget to provide the required level of cybersecurity. Security measures are not implemented systematically and only a small number of organizations give priority to advanced technologies. For most companies, cybersecurity remains a matter of paramount importance. The survey showed that a significant number of respondents (77%) have a basic set of tools to ensure cybersecurity. Sometimes companies do not know exactly where the most critical information

assets are stored and have no guarantees about their security. 77% of organizations plan not only to install basic cybersecurity tools, but also to configure them according to business opportunities and conditions. Organizations are convinced that cyber risk management and the development of cybersecurity are essential for success in the digital age.

The use of digital audit by companies improves the quality of work and creates additional value for business. The use of technology in the audit of public and private companies increases transparency, improves the risk assessment system, automates routine processes and generally improves the quality of the audit. Digital technology audit uses digital channels from the beginning to the end of all processes. It is based on three solutions: automation, analytics and digital customer experience. The basis of digital audit success is a technology platform that should effectively connect all members of the audit team with each other, with representatives of the client company, as well as increase the efficiency of project management at all stages (Sidhu, 2019).

Creating a favorable business environment, ensuring competition, encouraging entrepreneurship and innovation are drivers of economic growth and increasing its growth rate, improving the investment attractiveness of the country. The competitiveness and innovative potential of the state largely depend on the readiness of business entities and their staff to use new methods and technologies of business management, in particular, digital technologies.

Accounting and audit in digitalization has a number of significant advantages over traditional accounting, due to the efficiency of creation, signing, transmission of information, documents and reports, online monitoring of the financial position of the enterprise, resources and indicators, remote access to information regardless of location (including from a smartphone), environmental friendliness of the process. At the same time, new conditions in the provision of accounting procedures lead to inevitable organizational changes in the accounting services of enterprises, transformation of accounting processes, technologies of operations and, in particular, their centralized management in systems, but with decentralized access to such systems and data.

The advantages of centralized accounting procedures in combination with the use of digital technologies were especially noticeable in the conditions of quarantine, in order to prevent the spread of acute respiratory disease COVID-19 caused by SARS-CoV-2 coronavirus, which caused the activity enterprises and, often, the need for separate work of many employees, including accountants, analysts, auditors.

In March 2020, the Association of Chartered Certified Accountants (ACCA) (2020) decided to investigate the impact of COVID-19 on companies. She conducted a global survey and found that due to the crisis caused by the coronavirus pandemic, such a common action for accountants and auditors as attracting new clients has become a real problem (Fig. 5).

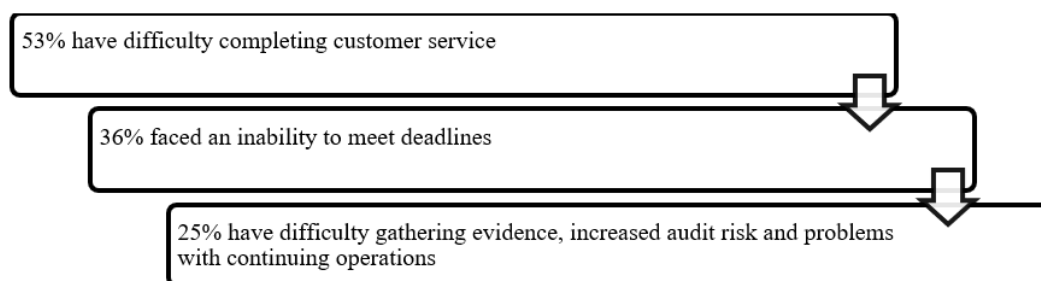


Figure 5. Problems faced by accountants and auditors under the influence of COVID-19, developed by the authors based on ACCA (2020)

Despite the problems associated with COVID-19, the audit should be conducted in full compliance with the standards, although in the circumstances, the completion of the audit may take longer. Therefore, the use of information technology simplifies the work of the auditor and involves conducting audits using computer technology. Some researchers have conducted research on the adequacy of accounting data. For example, studies conducted by A.Tugui and A.-M. Gheorghe (2016) in the form of a survey of 300 accountants in Romania show that 73.98% of professionals confirm that they have encountered insufficient and inability to obtain accounting data when performing specific tasks, while 69.92% link issues of access with insufficient or limited access to data of old or new accounting information systems.

The trend towards the development of centralized models in combination with digital technologies is confirmed by the analysis of the top best accounting programs 2020, published on TechRadar (Williams et al., 2020). The analysis shows that although some accounting packages are downloadable software, cloud work is now more common for applications. However, according to the same analysis, individual businesses may prefer downloadable software, as it often allows better control of their own data, working on their own machines, rather than on third-party clouds. Therefore, this article is based on the tendency to use centralized software that may not be a cloud solution, controlled by the company, but provides access to it to different users from different points and digital devices. Today it is impossible to imagine the economy as a whole, and accounting, analysis and audit

of a modern enterprise without the use of digital devices. At the same time, the current state of society is characterized by increasing the rate of innovation, the use of new digital technologies (Fig. 6).

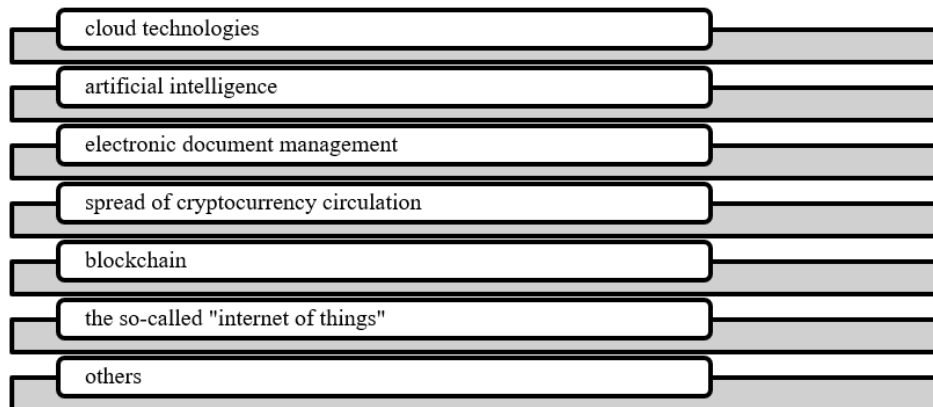


Figure 6. New digital technologies, developed by the authors

Accordingly, there is a growing interest in these issues and their impact on various sciences and enterprises. The field of accounting, analysis and audit is no exception. In general, the article by K. Bagatska and A. Heydor (2019), which is based on research by foreign and domestic researchers, summarizes that *three terms reflect the logical sequence of digital technology implementation in business models and business processes of companies* (Fig. 7).



Figure 7. The sequence of stages of digital transformation of business, developed by the authors based on K. Bagatska and A. Heydor (2019)

However, analyzing the terminology and stages, it is advisable to propose the following changes to the scheme of K. Bagatska and A. Heydor (2019):

- the first block of the digital *digitization* block;
- in the first block of *automation of calculations* fully replace the *automation of individual actions*;
- in another block of *digitization*, include *automation of processes*, so that you can directly get in touch with it already in the whole process (and not only part of one process).

Vibration of centralized and decentralized models of accounting and accounting of quieter and lower types of procedures as a whole to lay down the windows for the skin and skin (Britchenko & Saienko, 2017). In science literature, in the main, there were three models of accounting organization – centralized, decentralized and combined. Schematically, the order of front-line interaction (structural units) and the introduction of documents and transactions in software for restoration operations for the purposes of analysis, analysis and audit are shown in Fig. 8.

The centralization of accounting procedures

For a long time, the model of centralized accounting has not been dominant both in terms of the presence of its supporters in scientists and in practice. And this was entirely due to the fact that it is much more convenient to keep records where such transactions *occur*, ie, depending on the physical location of the objects of accounting and management decisions. This is largely due to the fact that the primary documents for paperwork were paper documents, and accounting software was downloaded to local computers and servers. But often, where primary documents are not required, decentralized procedures have been replaced by centralized ones.

Models for reflecting transactions in accounting and reporting are not stable, so depending on the needs and development of the enterprise may change. The vast majority of accounting services for medium and large enterprises in connection with the development of digital technology is moving from a decentralized and combined model of accounting to a centralized one.

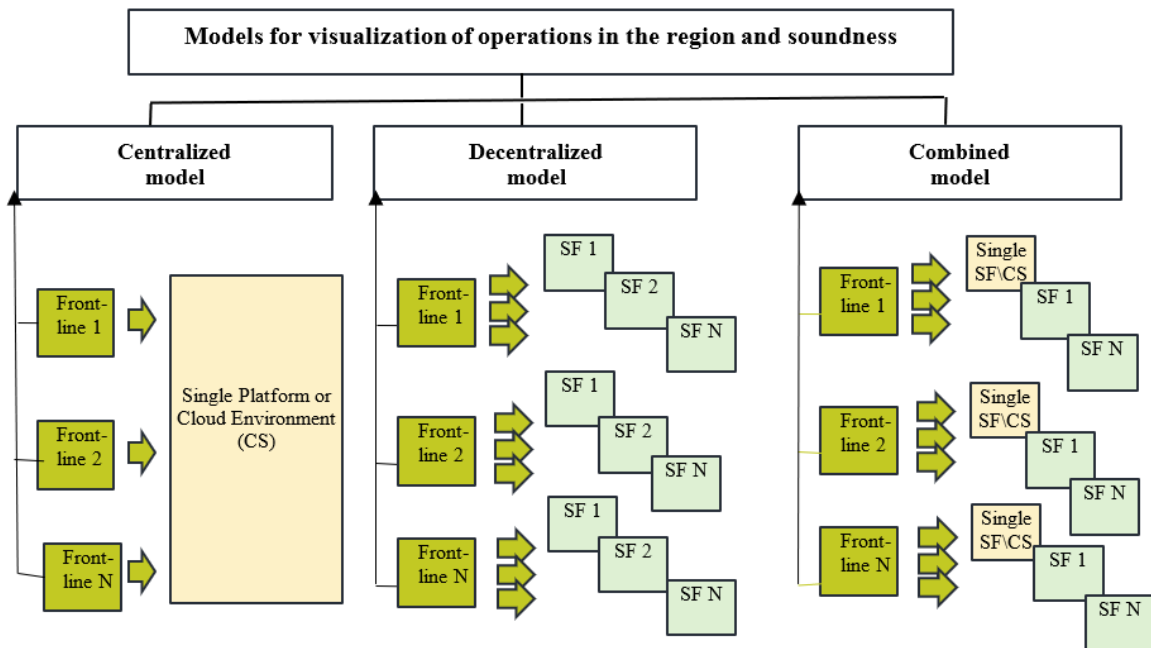


Figure 8. Interactions of front lines and input of documents in the software for registration of operations for the purposes of the account, the analysis and audit, developed by the authors

With a centralized accounting model, the company can make greater use of modern technologies for online accounting of all types of accounting, preparation and submission of reports. Unified software, unified databases in combination with modern capabilities allow to analyze operational accounting and reporting data, solve problems in a timely manner and make relevant decisions. This conclusion is confirmed in the monograph of the well-known expert on digital transformation Dr M. Baker (2014): *Experts on digital transformation often tell directors about the importance of centralized data and gaining control over it. CEOs sadly shake their heads, knowing the years of investment that have been invested in various, incompatible systems, developed without the thought of data unification, and say that it is 'impossible'.*

In the analysis of centralized and decentralized models, and in the subsequent revision of accounting functions, which is associated with digital transformation in the modern enterprise, the functions should be grouped by blocks (Fig. 9).

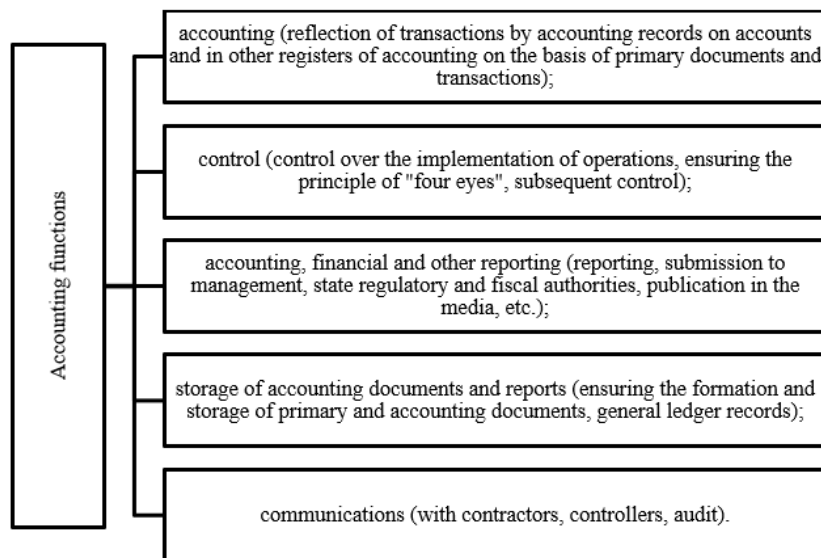


Figure 9. Accounting functions in the analysis of centralized and decentralized models in the digital world, developed by the authors

The decentralized approach has a number of significant disadvantages compared to the centralized one. These are mainly the lack of operational and limited available data on the enterprise as a whole, complications to ensure a unified accounting policy, taking into account adjustments in the activities of individual factors for certain operations and actions, the difficulty of maintaining and updating all software in different locations and insufficient interchangeability accounting staff.

That is why the use of a centralized accounting model will minimize most of the above shortcomings and ensure the relevance and integrity of data on the financial condition and performance of the enterprise as a whole and its individual structural units, simplify access to maintaining and obtaining such information, ensure uniform accounting rules and unified forms, simplify software administration, strengthen the specialization of accounting staff.

Currently, the organization of accounting of the vast majority of modern enterprises is based on a combined model, ie there are both centralized accounting procedures, such as financial reporting, and decentralized, such as settlements with suppliers and customers, settlements with staff. At the same time, with the transition of n enterprises to electronic document management, the need to provide remote access to programs and obtain operational data, the situation changes. If previously the primary document was available at the point of its creation, and the transfer to the centralized accounting service required additional time and resources, then due to the introduction of electronic document management at the enterprise (with a qualified electronic signature) created the original document, not a digitized copy, can be immediately available anywhere in the world and on various electronic devices.

This approach is not only convenient, but also leads to significant cost savings.

In addition to making purely administrative decisions to change the accounting model, the centralization of accounting procedures often occurs spontaneously as a result of external or internal changes in the business processes of enterprises – online sales, centralized supply of equipment and inventories. In all such cases, the management of the accounting processes themselves is not simplified, but complicated, and the advantages of centralized models are not always used (Trachenko et al., 2021). To improve the situation, it is advisable to increase the manageability and transparency of accounting procedures, which is achieved by reviewing all accounting functions and technologies used in accounting, developing a strategy for change to further build a centralized model. The main imperatives of this process are shown in Table 1.

Table 1. Imperatives of centralization of accounting functions, developed by the authors

#	The imperative of centralization	Content of the imperative (task)
1	Compliance with strategic goals and external / internal challenge of the enterprise	<ul style="list-style-type: none"> • identification of necessary changes in the processes of interaction and accounting in connection with the presence of other related centralized and decentralized business functions and processes; • identification of new opportunities based on digitalization; • clear, reliable and comparable reflection of transactions in the reporting;
2	Analysis and complete review of functions in the field of accounting	<ul style="list-style-type: none"> • determination of the full list of functions performed in the field of accounting and their distribution between divisions of the enterprise; • updating the model of redistribution of functions
3	Reengineering of internal accounting processes	<ul style="list-style-type: none"> • full review of accounting procedures taking into account the best practices of their implementation and application of digital technologies; • process automation; • development of forms of unified accounting documents; • review of the organizational structure of the accounting service
4	Location of the accounting service	<ul style="list-style-type: none"> • remote location of accounting departments from the objects of accounting; • the ability to view the location of structural units of the accounting service, including remote access to the centralized accounting and document management system
5	Restriction	<ul style="list-style-type: none"> • the introduction of new technologies requires additional time to improve the skills of accounting staff; • certain activities of the enterprise may not be integrated into existing software packages

In the table all the elements are interconnected, but an additional, synergistic effect can be achieved by expanding the use of digital technologies. To achieve a synergistic effect for each of our selected areas can be developed a separate roadmap for centralization in terms of digitalization (Koval et al., 2021). The directions of such improvement are shown in Table 2. Under the conditions of centralization of accounting procedures, all primary documents are sent to a single center, processed, accounting documents are formed on their basis and reports are prepared. In electronic document management, primary documents are not received, but in fact already arise and are stored in a single electronic center. For modern enterprises, these are large arrays of documents and data.

Table 2. The main vectors of centralization of accounting procedures, developed by the authors

Name of the group of accounting functions	Vectors
Accounting	<ul style="list-style-type: none"> • software update for accounting – centralized software or ERP, access through web resources and mobile applications, integration with other software packages; • use of electronic primary and accounting documents; • ensuring the signing of documents with a qualified electronic signature (QES); • refusal to print documents; • establishment of external and internal electronic document management procedures
Accounting control	<ul style="list-style-type: none"> • simplification of procedures for access to accounting information; • automation of control procedures; • formation of operational control reports
Accounting, financial and other reporting	<ul style="list-style-type: none"> • automation of centralized reporting procedures; • automation of procedures for signing and submitting reports
Storage of accounting documents and reports	<ul style="list-style-type: none"> • use of centralized software, cloud technologies; • simplification of procedures for the formation of document archives; • simplification of procedures for access to documents, information and their processing
Communications	<ul style="list-style-type: none"> • simplification of procedures for access to accounting information by setting up individual types of reports for different user roles on the basis of a centralized accounting system

It is for managing large data sets that accounting software providers offer cloud solutions where data sets are stored and managed in one central location, allowing even the most experienced professionals to deliver better results faster, better and more efficiently.

In the centralized accounting model, the same employee of the accounting service processes larger volumes of operations, but homogeneous, compared to the decentralized accounting model, when the employee processes a larger range of operations, but in a smaller total number. Thus, the centralized model increases the specialization of workers, ie there is a division of labor with a focus on one or a limited type of operations, which, as has been repeatedly proven by scientists in other areas, leads to increased productivity. In addition, the narrow specialization allows the employee to constantly improve their professional level, achieve excellence, gain knowledge about new digital technologies that can be applied in this area. This is extremely important to correct the current situation with the lag in the level of development of the competencies of accountants, the existence of which, as already mentioned, was confirmed by the study of A. Zhyvets (2018).

An increase in labor productivity means an increase in the number of products produced per unit of time, or savings in working time spent per unit of output. To determine this indicator in the field of accounting for the number of products can be used the number of accounting records, the number of generated reports. As an example, we can consider the results of the transition during 2016-2017, from the decentralized business accounting model of the National Bank of Ukraine to the centralized model based on existing, not new, software products, but in combination with the transition to partial electronic document management. Until 2016, business accounting and reporting to the NBU were carried out both in the central office and in the regions, and since 2017 they have been transferred from the regions to the central office. This allowed the institution to significantly reduce the total number of accounting staff to perform the same volume of operations and increase the productivity of accountants. As a result of the centralization of business accounting functions, the average number of postings per employee has doubled. This effect is achieved by combining changes in the accounting model, partial use of electronic document management, increasing the level of specialization of employees in performing operations.

Digitalization has the greatest impact on such components of the business model as cost proposal, internal infrastructure management and customer relationships (Mikelsone et al., 2021). Mostly changes in the form of new proposals (products, services, solution packages in the form of cloud computing, forecasting services) are the driving factors in the modification of the business model.

In recent years, society is paying more and more attention to audit, because confidence in the information received is a necessary factor in the trust of partners. In this regard, the market of audit services is transformed in the areas and interests of customers who work in different sectors of business and differ from each other in form of ownership, management systems and financial condition. As more and more data is generated due to the digitalization of companies, there is a need to develop the functions of auditors. For example, the audit practice includes procedures in forensics, tax audit, due diligence, management accounting, personnel audit and other related services. These audit and other services require an emphasis on understanding the specific risks of the business and developing an audit approach that can respond effectively to those risks. Computer technology is also becoming increasingly involved in the new role of the auditor as it shifts from testing tasks to more analytical approaches to working with data.

Conclusions

The growing amount of information needs to be used effectively to conduct high-quality audits and to enable auditors to pay more attention to identifying risks and understanding the business. The large amount and untapped potential of data generated by new technologies necessitates constant digitalization of the audit. The functions of a professional auditor change in response to the digital transformation of companies. Using automation to increase data can help conduct high-quality audits and allow auditors to focus more on identifying risks and understanding the business. This development of the audit leads to greater interconnectedness and transparency and, as a result, greater stakeholder trust.

Audit automation issues cover the whole range of applied problems related to the use of information technology in the control, audit and analysis of financial statements of enterprises, evaluation of efficiency and reliability of information technology, as well as the organization of audit firms in modern conditions. Given the current high level of use of computer systems in business, the auditor should be competent, including in the field of typical computer information technology. Yes, he has the opportunity to use the services of a specialist in computer information technology, but it should be noted that this increases the risk of non-detection and additional risk and increases the cost of the audit.

Data protection in computer networks is becoming one of the most pressing problems in modern information and computer systems. Modern information technologies create conditions for the growth of unauthorized access to information and allow to perform complex procedures for its processing. To ensure the protective functions of the audit, data protection avoids the abuse of persons who have access to databases, which are especially common in doing business over the Internet. Practice shows that in the conditions of automated information processing systems, thefts of valuables are carried out with the participation of employees engaged in the processing of economic information. Blockchain technologies provide the highest level of protection from external influences. Data contained in the system cannot be deleted or replaced. Such a database is characterized by anonymity, an agreed mechanism, does not belong to a specific entity, is not controlled and regulated by third parties. Blockchain technologies are ideal for accounting and audit, as they track all operations and changes in the system, do not allow manipulation and distortion.

Thus, the advantages and disadvantages of centralized and decentralized accounting models, the development of electronic document management and the appearance on the market of software solutions using cloud technologies and remote access to work in accounting programs from different locations and devices suggest that the trend towards centralized accounting will only intensify with the development of digital technologies. However, it should be noted that the centralization of accounting does not mean the centralization of management decisions or non-use of blockchain technology. For example, the decentralization of power can be fully developed and operate with a centralized model of accounting procedures for one company, as well as accounting by one accounting service for several companies. With the transition to centralized accounting procedures, with the expansion of the use of modern digital technologies, the efficiency of economic activity of enterprises increases, including through accounting, analysis and audit.

References

1. ACCA, 2020, *Covid-19 Having Significant Impact on the World's Auditors*, <https://www.accaglobal.com/gb/en/news/2020/april/ACCA-Covid-19-Research-Audit.html> (02.02.2022).
2. ALEKSYSHYN V., MYKHALCHUK H., 2019, Method of Ranking Objects to Search by Keywords in a Decentralized Network, *Current Problems of Automation and Information Technology*, 23: 78-89.
3. BAHATSKA K., HEIDOR A., 2019, Business PROCESSES in the CONTEXT of DIgitalization of the Economy, *KTUTE Bulletin*, 5: 23-32.
4. BAKER, M., 2014, *Digital Transformation*. South Carolina, CreateSpace Independent Publishing Platform.
5. BOIKO, V., 2019, Advantages and Disadvantages of Using Decentralized Payment Systems as an Innovative Method of Cross-Border Settlements, *Investments: Practice and Experience*, 8: 75-82.
6. BRITCHENKO I., SAIENKO V., 2017, The Perception Movement Economy of Ukraine to Business, *Ikonomicheski Izsledvania*, 26(4): 163-181.
7. BUTYNETS F., IVAHNENKOV T., DAVYDIUK T., SHAKHRAICHUK T., 2002, *Accounting Information Systems*. Zhytomyr, Ruta.
8. FEDORENKO A., 2019, Actual Aspects of Ukraine's Transition to a Decentralized System of Enforcement Proceedings, *Modern Issues of Economics and Law*, 1: 296-305.
9. GULIYEVA A., BRITCHENKO I., RZAYEVA U., 2018, Global Security and Economic Asymmetry: A Comparison of Developed and Developing Countries, *Journal of Security and Sustainability Issues*, 7(4): 707-717.
10. HORBACHUK V., LYASHKO A., 2019, The Issue of Decentralized Consensus of Blockchains, *Market Infrastructure*, 34: 325-332.
11. HOROSHKOVA L., VOLKOV V., KARBIVNYCHYI I., 2018, Financial Levers as Mechanisms for Managing Decentralized Resources, *Theoretical and Practical Aspects of Economics and Intellectual Property*, 17: 106-116.
12. IVANCHENKOVA L., SKLIAR L., PAVELKO O., CHEBAN Y., KUZMENKO H., ZINKEVYCH A., 2019, Improving Accounting and Analysis of Innovative Costs, *International Journal of Innovative Technology and Exploring Engineering*, 9(1): 4003-4009.

13. KESSEL P., 2018, Is Cybersecurity More Than Protection? https://www.ey.com/uk_ua/advisory/global-information-security-survey-2018-2019 (26.01.2022).
14. KHARCHENKO M., 2017, Centralized and Decentralized Accounting in Budgetary Institutions: Advantages And Disadvantages, *Economy and State*, 7: 24-27.
15. KHODAKIVSKYI YE., YAKOBCHUK V., ZAKHARINA O., PLOTNIKOV M., IVANIUK O., 2019, Formation of the European Q-management System in Decentralized Communities, *Scientific Horizons*, 3: 10-18.
16. KOVAL V., OLCZAK P., VDOVENKO N., BOIKO O., MATUSZEWSKA D., MIKHNO I., 2021, Ecosystem of Environmentally Sustainable Municipal Infrastructure in Ukraine, *Sustainability*, 13(18):10223. <https://www.mdpi.com/2071-1050/13/18/10223> (02.02.22).
17. KOZLOVSKYI S., BUTYRSKYI A., POLIAKOV B., BOBKOVA A., LAVROV R., IVANYUTA N., 2019, Management and Comprehensive Assessment of the Probability of Bankruptcy of Ukrainian Enterprises Based on the Methods of Fuzzy Sets Theory, *Problems and Perspectives in Management*, 17(3): 370-381, DOI: 10.21511/ppm.17(3).2019.30.
18. KURBATOV O., KRAVCHENKO P., POLUYANENKO O., SHAPOVAL O., KUZNETSOVA T., 2019, Decentralized System of Identification and Certification, *Cybersecurity: Education, Science, Technology*, 2:19-31.
19. LAZAREVA M., 2018, Transaction Costs and Synergy Effects in Modern Corporations. *Economic Annals – XXI*, 171: 23-28.
20. MIKELSONE E., ATSTAJA D., KOVAL V., UVAROVA I., MAVLUTOVA I., KUZMINA J., 2021, Exploring Sustainable Urban Transformation Concepts for Economic Development, *Estudios de Economía Aplicada*, 39(5). <http://ojs.ua.es/ojs/index.php/eea/article/view/5209> (18.01.2022).
21. NARIBAEV K., 1983, Finance and Statistics, *Organization and Methodology of Accounting in Terms of ACS*, 1: 135.
22. NAZAROVA K., MYSIUK V., GORDOPOLOV V., KOVAL V., DANILEVIČIENĖ I., 2020, Preventional Audit: Implementation of SOX Control to Prevent Fraud, *Business: Theory and Practice*, 21(1): 293-301.
23. OLIYNYK V., ZHURAVKA F., BOLGAR T., YEVTUSHENKO O., 2017, Optimal Control of Continuous Life Insurance Model, *Investment Management and Financial Innovations*, 14(4): 21-29.
24. POPITICH T., 2010, Economic Analysis, *Prerequisites for the Rational Organization of Accounting in Consumer Cooperation*, 6: 303-305.
25. PWC, 2020, *23rd Annual Global CEO Survey: Navigating the Rising Tide of Uncertainty*, <https://www.pwc.com/gx/en/ceo-survey/2020/reports/pwc-23rd-global-ceo-survey.pdf> (26.01.2022).
26. SIDHU H., 2019, *Is Digital Audit Communication an Opportunity We Don't Notice?*, https://www.ey.com/uk_ua/digital-audit/connectivity-audit-overlooked-opportunity (02.02.2022).
27. STRILETS V., PROKOPENKO O., ORLOV V., 2020, Impact of Covid-19 on the Budget Security of the National Economy: a Forecast for Ukraine, *Public and Municipal Finance*, 9(1): 25-33.
28. TRACHENKO L., LAZORENKO L., MASLENNIKOV Y.E., HRINCHENKO YU., ARSAWAN I.W.E., KOVAL V., 2021, Optimization Modeling of Business Processes of Engineering Service Enterprises in the National Economy, *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, 4: 165-171.
29. TUGUI A., GHEORGHE A.-M., 2016, Identifying Difficulties Encountered by the Accounting Profession in Accessing Documents, in the Digital Economy Context of Romania, *Audit Financiar*, 3: 291-301.
30. WILLIAMS M., MURO J., TURNER B., MARSHALL C., 2020, *Best Accounting Software in 2020: Free and Paid Versions to Manage Accounts*, <https://www.techradar.com/best/best-accounting-software#1-zipbooks> (26.01.2022).
31. YAROSHENKO O. M., MOSKALENKO O. V., SLIUSAR A. M., VAPNYARCHUK N. M., 2018, Commercial Secret as an Object of Labour Relations: Foreign and International Experience, *Journal of Legal, Ethical and Regulatory Issues*, 21(Special Issue 1), <https://www.abacademies.org/articles/commercial-secret-as-an-object-of-labour-relations-foreign-and-international-experience-7853.html> (18.01.2022).
32. ZHYVETS A., 2018, Evolution of Professional Competencies of Accountants of Small Enterprises in the Digital Economy of Ukraine, *Baltic Journal of Economic Studies*, 5: 87-93.